Native Vegetation Handbook for the Shire of Trayning

Sarah J. Weaving

Follow this and additional works at: http://researchlibrary.agric.wa.gov.au/nat_veg

Part of the Biodiversity Commons, Botany Commons, Environmental Monitoring Commons, and the Weed Science Commons

Recommended Citation


This report is brought to you for free and open access by Research Library. It has been accepted for inclusion in Native Vegetation Handbook Series by an authorized administrator of Research Library. For more information, please contact jennifer.heathcote@agric.wa.gov.au, sandra.papenfus@agric.wa.gov.au.
IMPORTANT DISCLAIMER

This document has been obtained from DAFWA's research library website (researchlibrary.agric.wa.gov.au) which hosts DAFWA's archival research publications. Although reasonable care was taken to make the information in the document accurate at the time it was first published, DAFWA does not make any representations or warranties about its accuracy, reliability, currency, completeness or suitability for any particular purpose. It may be out of date, inaccurate or misleading or conflict with current laws, policies or practices. DAFWA has not reviewed or revised the information before making the document available from its research library website. Before using the information, you should carefully evaluate its accuracy, currency, completeness and relevance for your purposes. We recommend you also search for more recent information on DAFWA's research library website, DAFWA's main website (https://www.agric.wa.gov.au) and other appropriate websites and sources.

Information in, or referred to in, documents on DAFWA's research library website is not tailored to the circumstances of individual farms, people or businesses, and does not constitute legal, business, scientific, agricultural or farm management advice. We recommend before making any significant decisions, you obtain advice from appropriate professionals who have taken into account your individual circumstances and objectives.

The Chief Executive Officer of the Department of Agriculture and Food and the State of Western Australia and their employees and agents (collectively and individually referred to below as DAFWA) accept no liability whatsoever, by reason of negligence or otherwise, arising from any use or release of information in, or referred to in, this document, or any error, inaccuracy or omission in the information.
Native Vegetation Handbook for the Shire of Trayning
Acknowledgements

I would like to thank Ann Brandenburg for kindly proof reading this handbook and for her useful suggestions.

Digital data was provided for mapping by the Pastoral and Agricultural Geographic Information System (PAGIS) at the Department of Agriculture, Western Australia. The contribution of digital data from the Department of Land Administration (DOLA) and the Department of Conservation and Land Management (CALM) is greatly appreciated.

For his cartographic work I would like to thank Matthew Chafer.

Copies of the Native Vegetation Handbook for the Shire of Trayning are available by contacting:

The Spatial Resource Information Group
Western Australian Department of Agriculture,
South Perth.
Phone: (09) 368 3732

ISBN 0 7244 8799 9

Cover: The Shire of Trayning in relation to the Avon River Catchment (indicated by a bold line).
NATIVE VEGETATION HANDBOOK
FOR THE SHIRE OF TRAYNING

Sarah J. Weaving
Spatial Resources Information Group
Division of Regional Operations
Western Australian Department of Agriculture

Produced by the Western Australian Department of Agriculture, the Environmental Protection Authority and Greening Western Australia with the assistance from the Commonwealth Government through the Australian Nature Conservation Agency's Save the Bush Program.

January, 1995
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>1</td>
</tr>
<tr>
<td>Purpose of the Handbook</td>
<td>1</td>
</tr>
<tr>
<td>Shire of Trayning</td>
<td>2</td>
</tr>
<tr>
<td><strong>Natural Resources of the Shire of Trayning - Past and Present</strong></td>
<td>3</td>
</tr>
<tr>
<td>Brief Description of the Vegetation Systems</td>
<td>3</td>
</tr>
<tr>
<td>Current Extent of Native Vegetation</td>
<td>5</td>
</tr>
<tr>
<td>Wetlands</td>
<td>7</td>
</tr>
<tr>
<td>Fauna</td>
<td>8</td>
</tr>
<tr>
<td>Rare and Endangered Flora</td>
<td>9</td>
</tr>
<tr>
<td><strong>Land Resources</strong></td>
<td>11</td>
</tr>
<tr>
<td>Geology</td>
<td>11</td>
</tr>
<tr>
<td>Soils</td>
<td>11</td>
</tr>
<tr>
<td>Topography</td>
<td>12</td>
</tr>
<tr>
<td><strong>Land Management and Land Degradation Issues</strong></td>
<td>13</td>
</tr>
<tr>
<td>Clearing</td>
<td>13</td>
</tr>
<tr>
<td>Rising Water Table and Salinity</td>
<td>14</td>
</tr>
<tr>
<td>Waterlogging</td>
<td>16</td>
</tr>
<tr>
<td>Wind Erosion</td>
<td>16</td>
</tr>
<tr>
<td>Water Erosion</td>
<td>17</td>
</tr>
<tr>
<td>Acidity</td>
<td>17</td>
</tr>
<tr>
<td>Soil Compaction</td>
<td>18</td>
</tr>
<tr>
<td>Managing Existing Vegetation</td>
<td>18</td>
</tr>
<tr>
<td><strong>Bringing It All Together</strong></td>
<td>19</td>
</tr>
<tr>
<td>Integrated Management for Land and Nature Conservation in the Shire</td>
<td>19</td>
</tr>
<tr>
<td>Projects in the Shire</td>
<td>20</td>
</tr>
<tr>
<td>Reducing the Cost of Conservation</td>
<td>21</td>
</tr>
<tr>
<td><strong>References</strong></td>
<td>22</td>
</tr>
<tr>
<td>Local Contacts</td>
<td>25</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>----</td>
</tr>
<tr>
<td>Further Reading</td>
<td>26</td>
</tr>
<tr>
<td>Practical Management</td>
<td>26</td>
</tr>
<tr>
<td>General Reading</td>
<td>26</td>
</tr>
<tr>
<td><strong>Appendix 1. Plant Species List (Mount Caroline System)</strong></td>
<td>27</td>
</tr>
<tr>
<td><strong>Appendix 2. Plant Species List (Jibberding System)</strong></td>
<td>35</td>
</tr>
<tr>
<td><strong>Appendix 3. Plant Species List (Moorine Rock System)</strong></td>
<td>38</td>
</tr>
<tr>
<td><strong>Appendix 4. Dominant Native Vegetation According to Soil Landscape Unit</strong></td>
<td>40</td>
</tr>
<tr>
<td><strong>Appendix 5. Inventory of Mammals found in the Merredin District</strong></td>
<td>42</td>
</tr>
<tr>
<td><strong>Appendix 6. Inventory of Amphibians and Reptiles in the Merredin District</strong></td>
<td>44</td>
</tr>
<tr>
<td><strong>Appendix 7. Bird Species seen in the Shire of Trayning</strong></td>
<td>47</td>
</tr>
<tr>
<td><strong>Appendix 8. Sources of Funding for Projects aimed at Land and Nature Conservation</strong></td>
<td>50</td>
</tr>
<tr>
<td><strong>Appendix 9. State Landcare Projects in the Shire of Trayning</strong></td>
<td>52</td>
</tr>
</tbody>
</table>
List of Figures

Figure 1. All Major, Minor and Access Roads in the Shire of Trayning.

Figure 2. Cadastral Boundaries of the Shire of Trayning.

Figure 3. The Shire of Trayning in relation to the Natural Resource Zones of the South-West Land Division of Western Australia (Allison et al., 1993).

Figure 4. Vegetation Systems (italics) and Major Vegetation Types (continuous line) in the Shire of Trayning (according to Beard, 1980).

Figure 5. The Existing Remnant Vegetation and Public Reserves in the Shire of Trayning.

Figure 6. The Avon River Catchment (dotted line) showing the Avon River Management Authority Management Area (solid line), which includes the Shire of Trayning.

Figure 7. Soil Systems of the Shire of Trayning (McArthur, 1992: Grealish and Wagnon, 1993)

Figure 8. Topographic View of the Shire of Trayning.

Figure 9. Contour Map of the Shire of Trayning

Figure 10. Major Drainage Systems of the Shire of Trayning.

Figure 11. Remnant Vegetation Protection Scheme (RVPS), One Billion Trees (OBT) and Save The Bush (STB) Funding.
The Vegetation Handbooks for the Shire of Trayning is one of a series covering the agricultural region of Western Australia. Other handbooks in the series that have been completed are:

The Shire of Broomehill
The Shire of Corrigin
The Shire of Cunderdin
The Shire of Dumbleyung
The Shire of Katanning
The Shire of Kellerberrin
The Shire of Kojonup
The Shire of Merredin
The Shire of Mingenew
The Shire of Narrogin
The Shire of Tammin
The Shire of Wagin
The Shire of West Arthur
The Shire of Wickepin
The Shire of Williams
The Shire of Woodanilling
The Shire of Wyalkatchem
The Shire of York
The Shire of Trayning

Introduction

Purpose of this Booklet
This booklet is one of a series covering the agricultural region of Western Australia. The project has arisen from the need to provide data to people in rural communities, land conservation districts (LCDs) and local government authorities who manage the remnant native vegetation within rural areas, whether on a regional, catchment or local basis.

The management of native vegetation and agricultural land is closely related. It is vital that both native vegetation and agricultural land issues are considered within the context of their ecological area of influence. Both have a wide range of effects on each other and as a consequence should be managed together. For example, native vegetation has an effect on the hydrology of agricultural land and nutrients can be transferred from farmland to remnants of native vegetation.

This booklet provides land managers with information relating to the natural resources of the Shire of Trayning including the existing vegetation, drainage systems and soils. Some of the problems relating to the management of natural vegetation resources in the Shire of Trayning and possible solutions to these problems are also discussed. Provision of this information will contribute to the long term viability of the agricultural landscape and the conservation of native vegetation within the Shire.
Figure 1: Cadastral boundaries and townsites in the Shire of Trayning.
Figure 2: All major, minor and access roads in the Shire of Trayning.
Figure 3. The Shire of Trayning in relation to the Natural Resource Zones of the South West Land Division of Western Australia.
The Shire of Trayning

The Shire of Trayning covers an area of 164,255 hectares. It falls within the Avon River Catchment (cover map). The townsites in the Shire include Trayning and Kununoppin and Yelbeni (Figure 1).

The Shires' climate is regarded as Mediterranean, with dry, warm summers and cool winters. It receives on average, 320 mm rainfall per annum. The average maximum temperatures range from 33.2°C in January to 16.9°C in July, while the corresponding average minimum temperatures range from 17.6°C in January to 5.2°C in July. The population of the Shire was 560 in 1992 (Municipal Directory, 1992). There has been a slight decline in population since records taken in 1982 (Pink, 1991).

Agricultural land use in the Shire is predominantly wheat and sheep. In 1991/92 a total of 43,087.3 hectares of the Shire was sown with wheat, 32,936 hectares with sown pasture and grasses, 23,303.4 hectares of native pastures, 28 hectares with hay and 12,366.4 hectares left fallow (ABS, 1992.). The cadastral boundaries of the Shire are shown in Figure 1 and all 758 kilometres of road network in the Shire are shown in Figure 2.

The South-west of Western Australia has been divided into districts (called Natural Resource Zones) based on their vegetation type, drainage system and rainfall (Allison et al., 1993). The Shire of Trayning contains parts of one Natural Resource Zone (No.62) (Figure 3) and it can be described as a mosaic of vegetation types within an area receiving less than 500 mm rainfall per annum.

The Trayning Land Conservation District (LCD) formed in 1984 and is contained within the Shires’ boundaries. The Land Conservation District Committee (LCDC) is an active and successful group.
Figure 4. Vegetation systems (italics, dashed lines) and Major Vegetation Types (continuous line) in the Shire of Trayning (according to Beard, 1980).
Vegetation
Physical factors such as soil and climate combine to produce natural ecological regions, within which the plant life essentially similar. Western Australia is divided into three Botanical Provinces (i.e., natural ecological regions); the South-Western, the Eremaean, and the Northern (Beard, 1980). These Botanical Provinces are in turn divided into Botanical Districts and then into Vegetation Systems. The Shire of Trayning lies within the Avon Botanical District of the South-West Botanical Province and contains portions of three Vegetation Systems - the Mount Caroline Vegetation System, the Moorine Rock Vegetation System and the Jibbering Vegetation System (Figure 4). These Vegetation Systems consists of a series of plant communities occurring in a mosaic pattern which are closely linked to topographic and soil features. Full lists of the plant species found in these vegetation systems can be found in Appendices 1, 2 and 3.

Brief Description of the Vegetation Systems
This section is based on the plant distribution studies of J.S. Beard and describes what vegetation may have been like had European settlement and clearing not occurred.


The type of vegetation is closely related to the soil type on which it grows with many of the soil types of the Shire being recognised by the type of vegetation they support.

Part of the *Mount Caroline Vegetation System* occurs in the lower half of the Shire, below the railway line leading into Trayning from the west. The country is gently undulating, consisting mainly of plains underlain by hard-setting loams. Small remnants of residual sandplains remain, their dissection and removal having exposed granite domes and tors which form conspicuous features in the landscape.

Granite outcrops have patchy vegetation consisting of jam (*Acacia acuminata*)-rock sheoak (*Allocasuarina huegeliana*) low woodland. Outcrops are a mosaic of bare granite slopes with shallow or deep soil pockets surrounded by shrublands and low woodlands of rock sheoak, jam and York gum (*Eucalyptus loxophleba*).

Kwongan communities (heath, thicket and scrub) consist of different species according to soils types. In the Trayning Shire, there are scattered tamma (*Allocasuarina campestris*) thickets found on ironstone gravels joined occasionally by Acacias (*Acacia aff. linophylla, Acacia stereophylla, Acacia neurophylla*). Mixed thicket and heath communities are found on sandplains throughout the area.

Woodland is composed mainly of salmon gum (*Eucalyptus salmonophloia*) and gimlet (*Eucalyptus salubris*).
Salt flats occur in the east of the vegetation system. Vegetation recorded in the salt areas include York gum, yorrell (Eucalyptus yilgarnensis) and gimlet with samphire (Halosarcia spp.). The understorey is usually made up of teatree.

The Jibberding Vegetation System occurs in the north-western corner of the Shire. It lies east of the Guangan system as far as Kununoppin. The southern boundary lies just south of the railway from Korrelocking to Trayning.

Within the Jibberding Vegetation System there are three basic kwongan communities, with one of these occurring in the Shire of Trayning. This is the mixed kwongan association, found on yellow sandy soils containing ironstone gravel, with Acacia, Allocasuarina and Melaleuca species. Black tamma (Allocasuarina acutivalvis) is usually common in the upper layer with various Acacias such as Acacia ligustrina and Acacia multispicata. In some cases, tamma and grey tamma (Eucalyptus corinaculata) are present.

Woodland is composed mainly of York gum, yorrell, salmon gum and redwood (Eucalyptus transcontinentalis) with red-flowered mallee (Eucalyptus erythronema), wandoo and jam as minor species. York gum, while declining in numbers eastwards, is generally common. Yorrell is only found in salt country, usually in association with salmon gum. Wandoo (Eucalyptus wandoo) is quite rare.

Lakes, within the salt country, have bare floors. These usually fill with water in winter and dry to a surface of salt crystals in the summer. The lakes are surrounded by samphire, including Halosarcia bidens, shrubby samphire (Halosarcia halocnemoides) and Halosarcia lepidosperma.

The Moorine Rock Vegetation System occupies the north-eastern portion of the Shire.

The Billyacatting Hill Nature Reserve in the Shire of Trayning falls within this vegetation system. This large reserve (2,064 ha) is dominated by a granite outcrop which covers 1,369 ha (66%) of the reserve, making it one of the most extensive outcrops in the wheatbelt. The outcrop rises abruptly from the surrounding country, particularly on the eastern side and is quite flat on top. It is very dissected, with an increase in altitude from west to east to an altitude of 417 m above sea level.

Soil pockets are vegetated by shrubland communities. On top there are tamma thickets with jam, graceful honeymyrtle (Melaleuca radula) and broom bush (Melaleuca uncinata). Deeper pockets have prickly poison (Gastrolobium spinosum), sea urchin hakea (Hakea petiolaris), caterpillar wattle (Acacia lasiocalyx) or clumps of tamma.

At the base of the rock where moisture is received from run-off, there are thickets of Calothamnus asper, graceful honey myrtle, granite bottlebrush (Melaleuca elliptica), jam, sea urchin hakea or tamma.

On the flat area about 10 m from the edge of the rock there are thickets of Calothamnus asper, Grevillea paniculata, graceful honey myrtle and tamma. The
remainder of the reserve contains woodland of salmon gum, gimlet, yorrell, wandoo and mallee with York gum, ribbon bark gum (*Eucalyptus sheathiana*), black marlock (*Eucalyptus subangusta*) and narrow-leaved red mallee (*Eucalyptus foecunda*). Granitic sandplains contain tamma thickets and are a mosaic of communities similar to those on Billyacatting Hill. On the yellow sandplains, communities include thickets dominated by either *Acacia neurophylla* or *Acacia resinomarginea* and mixed kwongan association dominated by *Acacia* and *Allocasuarina* spp.

There is a small area of mallee of mostly York gum and ribbon-bark gum. Most of the woodland associations consist of gimlet and salmon gum with some York gum and wandoo.

There has been more recent work into the dominant vegetation types on different soil types over part of the south-west by Lantzke and Fulton at the Department of Agriculture. The dominant vegetation types for the Shire of Trayning are shown in Appendix 4.

**Current Extent of Native Vegetation**

Native vegetation has been degraded in a variety of ways as a consequence of the extensive clearing and agricultural practices. In the South-west of Western Australia, clearing for agricultural purposes has resulted in the removal of 85-95% of native vegetation. More than 80% of plant species, now extinct, were formerly found on land cleared for agriculture.

In the Shire of Trayning approximately 10.95% of remains covered by original native vegetation, 7.1% (11630.6 ha) of which is found on private land. The remaining 3.87% (6358.1 ha) exists as public reserves not all of which have a covering of native vegetation.

In the Shire of Trayning there are 579 bush remnants (Figure 5), of which 475 remnants (82.04%) are regarded as being "remnant vegetation", 89 remnants (15.37%) regarded as being "scattered trees" and 15 remnants (2.59%) as being of "modified vegetation" (Table 1). of all the bush remnants in the shire, 443 remnants (76.5%) are less than 20 ha in area and 522 remnants (90.15%) are less than 50 ha (Beeston *et al.*, 1993).

A survey of the condition of the native vegetation in the Shire is currently being completed by Denise True for the Department of Agriculture.

There are five nature reserves in the Shire of Trayning, ranging in size from 17 ha for Nature Reserve number 15564 to 2063 ha for Billyacatting Hill Nature Reserve. Other nature reserves include Yelbeni NR, East Wallambin NR and Walcancobbing NR.

A study of the Shire was undertaken by Muir *et al.*, (1981) centred on the Billyacatting Hill Nature Reserve, 16km north east of Kunanoppin.
Table 1.

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 (i.e. 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" have:

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

Woodlands, mallee, shrubland, heath and lithic complex are all represented on Billyacatting Hill Nature Reserve. The distribution of each of these vegetation types depends upon the rainfall runoff from the granite outcrops, soil development and fire history.

Woodland has developed on clayey soils over granite consisting of salmon gum, gimlet, yorrell, wandoo with caterpillar wattle and sea urchin hakea.

Mallee formations occur on similar soil but in areas where the clay is shallower. Species include York gum, black marlock, ribbon bark gum and narrow-leaved red mallee.

Shrublands are common at the base of the granite where there is excess runoff, or in pockets of soil on the outcrops. Jam, tamma, broom bush are included in the shrubland species with Dodonaea inequifolia, Calothamnus asper, Melaleuca eletherostachya and Calycopeplus helmsii.

Heaths occur as regrowth after burning of shrubland or in areas of shallow soil. Heath consists of tamma and broom bush with Acacia stereophylla. Lithic complex dominates the reserve. Lithic complex includes all the associations mentioned, found around the granite outcrops.

The survey of this reserve showed it to be vitally important as a conservation area for flora and fauna.
Figure 5  The Shire of Trayning, showing native vegetation cover. 10.9 percent of the Shire remains under perennial native vegetation, with 7.1 percent on private land.
East Wallambin Nature Reserve was surveyed by Muir in 1979. This reserve, of 40 ha, is 5.5km east of Wallambin lake. The southern third of this reserve is covered by open scrub mallee of black marlock. The remainder is *Acacia* shrub over broom bush scrub or broom bush heath. At the time of the survey, the reserve was in excellent condition with very little disturbance because of its isolation from roadways.

**Wetlands**

Wetlands are defined by the Wetlands Advisory Committee as ".... areas of seasonally, intermittently or permanently waterlogged soils or inundated land whether natural or otherwise, fresh or saline, eg. waterlogged soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and tributaries".

The Shire of Trayning is in the Avon River catchment. The Avon River System drains 120 000 km$^2$ of land mass. It comprises the Avon, the North Mortlock, the East Mortlock and Dale. The main Avon River flows from Yenyening Lakes downstream to Wooroloo Brook. The Mortlock rivers join just east of Northam flowing eastwards to join the Avon further downstream. The North Mortlock drains an area within the Wongan-Ballidu Shire and the East and South Mortlock drain an area of salt lakes within a number of shires including Tammin, Cunderdin and Wyalkatchem (Avon River Management Strategy, 1993). One of the branches of the Avon River passes through the Shire, to the east of Trayning and is represented today by salt flats. These may be inundated with water after heavy rainfall.

Part of Lake Wallambin falls within the Shire. This is a large, mainly dry salt lake, found to the north of Trayning. The lake is surrounded by samphire flats with the elevated lake margins dominated by *Melaleuca* spp. Salmon gum and York gum appear on higher ground.

Most of the wetlands in the Avon River Catchment were fresh or near fresh until the 1930's. In the East Mortlock river salt, was found to have appeared in 1920 (Sanders, 1991). The wetlands of the wheatbelt have suffered enormous changes as a result of clearing, soil salinisation, run off, siltation and eutrophication. These changes were quickly followed by the death of vegetation fringing lakes and wetlands in the catchment and the establishment of salt tolerant samphire communities.

Prior to increases in salinity the wetlands were covered by sheoak, paperbark and teatree, forming a dense canopy with low scrub below. Locals recall that horses, cattle and sheep were seen drinking from Avon Pools up to the early 30's. Animal life in the area of the Avon was varied and quite different to that which occurs today (Sanders, 1991).

Environmental changes in the wetlands of the Avon Catchment began with the rise of the saline water table that followed the "opening up" of the wheatbelt in the early 1900's. The salinity changes in the Avon River catchment began to take effect in 1930, which was earlier than many other wheatbelt catchments as the region was settled and cleared earlier.

Many of the vertebrate animals (including water-rats *Hydromys chrysogaster*, water birds, reptiles, frogs) that were once common to wetlands and the surrounding areas
Figure 6: The Avon River Catchment (dotted line) showing the Avon River Management Authority Management Area (solid line).
have now disappeared. This could be because of increased wetland salinity, the decline of their prey or related to predation by introduced animals, habitat destruction or other factors.

The Avon Management Committee was set up in 1984 to tackle some of the problems facing the Avon River System and bring together local government representatives from each shire along the river. One element of the management strategy was the establishing of The Avon River Management Authority in 1992 (under the Waterways Conservation Act of 1976-1982) and Trayning Shire is included in its management area (Avon River System Management Strategy, 1993) (Figure 6).

The authority’s role is to coordinate and advise on the research, management and monitoring of the area with the help of a range of organisations including the Department of Agriculture, the Department of Conservation and Land Management, the Environmental Protection Authority, the Water Authority of WA, the Waterways Commission and a number of community organisations such as the Land Conservation District Committee.

The main problems being addressed by the management committee are the impact of siltation on the river, the loss of pools through siltation, water quality, pollution, erosion and decline of foreshore vegetation, plus a range of issues concerning the catchment area and how that affects the river system.

Many of these issues require urgent attention in order to protect the river and the catchment. The Management Strategy was not designed to solve land management problems, only to address the issues as far as they affect the river. It hopes to develop links between catchment management and river management and suggest possible strategies to deal with the problems of land degradation, loss of agricultural productivity and conservation issues.

Further information is available from Mr Viv Read at the Department of Agriculture (Northam)

Fauna
Native mammals recorded in the Shire of Trayning at Billyacatting Hill Nature Reserve (Muir et al., 1981) include the euro (Macropus robustus), the western grey kangaroo (Macropus fuliginosus), the common dunnart (Sminthopsis murina), the echidna (Tachyglossus aculeatus), Gould's wattled bat (Chalinolobus gouldii) and the little flat bat (Tadarida planiceps). Introduced mammal species include the house mouse (Mus musculus), the European rabbit (Oryctolagus cuniculus) the feral cat (Felis catus) and the fox (Vulpes vulpes).

Twenty species of reptiles and four species of frogs were collected from Billyacatting Hill Reserve (Muir et al., 1981). A full list of mammals seen in the wheatbelt can be found in Appendix 5 and a full list of amphibians and reptiles can be found in Appendix 6.

In the area around the Shire of Trayning, mammals that have become locally extinct since the early part of this century include the bilby (Macrotis lagotis), Mitchell’s
hopping mouse (*Notomys mitchelli*) and the south-western pigmy possum (*Cercartetus concinnus*). The ashy grey mouse (*Pseudomys albocinereus*), black-footed rock wallaby (* Petrogale lateralis*) and the brush-tailed possum (*Trichosurus vulpecula*) also occurred in the area around the Shire but are now uncommon or of unknown status (Kitchener and Vicker, 1981).

The clearing of large amounts of natural bushland for agriculture, the introduction of feral animals, alterations to fire regimes and other disturbances have caused the local extinction of 17 of the 43 species (40%) of mammals (excluding bats) recorded from the wheatbelt since European settlement. Only 12 of the 43 species are now considered to be moderately common to abundant (Kitchener et al., 1980).

Those mammals which are the more specialised in habitat or in feeding requirements are most affected by the changes in the wheatbelt. The woylie (*Bettongia penicillata*), the burrowing bettong (*Bettongia lesueur*), the banded hare wallaby (*Lagorchestes fasciatus*) and the western hare wallaby (*Lagorchestes hirsutus*) are among the more specialised mammals once found in the wheatbelt but now locally extinct (Kitchener et al., 1980). The echidna, which is more general in its requirements, is still widely distributed over the area (Hobbs et al., 1993).

Many of the original species of birds still occur in the wheatbelt, although several species have been lost from particular nature reserves (Kitchener et al., 1982). Birds, particularly those with small or particular ranges, eg. the golden whistler (*Pachycephala pectoralis*), have not coped well with the changes associated with clearing and are generally declining in numbers. They may become locally extinct. Species such as Major Mitchell's cockatoo (*Cacatua leadbeateri*) have undergone a significant reduction through loss of habitat (Saunders et al., 1985).

In the south-west of the state, 83% of the land birds are dependant on native vegetation for all or some of their annual requirements (Smith, 1987). Continued loss of these bird species can therefore be expected due to degradation of remnant vegetation and continued clearing.

However, some species such as galahs (*Cacatua roseicapilla*), ravens (*Corvus coronoides*), crested pigeons (*Geophaps lophotes*), magpies (*Gymnorhina dorsalis*) and wood ducks (*Chenonetta jubata*) have benefited from increased agricultural development and are increasing in numbers, some to the detriment of other birds. A full list of birds found in the Shire of Trayning can be found in Appendix 7.

Animals considered to be the under threat of extinction and being monitored include the tammar wallaby (*Macropus eugeni*), the brush wallaby (*Macropus irma*) and Carnaby's cockatoo. Most of these species are under threat because of introduced predators, loss of habitat and of their preferred food. Very little current data is available for fauna in the Shire of Trayning.

**Rare and Endangered Flora**

Of the 238 species of Western Australian plants declared endangered 77 are found in the wheatbelt and one in the Shire of Trayning (Hopper et al., 1990).
The one Rare and Endangered species of flora found in the Shire of Trayning is:

*Boronia adamsiana* (barbalin boronia) - An upright hairy shrub to 50cm high with leaflets to 10cm long and narrow sepals 4.5mm long. Confined to scrub and heath on yellow sand near granite outcrops in the Muckinbudin area (Donerty Road in Trayning). Flowering period: June-July.

Western Australia is internationally renowned for the biodiversity and uniqueness of its indigenous flora, particularly the south-west. Endangered plants warrant special conservation attention as their extinction is more likely than other species. Such extinctions would constitute an irreplaceable loss to humans, both in the opportunity for plant utilisation and in the study of their biological diversity. An equally compelling reason for their careful conservation is the lost chance to appreciate the particular beauty of each of these rare and endangered plants. Some of the world's rare plant species have proven to be of outstanding economic value and much is yet to be discovered about their biochemistry. There is a possibility that the cures to many human diseases may be uncovered. For example, it has recently been publicised that smokebush (*Conospermum* spp.) may possibly provide a potential cure for AIDS.
Land Resources

Geology
The Shire of Trayning is part of the Darling Plateau, an area underlain by the Yilgarn Block. The Yilgarn Block is made up of Archaean granites and gneisses with some altered volcanic rocks and sediments. Trayning is underlain by granitic rocks covered by alluvia in the major valleys. Mainly, the rock is deeply weathered and covered by the "pallid zone", capped by soil or massive laterite, ironstone gravels or sands. Locally, massive granite, which is resistant to weathering, approaches the surface or crops out to form rock domes and tors.

Soils
The Shire of Trayning falls within one physiographic region with characteristic landforms, soils and vegetation - The Zone Of Ancient Drainage. This landscape is characterized by broad, flat valleys of low gradient with salt lake chains at their lowest points, gently sloping valley sides, some rock outcrop and large areas of yellow sandplain.

Within this zone are eight soil landscape units which differ mainly in their position within the topographic profile and form a mosaic of soil landscapes.

The Shire has been surveyed as part of two projects (McArthur, 1992 and Grealish and Wagnon, 1993), each using different soil landscape units. The McArthur (1992) Soil Landscape units have been used in the description but the corresponding soil landscape units from the Grealish and Wagnon survey (1993) are also shown. The distribution of these soil landscape units is shown on Figure 7. A key to understanding the eight soil landscape units which occur in the Shire follows (Lantzke and Fulton, 1994):

Zone of Ancient Drainage

Units associated with the lateritic plateau
Sandplain Soils

Ulva Soil Landscape Unit (Yelbeni Soil Landscape Unit)
Upland areas and divides with long gentle slopes. Areas of undulating sandplain remnants. Chief soils are deep pale sands, deep yellow sands, yellow gradational loamy sand, deep yellow acid sand, pale sand over gravel.

Hillside Soils
Units developed on weathered mottled and pallid zone materials

Booraan Soil Landscape Unit (Nembudding Soil Landscape Unit)
Long hillslopes often below the Ulva Landscape Unit, separated by a breakaway. Hardsetting grey to brown sandy loam over mottled yellow and brown clay, loamy sand over clay,
Figure 7: Soil landscape units of the Shire of Trayning (McArthur (1992), Grealish and Wagnon (1993)).
Collgar Soil Landscape Unit (Nungarin Soil Landscape Unit)
Very gentle lower slopes fringing valley floors and in the heads of drainage lines. Sandy surface duplex soil with a mottled yellow and grey clay subsoil.

Units developed on fresh rock
Danberrin Soil Landscape Unit (Kwelkan Soil Landscape Unit)
Irregular low hills and gentle slopes. Rocky red and brownish grey loamy soils formed from freshly exposed bedrock. Brownish grey granitic loamy sands and red brown doleritic clay loam, some yellow duplex soils. Rocky outcrops found.

Rocky Outcrop Soil Landscape Unit
Areas of bare rock and steep rocky hills. Shallow red and brown grey gritty loamy soils.

Valley floor Soils
Baandee Soil Landscape Unit (Wallambin Soil Landscape Unit)
Salt lakes, channels, flats and associated dunes. Calcareous and gypsiferous loams.

Merredin Soil Landscape Unit (Trayning Soil Landscape Unit)
Broad flat to gently inclined terrain on major valley floors. Red brown sandy loam over red clay, red and grey valley soil and grey to brown cracking clay.

Nangeenan Soil Landscape Unit (Kununoppin Soil Landscape Unit)
Flat or gently sloping land adjacent to saline drainage lines. It may occur on the lower slopes The soils are fine textured, grey, highly calcareous clays and are prone to saline patches when cleared.

Topography
The Shire of Trayning falls into the Avon Catchment and is characterised by a gently, undulating relief, broken only by isolated hills. Valleys are broad and flat bottomed, containing extensive chains of salt lakes. The highest elevation in the Shire is 417m above sea level, with an average elevation of 300m above sea level.

Significant features in the landscape are Mount Stevens, Billyacatting Hill, Duranning Rock and Huandanning Rock. Part of Lake Wallambin falls to the north of the Shire and some mainly dry salt lakes, called Sachsces Lakes, occur in the south-east. Figure 8 gives a topographic view of the Shire and Figure 9 is a map of the Shire, with contours at 20m intervals.
Contour Interval  20m

Figure 9: Contour lines in the Shire of Trayning at intervals of 20m.
Land Management and Land Degradation Issues of the Shire

European settlement in the south-west of Western Australia and the subsequent clearing of native vegetation and replacement with crops and pastures have given rise to the problems of land degradation, loss of agricultural production and loss of conservation values. The most obvious problems are associated with changes in hydrology, for example, the rising water table with salinity and waterlogging.

Within the Shire of Trayning, the most prevalent land degradation problems are wind and water erosion. Secondary salinisation is not a major problem but it has a high profile.

An integrated approach to land management maximises agricultural production on a sustainable basis and enhances the conservation value of the landscape. Practices used include reorientation of paddock boundaries, revegetation and fencing of drainage lines, protecting and connecting existing vegetation, establishing windbreaks and replanting on recharge and discharge areas. In addition, altering management practices to minimum and zero tillage will benefit both agricultural production and wildlife conservation.

It is now evident to most farmers that the replanting of trees and shrubs, that were established in the area before clearing, is an effective method of reversing current land degradation trends. A barrier to this revegetation has been the lack of relevant information about how to go about it and what to plant. "The Revegetation Guide to the Central Wheatbelt" (Lefroy et al., 1991) is an excellent resource book which attempts to address these problems by providing lists of local species grouped according to the specific soil types of a particular area.

Clearing
The Shire of Trayning, was settled in a similar way to Kellerberrin and Tammin, first used by pastoralists for the grazing of sheep. Then, to encourage settlers to adopt agriculture, the Homestead Act (1893) allowed settlers to select farm blocks of 64ha. In the following years various acts made it possible for new farms to establish more rapidly (Main, 1993). The Shire of Trayning, being further north of the main Goldfields' route, was settled slightly later and initially slower than land adjacent to the Goldfields' railway (Couper, 1993).

Current clearing guidelines recommend that for an area receiving 500 mm/annum rainfall or less (eg. Shire of Trayning), 20% of the catchment should remain under perennial vegetation to prevent land degradation (Clark, 1992). Currently, the Shire has approximately 10.95% remnant native vegetation cover. The Avon District is recognised as the worst affected area in the wheatbelt as far as the destruction of native vegetation.

Action to prevent clearing of native vegetation is being taken by the State Government and Local Authorities. Land clearing is currently controlled under the Soil and Land Conservation Act requiring all landowners to give notice to the Commissioner for Soil Conservation of intent to clear land. Landscape and soils are assessed within a set of
guidelines directed at preventing land degradation (Select Committee into Land Conservation, 1992). In addition, many local government authorities have implemented planning schemes which may give them more scope in effectively controlling the clearing of land.

Maintenance of native vegetation is a high priority in the Avon River Basin and in the Shire of Trayning. There were two main periods of clearing in this area; from 1900-1930 and another period from 1950-1980 after World War II.

The Government set aside areas of native vegetation as crown reserves for townsites, water catchments and for gravel extraction. Many of these patches of vegetation were designated as nature reserves in the 1960s and 1970s including Billyacatting Nature Reserve.

While the conservation value of many of these nature reserves is limited as they are small and isolated from other areas of native vegetation even these areas of native vegetation are known to have some conservation value.

Some vegetation associations have been more widely cleared than others, for example, areas of York gum and salmon gum woodlands were considered indicators of potentially good agricultural land by early settlers and therefore extensively cleared (Saunders et al., 1987). Woodlands carrying salmon gum, gimlet and morrell were classified as first class land.

**Rising Water Tables and Salinity**

The principle cause for increased soil surface salinisation in much of the wheatbelt has been the removal of native vegetation. Deep-rooted perennial native vegetation has been replaced by annual shallow-rooted crops and pasture. Less water is transpired (water vapour given out via the leaves) by these shallow-rooted plants resulting in the rise of groundwater, subsequent mobilisation and rise of soluble salts to plant roots or the soil surface. An increase in the infiltration of rainwater occurs because there is no vegetation to intercept it. With increased runoff comes a greater risk of flooding. This lack of water use causes the water table to rise and dissolve the accumulated salts. Quite often the effects of salinity are not seen for 15-20 years following native vegetation removal.

Trees and shrubs affected by salt show a reduction in growth and stunting. With further salination, intolerant species suffer the death of leaves and branches, from the base upwards, followed by wilting, death of growing tip and eventually the death of the whole tree.

The Shire of Trayning has a potentially serious problem with salinity (State of the Environment Report, 1992). It had 3,155 ha (2.62 % of arable land) affected by severe salinity in 1989 (George, 1990). The average area of saline land per affected farm in the Shire was 98ha. The affect of salinity on the landscape varies from catchment to catchment.

There are four types of salinity; valley floor salinity, sandplain seepages, hillside seepages and dryland salinity. Valley floor salinity is the most widespread.
The soils with the greatest salinity problem in the Shire are the loamy sands over clay associated with the Collgar and Booraan Soil Landscape Units. Much of the Merredin Soil Unit has a potential or realised salinity problem. Soils fringing salt lakes of the Baandeel Soil Landscape Unit are particularly saline and parts of the Danberrin Soil landscape Unit suffer salinity in seepage areas. The powdery calcareous soil of the Nangeenan soil Landscape Unit is inherently saline (Lantzke, 1992). These Landscape units cover extensive areas of the Shire.

Expensive pumping methods can be used to drain land in areas that have become saline or are at risk of doing so. A cheaper, biological solution is available, by planting perennial, deep-rooted vegetation to take up groundwater and reduce recharge. It was found that vegetation appeared to delay, if not prevent the development of secondary salinity areas of Wallatin Creek, Kellerberrin (McFarlane and George, 1992).

Salt tolerant plants (halophytes) are required for these salt affected sites. Recharge and discharge areas should be replanted to help lower the water table, control the spread of salinity and to prevent and manage erosion. When planting a salt affected or waterlogged area, site mounds of approximately 25-30 cm high need to be made to prevent seedlings from flooding and aid root growth (Negus, 1988).

A wide variety of plants will tolerate mildly saline soils but only a few can tolerate severely saline or waterlogged soil, these include samphire, some Melaleuca species, wandoo, swamp sheoak, flat-topped yate (Eucalyptus occidentalis), salt river gum (Eucalyptus sargentii), flooded gum (Eucalyptus rudis), coastal moort (Eucalyptus platypus var. heterophylla), saltbush (Atriplex spp.) and bluebush (Maireana brevifolia). On more mildly saline sites York gum may be planted.

For the soils indigenous of the Shire of Trayning the following suggestions have been made for planting (Lefroy et al., 1991) salmon gum, gimlet, red morrell (Eucalyptus longicornis), yorrell and wait-a-while. A full list of dominant native vegetation types related to Soil Landscape Unit can be found in Appendix 4.

On soils following drainage lines salt river gum (Eucalyptus sargentii) and swamp sheoak are suggested, with river saltbush (Atriplex amnicola), marsh saltbush (Atriplex undulata), marsh saltbush (Atriplex paludos), wavy leaf saltbush (Atriplex undulata), marsh saltbush (Atriplex paludos), bluebush (Enchylaena tomentosa) bluebush, puccinellia (Pulcinella ciliata) and samphire.

Alley farming provides a cost effective way of combating salinity problems and preventing soil erosion. Rows of native trees, which are wide enough to allow the free passage of machinery and animals for normal wheat or sheep farming, provide a permanent cover for the soil and water use for twelve months of the year.

In a cereal crop rotation incorporating lupins instead of clover, the amount of rainfall penetrating beyond the root zone to the groundwater is reduced considerably. Lupins have a higher peak rate of water use and use water for more hours in the day (Nulsen, 1982).
Waterlogging
A soil is waterlogged when it is completely saturated by water on a temporary or permanent basis. The principal cause of waterlogging is a combination of excess rainfall, poor internal and surface drainage and the limited ability of the soil to store water. This is exacerbated by the removal of deep-rooted vegetation, cultivation, soil compaction from stock trampling and use of heavy farm machinery. Waterlogging can induce or intensify other forms of land degradation like dryland salinity, decline of soil structure and water erosion.

Waterlogging is most prevalent in the 500-600mm rainfall area of the wheatbelt, particularly on the plains and valley floors with duplex and clay soils with a high risk of inundation. The Shire of Trayning is not a high risk area for waterlogging, in general, but has areas subject to inundation with water.

The chief soil types associated with waterlogging in the Shire are the loamy sand and sandy loam over clay of the Booraan and Collgar Soil landscape units and in the valley soils of the Merredin Soil Landscape Unit. The brownish grey granitic loamy soils of the Danberrin Soil Landscape Unit can suffer waterlogging in small patches and the powdery surfaced calcareous soil of the Nangeenan Unit may become flooded in low lying areas (Lantzke, 1992).

Wind Erosion
Wind erosion is the removal of topsoil by the wind from bare soil surfaces, redepositing it elsewhere, maybe many kilometres away in the case of fine clay particles. Following Cyclone Alby in 1978, soil from WA was found on mountains in New Zealand. Wind erosion results in a reduction of topsoil fertility and soil structure and the loss of vegetation through sandblasting and inundation. It can also increase siltation in the Avon River and its tributaries.

The loose, sandy soils of Western Australia are naturally prone to wind erosion especially when vegetation is insufficient to protect the soil surface and in times of sustained droughts. Most of the soils of the south-west may be susceptible to wind erosion at some time to varying degrees. The extent and severity of wind erosion depends on seasonal conditions. Strong gale-force winds, like those experienced in 1991 during Cyclone Fifi, constitute an extreme wind erosion risk over the whole wheatbelt.

The Shire of Trayning, being largely comprised of leached and weathered soils is considered to be highly susceptible to wind erosion. The soils of the Ulva Soil Landscape Unit are particularly susceptible to this erosion. The soils fringing salt lakes of the Baandee Soil Landscape Unit are highly prone to wind erosion as are the powdery surfaced calcareous soil of the Nangeenan Unit (Lantzke, 1992). These Landscape Units make up an extensive part of the Trayning Shire.

A number of good management practices are suggested to reduce the effects of wind erosion. Appropriate grazing management, farming to soil type, modifying tillage and direct seeding into stubble are included. The establishment of windbreaks reduces the speed and damaging effects of wind and act as 'silt traps' to catch windblown sand. They should be several rows wide, consisting of trees and understorey and at right
angles to the most damaging winds. Planted with native species, these windbreaks also serve as effective wildlife corridors linking of existing vegetation.

Water Erosion

As water flows over the soil surface as run off, soil particles may be dislodged and carried away causing soil erosion. Water erosion occurs in three forms; sheet, rill and gully with gully being the most visible and most severe. Loss in soil fertility, reduced crop yield and siltation of waterways result from this erosion.

The dry, sandy soils of Western Australian are particularly susceptible to water erosion, made worse by over-cultivation, overgrazing and stock trampling. The most severe and extensive erosion has occurred on those areas associated with major rivers. An estimated 0.7 million hectares of the 6 million hectares of land cropped annually in the wheatbelt is affected by water erosion. The most severe forms of water erosion occur during infrequent, intense rainfall, carrying large amount of soil off the higher sections of the landscape (State of the Environment Report, 1992). Perennial vegetation can reduce the impact of raindrops and water flow to help reduce this problem.

In the Shire of Trayning water erosion can be expected to occur on many soil types particularly on slopes steeper than 2%. Those Soil Landscape Units that are most susceptible to water erosion include the soils of the Danberrin Unit, the deep yellow acid sand and yellow gradational loamy sand of the Ulva Unit, the soils of the Booraan and Collgar Units and those of the Nangeenan Unit and Rocky Outcrop Unit (Lantzke, 1992). Figure 10 shows the hydrology of the Shire. All water courses may be susceptible to water erosion.

Acidity

Soil pH is a measure of the acidity or alkalinity of a soil, with values below 7 indicating increasing acidity. The acidification of topsoils and subsoils can inhibit the growth of plant roots of both native and pasture species.

Although some soils are predisposed to acidic conditions, agricultural practices are a major cause of the acceleration of the acidification process. This happens through the use of ammonium-based fertilisers and growing clover pastures. The rate of acidification is faster on higher producing soils than on the poorer soils.

Acidic soils tend to be more susceptible to degradation by wind and water erosion (State of the Environment Report, 1992) as soil particles do not bind together effectively under conditions of low pH.

In the Shire of Trayning, some of the soils regarded as being at risk of developing soil acidification are contained within the Ulva Soil Landscape Unit and the brownish grey granitic loamy sand of the Danberrin Unit (Lantzke, 1992).

Solutions to ameliorating soil acidity include the rotation of legume-based pastures with non-legume based pastures, reduction in the use of chemical fertilisers and increased liming and gypsum applications.
Legend

- Land Subject to Inundation
- Water Courses

Figure 10: Major drainage systems of the Shire of Trayning showing areas subject to inundation and major water courses.
Soil Compaction
Soil compaction by stock and heavy farm machinery is a major degradation problem experienced by many wheatbelt Shires including Trayning (particularly on the soils of the Ulva Soil Landscape Unit (Lantzke, 1992)). Stock and heavy machinery compact the soil and prevent infiltration of both water and air. This inevitably results in reduced plant growth and an increase in wind and water erosion. The problem can be rectified by using lighter farm machinery and restricting machinery traffic on the land through using minimum or zero tillage to establish crops. The fencing of remnant vegetation to limit stock access will prevent stock causing soil compaction within the bush.

Managing Existing Vegetation
Protecting existing vegetation is often easier than replanting. However, the survival of existing vegetation is affected by a number of factors including: grazing by stock of unfenced bush (passive clearing); changes in hydrology; increased exposure to pests; herbicide drift, fertiliser drift and weed invasion.

Native plants are often choked or covered by fast growing introduced plants that become weeds when they escape from pastures. Weeds compete with native plants for water and nutrients, increase the risk of fire and often do not provide the food and shelter that wildlife need.

Specific recommendations on how to manage existing bush are provided in "Managing your Bushland: A Guide for Western Australian Landowners" (Hussey and Wallace, 1993).

The long term solution to the problems of land degradation and the loss of local plant and animal species lies in taking a catchment approach to the management of natural resources within the Shire of Trayning.
Bringing It All Together

Integrated Management for Land and Nature Conservation in the Shire
The wheatbelt of Western Australia has severe nature conservation and agricultural problems resulting from the excessive clearing of native vegetation. The problems of land degradation and the degradation of native vegetation are firmly linked and can be prevented, even reversed with co-operative planning and the adoption of more stable agricultural practices over whole catchment areas. These practices must aim at optimal water use, soil protection and improvement, management of native vegetation and the maintenance of diversity of the flora and fauna, while ensuring sustainable agricultural production.

Landholders now realise that conservation does not stop at their farm boundary and are becoming increasingly involved in integrated catchment planning with neighbouring farmers and LCDs. With increased knowledge of the soils and natural features, limitations, degradation problems and management needs of their land, farmers can draw up farm-based plans.

Within this planning comes the retention of remnant vegetation, the rehabilitation of degraded areas and strategic revegetation. Responsibility for the problems and solutions at a local scale is the key to success. Nature conservation problems cannot be isolated from land degradation problems in an agricultural area. The maintenance of native vegetation and sustaining agriculture are interrelated. Good farming practices protect native vegetation and native vegetation helps to control the water table.

Factors which may increase the conservation value of bush remnants and replanted areas, are that they contain diverse plant species, preferably local species, that they have an understorey, that the species are matched to soil type and that they remain ungrazed and undisturbed. Leaving fallen logs and branches also create alternative sources of habitat for small animals.

More than 80% of the animal and plant species in Australia occur nowhere else in the world. Considerations of wildlife conservation are important in balance with sustaining agricultural production.

Biodiversity describes the wide range of living organisms occurring within a natural environment and maintaining this biodiversity is an important reason for conserving fauna and flora species. These fauna and flora species, interact with each other in a balanced way to form ecosystems. Some practical reasons for maintaining this biodiversity are:

• that many native plants are untapped storehouses of possible medicines
• they may act as aids to disease resistance in crops
• they may be possible food sources
• many animals act as natural pest controllers and reducing diversity of these species increases the risk of destructive outbreaks of harmful crop pests.
• it is important to retain the biodiversity of species for the benefit of future generations and for its aesthetic value.
Since a large proportion of native vegetation and revegetated areas are under the control of private landowners and the local government authorities, the responsibility for the co-ordination of the conservation and management of natural resources must ultimately be with these locally based groups. The Shire of Trayning has a number of different organisations working towards land and nature conservation in the Shire.

The Trayning Land Conservation District Committee and individual catchment groups have been active in this area.

**Projects in the Shire**

A combination of measures and solutions aimed at protecting remnant vegetation, strategically revegetating areas degraded or void of native vegetation, and combating land degradation problems in the Shire of Trayning have proven to be an effective method of achieving positive results. A list of examples of sources of funding for projects aimed at land and nature conservation can be found in Appendix 8.

The Remnant Vegetation Protection Scheme (RVPS) was developed by the State Government in 1988 to enhance soil and nature conservation by protecting native vegetation on farm land. Since 1988/89, the Shire of Trayning has received 2 RVPS grant to assist in the fencing of 155 hectares of native vegetation on farm land (Figure 11). It is hoped that this fenced area shows signs of regeneration.

Road verges in the Shire of Trayning are being surveyed for their vegetation conservation status with the assistance of the Roadside Conservation Committee (RCC). The surveys are undertaken by community volunteers using the method developed by the RCC. The survey started in January 1991. So far, in the Shire 7 roads (81.1km) have been surveyed for roadside conservation value. This is 7.7% of the total roads in the Shire.

The Avon Catchment Landcare Program was established in 1990 and initiated by ALCOA and the Western Australian Agricultural Department as part of the National Decade of Landcare. The program provides financial, human and technical resources to undertake catchment, farm planning and demonstration of rehabilitation techniques that tackle soil and water degradation problems. This project supports the ALCOA Landcare Project (Brewin and Collett, 1991).

The ALCOA Landcare Project was launched in 1989. It supports 6 farmer catchment groups including Yeelanna Catchment (north-west of Trayning) and aims to accelerate land reclamation through the establishment of on-farm demonstrations.

In 1989/90 the Trayning LCDC were successful in obtaining funding from One Billion Trees (OBT) for $5,393 (3,680 trees). Another grant of $3,250 was obtained from OBT in 1993/94 by the Shire of Trayning for direct seeding trials on 5 soil types on road reserves in Kununoppin.

The Trayning Shire Council secured a grant from the National Soil Conservation Program in 1992/93 for $30,000. This was for monitoring water tables in different catchment areas.
LEGEND

Remnant Vegetation Protection Scheme Sites.

X  1990

One Billion Trees (OBT)

Figure 11: One Billion Trees and Remnant Vegetation Protection Scheme sites in the Shire of Trayning.
In 1993/94, Plants For Conservation donated over 7,000 seedlings to the South Trayning and Huandanning catchment groups for replanting.

The Trayning Conservation District Committee has endeavoured to reverse land degradation problems with assistance from several programs. The National Landcare Program (NLP) has primarily had the role of providing funding to train Landcare Assistants and employing National Landcare Program Project Officers. There have also been several State Landcare funded projects in the Shire of Trayning since 1989/90, one of which have involved cooperation with neighbouring shires. Details of each of these projects are outlined in detail in Appendix 9.

Reducing the cost of conservation
It is now widely recognised that planting native trees and shrubs can be used to remedy land degradation problems. The cost of revegetation is a relatively cheap practice but protecting the area with fencing is expensive. However, there are methods of protecting remnant vegetation and planting native trees and shrubs in a cost-effective way. Initial costs are offset by long-term increases in productivity and decreases in land degradation.

To reduce the establishment costs for vegetation projects, a landholder could consider:
• cheaper fencing - (electric or re-cycled)
• collecting native plant seed from nearby sources instead of buying it (NB if the seed collector does not own the land, a licence will be needed. Check with CALM for details.)
• growing their own seedlings instead of buying in.
• direct seeding instead of planting seedlings
• include deep-rooted perennial fodder species for multiple use of revegetation areas.

Developing new products and industries from planted trees has the potential to provide farmers with an additional source of income. Some possibilities for the development of tree-farm products include eucalypt and tea tree oils; tannins from acacia and eucalypt species; cut wildflowers and wildflower seeds; and value-added wood products such as tool handles, craftwood and laminated wood products for furniture manufacture.
References


Lantzke, N. and Fulton, I., (1994). *Land Resources of the Northam Region*. Land Resources Series No. 11, Department of Agriculture, South Perth.


Local Contacts

1. Trayning Land Conservation District Committee
   Secretary: Geoff Peddie - Phone: (096) 831001

2. Shire of Trayning Offices
   Phone: (096) 831001

3. Department of Conservation and Land Management District Office
   (Merredin - Wheatbelt Region) - Phone: (090) 412488

4. Western Australian Department of Agriculture
   (Merredin) - Phone: (090) 411035
   (Northam) - Phone: (096) 226100

5. National Landcare Program - Department of Agriculture
   Project Officers - (Northam) - Phone: (096) 226100

6. Avon River System Management Authority
   Regional Manager - Viv Read - Phone: (096) 226119
Further Reading

Practical Management


General Reading


### Appendix 1.

**Plant List-Dominant Species of the Mount Caroline System (Beard, 1980)**

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name (if known)</th>
<th>Granite outcrops</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trees</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Acacia acuminata</em></td>
<td>Jam</td>
<td></td>
</tr>
<tr>
<td><em>Acacia lasiocalyx</em></td>
<td>Caterpillar wattle</td>
<td></td>
</tr>
<tr>
<td><em>Allocasuarina huegeliana</em></td>
<td>Rock sheoak</td>
<td></td>
</tr>
<tr>
<td><em>Eucalyptus loxophleba</em></td>
<td>York gum</td>
<td></td>
</tr>
<tr>
<td><em>Leptospermum erubescens</em></td>
<td>Roadside teatree</td>
<td></td>
</tr>
<tr>
<td><strong>Shrubs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Acacia acuaria</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Grevillea paniculata</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Hakea recurva</em></td>
<td>Standback</td>
<td></td>
</tr>
<tr>
<td><em>Melaleuca adnata</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Melaleuca uncinata</em></td>
<td>Broom bush</td>
<td></td>
</tr>
<tr>
<td><em>Santalum spicatum</em></td>
<td>Sandalwood</td>
<td></td>
</tr>
<tr>
<td><strong>Twiner</strong></td>
<td><em>Cheiranthera parviflora</em></td>
<td></td>
</tr>
<tr>
<td><strong>Herbaceous</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Borya sp.</em></td>
<td>Pincushions</td>
<td></td>
</tr>
<tr>
<td><em>Cheilanthes tenuifolia</em></td>
<td>Rock fern</td>
<td></td>
</tr>
<tr>
<td><em>Dianella revoluta</em></td>
<td>Blueberry lily</td>
<td></td>
</tr>
<tr>
<td><em>Erodium cygnorum</em></td>
<td>Blue heronsbill</td>
<td></td>
</tr>
<tr>
<td><em>Lepidosperma costale</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Lepidosperma gracile</em></td>
<td>Slender sword sedge</td>
<td></td>
</tr>
<tr>
<td><em>Thysanotus tenellus</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ephemerals</strong></td>
<td><em>Enneapogon caerulescens</em></td>
<td>Limestone grass</td>
</tr>
<tr>
<td><em>Podotheca gnaphalioides</em></td>
<td>Golden long-heads</td>
<td></td>
</tr>
<tr>
<td><em>Schoenia cassianum</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Stipa hemipogon</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Waitzia acuminata</em></td>
<td>Orange immortelle</td>
<td></td>
</tr>
<tr>
<td><strong>Kwongan</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tall shrubs</strong></td>
<td><em>Acacia filifolia</em></td>
<td>Golden wreath wattle</td>
</tr>
<tr>
<td><em>Acacia heteroneura</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Acacia multisepicata</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Acacia saligna</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Acacia stereophylla</em></td>
<td><em>Actinostrobus arenarius</em></td>
<td>Sandplain cypress</td>
</tr>
<tr>
<td><em>Banksia attenuata</em></td>
<td>Slender banksia</td>
<td></td>
</tr>
<tr>
<td><em>Banksia prionotes</em></td>
<td>Acorn banksia</td>
<td></td>
</tr>
<tr>
<td><em>Allocasuarina huegeliana</em></td>
<td>Rock sheoak</td>
<td></td>
</tr>
<tr>
<td><em>Eucalyptus albeda</em></td>
<td>White-leaved mallee</td>
<td></td>
</tr>
<tr>
<td><em>Eucalyptus drummondii</em></td>
<td>Drummond's gum</td>
<td></td>
</tr>
<tr>
<td><em>Eucalyptus loxophleba</em></td>
<td>York gum</td>
<td></td>
</tr>
<tr>
<td><em>Eucalyptus subangusta</em></td>
<td>Black marlock</td>
<td></td>
</tr>
</tbody>
</table>
Grevillea excelsoir  Quandong
Santalum acuminatum  Sandplain woody pear
Xylomelum angustifolium

Shrubs
Acacia acuaria  Jam
Acacia acuminata
Acacia desertorum  Tan wattle
Acacia fragilis
Acacia hetimeles
Acacia heteroneura
Acacia hynesiana  Caterpillar wattle
Acacia laiocalyx
Acacia lasiocaarpa  Panjang
Acacia lineolata
Acacia aff. linophylla
Acacia multisipicata
Acacia saligna  Golden wreath wattle
Acacia sclerophylla
Acacia stereophylla
Acacia yorukrinensis
Actinostrobus arenarius  Sandplain cypress
Allocasuarina acutivalvis  Black tamma
Allocasuarina campestris  Tamma
Allocasuarina huegeliana  Rock sheoak
Astroloma serratifolium  Kondrun
Astroloma pallidum  Kickbush
Baekeea crispiflora
Baekeea floribunda
Baekeea muricata
Beafofortia bracteosa
Beafofortia micrantha
Boronia caeruleascens
Burtonia gompholoboides
Calothamnus chrysantherus  Claw flower
Calothamnus gilesii
Calothamnus quadrifidus  One-sided bottlebrush
Calytrix empetroides
Calytrix fraseri  Pink summer calytrix
Carpobrotus edulis  Hottentot fig
Chamelium drummondii
Choretrum pritzelli
Comesperma scoparium  Broom milkwood
Comesperma spinosum  Spiny milkwood
Conospermum stoechadis  Common smokebush
Cryptandra leucophracta  Rusty poison
Cryptandra myrianthra
Cryptandra pungens
Cyanostegia angustifolia
Dampiera spicigera  Spiked dampiera
Darwinia purpurea  Rose darwinea
Daviesia aphylla
Daviesia juncea
Daviesia nudiflora
Doddonaea attenuata  Native hops
Doddonaea caespitosa
Dickistylis parvifolia
Dryandra sessilis  Parrot bush
<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eriostemon thryptomenoides</td>
<td></td>
</tr>
<tr>
<td>Eremaea pauciflora</td>
<td>White-leaved mallee</td>
</tr>
<tr>
<td>Eriostemon tomentellus</td>
<td>Burracoppin mallee</td>
</tr>
<tr>
<td>Eucalyptus alibida</td>
<td>Drummond's mallee</td>
</tr>
<tr>
<td>Eucalyptus burracoppinensis</td>
<td>Narrow-leaved red mallee</td>
</tr>
<tr>
<td>Eucalyptus drummondii</td>
<td>Oldfield's mallee</td>
</tr>
<tr>
<td>Eucalyptus foecunda</td>
<td>Leafless ballart</td>
</tr>
<tr>
<td>Eucalyptus oldfieldii</td>
<td>Pink spike heakea</td>
</tr>
<tr>
<td>Exocarpos aphyllus</td>
<td>Marble heke</td>
</tr>
<tr>
<td>Hakea ambiguа</td>
<td>Honey bush</td>
</tr>
<tr>
<td>Hakea circumalata</td>
<td>Sea urchin heakea</td>
</tr>
<tr>
<td>Hakea coriacea</td>
<td>Cricket ball heakea</td>
</tr>
<tr>
<td>Hakea falcata</td>
<td>Standback</td>
</tr>
<tr>
<td>Hakea incrassata</td>
<td></td>
</tr>
<tr>
<td>Hakea lissocarpha</td>
<td></td>
</tr>
<tr>
<td>Hakea petiolaris</td>
<td></td>
</tr>
<tr>
<td>Hakea platysperma</td>
<td></td>
</tr>
<tr>
<td>Hakea recurva</td>
<td></td>
</tr>
<tr>
<td>Hakea scoparia</td>
<td></td>
</tr>
<tr>
<td>Hakea subsulcata</td>
<td></td>
</tr>
<tr>
<td>Halogania lavandulacea</td>
<td>Blue bush</td>
</tr>
<tr>
<td>Hibbertia glomerosa</td>
<td>Guinea-flower</td>
</tr>
<tr>
<td>Hibbertia uncinata</td>
<td>Grey stinkwood</td>
</tr>
<tr>
<td>Isopogon scabriusculus</td>
<td>Roadside teatree</td>
</tr>
<tr>
<td>Jacksonia furcellata</td>
<td></td>
</tr>
<tr>
<td>Leptospermum erubescens</td>
<td></td>
</tr>
<tr>
<td>Leucopogon crassifolius</td>
<td></td>
</tr>
<tr>
<td>Leucopogon hamulosus</td>
<td></td>
</tr>
<tr>
<td>Leucopogon dielsianus</td>
<td></td>
</tr>
<tr>
<td>Melaleuca conothamnoides</td>
<td>Wheatbelt honeymyrtle</td>
</tr>
<tr>
<td>Melaleuca cordata</td>
<td>Graceful honeymyrtle</td>
</tr>
<tr>
<td>Melaleuca platyclayx</td>
<td>Rough honeymyrtle</td>
</tr>
<tr>
<td>Melaleuca radula</td>
<td></td>
</tr>
<tr>
<td>Melaleuca scabra</td>
<td>Broom bush</td>
</tr>
<tr>
<td>Melaleuca seriata</td>
<td>Leathery-leaf persoonia</td>
</tr>
<tr>
<td>Melaleuca spathulata</td>
<td></td>
</tr>
<tr>
<td>Melaleuca subtrigona</td>
<td>Karno</td>
</tr>
<tr>
<td>Melaleuca uncinata</td>
<td></td>
</tr>
<tr>
<td>Mirbelia spinosa</td>
<td></td>
</tr>
<tr>
<td>Micromyrtus imbricata</td>
<td></td>
</tr>
<tr>
<td>Micromyrtus rosea</td>
<td></td>
</tr>
<tr>
<td>Olearia acillaris</td>
<td></td>
</tr>
<tr>
<td>Persoonia coriacea</td>
<td></td>
</tr>
<tr>
<td>Persoonia striata</td>
<td></td>
</tr>
<tr>
<td>Persoonia trinervis</td>
<td></td>
</tr>
<tr>
<td>Petrophile ericifolia</td>
<td></td>
</tr>
<tr>
<td>Petrophile seminuda</td>
<td></td>
</tr>
<tr>
<td>Phebalium brachycalyx</td>
<td></td>
</tr>
<tr>
<td>Phebalium tuberculosum</td>
<td></td>
</tr>
<tr>
<td>Pimelea brevifolia</td>
<td></td>
</tr>
<tr>
<td>Platysace maxwellii</td>
<td></td>
</tr>
<tr>
<td>Pulicenae capitata</td>
<td></td>
</tr>
<tr>
<td>Pulicenae neurocalyx</td>
<td></td>
</tr>
<tr>
<td>Santalum acuminatum</td>
<td>Quandong</td>
</tr>
<tr>
<td>Santalum spicatum</td>
<td>Sandalwood</td>
</tr>
<tr>
<td>Verticordia acerosa</td>
<td>Common cauliflower</td>
</tr>
<tr>
<td>Verticordia brownii</td>
<td></td>
</tr>
<tr>
<td>Verticordia chrysantha</td>
<td></td>
</tr>
</tbody>
</table>
Verticordia picta
Westringia sp.
Xanthorrhoea nana

Painted featherflower
Dwarf grasstree

Climbers
Cassytha racemosa
Cassytha pubescens
Comesperma volubile
Muhlenbeckia adpressa
Sollya heterophylla

Dodder laurel
Love creeper
Climbing lignum
Australian bluebell

Herbaceous
Borya sp.
Chamaexeros fimbriata
Conostylis aculeata
Diameilla revoluta
Ecdioleoa monstachya
Enneapogon caerulescens
Gahnia polyphylla
Glischrocarpon flavescens
Harperia lateriflora
Laxmannia squarrosa
Leptocarpus sp.
Lepidosperma angustatum
Lepidosperma drummondii
Lepidosperma gracile
Lepidosperma tenue
Lomandra fimbriata
Lyginia tenax
Mesomelaena uncinata
Plectrachne dielsii
Schoenus aff. brevifolius
Schoenus compressus
Stipa compressa
Stipa elegansissima
Stipa hemipogon
Stypandra imbricata

Pincushions
Prickly conostylis
Blueberry lily
Limestone grass
Tussock grass
Slender sword sedge
Feather speargrass

Woodland

Shrubs
Acacia acuaria
Acacia acuminata
Acacia dura
Acacia erinacea
Acacia hemiteles
Acacia lasiocalyx
Acacia leptospermoides
Acacia lineolata
Acacia mackeyana
Acacia microbotrya
Acacia pulchella
Acacia saligna
Allocasuarina campestris
Allocasuarina huegeliana
Allocasuarina microstachya
Alyxia buxifolia
Astrolopha serratifolium
Atriplex paludosu

Jam
Tan wattle
Caterpillar wattle
Manna wattle
Prickly moses
Golden wreath wattle
Tamma
Rock sheoak
Dysentery bush
Kondrung
Marsh saltbush
Baeckea crispiflora
Bassia aff. dicantha
Bertya cunninghamii
Beyeria leschenaultii
Calothamnus villosus
Calytrix brachypetala
Calytrix empetroides
Cassia nemophila
Chorizema aciculare
Coopermookia strophiolata
Cryptandra pungens
Dampiera spicigera
Daviesia acanthoclona
Daviesia nematophylla
Dodonaea attenuata
Dodonaea bursarifolia
Dodonaea caespitosa
Enchylaena tomentosa
Eremophila brevifolia
Eremophila decipiens
Eremophila drummondii
Eremophila glabra
Eremophila woolstiana
Eucalyptus loxophleba
Eucalyptus salmonophloia
Eucalyptus salubris
Eucalyptus subangusta
Eucalyptus transcontinentalis
Eucalyptus wandoo
Exocarpos spartes
Gastrolobium crassifolium
Gastrolobium aff. hookeri
Grevillea circumalata
Guichenotia lepidota
Hakea recurva
Hakea lissocarpha
Hakea preissii
Hakea scoparia
Lasioptetalum indutum
Leptospermum erubescens
Maireana enchylaenoides
Maireana georgei
Melaleuca acuminata
Melaleuca cymbifolia
Melaleuca eleuterostachya
Melaleuca lateriflora
Melaleuca laxiflora
Melaleuca spicigera
Melaleuca undulata
Olearia muelleri
Olearia revoluta
Opercularia vaginata
Persoonia striata
Pittosporum phylliraeoides
Platysace maxwellii
Pultenaea sp.
Rhagodia nitans
Rhagodia preissii

Pale turpentine bush
Desert cassia
Needle-leaved chorizema
Spiked dampiera
Native hops
Ruby saltbush
Spotted eremophila
Slender fuchsia
Tar bush
York gum
Salmon gum
Gimlet
Black marlock
Redwood
Wandoow
Broom ballart
Thickleaf poison
Standback
Honey bush
Needlebush
Roadside teatree
Satiny bluebush
Gorada
Hidden honey-myrtle
Goldfields daisybush
Dogweed
Weeping pittosporum
Karno
**Rhagodia spinescens**  
Spiny saltbush  
**Sanialum spicatum**  
Sandalwood  
**Stylobrasium australe**  
**Templetonia sulcata**  
**Trymalium ledfoliolium**  
**Verticordia densiflora**  
**Westringia cephalantha**  
**Westringia aff. rigidula**  

**Climber**  
Cheiranthera parvifolia

**Herbaceous**

- **Amphipogon debilis**  
- **Avena sativa**  
- **Borya sp.**  
- **Caesia parviflora**  
- **Dawrencea lindleyi**  
- **Dianella revoluta**  
- **Ehrharta longiflora**  
- **Enneapogon caerulescens**  
- **Galania aff. polypylla**  
- **Harperia lateriflora**  
- **Hordeum marinum**  
- **Lepidosperma angustatum**  
- **Lepidosperma drummondii**  
- **Lepidosperma effusum**  
- **Lepidosperma gracile**  
- **Lepidosperma pubisquameum**  
- **Lepidosperma tenue**  
- **Lomandra effusa**  
- **Loxocarya fasciculata**  
- **Loxocarya pubescens**  
- **Loxocarya aff. vestita**  
- **Loxocarya aff. mucronata**  
- **Mesemelaena uncinata**  
- **Neurachne sp.**  
- **Spartochloa scirpoidea**  
- **Stipa compressa**  
- **Stipa elegantissima**  
- **Stipa hemipogon**  
- **Waitzia acuminata**  
- **Wilsonia humilis**  

Oat  
Pincushions  
Pale grass lily  
Lindley's everlasting  
Blueberry lily  
Annual veldt grass  
Limestone grass  
Sea barley  
Tussock grass  
Spreading sword sedge  
Slender sword sedge  
Scented matrush  

**Trees and Shrubs**

- **Acacia acuaria**  
- **Acacia acuminata**  
- **Acacia brachyclada**  
- **Acacia colletioides**  
- **Acacia erinacea**  
- **Acacia fragilis**  
- **Acacia hemiteles**  
- **Acacia mackeyana**  
- **Acacia merrallii**  
- **Acacia multispicata**  
- **Acacia aff. nigrifilosa**  
- **Acacia pulchella**

Jam  
Wait-a-while  
Tan wattle  
Merrall’s wattle  
Prickly moses

**Mallee Species**
Allocasuarina acutivalvis
Allocasuarina campestris
Baeckea aff. crispiflora
Baeckea heteranthera
Baeckea sp.
Bassia aff. diacantha
Bossiaea eriocarpa
Callitris canescens
Calothamnus gilesii
Calytrix empetroides
Cryptandra leucophracta
Cryptandra myriantha
Daviesia acaenholcena
Dodonaea atenuata
Dodonaea bursariifolia
Dodonaea caespitosa
Dodonaea aff. concinna
Enchylaena georgii
Enchylaena tomentosa
Eremophila clarkei
Eremophila drummondii
Eremophila woolianiana
Eucalyptus albida
Eucalyptus annulata
Eucalyptus cylindriflora
Eucalyptus erythronema
Eucalyptus foecunda
Eucalyptus incrassata
Eucalyptus loxophleba
Eucalyptus pileata
Eucalyptus salmonophloia
Eucalyptus salubris
Eucalyptus sheathiana
Eucalyptus subangusta
Eucalyptus transcontinentalis
Eucalyptus wandoo
Exocarpos spartetus
Gastrolobium hookeri
Gastrolobium trilobum
Grevillea acuaria
Grevillea circumalata
Grevillea aff. disjuncta
Grevillea huegeli
Grevillea paniculata
Hakea coriacea
Hakea multilineta
Hakea subsulcata
Jacksonia aff. racemosa
Leptospermum erubescens
Melaleuca acuminata
Melaleuca adnata
Melaleuca conifera
Melaleuca eleuterostachya
Melaleuca hamulosa
Melaleuca laxiflora
Melaleuca pauperiflora
Melaleuca radula
Melaleuca scabra
Black tamma
Tamma
Common brown pea
Rusty poison
Native hops
Ruby saltbush
Turpentine bush
White-leaf mallee
Open-fruited mallee
White mallee
Red-flowered mallee
Narrow-leaved red mallee
Lerp mallee
York gum
Capped mallee
Salmon gum
Gimlet
Ribbon-barked gum
Black marlock
Redwood
Wandoo
Broom ballart
Bullock poison
Pink spike hakea
Grass leaf hakea
Furrowed hakea
Roadside tea-tree
Boree
Graceful honeymyrtle
Wongan melaleuca
Melaleuca subtrigona  Broom bush  
Melaleuca uncinata  Hidden honey-myrtle  
Melaleuca undulata  
Micromyrtus imbricata  
Mirbelia spinosa  
Olearia muelleri  
Olearia revoluta  
Persoonia coriacea  
Petrophile seminuda  
Phebalium tuberculatum  
Platysace maxwellii  Kano  
Ragodia spinescens  Thorny saltbush  
Santalum acuminatum  Quandong  
Templetonia sulcata  Kerosene bush  
Westringia cephalantha  

Salt Country  

Acacia colletioides  Wait-a-while  
Acacia lylei  
Acacia merrallii  Merrall’s wattle  
Acacia pergranulatum  
Atriplex semibaccata  Berry saltbush  
Bassia aff. diacantha  
Cotula coronopifolia  
Carpobrotus sp.  Waterbuttons  
Casuarina obesa  Swamp sheoak  
Calistemon phoeniceus  Lesser bottlebrush  
Disphyma blackii  
Enchylaena tomentosa  
Eucalyptus alba  Barrier saltbush  
Eucalyptus loxophleba  White-leaved mallee  
Eucalyptus salubris  York gum  
Eucalyptus subangusta  Gimlet  
Eucalyptus yilgarnensis  Black marlock  
Halosarcia bidens  Yorrell  
Halosarcia halocnemoides  
Hakea preissii  
Lycium australe  Needlebush  
Maireana brevifolia  Australian boxthorn  
Melaleuca adnata  Small-leaf bluebush  
Melaleuca cymbifolia  
Melaleuca hamulosa  
Melaleuca thyoides  
Melaleuca uncinata  Broom bush  
Polypogon monspeliensis  Annual beardgrass  
Ragodia mutans  
Ragodia spinescens  Spiny saltbush  
Santalum acuminatum  Quandong  
Thryptomene sp.  
Templetonia sp.  

34
### Appendix 2.

**Plant List - Dominant Species of the Jibberding System (Beard, 1980)**

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Names (if known)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kwongan</strong></td>
<td></td>
</tr>
<tr>
<td>Shrubs and Mallees</td>
<td></td>
</tr>
<tr>
<td>Acacia chryseola</td>
<td></td>
</tr>
<tr>
<td>Acacia desertorum</td>
<td></td>
</tr>
<tr>
<td>Acacia fragilis</td>
<td></td>
</tr>
<tr>
<td>Acacia heteroclita</td>
<td></td>
</tr>
<tr>
<td>Acacia lineolata</td>
<td></td>
</tr>
<tr>
<td>Acacia ligustrina</td>
<td></td>
</tr>
<tr>
<td>Acacia neurophylla</td>
<td></td>
</tr>
<tr>
<td>Acacia signata</td>
<td></td>
</tr>
<tr>
<td>Acacia spicata</td>
<td></td>
</tr>
<tr>
<td>Acacia stereophylla</td>
<td></td>
</tr>
<tr>
<td>Astroloma serratifolium</td>
<td></td>
</tr>
<tr>
<td>Baeckea crispiflora</td>
<td></td>
</tr>
<tr>
<td>Baeckea floribunda</td>
<td></td>
</tr>
<tr>
<td>Baeckea heteranthera</td>
<td></td>
</tr>
<tr>
<td>Baeckea muricata</td>
<td></td>
</tr>
<tr>
<td>Boronia ternata</td>
<td></td>
</tr>
<tr>
<td>Borya sp.</td>
<td>Pincushions</td>
</tr>
<tr>
<td>Brachysema daviesioides</td>
<td>Upside-down pea-bush</td>
</tr>
<tr>
<td>Calothamnus gilesii</td>
<td>Claw flower</td>
</tr>
<tr>
<td>Calytrix brachyphylla</td>
<td></td>
</tr>
<tr>
<td>Allocasuarina acutivalvis</td>
<td>Black tamma</td>
</tr>
<tr>
<td>Allocasuarina campestris</td>
<td>Tamma</td>
</tr>
<tr>
<td>Allocasuarina corniculata</td>
<td>Grey tamma</td>
</tr>
<tr>
<td>Dianella revoluta</td>
<td>Blueberry lily</td>
</tr>
<tr>
<td>Eriostemon deserti</td>
<td></td>
</tr>
<tr>
<td>Eriostemon thryptomenoides</td>
<td></td>
</tr>
<tr>
<td>Eriostemon tomentellus</td>
<td></td>
</tr>
<tr>
<td>Eucalyptus leptopoda</td>
<td>Tammin mallee</td>
</tr>
<tr>
<td>Eucalyptus subangusta</td>
<td>Black marlock</td>
</tr>
<tr>
<td>Grevillea didymobotrya</td>
<td></td>
</tr>
<tr>
<td>Grevillea excelsior</td>
<td></td>
</tr>
<tr>
<td>Grevillea paniculata</td>
<td>Bottlebrush grevillea</td>
</tr>
<tr>
<td>Grevillea paradoxa</td>
<td></td>
</tr>
<tr>
<td>Hakea coriacea</td>
<td>Pink spike hakea</td>
</tr>
<tr>
<td>Hakea francisiana</td>
<td></td>
</tr>
<tr>
<td>Hakea aff. minyma</td>
<td>Emu tree</td>
</tr>
<tr>
<td>Hakea subsulcata</td>
<td></td>
</tr>
<tr>
<td>Hibbertia aurea</td>
<td></td>
</tr>
<tr>
<td>Hibbertia aff. glomerosa</td>
<td></td>
</tr>
<tr>
<td>Hakea rostellata</td>
<td></td>
</tr>
<tr>
<td>Jacksonia furcellata</td>
<td>Grey stinkwood</td>
</tr>
<tr>
<td>Keraudrenia integrifolia</td>
<td>Common firebush</td>
</tr>
<tr>
<td>Leucopogon hamulosus</td>
<td></td>
</tr>
<tr>
<td>Melaleuca cordata</td>
<td></td>
</tr>
<tr>
<td>Melaleuca laxiflora</td>
<td></td>
</tr>
<tr>
<td>Melaleuca nematophylla</td>
<td></td>
</tr>
<tr>
<td>Melaleuca oldfieldii</td>
<td></td>
</tr>
<tr>
<td>Melaleuca spathulata</td>
<td></td>
</tr>
<tr>
<td>Melaleuca uncinata</td>
<td>Broom bush</td>
</tr>
</tbody>
</table>

35
**Micromyrtus imbricata**  
**Micromyrtus rosea**  
**Persoonia saundersiana**  
**Pimelea sylvestris**  
**Phebalium tuberculosum**  
**Platysace effusa**  
**Prostanthera eckersleyana**  
**Ptilotus obovatus**  
**Santalum acuminatum**  
**Scholtzia parviflora**  
**Thryniome australis**  
**Thryniome tuberculata**  
**Wehilia aff. thryniomenoides**

**Herbaceous**

**Amphipogon debilis**  
**Brunonia australis**  
**Edecoolea monostachya**  
**Enneapogon caerulescens**  
**Glischrocaryon flavescens**  
**Gonocarpus aff. confertifolius**  
**Goodenia helmsii**  
**Lepidosperma tenue**  
**Schoenus sp.**  
**Stipa elegansissima**  
**Stipa hemipogon**  
**Thysanotus patersonii**  
**Velleia discophora**  
**Wattia acuminata**

**Climber**

**Cassia glabella**

**Trees and Shrubs**

**Acacia acuminata**  
**Eucalyptus erythronema**  
**Eucalyptus yilgarnensis**  
**Eucalyptus loxophleba**  
**Eucalyptus salmonophloia**  
**Eucalyptus salubris**  
**Eucalyptus transcontinentalis**

**Salt Country**

**Acacia colletoides**  
**Acacia eremaea**  
**Aizoos quadrifidum**  
**Atriplex vesicaria**  
**Callitris preissii**  
**Disphyma blackii**  
**Enchylaena tomentosa**  
**Eremophila miniata**  
**Eucalyptus loxophleba**  
**Eucalyptus salmonophloia**  
**Eucalyptus yilgarnensis**  
**Frankenia desertorum**  
**Grevillea huegelii**  
**Halosarcia halocnemoides**

**Woodland**

**Jam**  
**Red flowered mallee**  
**Yorrell**  
**York gum**  
**Salmon gum**  
**Gimlet**  
**Redwood**

**Salt Country**

**Wait-a-while**  
**Mallee saltbush**  
**Rottnest Island pine**  
**Ruby saltbush**  
**Kopi poverty bush**  
**York gum**  
**Salmon gum**  
**Yorrell**  
**Scrubby sapphire**
Halosarcia leptoclada
Hakea preissii
Lycium australe
Maireana appressa
Mesembryanthemum crystallinum
Mesembryanthemum nodiflorum
Pittosporum phylliraeoides
Rhogodia nutans
Sclerostegia moniliformis
Stipa elegantissima
Threlkeldia diffusa

Needlebush
Australian boxthorn
Iceplant
Slender iceplant
Weeping pittosporum

Feather speargrass
Wallaby saltbush

Granite Outcrop
Acacia acuminata
Acacia neurophylla
Acacia lastiocalyx
Allocasuarina campestris
Borya sp.
Kunzea pulchella
Santalum spicatum

Jam
Caterpillar wattle
Tanuma
Pincushions
Granite kunzea
Sandalwood
### Appendix 3

### Plant List - Dominant Species of the Moorine Rock Vegetation System (Beard, 1980).

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Names (If Known)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Granite Outcrop</strong></td>
<td></td>
</tr>
<tr>
<td><em>Acacia acuminata</em></td>
<td>Jam</td>
</tr>
<tr>
<td><em>Acacia lasiocalyx</em></td>
<td>Caterpillar wattle</td>
</tr>
<tr>
<td><em>Allocasuarina campestris</em></td>
<td>Tamma</td>
</tr>
<tr>
<td><em>Calycopeplus helmsii</em></td>
<td>Broom spurge</td>
</tr>
<tr>
<td><em>Calothamnus asper</em></td>
<td></td>
</tr>
<tr>
<td><em>Cassytha aff. glabella</em></td>
<td>York gum</td>
</tr>
<tr>
<td><em>Eucalyptus loxophleba</em></td>
<td></td>
</tr>
<tr>
<td><em>Eucalyptus salmonophloia</em></td>
<td>Salmon gum</td>
</tr>
<tr>
<td><em>Eucalyptus salubris</em></td>
<td>Gimlet</td>
</tr>
<tr>
<td><em>Eucalyptus yilgarnensis</em></td>
<td>Yorrell</td>
</tr>
<tr>
<td><em>Eucalyptus wandoo</em></td>
<td>Wandoo</td>
</tr>
<tr>
<td><em>Eucalyptus sheathiana</em></td>
<td>Ribbon bark gum</td>
</tr>
<tr>
<td><em>Eucalyptus subangusta</em></td>
<td>Black marlock</td>
</tr>
<tr>
<td><em>Eucalyptus foecunda</em></td>
<td>Narrow-leaved red mallee</td>
</tr>
<tr>
<td><em>Gastrolobium spinosum</em></td>
<td>Prickly poison</td>
</tr>
<tr>
<td><em>Grevillea paniculata,</em></td>
<td></td>
</tr>
<tr>
<td><em>Hakea petiolaris</em></td>
<td>Sea urchin hakea</td>
</tr>
<tr>
<td><em>Melaleuca hamulosa</em></td>
<td></td>
</tr>
<tr>
<td><em>Melaleuca lateriflora</em></td>
<td>Gorada</td>
</tr>
<tr>
<td><em>Melaleuca radula</em></td>
<td>Graceful honeymyrtle</td>
</tr>
<tr>
<td><em>Melaleuca elliptica</em></td>
<td>Granite bottlebrush</td>
</tr>
<tr>
<td><em>Olearia revoluta</em></td>
<td></td>
</tr>
<tr>
<td><em>Spartochloa scirpoidea</em></td>
<td></td>
</tr>
<tr>
<td><strong>Kwongan</strong></td>
<td></td>
</tr>
<tr>
<td><em>Acacia neurophylla</em></td>
<td>Black tamma</td>
</tr>
<tr>
<td><em>Acacia stereophylla</em></td>
<td>Tamma</td>
</tr>
<tr>
<td><em>Allocasuarina acutivalvis</em></td>
<td>Grey tamma</td>
</tr>
<tr>
<td><em>Allocasuarina camppestris</em></td>
<td>Black marlock</td>
</tr>
<tr>
<td><em>Allocasuarina corniculata</em></td>
<td></td>
</tr>
<tr>
<td><em>Eucalyptus subangusta</em></td>
<td>Broom spurge</td>
</tr>
<tr>
<td><em>Calycopeplus helmsii</em></td>
<td>Claw flower</td>
</tr>
<tr>
<td><em>Calothamnus gilesii</em></td>
<td></td>
</tr>
<tr>
<td><em>Choretrum pritzelia</em></td>
<td></td>
</tr>
<tr>
<td><em>Ecdiocolea monostachya</em></td>
<td></td>
</tr>
<tr>
<td><em>Eriostemon thryptomenoides</em></td>
<td></td>
</tr>
<tr>
<td><em>Eucalyptus leptopoda</em></td>
<td>Tammin mallee</td>
</tr>
<tr>
<td><em>Goodenia pinifolia</em></td>
<td>Pine-leaved goodenia</td>
</tr>
<tr>
<td><em>Grevillea excelsior</em></td>
<td></td>
</tr>
<tr>
<td><em>Grevillea paradoxa</em></td>
<td>Bottlebrush grevillea</td>
</tr>
<tr>
<td><em>Hakea coriacea</em></td>
<td>Pink spike hakea</td>
</tr>
<tr>
<td><em>Melaleuca cordata</em></td>
<td></td>
</tr>
<tr>
<td><em>Melaleuca uncinata</em></td>
<td>Broom bush</td>
</tr>
<tr>
<td><em>Thryptomene sp.</em></td>
<td></td>
</tr>
<tr>
<td><em>Westringia sp.</em></td>
<td></td>
</tr>
<tr>
<td><strong>Mallee</strong></td>
<td></td>
</tr>
<tr>
<td><em>Eucalyptus fragilis</em></td>
<td>York gum</td>
</tr>
<tr>
<td><em>Eucalyptus loxophleba</em></td>
<td></td>
</tr>
</tbody>
</table>
Trees and Shrubs

Eucalyptus mackeyana
Eucalyptus salmonophloia
Eucalyptus sheathiana
Eucalyptus subangust

Aqucacia acuminata
Aqucacia colletioides
Aqucacia erinacea
Aqucacia mackeyana
Aqucacia merrallii
Aqucacia clarkei
Aqucacia drummondii
Aqucacia oppositifolia
Aqucatus loxophleba
Aqucatus salubris
Aqucatus salmonophloia
Aqucatus wando
Aqucatus aphyllus
Aqucatus sparsius
Olearia muelleri
Ptilotus obovatus
Santalum acuminatum
Solanum nummularium

Woodland

Jam
Wait-a-while
Spiny wattle
Merrall’s wattle
Turpentine bush
Weeoka
York gum
Gimlet
Salmon gum
Wando
Leafless ballart
Broom ballart
Goldfield’s daisybush
Cotton bush
Quandong
Money-leaved solanum

Succulent Shrubs

Bassia diacantha
Enchylaena tomentosa
Rhagodia nutans

Ruby saltbush

Herbaceous

Dianella revoluta
Pilothus exaltatus
Stipa elegantissima
Waitzia acuminata

Blueberry lily
Tall mulla-mulla
Feather speargrass
Orange immortelle

Salt Country

Acacia multispicata
Argyrobiotis turbinata
Atriplex? vesicaria
Bassia diacantha
Carpobrotus edulis
Disphyma blackii
Gunniposis intermedia
Halosarcia bidens
Halosarcia halocremoides
Melaleuca uncinata
Rhagodia nutans

Hottentot fig
Yellow salt star
Shrubby samphire
Broom bush
Appendix 4.

Dominant Native Vegetation in the Shire of Trayning according to Soil Landscape Unit (Lantzke, 1992)

Sandplain Soils
Ulva Soil Landscape Unit

- *Acacia assimilis* (wodjil)
- *Acacia resinomarginea*
- *Acacia neurophylla*
- *Acacia signata.*
- *Allocasuarina acutivalvis* (black tamma)
- *Allocasuarina campestris* (tamma)
- *Allocasuarina huegeliana* (rock sheoak)
- *Bankia* sp.
- *Eucalyptus burroccopinensis* (Burrcoppin mallee)
- *Eucalyptus leptopoda* (Tammin mallee)
- *Eucalyptus pyriformis* (Dowerin rose)
- *Hakea coriacea*
- *Leptospermum erubescens* (roadside teatree)
- *Sanialum* sp. (quandong )
- *Xyloomelum angustifolium* (sandplain woody pear)

Hillside Soils
Booraan Soil Landscape Unit

- *Callitris canescens*
- *Eucalyptus capillosa* (inland wandoo)
- *Eucalyptus salmonophloia* (salmon gum)
- *Eucalyptus salubris* (gimlet)
- *Eucalyptus wandoo* (wandoo)

Collgar Soil Landscape Unit

- *Eucalyptus capillosa* (inland wandoo)
- *Eucalyptus cylindriflora* (white mallee)
- *Eucalyptus erythronema* (red-flowered mallee)
- *Eucalyptus foecunda* (narrow-leaved red mallee)
- *Eucalyptus transcontinentalis* (redwood)

Danberrin Soil Landscape Unit

- *Acacia acuminata* (jam)
- *Allocasuarina huegeliana* (rock sheoak)
- *Eucalyptus foecunda* (narrow-leaved red mallee)
- *Eucalyptus loxophleba* (York gum)
- *Eucalyptus salmonophloia* (salmon gum)
- *Eucalyptus wandoo* (wandoo)
- *Hakea preissii* (needlebush)

Valley Floor Soils
Merredin Soil Landscape Unit

- *Eucalyptus salmonophloia* (salmon gum)
- *Eucalyptus salubris* (gimlet)
- *Hakea preissii* (needlebush)
Baandee Soil Landscape unit

Allocasuarina lepidophloia
Atriplex spp. (saltbush)
Callitris sp
Casuarina obesa (swamp sheoak)
Enchylaena spp.
Hakea preissii (needlebush)
Maireana spp (bluebush).
Melaleuca sp.

Nangeenan Soil Landscape Unit

Eucalyptus longicornis (morrell)
Appendix 5.

An Inventory of Mammals in the Wheatbelt Region of Western Australia (Sanders and Harold, 1991).

<table>
<thead>
<tr>
<th>Regional Status Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR</td>
<td>At risk within the region</td>
</tr>
<tr>
<td>E</td>
<td>Extinct throughout its former range</td>
</tr>
<tr>
<td>ER</td>
<td>Extinct within the region</td>
</tr>
<tr>
<td>G1</td>
<td>Gazetted as Schedule 1 under Wildlife Conservation Act 1950</td>
</tr>
<tr>
<td>G2</td>
<td>Gazetted as schedule 2 under Wildlife Conservation Act 1950</td>
</tr>
<tr>
<td>I</td>
<td>Introduced since European settlement</td>
</tr>
<tr>
<td>NK</td>
<td>Date of last record not known</td>
</tr>
<tr>
<td>NR</td>
<td>Not recorded in region since 1980</td>
</tr>
<tr>
<td>PO</td>
<td>Possibly occurring in region but not yet recorded (district in brackets)</td>
</tr>
<tr>
<td>RE</td>
<td>Regional endemic</td>
</tr>
<tr>
<td>RP</td>
<td>Have populations mainly within the region</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Conservation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monotremes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tachyglossus aculeatus</td>
<td>echidna</td>
<td></td>
</tr>
<tr>
<td><strong>Carnivorous Marsupials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dasyurus geoffroii</td>
<td>chuditch</td>
<td>G1, AR</td>
</tr>
<tr>
<td>Phascolagus insularis</td>
<td>brush-tailed phascogale</td>
<td>G1, AR, RP</td>
</tr>
<tr>
<td>Phascolagus caligatus</td>
<td>red-tailed phascogale</td>
<td>G1, AR, RP</td>
</tr>
<tr>
<td>Antechinus flavipes</td>
<td>mardo</td>
<td></td>
</tr>
<tr>
<td>Smynthopsis murina</td>
<td>common dunnart</td>
<td>PO(N), NK</td>
</tr>
<tr>
<td>Smynthopsis hirtipes</td>
<td>hairy-footed dunnart</td>
<td>NK</td>
</tr>
<tr>
<td>Smynthopsis granulipes</td>
<td>white-tailed dunnart</td>
<td></td>
</tr>
<tr>
<td>Smynthopsis crassicaudata</td>
<td>fat-tailed dunnart</td>
<td></td>
</tr>
<tr>
<td>Ningal Ridley</td>
<td>Wondai ningaul</td>
<td>NK</td>
</tr>
<tr>
<td>Ningal yvonneae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antechinomys laniger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myrmecobius fasciatus</td>
<td>mumbat</td>
<td>G1, AR, RP</td>
</tr>
<tr>
<td><strong>Bandicoots and Bilbies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isoodon obesulus fuscinventor</td>
<td>brown bandicoot</td>
<td>G1, AR</td>
</tr>
<tr>
<td>Parames bougainville</td>
<td>western barred bandicoot</td>
<td>ER, G1</td>
</tr>
<tr>
<td>Chaeropus ecaudatus</td>
<td>pig-footed bandicoot</td>
<td>E</td>
</tr>
<tr>
<td>Macrotis lagotis</td>
<td>bilby</td>
<td>ER, G1</td>
</tr>
<tr>
<td><strong>RIngtailes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pseudocheirus peregrinus occidentalis</td>
<td>common ringtail possum</td>
<td>G1, AR, NK</td>
</tr>
<tr>
<td><strong>Brushtails</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichosurus vulpecula</td>
<td>common brushtail possum</td>
<td></td>
</tr>
<tr>
<td><strong>Pygmy Possums</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cercartetus concinns</td>
<td>western pygmy possum</td>
<td></td>
</tr>
<tr>
<td><strong>Honey-possums</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tarsipes rostratus</td>
<td>honey-possum</td>
<td></td>
</tr>
<tr>
<td><strong>Bettongs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bettongia leseuer</td>
<td>burrowing bettong</td>
<td>ER, G1</td>
</tr>
<tr>
<td>Bettongia penicilliata</td>
<td>brush-tailed bettong</td>
<td>G1, AR</td>
</tr>
<tr>
<td><strong>Kangaroos</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagorchestes hirsutus</td>
<td>rufous hare-wallaby</td>
<td>ER, G1</td>
</tr>
<tr>
<td>Lagostrophus fasciatus</td>
<td>banded hare-wallaby</td>
<td>ER, G1</td>
</tr>
<tr>
<td>Onychogalea lunata</td>
<td>wurrung</td>
<td>ER</td>
</tr>
<tr>
<td>Petrogale lateralis</td>
<td>black-footed rock wallaby</td>
<td>G1, NK</td>
</tr>
<tr>
<td>Macropus eugenii</td>
<td>Tammar wallaby</td>
<td>G1, AR</td>
</tr>
</tbody>
</table>

42
<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Macropus rufus</em></td>
<td>red kangaroo</td>
</tr>
<tr>
<td><em>Macropus fuliginosus</em></td>
<td>western grey kangaroo</td>
</tr>
<tr>
<td><em>Macropus robustus</em></td>
<td>euro</td>
</tr>
<tr>
<td><em>Macropus irma</em></td>
<td>western brush wallaby</td>
</tr>
</tbody>
</table>

**Mastiff bats**

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Tadarida australis</em></td>
<td>white-striped mastiff bat</td>
</tr>
<tr>
<td><em>Tadarida planiceps</em></td>
<td>little mastiff bat</td>
</tr>
</tbody>
</table>

**Vespertilionid (ordinary) bats**

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Nyctophilus timoriensis</em></td>
<td>greater long-eared bat</td>
</tr>
<tr>
<td><em>Nyctophilus gouldii</em></td>
<td>Gould's long-eared bat</td>
</tr>
<tr>
<td><em>Nyctophilus geoffroyii</em></td>
<td>lesser long-eared bat</td>
</tr>
<tr>
<td><em>Chalinolobus morio</em></td>
<td>chocolate wattled bat</td>
</tr>
<tr>
<td><em>Chalinolobus gouldii</em></td>
<td>Gould's wattled bat</td>
</tr>
<tr>
<td><em>Nycticeius greyii</em></td>
<td>little-broad nosed bat</td>
</tr>
<tr>
<td><em>Pipistrellus tasmaniensis</em></td>
<td>great pipistrelle</td>
</tr>
<tr>
<td><em>Eptesicus regulus</em></td>
<td>King River eptesian</td>
</tr>
</tbody>
</table>

**Mice and Rats**

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Hydromys chrysogaster</em></td>
<td>water rat</td>
</tr>
<tr>
<td><em>Pseudomys shortridgei</em></td>
<td>heath rat</td>
</tr>
<tr>
<td><em>Pseudomys hermannsburgensis</em></td>
<td>Sandy Island mouse</td>
</tr>
<tr>
<td><em>Pseudomys albocinereus</em></td>
<td>ashy-grey mouse</td>
</tr>
<tr>
<td><em>Pseudomys occidentalis</em></td>
<td>western mouse</td>
</tr>
<tr>
<td><em>Pseudomys bolani</em></td>
<td>native rat</td>
</tr>
<tr>
<td><em>Leporillus sp.</em></td>
<td>native rat</td>
</tr>
<tr>
<td><em>Notomys michellii</em></td>
<td>Mitchell's hopping mouse</td>
</tr>
<tr>
<td><em>Notomys alexis</em></td>
<td>brown hopping mouse</td>
</tr>
</tbody>
</table>

**Introduced Animals**

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Oryctolagus cuniculus</em></td>
<td>rabbit</td>
</tr>
<tr>
<td><em>Canis familiaris dingo</em></td>
<td>dingo</td>
</tr>
<tr>
<td><em>Vulpes vulpes</em></td>
<td>fox</td>
</tr>
<tr>
<td><em>Felis catus</em></td>
<td>feral cat</td>
</tr>
<tr>
<td><em>Equus caballus</em></td>
<td>horse</td>
</tr>
</tbody>
</table>
### Appendix 6.

An Inventory of Amphibians and Reptiles in the Merredin District of the Wheatbelt of Western Australia (Sanders and Harold, 1991)

<table>
<thead>
<tr>
<th>Regional Status Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR</td>
<td>At risk within the region</td>
</tr>
<tr>
<td>E</td>
<td>Extinct throughout its former range</td>
</tr>
<tr>
<td>ER</td>
<td>Extinct within the region</td>
</tr>
<tr>
<td>G1</td>
<td>Gazetted as Schedule 1 under Wildlife Conservation Act 1950</td>
</tr>
<tr>
<td>G2</td>
<td>Gazetted as schedule 2 under Wildlife Conservation Act 1950</td>
</tr>
<tr>
<td>I</td>
<td>Introduced since European settlement</td>
</tr>
<tr>
<td>NK</td>
<td>Date of last record not known</td>
</tr>
<tr>
<td>NR</td>
<td>Not recorded in region since 1980</td>
</tr>
<tr>
<td>PO</td>
<td>Possibly occurring in region but not yet recorded (district in brackets)</td>
</tr>
<tr>
<td>RE</td>
<td>Regional endemic</td>
</tr>
<tr>
<td>RP</td>
<td>Have populations mainly within the region</td>
</tr>
</tbody>
</table>

### Scientific Name | Common Name       | Conservation Status |
|-------------------|-------------------|---------------------|

#### Amphibians

- **Crinia pseudinsignifera**
  - Leptodactylidae (southern frogs)
  - Common Name: western banjo frog
  - Conservation Status: NK, AR

- **Heleioporus albopunctatus**
  - Conservation Status: AR

- **Heleioporus psammophilus**
  - Conservation Status: NR, AR

- **Limnodynastes dorsalis**
  - Conservation Status: AR

- **Myobatrachus gouldii**
  - Conservation Status: AR

- **Neobatrachus albipes**
  - Conservation Status: RP, AR

- **Neobatrachus kunapalari**
  - Conservation Status: AR

- **Neobatrachus pelobatoides**
  - Conservation Status: AR

- **Neobatrachus sutor**
  - Conservation Status: NR, AR

- **Pseudophryne guentheri**
  - Conservation Status: AR

- **Pseudophryne occidentalis**
  - Conservation Status: NK, AR

#### Reptiles

- **Gekkonidae (geckos)**

- **Crenadactylus occellatus occellatus**
  - Conservation Status: NK

- **Diplogrypus alboguttatus**
  - Conservation Status: NK

- **Diplogrypus spinigerus**
  - Conservation Status: NK

- **Diplogrypus elderi**
  - Conservation Status: NK

- **Diplogrypus vittatus**
  - Conservation Status: NK

- **Diplogrypus mainii**
  - Conservation Status: NK

- **Diplogrypus michaelsoni**
  - Conservation Status: NK

- **Diplogrypus pulcher**
  - Conservation Status: NK

- **Diplogrypus squarrosum**
  - Conservation Status: NK

- **Diplogrypus stenodactylus**
  - Conservation Status: NK

- **Gehyra variegata**
  - Conservation Status: NK

- **Heteronotia binoei**
  - Conservation Status: NK

- **Nephurus stellatus**
  - Conservation Status: NK

- **Nephurus vertebralis**
  - Conservation Status: NK

- **Oedura reticulata**
  - Conservation Status: NK

- **Phyllostomus marmoratus marmoratus**
  - Conservation Status: NK

- **Phyllostomus ornatus**
  - Conservation Status: NK

- **Phylurus mili**
  - Conservation Status: NK

#### Pygopodidae (legless lizards)

- **Aprasia repens**
  - Conservation Status: NK

- **Delma australis**
  - Conservation Status: NK

- **Delma butleri**
  - Conservation Status: NK

- **Delma fraseri**
  - Conservation Status: NK

- **Delma grayi**
  - Conservation Status: NK

- **Lialis burtonis**
  - Conservation Status: NK

- **Pletholax gracilis**
  - Conservation Status: NK

- **Pygopus lepidopus lepidopus**
  - Conservation Status: NK

- **Pygopus nigriceps nigriceps**
  - Conservation Status: NK
<table>
<thead>
<tr>
<th>Agamidae (dragon lizards)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Amphibolurus cristatus</em></td>
<td>crested dragon</td>
<td>NK</td>
</tr>
<tr>
<td><em>Amphibolurus fordii</em></td>
<td>mallee dragon</td>
<td>NK</td>
</tr>
<tr>
<td><em>Amphibolurus inermis</em></td>
<td>central netted dragon</td>
<td>NK</td>
</tr>
<tr>
<td><em>Amphibolurus isolepis citrinus</em></td>
<td>military dragon</td>
<td></td>
</tr>
<tr>
<td><em>Amphibolurus maculatus griseus</em></td>
<td>spotted dragon</td>
<td></td>
</tr>
<tr>
<td><em>Amphibolurus ornatus</em></td>
<td>ornate dragon</td>
<td></td>
</tr>
<tr>
<td><em>Amphibolurus reticulatus</em></td>
<td>western netted dragon</td>
<td>NR</td>
</tr>
<tr>
<td><em>Amphibolurus salinarum</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Amphibolurus scutulatus</em></td>
<td>lozenge-marked dragon</td>
<td></td>
</tr>
<tr>
<td><em>Amphibolurus minor</em></td>
<td>dwarf bearded dragon</td>
<td></td>
</tr>
<tr>
<td><em>Amphibolurus adelaidensis chapmani</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Moloch horridus</em></td>
<td>thorny devil</td>
<td>NK</td>
</tr>
<tr>
<td><em>Typanocryptis cephalia</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scincidae (skinks)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Cryptoblepharus carnabyi</em></td>
<td></td>
<td>NK</td>
</tr>
<tr>
<td><em>Cryptoblepharus plagioccephalus</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ctenotus atlas</em></td>
<td></td>
<td>NK</td>
</tr>
<tr>
<td><em>Ctenotus fallens</em></td>
<td></td>
<td>PO(M) NR</td>
</tr>
<tr>
<td><em>Ctenotus impar</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ctenotus mimetes</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ctenotus pantherinus pantherinus</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ctenotus schomburgkii</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ctenotus uber uber</em></td>
<td></td>
<td>PO(N) NR</td>
</tr>
<tr>
<td><em>Ctenotus xenopleura</em></td>
<td></td>
<td>PO(M)</td>
</tr>
<tr>
<td><em>Omolepida branchialis</em></td>
<td></td>
<td>PO(M) NK</td>
</tr>
<tr>
<td><em>Egerinia depressa</em></td>
<td></td>
<td>NK</td>
</tr>
<tr>
<td><em>Egerinia inornata</em></td>
<td></td>
<td>NR</td>
</tr>
<tr>
<td><em>Egerinia multiscutata bos</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Egerinia napoleonis</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Egerinia carinata</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Egerinia stokesii badia</em></td>
<td></td>
<td>NR</td>
</tr>
<tr>
<td><em>Sphenomorphia richardsonii</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Hemiergis initials initials</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Lerista distinguenda</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Lerista elegans</em></td>
<td></td>
<td>PO(M)</td>
</tr>
<tr>
<td><em>Lerista gerrardi</em></td>
<td></td>
<td>NK</td>
</tr>
<tr>
<td><em>Lerista macropisthophus</em></td>
<td></td>
<td>PO(N) NR</td>
</tr>
<tr>
<td><em>Lerista muelleri</em></td>
<td></td>
<td>PO(M)(N)</td>
</tr>
<tr>
<td><em>Lerista picturata picturata</em></td>
<td></td>
<td>PO(M)</td>
</tr>
<tr>
<td><em>Lerista praepedita</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Menetia greyii</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Morethia butteri</em></td>
<td></td>
<td>NR</td>
</tr>
<tr>
<td><em>Morethia lineoocellata</em></td>
<td></td>
<td>NR</td>
</tr>
<tr>
<td><em>Morethia obscura</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Tiliqua occipitalis</em></td>
<td>western blue-tongued lizard</td>
<td></td>
</tr>
<tr>
<td><em>(bobtail)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Tiliqua rugosa rugosa</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Varanidae (goannas)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Varanus caudolineatus</em></td>
<td></td>
<td>NK</td>
</tr>
<tr>
<td><em>Varanus gouldii gouldii</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Varanus tristis tristis</em></td>
<td></td>
<td>NK</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Typhlopidae (blind snakes)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Typhlina australis</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Typhlina bituberculata</em></td>
<td></td>
<td>NK</td>
</tr>
<tr>
<td><em>Typhlina pinguis</em></td>
<td></td>
<td>NK</td>
</tr>
<tr>
<td><em>Rhamphothyphlops hamatus</em></td>
<td></td>
<td>PO(N) NK</td>
</tr>
<tr>
<td><em>Rhamphothyphlops waitii</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Boidae (pythons)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Aspidites ramsayi</em></td>
<td>woma</td>
<td>G2 AR NK</td>
</tr>
<tr>
<td><em>Python spilota imbricatus</em></td>
<td>carpet python</td>
<td>G2 AR</td>
</tr>
<tr>
<td><em>Lialis stimsoni stimsoni</em></td>
<td></td>
<td>PO(K) NK</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elapidae (elapid snakes)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acanthophis pyrrhus</em></td>
<td>desert death adder</td>
<td>PO(M)</td>
</tr>
<tr>
<td><em>Brachyaspis atriceps</em></td>
<td></td>
<td>NK RE</td>
</tr>
<tr>
<td><em>Dendroaspis reticulata reticulata</em></td>
<td></td>
<td>NK</td>
</tr>
<tr>
<td>Species</td>
<td>Common Name</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td><em>Denisonia fasciata</em></td>
<td>Rosen's snake</td>
<td>NR</td>
</tr>
<tr>
<td><em>Furina ornata</em></td>
<td></td>
<td>NK</td>
</tr>
<tr>
<td><em>Brachyapsis curia</em></td>
<td></td>
<td>PO(M)</td>
</tr>
<tr>
<td><em>Neelaps bimaculatus</em></td>
<td>western black-naped snake</td>
<td>PO(K) NK</td>
</tr>
<tr>
<td><em>Pseudonaja australis</em></td>
<td></td>
<td>NR</td>
</tr>
<tr>
<td><em>Pseudonaja affinis affinis</em></td>
<td>dugite</td>
<td>NK</td>
</tr>
<tr>
<td><em>Pseudonaja modesta</em></td>
<td>ringed brown snake</td>
<td>NK</td>
</tr>
<tr>
<td><em>Pseudonaja nuchalis</em></td>
<td>western brown snake</td>
<td></td>
</tr>
<tr>
<td><em>Denisonia gouldii</em></td>
<td></td>
<td>NR</td>
</tr>
<tr>
<td><em>Denisonia monachus</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Denisonia nigriceps</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Vermicella bertholdi</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Vermicella fasciolata fasciolata</em></td>
<td></td>
<td>NK</td>
</tr>
<tr>
<td><em>Vermicella semifasciata semifasciata</em></td>
<td></td>
<td>PO(N) NR</td>
</tr>
</tbody>
</table>
## Appendix 7.

**Bird Species seen in the Shire of Trayning (Muir *et al*, 1981: Saunders and Ingram, 1994)**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emu</td>
<td>Dromaius novaehollandiae</td>
</tr>
<tr>
<td>Little black cormorant</td>
<td>Phalacrocorax sulcirostris</td>
</tr>
<tr>
<td>Black-throated grebe</td>
<td>Podiceps novaehollandiae</td>
</tr>
<tr>
<td>Hoary-headed grebe</td>
<td>Poliocephalus poliocephalus</td>
</tr>
<tr>
<td>White-faced heron</td>
<td>Ardea novaehollandiae</td>
</tr>
<tr>
<td>White-necked heron</td>
<td>Ardea pacifica</td>
</tr>
<tr>
<td>Straw-necked ibis</td>
<td>Threskiornis spinicollis</td>
</tr>
<tr>
<td>Mountain duck</td>
<td>Tadorna tadornoides</td>
</tr>
<tr>
<td>Black duck</td>
<td>Anas superciliosa</td>
</tr>
<tr>
<td>Grey teal</td>
<td>Anas clypeata</td>
</tr>
<tr>
<td>Wood duck</td>
<td>Chenonetta jubata</td>
</tr>
<tr>
<td>Black-shouldered kite</td>
<td>Elanus notatus</td>
</tr>
<tr>
<td>Square-tailed kite</td>
<td>Lophoictinia isura</td>
</tr>
<tr>
<td>Whistling kite</td>
<td>Milvus sphenurus</td>
</tr>
<tr>
<td>Brown goshawk</td>
<td>Accipiter fasciatus</td>
</tr>
<tr>
<td>Collared sparrowhawk</td>
<td>Accipiter cirrocephalus</td>
</tr>
<tr>
<td>Wedge-tailed eagle</td>
<td>Aquila audax</td>
</tr>
<tr>
<td>Little eagle</td>
<td>Hieraaetus morrhoides</td>
</tr>
<tr>
<td>Spotted harrier</td>
<td>Circus assimilis</td>
</tr>
<tr>
<td>Peregrine falcon</td>
<td>Falco peregrinus</td>
</tr>
<tr>
<td>Brown falcon</td>
<td>Falco berigora</td>
</tr>
<tr>
<td>Australian kestrel</td>
<td>Falco cenchroides</td>
</tr>
<tr>
<td>Stubble quail</td>
<td>Coturnix pectoralis</td>
</tr>
<tr>
<td>Brown quail</td>
<td>Coturnix ypsilophora</td>
</tr>
<tr>
<td>Little button quail</td>
<td>Turnix velox</td>
</tr>
<tr>
<td>Painted button-quail</td>
<td>Turnix varia</td>
</tr>
<tr>
<td>Black-tailed native hen</td>
<td>Gallinula ventralis</td>
</tr>
<tr>
<td>Bustard</td>
<td>Araeotis kori</td>
</tr>
<tr>
<td>Banded plover</td>
<td>Vanellus tricolor</td>
</tr>
<tr>
<td>Banded stilt</td>
<td>Cladorhyncha leucocephalus</td>
</tr>
<tr>
<td>Pied stilt</td>
<td>Himantopus himantopus</td>
</tr>
<tr>
<td>Red-necked avocet</td>
<td>Recurvirostra novaehollandiae</td>
</tr>
<tr>
<td>Bush-stone curlew</td>
<td>Burhinus grallarius</td>
</tr>
<tr>
<td>Laughing dove</td>
<td>Streptopelia senegalensis</td>
</tr>
<tr>
<td>Domestic pigeon</td>
<td>Columba livia</td>
</tr>
<tr>
<td>Common bronzewing</td>
<td>Phaps chalcoptera</td>
</tr>
<tr>
<td>Crested pigeon</td>
<td>Geophaps lophotes</td>
</tr>
<tr>
<td>Purple-crowned lorrikeet</td>
<td>Glossopsitta porphyrocephala</td>
</tr>
<tr>
<td>Port Lincoln ring-necked parrot</td>
<td>Barnardius zonarius</td>
</tr>
<tr>
<td>Mulga parrot</td>
<td>Psophus varius</td>
</tr>
<tr>
<td>Regent parrot</td>
<td>Polytelis anthepeplus</td>
</tr>
<tr>
<td>Elegant parrot</td>
<td>Neophema elegans</td>
</tr>
<tr>
<td>Budgerigar</td>
<td>Melopsittacus undulatus</td>
</tr>
<tr>
<td>Cockatiel</td>
<td>Leptolophus hollandicus</td>
</tr>
<tr>
<td>Carnaby's cockatoo</td>
<td>Calyptorhynchus funereus latirostris</td>
</tr>
<tr>
<td>Red-tailed black cockatoo</td>
<td>Calyptorhynchus banksii</td>
</tr>
<tr>
<td>Galah</td>
<td>Cacatua roseicapilla</td>
</tr>
<tr>
<td>Long-billed corella</td>
<td>Cacatua temuirostris</td>
</tr>
<tr>
<td>Pallid cuckoo</td>
<td>Cuculus pallidus</td>
</tr>
<tr>
<td>Fan-tailed cuckoo</td>
<td>Cuculus flabelliformis</td>
</tr>
<tr>
<td>Black-eared cuckoo</td>
<td>Chrysococcyx osculans</td>
</tr>
</tbody>
</table>
Horsfield's bronze-cuckoo
Shining bronze cuckoo
Barn owl
Barking owl
Boobook owl
Tawny frogmouth
Australian owlet-nightjar
Spotted nightjar
Sacred kingfisher
Red-backed kingfisher
Rainbow bee-eater
Welcome swallow
White-backed swallow
Tree martin
Fairy martin
Richard's pipit
Black face cuckoo shrike
White-winged triller
Jacky winter
Brown flycatcher
Red-capped robin
Western yellow robin
Golden whistler
Rufous whistler
Grey shrike-thrush
Crested bellbird
Grey fantail
Willy wagtail
Chestnut quail-thrush
Southern scrub-robin
White-browed babbler
Southern whiteface
Western flyeater
Weebill
Broad-tailed thornbill
Chestnut-rumped thornbill
Yellow-rumped thornbill
Redthroat
White-browed scrub wren
Shy hylacola
Blue-breasted fairy-wren
White-winged wren
Rufous songlark
Brown songlark
Varied sittella
Mistletoe-bird
Striated pardalote
Spotted pardalote
Yellow-rumped pardalote'
Silvereye
Brown honeyeater
Singing honeyeater
Yellow-plumed honeyeater
White-eared honeyeater
Brown-headed honeyeater
White-fronted honeyeater
Tawney-crowned honeyeater
Yellow throated miner
Chrysococcyx basilis
Chrysococcyx ludicus
Tyto alba
Ninox connivens
Ninox novaeseelandiae
Podargus strigoides
Aegotheles cristatus
Eurostopodus argus
Todirhamphus sancta
Todirhamphus pyrrhopogia
Merops ornatus
Hirundo neoxena
Cheramoeca leucosternum
Hirundo nigricans
Hirundo arde
Anthus novaeseelandiae
Coracina novaehollandiae
Lalage tricolor
Microeca leucophaea
Microeca leucophaea
Petroica goodenovii
Eopsaltria griseogularis
Pachycephala pectoralis
Pachycephala rufiventris
Collibricincla harmonica
Oreoica gutturalis
Rhipidura fuliginosa
Rhipidura leucophrys
Cinclosoma castanotum
Drymodes bruneopygia
Pomatostomus superciliosus
Aphelocephala leucopsis
Gerygone fusca
Smicrornis brevirostris
Acanthiza apicalis
Acanthiza uryppygalis
Acanthiza chrysorrhoea
Pyrrholaemus bruneus
Sericornis frontalis
Sericornis caurus
Malaria pallicerrimus
Malaria leucopeus
Cinclorhamphus mathewsi
Cinclorhamphus cruralis
Daphoenositta chrysoptera
Dicaeum hirundinaceum
Pardalotus striatus
Pardalotus punctatus
Pardalotus xanthogygus
Zosterops lateralis
Lichmera indistincta
Lichenostomus virescens
Lichenostomus ornatus
Lichenostomus leucotis
Melithreptus brevirostris
Phylidonyris albilons
Phylidonyris melanos
Manorina flavigula
<table>
<thead>
<tr>
<th>English Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spiny-cheeked honeyeater</td>
<td><em>Acanthagenys rufogularis</em></td>
</tr>
<tr>
<td>Red wattle bird</td>
<td><em>Anthoecaera carunculata</em></td>
</tr>
<tr>
<td>White-fronted chat</td>
<td><em>Ephialia alibrons</em></td>
</tr>
<tr>
<td>Zebra finch</td>
<td><em>Taeniopygia gutata</em></td>
</tr>
<tr>
<td>Magpie-lark</td>
<td><em>Grallina cyanoleuca</em></td>
</tr>
<tr>
<td>Black-faced wood-swallow</td>
<td><em>Artamus cinereus</em></td>
</tr>
<tr>
<td>Dusky wood-swallow</td>
<td><em>Artamus cyanopterus</em></td>
</tr>
<tr>
<td>Masked woodswallow</td>
<td><em>Artamus personatus</em></td>
</tr>
<tr>
<td>Grey butcherbird</td>
<td><em>Cracticus torquatus</em></td>
</tr>
<tr>
<td>Pied butcherbird</td>
<td><em>Cracticus nigrogularis</em></td>
</tr>
<tr>
<td>Australian magpie</td>
<td><em>Gymnornhina tibicen</em></td>
</tr>
<tr>
<td>Grey currawong</td>
<td><em>Strepera versicolor</em></td>
</tr>
<tr>
<td>Little crow</td>
<td><em>Corvus bennetti</em></td>
</tr>
<tr>
<td>Australian raven</td>
<td><em>Corvus coronoides</em></td>
</tr>
</tbody>
</table>
Appendix 8.

Sources of funding for projects aimed at land and nature conservation

Remnant Vegetation Protection Scheme
The Remnant Vegetation Protection Scheme (RVPS) was developed by the State Government in 1988 to enhance soil and nature conservation by protecting native vegetation on farm land. The Scheme (which is jointly administered by CALM and Western Australian Department of Agriculture [WADA], with WADA as the lead agency) provides a fifty percent subsidy towards to cost of protective fencing of native vegetation on farms. Landowners give an undertaking that the fenced vegetation will be managed for nature conservation for a period of at least thirty years.

To be granted a subsidy, the area of vegetation to be fenced must be five hectares or more, and must be in good condition or able to be rehabilitated to good condition.

National Landcare Program
The National Soil Conservation Program (NSCP) was established by the Federal Government in 1983 with the aim of developing and implementing a national strategy for the rehabilitation and sustainable use of the nation's soil and land resources. The program has provided funds to government, education and research institutions and landcare and other community groups for soil conservation projects, with particular emphasis given to fostering co-operation and co-ordination amongst government agencies and those in the local community working on land degradation problems.

In 1992/93, the Community grants section of the National Soil Conservation Program (NSCP), the One Billion Trees Program (OBT), the Save the Bush Program (STB) and the Federal Water Resources Assistance Program were integrated into a 'one-stop-shop' for community grants under the National Landcare Program. The aim of the NLP is to encourage community groups to responsibly manage and conserve land, water and biological diversity in their area.

One Billion Trees
The One Billion Trees (OBT) Program was initiated in 1989 by the Federal Government with the aim of catalysing revegetation projects aimed at land and nature conservation. It is administered in Western Australia by Greening Western Australia and the Australian Nature Conservation Agency (ANCA). The program provides grants for revegetation projects through the one-stop-shop for community groups under the National Landcare Program.

Save the Bush
The Save the Bush Program (STB) was established by the Federal Government in 1989 to assist with the preservation of biological diversity by the protection and management of remnant vegetation. It is administered by the Australian National Conservation Agency (ANCA) and by CALM in Western Australia. Grants from this scheme encourage, facilitate and support programs action and activities associated with the protection, management and investigation of remnant bush.
Ribbons of Green
Ribbons of Green is a community based Greening Western Australia project which started in 1989 with the aim of replanting and regenerating cleared strips of land with native plants and trees. The "Ribbons" are corridors along roads or rail reserves, along waterways or linking patches of bush. These 'Ribbons' may only contribute slightly to overall land conservation, but they are important for the conservation of wildlife by providing bush corridors. The details of what to plant, where and when to plant, are developed by the local community in consultation with Greening Western Australia, government departments (WADA, CALM and MRD), local government authorities, consultants and community groups.

Plants for Conservation
The aim of Plants for Conservation (PFC) is to support groups and individuals undertaking revegetation projects aimed at land and nature conservation.

The Plants for Conservation program provides more than 300,000 seedlings each year for revegetation projects aimed at land and nature conservation. It is managed by Greening Western Australia and sponsored by Alcoa of Australia and by the Hamel Nursery. With the sponsors support, Greening Western Australia provides the seedlings. Participating groups and individuals contribute additional seedlings, materials and labour towards the projects.

Gordon Reid Foundation for Conservation
The Gordon Reid Foundation for Conservation aims to provide funds or other support for the purposes of enhancing community involvement in conservation within Western Australia. Funds are provided for:
- the conservation of the Western Australian environment with emphasis on native flora and fauna;
- the identification and conservation of critical habitats and ecosystems;
- the conservation of rare, threatened and endangered species in WA;
- public education and awareness of environmental issues within WA;
- research or other studies into other matters related to any of the above.

State Landcare Program
The State Government introduced the State Landcare Program in the 1987 to support Land Conservation District Committees and catchment groups in combating land degradation problems in rural areas. Financial support is provided to LCDCs to undertake projects in catchment planning, demonstrate conservation practices and for communications and training in.
Appendix 9.

Projects in the Shire of Trayning which have been successful in receiving financial support through the State Landcare Program include:

<table>
<thead>
<tr>
<th>1989/90</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Title:</strong> Soil Conservation Techniques Demonstration.</td>
<td></td>
</tr>
<tr>
<td><strong>Project Location:</strong> Trayning Land Conservation District. Kodj Kodjin.</td>
<td></td>
</tr>
<tr>
<td><strong>Project Description:</strong> Implementing a soil conservation plan on the project site. To demonstrate flood mitigation and soil conservation techniques to LCDC members. Then for the implementation of these techniques on farms.</td>
<td></td>
</tr>
<tr>
<td><strong>State Assistance Requested:</strong> $5,550</td>
<td></td>
</tr>
<tr>
<td><strong>Contact Person:</strong> Don Hulls</td>
<td></td>
</tr>
<tr>
<td>Trayning WA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1992/93</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Title:</strong> Monitoring Watertables in Catchment Areas.</td>
<td></td>
</tr>
<tr>
<td><strong>Project Location:</strong> Trayning.</td>
<td></td>
</tr>
<tr>
<td><strong>Project Description:</strong> To encourage water control methods, encourage the planting of more indigenous trees and encourage landowners to adopt more appropriate and responsible land management practices. The sinking of piezometers to monitor water levels and ground water salinity.</td>
<td></td>
</tr>
<tr>
<td><strong>State Assistance Requested:</strong> $30,000</td>
<td></td>
</tr>
<tr>
<td><strong>Contact Person:</strong> Clem Kerp-Shire Clerk</td>
<td></td>
</tr>
<tr>
<td>PO Box 95</td>
<td></td>
</tr>
<tr>
<td>Trayning 6488</td>
<td></td>
</tr>
<tr>
<td><strong>Phone No:</strong> (096) 831 001 (BH)</td>
<td></td>
</tr>
<tr>
<td>(096) 831 154 (AH)</td>
<td></td>
</tr>
</tbody>
</table>