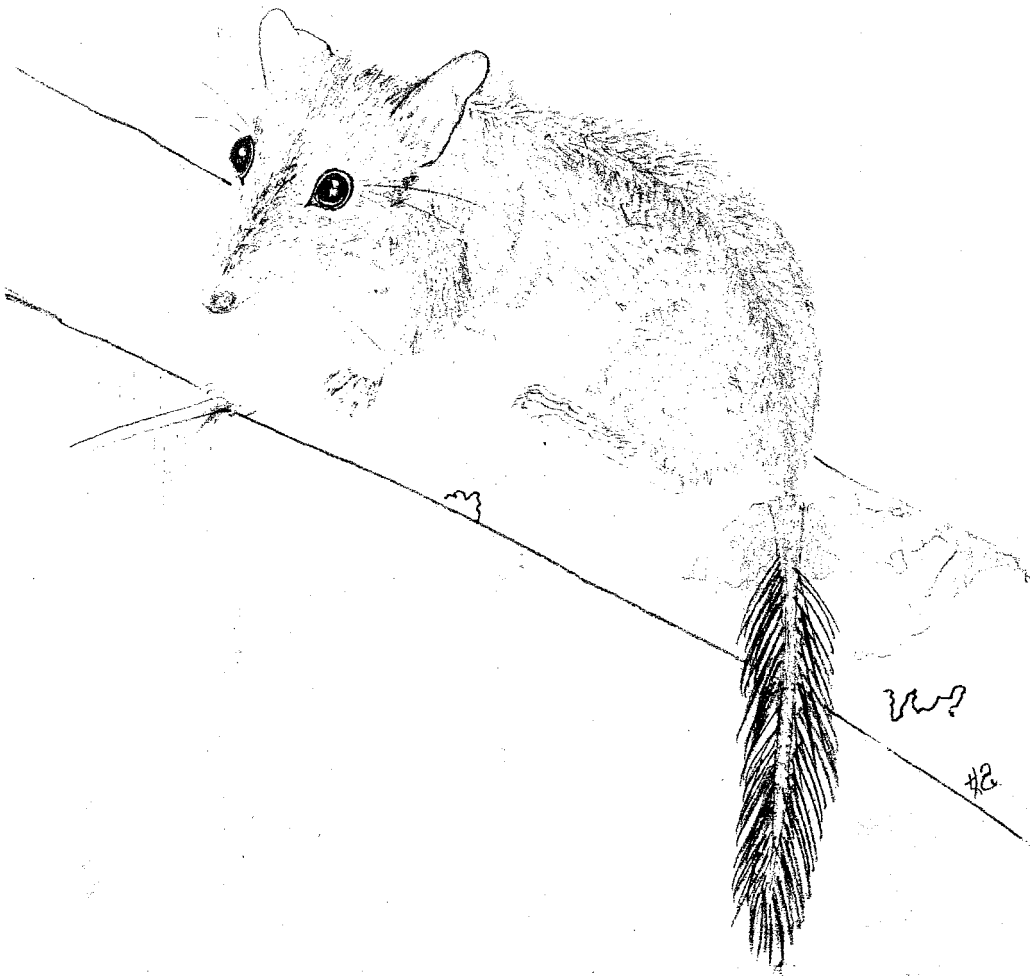


**Regional Assessment of the Wheatbelt of Western  
Australia:  
Central Wheatbelt**



by

Susan J. Wooller and Susan A. Moore  
in association with the Western Australian Natural Environment Evaluation Panel\*

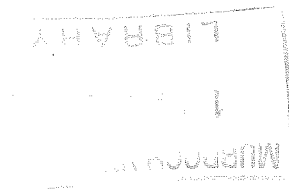
Prepared for the Australian Heritage Commission

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\* The Australian Heritage Commission established and relies on the Western Australian Natural Environment Evaluation Panel to provide advice to the Commission on natural environment heritage matters. Members are John Dell (Chairperson), Western Australian Museum; Jenny Davis, Murdoch University; Angas Hopkins, Department of Conservation and Land Management; John Huisman, Murdoch University; Kevin Kenneally, Department of Conservation and Land Management; Jonathon Majer, Curtin University of Technology; Ken McNamara, Western Australian Museum; Barry Muir, Muir Environmental; and Les Pettitt, Wheatbelt Aboriginal Corporation.

Cover drawing of *Phascogale calura* (red-tailed phascogale) by Fiona Scarff.

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## Summary

The Australian Heritage Commission (AHC) is responsible for identifying and providing advice to the Commonwealth Government about Australia's National Estate. The Register of the National Estate (RNE) is the comprehensive list of places throughout Australia that are deemed to be of National Estate significance as defined in the Australian Heritage Commission Act 1975 (Commonwealth). The objectives of this study were: to assess and determine places of natural National Estate significance in the central region of Western Australian Wheatbelt and, as part of this assessment, to document the assessment and consultation methods used as well as establish and maintain a relational database, capable of linking to a GIS, of places evaluated.

A six step assessment process was used. *Step 1* involved identifying all possible places for assessment, with the proviso that the vast majority of information available related to public, rather than private, lands. The next steps were collecting information on each place and then deciding if there was sufficient information for a place to be assessed (*Steps 2 and 3*). If there was, then the possibility of nominating the place to the Register of the National Estate was considered, as *Step 4*. In this step, for each place, information was collected on a number of attributes, for example rare flora. Information on attributes was used to determine, for the AHC nomination criteria, if the 'threshold of significance' had been met or exceeded. If this threshold was met or exceeded for one or more criterion, then the place was regarded as potentially suitable for listing. *Step 5* involved stakeholder review of the completed assessment, made available as a draft report for comment. The review had two purposes - to check and amend as necessary the assessment's factual content and to seek advice regarding places for nomination to the Register. *Step 6* involved determination, by the AHC Western Australian Natural Environment Evaluation Panel, of places for nomination. Preparation of nominations followed.

Consideration for nomination requires a place to meet or exceed the threshold of significance for one or more criterion. This was the case for 121 (60 %) of the 204 places assessed. Five places reached the threshold for all five of the criteria: Boyagin, Dongolocking, Dragon Rocks, Mt Stirling, and Yornaning Nature Reserves. Of these, Yornaning Nature Reserves is not listed or interim listed on the Register. Another ten places met the threshold for four criteria: Bendering, Cairn and Clackline Nature Reserves, Corrigin Water Reserve and Aerodrome Reserve, Dryandra Forest, and Lake Toolibin, Mokine and North Kalgarin Nature Reserves, Reserve 29313, and St Ronans Nature Reserve. Of these Bendering and Cairn Nature Reserve, Corrigin Water Reserve and Aerodrome Reserve, Mokine Nature Reserve, Reserve 29313 and St Ronans Nature Reserve and are not listed or interim listed on the Register. A further 10 remnants meet the threshold for three criteria. These are Avon Location 19769, Boolanelling Nature Reserve, Burracoppin Reserve, Charles Gardner Reserve, Lake Hurlstone Reserve System, Lake Towerrinning and Mooraning Nature Reserves, Noondeening Hill, Reserve 28940, and Tarin Rock Nature Reserve Reserve. The threshold for two criteria was met by a further 38 places.

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# 1. Introduction

## 1.1 Reason for the Study and Objectives

The Australian Heritage Commission is responsible for identifying and providing advice to the Commonwealth Government about Australia's National Estate. This study resulted from concerns regarding the small amount (about 20 %) of remnant natural vegetation remaining in the Wheatbelt of Western Australia. The Wheatbelt, with an area of 19 million ha, is the cereal-producing area in the south-west of the State. The area has been cleared extensively for agriculture and is threatened by rising salinity levels. The Western Australian Government is currently developing and implementing a Salinity Action Plan (SAP) (Agriculture Western Australia *et al.*, 1996; State Salinity Council in association with Community Groups and Government Agencies, 1998) to reduce further deterioration of agricultural land. The plan also aims to protect and restore key water resources and high value wetlands, and to maintain natural, biological and physical diversity within agricultural areas of Western Australia.

As part of the Salinity Action Plan, the Department of Conservation and Land Management is undertaking a flora and fauna survey of the Wheatbelt. Agriculture WA is preparing handbooks and atlases of the remnant vegetation and natural resources of the catchments in the Wheatbelt. In addition, the Department of Conservation and Land Management and Murdoch University are focusing their research and management energies on threatened ecological communities in the Wheatbelt, plus other areas. Information flowing from these studies will be incorporated in this project.

The Register of the National Estate (RNE) is the comprehensive list of places throughout Australia that are deemed to be of National Estate significance as defined in the Australian Heritage Commission Act 1975 (Commonwealth). For administrative purposes, entries in the Register (and nominations to the Register) are divided into cultural places (Aboriginal and built) and natural places; however, it is recognized that a place may have a combination of cultural and natural values. This project focuses on natural environment places. Places can be registered on the National Estate, or interim listed, or indicative places. A preferred approach to the development of the Register is to undertake regional or thematic studies to provide a context for entries. This project is both regional and thematic; it deals comprehensively with a single area (an identified region in socio-political terms), as well as assessing the values of remnant natural vegetation throughout that whole area.

The objectives of this study were:

- 1) to assess and determine places of natural National Estate significance in the Central Western Australian Wheatbelt;
- 2) as part of this assessment, to document the assessment and consultation methods used as well as establish and maintain a relational database, capable of linking to a GIS, of places evaluated; and
- 3) to provide nominations for listing on the Register of the National Estate.

The project also involved reviewing and, where necessary, up-dating existing natural environment entries in the Register of the National Estate, and compiling additional nominations. The assessment aims to provide a credible, comprehensive list of Places of National Estate significance. The basic tool for the assessment is an integrated database which contains the available information on the natural vegetation, landscapes, fauna and other National Estate values of the region.

## 1.2 Project Area

For the purposes of this study, the Wheatbelt (Figure 1) is defined as that part of the south-west receiving between 600 and 300 mm rainfall per year. It lies within the South West Botanical Province and includes the Avon-Wheatbelt Biogeographic Region defined by the Interim Biogeographic Regionalisation for Australia (IBRA), together with portions of the Geraldton Sandplains, Swan Coastal Plain, Jarrah Forest, Mallee, and Esperance Plains regions. A total of 15 m ha or 80% has been cleared for agriculture. Some 2.3 m ha (12%) (Saunders and Ingram, 1995) exists as national parks and approximately 500 nature reserves (Kitchener *et al.*, 1980a; Kitchener *et al.*, 1980b), or other categories of Crown land, including vacant Crown land. This includes three large nature reserves. The remaining nature reserves are quite small and three-quarters of them are less than 400 ha (Kitchener *et al.*, 1980a; Kitchener *et al.*, 1980b). Many of the nature reserves are less than 20 ha (Saunders and Ingram, 1995). The remaining 1.5 m ha (8%) of the Wheatbelt is mainly small, scattered remnants of native vegetation on private land.

For the purposes of this study, the Wheatbelt Region was subdivided into a central section (Great Eastern Highway to the Dumbleyung - Lake Grace - Newdegate - Lake King Road), a southern section (Lake Grace - Lake King Road to the south coast and eastwards to Cape Arid), and a northern section (Kalbarri /Northampton to the Great Eastern Highway) (Figure 1). It was hoped that these three areas would be worked on sequentially. This report addressed the Central Wheatbelt, where 93% of the land has been cleared, with the majority of the remnant native vegetation (approximately 85 %) unfenced and on private property (Saunders and Ingram, 1995).

### 1.2.1 Climate

The climate of the Wheatbelt is Mediterranean and rain falls mainly in winter while summers are dry (Beard, 1981). Rainfall varies from 600 mm per annum on the western side of the Wheatbelt to 300 mm on the eastern side. Between 1913 and 1986 parts of the Wheatbelt had a 4 – 5 % decrease in winter rainfall (Pittock, 1988).

### 1.2.2 Geology

The geology of the most northerly, inland section of the Wheatbelt is mainly sedimentary basins exposing Permian to Cretaceous sediments. The coastal Northern Wheatbelt has Mesozoic to recent sediments, while the Central Wheatbelt around Northam is Archaean granites with infolded metamorphics of the Yilgarn Block. The Southern Wheatbelt is Archaean and Proterozoic granites, but they are overlain in the east by Early Tertiary sediments. In the very south-east mainly Eocene sediments with outcrops of granites and quartzites occur (Beard, 1981).



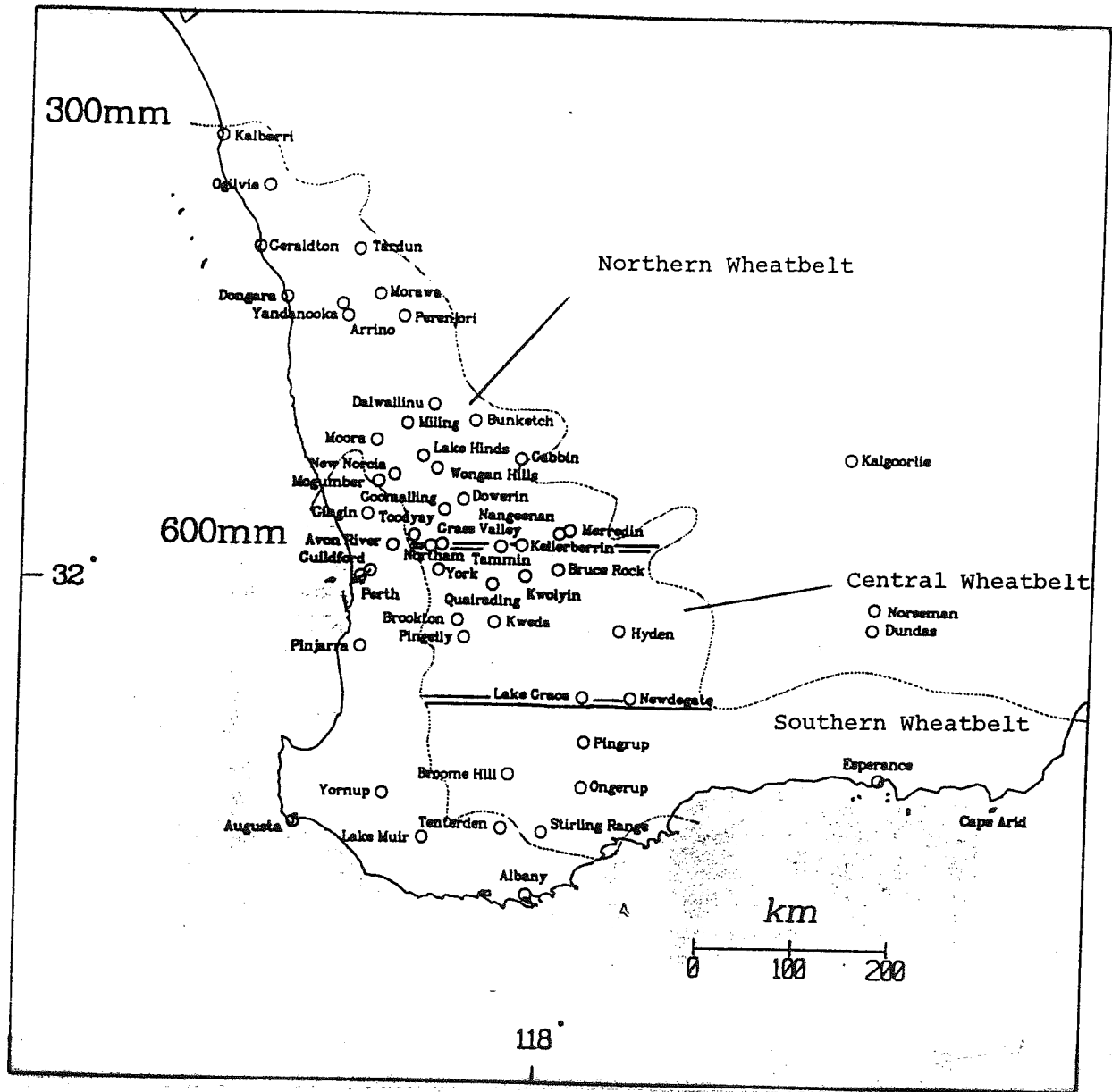


Figure 1. Map of South-western Australia showing the 300 and 600 mm rainfall isohyets. The Wheatbelt is the area lying between the two isohyets. (Source: Saunders and Ingram, 1995).

### 1.2.3 Soils

It has long been recognised that most Western Australian soils are of low to extremely low natural fertility. This is because of the great age of the landscape and the low levels of phosphate in the parent rocks. The only soils possessing reasonably natural fertility in the Wheatbelt are some of the young soils on alluvia or fresh rock. These include the York Gum soils of the Central Wheatbelt. As a consequence of low soil fertility, the use of super-phosphate to enrich the soils used for agriculture was introduced in the 1890s (Beard, 1981).

### 1.2.4 Clearing for agriculture

Clearing of vegetation was slow for the first half of the twentieth century. However, after the Second World War clearing accelerated (Main, 1993). Patterns of clearing vary throughout the Wheatbelt depending upon when development took place. Areas along main roads and railway lines, which were developed during the pioneering phase of clearing, have been more extensively cleared than areas developed more recently (Coates, 1987). For example, in the Shire of Cunderdin, where clearing began in the early nineteenth century, only 3 % of the original vegetation remains. Similarly, in the Shire of Tammin only 7 % remains (Saunders and Ingram, 1995). In areas more recently developed, more of the original vegetation remains. For example, in the Shire of Lake Grace about 31 % of the original vegetation remains (Coates, 1987).

### 1.2.5 Vegetation

The original vegetation varies from species-rich heathlands and shrublands on the deep sands and laterites of the uplands, to mallee and woodland associations on the valley slopes, down to fresh water and salt-lake systems on the valley floors (Saunders and Ingram, 1995). The flora of the region is species-rich, with a large number of endemics. There are about 8,000 species of plants in the region and three-quarters of these are found nowhere else (Hopper, 1992). The area is important for nature conservation as over 40 % of Australia's higher plants occur here. With the loss of the large proportion of this original vegetation there have been major impacts on the region's biota. A total of 1,372 species of plants are listed as rare or priority flora in the Wheatbelt and nearby areas (J. Riley, Department of Conservation and Land Management, personal communication, 1998), of which 224 species are rare. In addition, at least 18 species of plants are believed to be extinct (J. Riley, Department of Conservation and Land Management, personal communication, 1999).

The remnant vegetation that does survive is in danger of being degraded as a result of grazing by rabbits and domestic livestock, and changed ecological conditions in the surrounding agricultural lands. One consequence of agricultural development has been that the changing hydrological balance and rising water tables are threatening both remnant vegetation and agricultural land (Saunders and Ingram, 1995). An assessment of the conservation value of remnant vegetation in the Central Wheatbelt, using satellite imagery, showed that only 3% of the area of original vegetation could be considered to be in good condition (Lambeck and Wallace, 1993).

### 1.2.6 Fauna

With the great loss of habitat it is inevitable that the region's fauna must have been dramatically affected. Approximately 90 % of the habitat originally available has been removed and somewhere about this percentage of the total number of animals dependent upon that habitat

must have been lost (Saunders and Ingram, 1995). The highest rates of decline and extinction of native mammals in biomes of Western Australia have occurred in the Wheatbelt. By the 1970s, of the 43 species of native mammal (excluding bats) believed to have occurred in the Wheatbelt at European settlement, 13 species had disappeared from the region and only 12 were abundant or moderately abundant (Kitchener *et al.*, 1980b). Mammals continue to disappear from remnants of vegetation. There are limited data on some animal groups, particularly the invertebrates. Little is known of the invertebrates which were present before clearing and there is still very little known about what occurs in the region now (Kitchener *et al.*, 1980b).

### 1.2.7 Salinity

Ocean-derived salt is continuously transported inland and deposited with rainfall. In the Central Wheatbelt the amount of salt stored in the soil profile varies from an average of 247 tonnes ha<sup>-1</sup> upslope to around 13,500 tonnes ha<sup>-1</sup> in valley floors (McFarlane *et al.*, 1993). With the water tables rising in some cases over 20 m since the 1920s (George *et al.*, 1995) as a result of clearing of the original deep-rooted vegetation, salt is coming to the surface.

## 2. Methods and Results

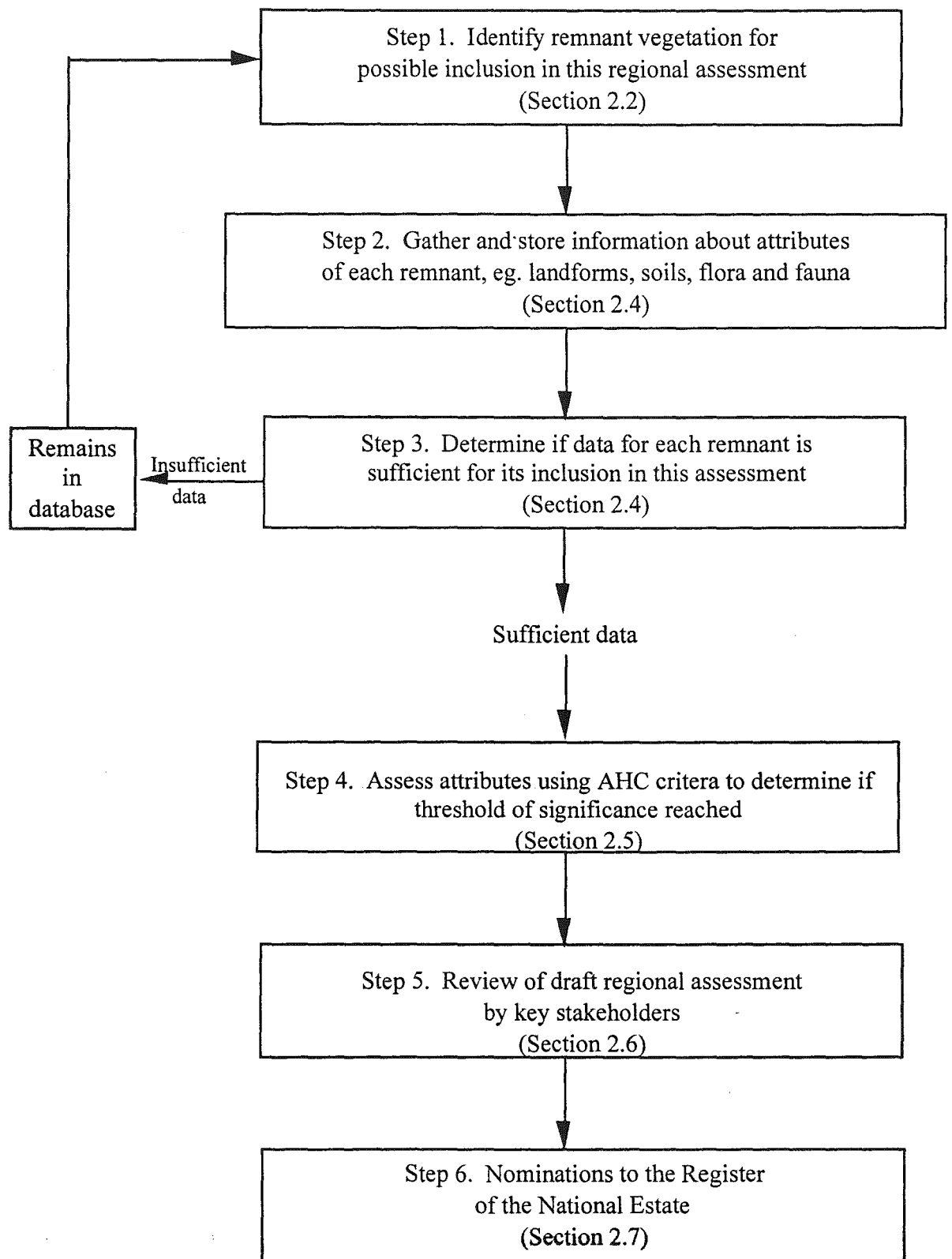
### 2.1 Overview of Methods and Results

The study methods, as described in detail in the following section and summarised in Figure 2, are similar to those used in the Victorian Central Highlands Joint Forests Project (Australian Heritage Commission, 1994) and Phase One of The Australian Heritage Commission's study of the National Estate Values in the Southern Forest Region of South-western Australia (Australian Heritage Commission and Department of Conservation and Land Management, 1992a; Australian Heritage Commission and Department of Conservation and Land Management, 1992b; Australian Heritage Commission and Department of Conservation and Land Management, 1992c; Australian Heritage Commission and Department of Conservation and Land Management, 1992d; Australian Heritage Commission and Department of Conservation and Land Management, 1992e). This report and associated assessment addresses the Central Wheatbelt. One of the principal aims of regional assessments of heritage values is to provide a context for subsequent nominations of places to the Register of the National Estate. As such, a series of nominations for the Central Wheatbelt are expected to follow finalisation of this assessment.

The remainder of this section describes in detail the assessment processes used (Figure 2) and associated results. The assessment was based on six steps and is a similar process to that applied earlier this decade to natural heritage assessments in Victoria and Western Australian forests. *Step 1* involved identifying all possible places for assessment, with the proviso that the vast majority of information available related to public, rather than private, lands. The next steps were collecting information on each place and then deciding if there was sufficient information for a place to be assessed (*Steps 2 and 3*). If there was, then the possibility of nominating the place to the Register of the National Estate was considered, as *Step 4*. In this step, for each place information was collected on a number of attributes, for example rare flora. Information on attributes was used to determine, for the Australian Heritage Commission nomination criteria, if the 'threshold of significance' had been met or exceeded. If this threshold was met or exceeded for one or more criterion, then the place was regarded as potentially suitable for listing. *Step 5* involved stakeholder review of the completed assessment (made available as a draft report for comment). The review had two purposes - to check and amend as necessary the assessment's factual content and to seek advice regarding places for nomination to the Register. *Step 6*, closely related to *Step 5*, involved determination by the Western Australian Natural Environment Evaluation Panel of places for nomination. *Step 6* involved this Panel drawing on the assessment, stakeholder feedback and professional judgement for decision making. Preparation of nominations followed.

Before exploring in detail the assessment processes and results, a brief overview of the results follows. In *Step 1*, 204 places were identified for possible assessment (Table 1). Details of these places are given in Appendices 1 and 2. Of these approximately 61% were forest, reserves or nature reserves managed by the Department of Conservation and Land Management, 36% were other public lands, and 3% privately owned. Vesting authorities included the National Parks and Nature Conservation Agency (61%), Water and Rivers Commission, Water Authority of Western Australia, or the Minister for Water Resources (10%), Local Authorities (6%), Western Australian National Parks and Reserves Association (1 reserve), Aboriginal Lands Trust (1 reserve) or the vesting was not given. Another 1% was unvested.

Information was gathered and stored for 145 attributes (*Step 2*). There was sufficient data for most places to be included in this assessment (*Step 3*). Ten of these places are currently listed



**Figure 2. Flow diagram showing main steps in Central Wheatbelt regional assessment**

**Table 1. Remnant vegetation in the Central Wheatbelt meeting thresholds for criteria A1-3, B1 and C1 (Step 4 of regional assessment)**

Remnant	Threshold <sup>o</sup>	A 1	A 2	A 3	B 1	C
Avon Location 19769	A1, A3, B1	Threshold		Threshold	Threshold	
Badjaling Nature Reserve	B1, C1				Threshold	Threshold
Badjaling North Nature Reserve						
Badjaling West Nature Reserve						
Belka Reserve	A2, B1		Threshold		Threshold	
Bendering Reserve	A1, A2, A3, B1, C1	Threshold	Threshold	Threshold	Threshold	Threshold
Bewnellling Nature Reserve	B1				Threshold	
Blechynden-Haily Block	A2, B1		Threshold		Threshold	
Boolanelling Nature Reserve	A1, A3, B1	Threshold		Threshold	Threshold	
Booraan Nature Reserve	B1				Threshold	
Boyagin Nature Reserve*	A1, A2, A3, B1, C1	Threshold	Threshold	Threshold	Threshold	Threshold
Boyer mucking Nature Reserve						
Bruce Rock Nature Reserve						
Bugin Nature Reserve						
Bungulla Nature Reserve						
Burracoppin Reserve	A2, A3, B1		Threshold	Threshold	Threshold	
Cairn Nature Reserve	A1, A3, B1, C1	Threshold		Threshold	Threshold	Threshold
Camel Peaks	C1					Threshold
Camping Reserve (12109)	B1				Threshold	
Casuarina Nature Reserve						

**Table 1. Remnant vegetation in the Central Wheatbelt meeting thresholds for criteria A1-3, B1 and C1 (Step 4 of regional assessment) (cont.)**

Remnant	Threshold°	A 1	A 2	A 3	B 1	C
Charles Gardner Reserve*	A1, A3, B1	Threshold		Threshold	Threshold	
Clackline Nature Reserve*	A1, A3, B1, C1	Threshold		Threshold	Threshold	Threshold
Corrigin Water Reserve and Aerodrome Reserve	A1, A2, A3, B1	Threshold	Threshold	Threshold	Threshold	
Craig Nature Reserve	A2		Threshold			
Dangin Nature Reserve	A2, A3		Threshold	Threshold		
Dattening Nature Reserve						
Dead Mans Swamp Nature Reserve	A2, B1		Threshold		Threshold	
Dongolocking Nature Reserve†	A1, A2, A3, B1, C1	Threshold	Threshold	Threshold	Threshold	Threshold
Dragon Rocks Nature Area*	A1, A2, A3, B1, C1	Threshold	Threshold	Threshold	Threshold	Threshold
Drummond Nature Reserve	B1				Threshold	
Dryandra Forest*	A2, A3, B1, C1		Threshold	Threshold	Threshold	Threshold
Dulbellin Nature Reserve						
East Yorkrakine Nature Reserve	C1					Threshold
Emu Hill Reserve						
Emu Rock	A2, B1		Threshold		Threshold	
Glenluce Nature Reserve	A2, B1		Threshold		Threshold	
Gorge Rock Nature Reserve	B1, C1				Threshold	Threshold
Graham Rock Nature Reserve	A2, B1		Threshold		Threshold	
Gundaring Nature Reserve	A3			Threshold		
Gundaring Lake Nature Reserve	A2, B1		Threshold		Threshold	

**Table 1. Remnant vegetation in the Central Wheatbelt meeting thresholds for criteria A1-3, B1 and C1 (Step 4 of regional assessment) (cont.)**

Remnant	Threshold	A1	A2	A3	B1	C
Highbury Nature Reserve†	A3			Threshold		
Hines Hill Nature Reserve						
Hotham River Nature Reserve	B1				Threshold	
Ibis Lake Nature Reserve	A2, B1		Threshold		Threshold	
Jennaberrig Nature Reserve						
Jilakin Rock	A1	Threshold				
Jingaring Nature Reserve	A3			Threshold		
Jitarning Nature Reserve						
Jura Nature Reserve						
Karlgarin Hill Nature Reserve	A2, B1?		Threshold		Threshold	
Koberbin Nature Reserve	C1					Threshold
Kokerbin Hill	C1					Threshold
Kondinin Salt Marsh Nature Reserve	A2, B1		Threshold		Threshold	
Koolberin Nature Reserve						
Kulin Nature Reserve						
Kumminin Reserve						
Kwolyin Nature Reserve	A2, B1		Threshold		Threshold	
Kwolyin Hill						
Lake Hurlstone Reserve System	A2, A3, B1		Threshold	Threshold	Threshold	



**Table 1. Remnant vegetation in the Central Wheatbelt meeting thresholds for criteria A1-3, B1 and C1 (Step 4 of regional assessment) (cont.)**

Remnant	Threshold	A1	A2	A3	B1	C
Lake King Nature Reserve	A2, B1		Threshold		Threshold	
Lake Toolibin Nature Reserve*	A2, A3, B1, C1		Threshold	Threshold	Threshold	Threshold
Lake Towerinning Nature Reserve	A1, B1, C1		Threshold		Threshold	Threshold
Lansdell's Property						
Little White Lake Nature Reserve	A2, B1		Threshold		Threshold	
Maublarling Nature Reserve	A3, B1			Threshold	Threshold	
Mears Lake Nature Reserve	A2, B1		Threshold		Threshold	
Meckering Fault Scarp†	A1	Threshold				
Meenaar Nature Reserve	A2, B1		Threshold		Threshold	
Merredin Nature Reserve	A3			Threshold		
Mokami Springs						
Mokine Nature Reserve	A1, A3, B1, C1	Threshold		Threshold	Threshold	Threshold
Mooradung Nature Reserve	B1				Threshold	
Moورانing Nature Reserve	A1, A2, B1	Threshold	Threshold		Threshold	
Moورانing Nature Reserve and Water Reserve						
Moorumbine Nature Reserve						
Mortlock River East Nature Reserve or Wyola						
Moulien Nature Reserve						
Mournucking Nature Reserve	B1				Threshold	

**Table 1. Remnant vegetation in the Central Wheatbelt meeting thresholds for criteria A1-3, B1 and C1 (Step 4 of regional assessment) (cont.)**

Remnant	Threshold	A1	A2	A3	B1	C
Mt Stirling Nature Reserve†	A1, A2, A3, B1, C	Threshold	Threshold	Threshold	Threshold	Threshold
Mt. Cramphorne Reserve						
Mungerungcutting Nature Reserve	A2		Threshold			
Nallian Nature Reserve	C1					Threshold
Nangeenan Nature Reserve	A3, C1			Threshold		Threshold
Nomans-Bokan Lakes Nature Reserve	A2, B1		Threshold		Threshold	
Noombling Nature Reserve						
Noonalling and Whitewater Reserve	A2, B1		Threshold		Threshold	
Noondeening Hill†	A2, B1, C1		Threshold		Threshold	Threshold
Noonying Lake Nature Reserve						
Norpa Nature Reserve	B1				Threshold	
North Jitarning Nature Reserve	A3			Threshold		
North Kalgarin Nature Reserve*	A2, A3, B1, C1		Threshold	Threshold	Threshold	Threshold
North Tarin Rock Nature Reserve	A2, B1		Threshold		Threshold	
North Woywering Nature Reserve	A3			Threshold		
Overheu Nature Reserve						
Pantapin Nature Reserve	A1, A2	Threshold	Threshold			
Paper Bark Nature Reserve 1	A2, A3		Threshold	Threshold		
Paper Bark Nature Reserve 2	A2, A3		Threshold	Threshold		
Parkeyerring Lake Nature Reserve	A2, B1		Threshold		Threshold	
Petercarring Nature Reserve						

**Table 1. Remnant vegetation in the Central Wheatbelt meeting thresholds for criteria A1-3, B1 and C1 (Step 4 of regional assessment) (cont.)**

Remnant	Threshold	A1	A2	A3	B1	C
Pikaring Hill Reserve	B1				Threshold	
Pikaring West Nature Reserve						
Private property, south of Popanyinning	B1				Threshold	
Quairading Spring Nature Reserve	B1				Threshold	
Querekin Rock Remnant	C1					Threshold
Red Lake Nature Reserve	A2		Threshold			
Reserve 10719	A3, B1			Threshold	Threshold	
Reserve 11024	A2		Threshold			
Reserve 13217						
Reserve 13565	A3			Threshold		
Reserve 13594	C1					Threshold
Reserve 14520						
Reserve 14694	A2		Threshold			
Reserve 15199						
Reserve 15855	A3, B1			Threshold	Threshold	
Reserve 16288						
Reserve 17420						
Reserve 17824						
Reserve 18444						
Reserve 1864						

**Table 1. Remnant vegetation in the Central Wheatbelt meeting thresholds for criteria A1-3, B1 and C1 (Step 4 of regional assessment) (cont.)**

Remnant	Threshold	A 1	A 2	A 3	B 1	C
Reserve 19119	A3			Threshold		
Reserve 19138	A3, C1			Threshold		Threshold
Reserve 20878	A3			Threshold		
Reserve 2275						
Reserve 22906						
Reserve 22967						
Reserve 23137						
Reserve 23366						
Reserve 23637						
Reserve 24097						
Reserve 24179						
Reserve 25872						
Reserve 25979	B1				Threshold	
Reserve 26661	B1				Threshold	
Reserve 26669	A3			Threshold		
Reserve 26897						
Reserve 27639	A3			Threshold		
Reserve 27644	A3			Threshold		
Reserve 28047						
Reserve 28319						

**Table 1. Remnant vegetation in the Central Wheatbelt meeting thresholds for criteria A1-3, B1 and C1 (Step 4 of regional assessment) (cont.)**

Remnant	Threshold	A1	A2	A3	B1	C
Reserve 28715						
Reserve 28940	A2, A3, B1		Threshold	Threshold	Threshold	
Reserve 29313	A2, A3, B1, C1		Threshold	Threshold	Threshold	Threshold
Reserve 29589						
Reserve 29906						
Reserve 30299						
Reserve 30324						
Reserve 34295	A3			Threshold		
Reserve A13594						
Rose Road Reserve	A3			Threshold		
Sale's Rock Remnant	C1					Threshold
Scriveners Rock Hole Nature Reserve	A3			Threshold		
Seagroatt Nature Reserve and Reserve 25979	A2, B1		Threshold		Threshold	
Sewell Rock Nature Reserve	A3			Threshold		
Shackleton Nature Reserve						
Sorensens Nature Reserve	A3			Threshold		
South Badjaling Nature Reserve	C1					Threshold
South Kulin Nature Reserve	A3			Threshold		
St Ronans Nature Reserve	A1, A2, A3, C1	Threshold	Threshold	Threshold		Threshold
St Ronans Well, York	B1				Threshold	

**Table 1. Remnant vegetation in the Central Wheatbelt meeting thresholds for criteria A1-3, B1 and C1 (Step 4 of regional assessment) (cont.)**

Remnant	Threshold	A 1	A 2	A 3	B 1	C
Taarblin Lake Nature Reserve	A2, B1		Threshold		Threshold	
Tammin Railway Dam Nature Reserve						
Tarin Rock Nature Reserve*	A2, B1, C1		Threshold		Threshold	Threshold
The Ovens (2023)	B1, C1				Threshold	Threshold
Throssell Nature Reserve	B1				Threshold	
Tutanning Nature Reserve*	A2, A3, B1, C1	Threshold	Threshold	Threshold	Threshold	Threshold
Ulva Nature Reserve						
Wambyn Nature Reserve	A1, B1	Threshold			Threshold	
Wandering Lake Nature Reserve	A2, B1		Threshold		Threshold	
Water Reserve 10125						
Water Reserve 10187						
Water Reserve 10644						
Water Reserve 11029	B1				Threshold	
Water Reserve 11222						
Water Reserve 1153						
Water Reserve 11649						
Water Reserve 12363						
Water Reserve 13035 and 15027						
Water Reserve 13172						
Water Reserve 13176						

**Table 1. Remnant vegetation in the Central Wheatbelt meeting thresholds for criteria A1-3, B1 and C1 (Step 4 of regional assessment) (cont.)**

Remnant	Threshold	A1	A2	A3	B1	C
Water Reserve 13327						
Water Reserve 13502	B1				Threshold	
Water Reserve 13536						
Water Reserve 14014						
Water Reserve 14171	B1				Threshold	
Water Reserve 15668						
Water Reserve 16582						
Water Reserve 244						
Water Reserve 25002						
Water Reserve 35598						
Water Reserve 5314						
Water Reserve 9448						
Wave Rock <sup>†</sup>	B1				Threshold	
White Lake Nature Reserve	B1				Threshold	
Wialkutting Nature Reserve						
Windmill Hill Railway Cutting <sup>†</sup>	B1, C1				Threshold	Threshold
Wogerlin Hill Reserve						
Wulyaling Nature Reserve						
Yandinilling Nature Reserve	A3			Threshold		

**Table 1. Remnant vegetation in the Central Wheatbelt meeting thresholds for criteria A1-3, B1 and C1 (Step 4 of regional assessment) (cont.)**

Remnant	Threshold	A 1	A 2	A 3	B 1	C
Yarding Nature Reserve						
Yenyening Lakes (Beverley Lakes Nature)	A2, B1		Threshold		Threshold	
Yilgerin Rock						
Yormaning Nature Reserve	A1, A2, A3, B1, C1	Threshold	Threshold	Threshold	Threshold	Threshold
Yoting Town Reserve	C1					Threshold
Yoting Water Reserve	C1					Threshold

o Criteria described in Table 2.

\* Register of the National Estate listed.

† Interim listed.



on the Register of the National Estate: Boyagin Nature Reserve, Charles Gardner Reserve, Clackline Nature Reserve, Dragon Rocks Nature Reserve, Dryandra Forest, Lake Toolibin Nature Reserve, Mt Stirling Nature Reserve, North Kalgarin Nature Reserve, Tarin Rock Nature Reserve and Tutanning Nature Reserve. Six are interim listed: Dongolocking Nature Reserve, Highbury Nature Reserve, Meckering Fault Scarp, Noondeening Hill, Wave Rock and Windmill Hill Railway Cutting. Consideration for nomination requires a place to meet or exceed the threshold of significance for one or more criterion, *Step 4*. This was the case for 126 (60 %) of the places assessed (Table 1). In summary, five places reached the threshold for all five of the criteria: Boyagin, Dongolocking, Dragon Rocks, Mt Stirling, and Yornaning Nature Reserves. Of these, Yornaning Nature Reserves is not listed or interim listed on the Register. Another ten places met the threshold for four criteria: Bendering, Cairn and Clackline Nature Reserves, Corrigin Water Reserve and Aerodrome Reserve, Dryandra Forest, and Lake Toolibin, Mokine and North Kalgarin Nature Reserves, Reserve 29313, and St Ronans Nature Reserve. Of these Bendering and Cairn Nature Reserve, Corrigin Water Reserve and Aerodrome Reserve, Mokine Nature Reserve, Reserve 29313 and St Ronans Nature Reserve are not listed or interim listed on the Register. A further 10 remnants meet the threshold for three criteria. These are Avon Location 19769, Boolanelling Nature Reserve, Burracoppin Reserve, Charles Gardner Reserve, Lake Hurlstone Reserve System, Lake Towerrinning and Mooraning Nature Reserves, Noondeening Hill, Reserve 28940, and Tarin Rock Nature Reserve. The threshold for two criteria was met by a further 38 places.

*Step 5* involved forwarding the draft to the Western Australian Natural Environment Evaluation Panel for review. The revised draft was then sent to the Australian Heritage Commission, CALM Science (the Western Australian Department of Conservation and Land Management's research division), and other key stakeholders. The purpose of the review was twofold: to check the factual content of the report; and to gain input on remnants for possible nomination to the Register of the National Estate.

In *Step 6* the WA Natural Environment Evaluation Panel in consultation with the WA Australian Heritage Commission Research Officer identified remnants for nomination using the draft report, stakeholder comments and their expert knowledge. The Research Officer then prepared nominations within the regional context provided by this report.

## ***2.2 Step 1. Identify Remnant Vegetation for Possible Inclusion in Regional Assessment***

Remnants were identified after a search of the available literature and by consultation with research scientists who provided information on the availability of literature. Only remnants which had been surveyed and for which written reports existed describing the surveys were included in the assessment. Surveys varied from brief day or half day surveys to intensive methods over several years. All of the remnants mentioned in the literature accessed are listed in Appendices 1 and 2. Not all these remnants reached threshold levels.

## ***2.3 Step 2. Gather and Store Information about Attributes***

An Access database was used to store and manipulate information pertinent to this regional assessment. The data fields were based on attributes derived from nomination criteria for the Register of the National Estate. Table 2 lists the nomination criteria and Table 3 gives the associated attributes. The attributes include geology, landforms, soils, fossil sites, flora,

**Table 2. Nomination criteria for the Register of the National Estate  
(Source: Australian Heritage Commission, 1994)**

**Criterion A. Importance in the evolution of Australian flora, fauna, landscapes or climate.**

- A.1 Importance in the evolution of Australian flora, fauna, landscapes or climate.
- A.2 Importance in maintaining existing processes or natural systems at the regional or national scale.
- A.3 Importance in exhibiting unusual richness or diversity of flora, fauna, or landscape features.

**Criterion B. Possession of uncommon, rare or endangered aspects of Australia's natural or cultural history .**

- B.1. Importance for rare, endangered or uncommon flora, fauna, communities, ecosystems, natural landscapes or phenomena, or as wilderness.

**Criterion C. Potential to yield information that will contribute to an understanding of Australia's natural or cultural history.**

- C.1. Importance for information contributing to a wider understanding of Australian natural history, by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.

**Criterion D: Importance in demonstrating the principal characteristics of:  
(i) a class of Australia's natural or cultural places; or (ii) a class of  
Australia's natural or cultural environments.**

- D.1 Importance in demonstrating the principal characteristics of the range of landscapes, environments or ecosystems, the attributes of which identify them as being characteristic of their class.

**Table 3. Attributes relevant to assessment of National Estate significance**  
(Source: Australian Heritage Commission, 1994)

<b>AHC Criterion</b>	<b>Relevant attributes</b>
A. 1	Flora and fauna species at limits of range Relict or disjunct populations of species Natural refugia for flora/fauna Endemic species of flora and fauna Fossil sites Earthquakes
A.2	Areas of remnant vegetation Places important for succession Wetlands which are habitat for migratory fauna species Habitat important for maintenance of fauna species Ecosystems little affected by human disturbance and which function in a natural or near-natural manner Refuges from fire and drought
A.3	Diversity of natural vegetation types (structural classification) Diversity of natural vegetation types (floristic classification) Landforms/land systems Diversity of flora or fauna species
B.1	Flora species (higher plants) Fauna species (vertebrates and invertebrates) Natural vegetation communities Undisturbed natural vegetation Geomorphological/landform features Wilderness
C.1	Type localities - fauna species Type localities - rare flora species Research sites Teaching sites

fauna and research values. Information sources included published and unpublished reports (Appendix 3) and expert advice (Appendix 4). Information was sought and provided by government departments, tertiary institutions, CSIRO and voluntary organisations.

#### ***2.4 Step 3. Determine if Data for each Remnant are Sufficient for its Inclusion in this Assessment***

Information about each attribute for each reserve was collated by entering it in the Murdoch University Access database. Once the information on attributes relevant to National Estate criteria was gathered for a remnant it was sometimes found that the level of information available was insufficient either to determine the presence of a value or to establish a threshold of significance for a particular criterion. In these cases, where the information was deemed insufficient, the remnant remained listed in the database and fields remained blank. This was to enable addition of data if it became available at a later date. As there were limited time and resources for this study and little information relevant to Criteria C2, D1 and E1 was uncovered, these criteria were not addressed in the study.

#### ***2.5 Step 4. Assess Attributes using AHC Criteria to Determine if Threshold of Significance Reached***

The Australian Heritage Commission uses the term 'threshold' to determine if a place is worthy of consideration for inclusion on the Register of the National Estate. To be included on the Register, a place must meet or exceed the threshold of significance for one or more of the AHC criteria (Table 2). Thresholds for each attribute were derived from the Victorian Highlands Joint Forest Project (Australian Heritage Commission, 1994).

The remainder of this subsection provides details on each criterion (Table 2) and the associated threshold of significance. The attribute information held in the project database was used to determine if the threshold for attributes for each criterion, for each remnant, where there was sufficient information, had been met or exceeded. Tables for each attribute summarise threshold details for those remnants where the threshold was met or was exceeded. Thresholds for geology, geomorphology and Aboriginal significance are less well developed than for other attributes. For geology and geomorphology, a site met the threshold if it was regarded as significant by a geologist or geomorphologist. Similarly, in this project, an Aboriginal site was significant if it was considered so by the Wheatbelt Aboriginal Corporation.

##### **2.5.1 Criterion A1: Places of Evolutionary Importance**

Criterion A1 identifies places important in the evolution of Australian flora and fauna. Environmental attributes assessed include: endemic species; disjunct populations of species; species at the limit of their range; refuges from climatic change; relictual species (refuges for ancient species of flora and fauna); and earthquake activity.

##### **Endemic or Threatened Species**

For the purpose of this study endemic flora and fauna are those taxa whose natural distribution is wholly or mainly confined to the Wheatbelt or which are on the Western Australian Department of Conservation and Land Management rare flora or fauna species lists. A remnant with endemic species was regarded as meeting the threshold for this criterion. Disturbance was not used as a threshold, since current presence of the species has been recorded despite past disturbance.

In the Central Wheatbelt, only an undescribed *Baeckea* found at Avon location 19769 was reported to be endemic. These results clearly underestimate the endemic flora in the Central Wheatbelt. Limited time and resources prevented further investigations. Fauna classified by the Australian and New Zealand Environment Council (ANZECC) as endangered or vulnerable, or declared threatened by the Department of Conservation and Land Management and found in the wheatbelt, are listed in Table 4. *Pseudomys occidentalis* (western mouse), *Bettongia penicillata* (woylie) and *Macropus eugenii* (tammar) have recently been removed from the gazetted rare fauna list and have been declared priority 4 fauna. Priority four fauna are taxa considered to have been adequately surveyed or for which sufficient knowledge is available, and are not currently threatened or in need of special protection, but could be if present circumstances change.

**Table 4. Rare fauna of the Central Wheatbelt (Schedule one fauna under the Wildlife Conservation Act 1950 (updated 1999)).**

<b>Mammals</b>	
<i>Dasyurus geoffroii</i> (chuditch)	<i>Phascogale calura</i> (red-tailed phascogale)
<i>Myrmecobius fasciatus</i> (numbat)	<i>Petrogale lateralis</i> (rock wallaby)
<i>Pseudomys shortridgei</i> (heath rat)	
<b>Birds</b>	
<i>Leipoa ocellata</i> (mallee fowl)	<i>Calyptorhynchus latirostris</i> (short-billed black-cockatoo)

Schedule One (Wildlife Conservation Act 1950) fauna

### Disjunct Flora and Fauna

Disjunct species are those whose sole or major Western Australian population is in the Wheatbelt and whose main stronghold is outside the Wheatbelt and/or interstate. A species was also classified as disjunct if, in the opinion of an expert, it was considered to be so. Each remnant which contained a disjunct species was regarded as meeting the threshold. Once again, disturbance was not used as a threshold. No disjunct flora or fauna was identified in the Central Wheatbelt from the available literature.

### Species or Vegetation Types at the Limit of their Range

Species or vegetation types at the limit of their biogeographic range are defined as those which reach the extreme northern, southern, western or eastern limit of their range in the Wheatbelt. Each remnant which supports a species at the limit of its range meets this threshold. Disturbance was not used as a threshold for this criterion.

In the Central Wheatbelt, 13 remnants contained flora species at the limit of their range (Table 5). This amounted to 26 species (Table 5) and one vegetation type, with seven at their northern limit, eight at their southern or south-western limit, three at their eastern limit, one at their north-eastern, and seven at their westernmost limit. Dragon Rocks Nature Reserve had the greatest number of such flora, with four species at the westernmost limit of their range, four at their southernmost limit and four at their northern limits (Table 5). This reserve is already registered on the National Estate, together with Clackline Nature Reserve. Dongolocking Nature Reserve is an indicative place and the other reserves with flora at the limit of their range are not listed.

Table 5. Flora which reach their range limit in the Central Wheatbelt

Remnant	Species at limit of range	Limit	Reference
Avon Location 19769	<i>Daviesia pachylina</i>	western	George and Hnatiuk (1978)
Boolanelling Nature Reserve Cairn Nature Reserve Clackline Nature Reserve*	<i>Eucalyptus sheathiana</i>	western	Muir (1978d) Muir (1978b) Moore and Williams (1986)
	<i>Olearia muelleri</i>	western	
	<i>Acacia glaucoptera</i> Tall mixed heath	northern	
Corrigin Water Reserve and Aerodrome Reserve	<i>Kennedia prostrata</i>	northern	Napier and Coates (1986)
	<i>Lomandra nutans</i>	eastern	
	<i>Lomandra spartea</i> <i>Dodonaea divaricata</i>	southern	
Dongolocking Nature Reserve <sup>+</sup>	<i>Pultenaea verrucosa</i> var. <i>brachyphylla</i>	northern	Napier, Keating and Trudgen (undated)
	<i>Acacia brachyclada</i>	south-west	
Dragon Rocks Nature Reserve*	<i>Hakea laurina</i>	northern	Coates (1992)
	undescribed <i>Baeckea</i>	southern	
	<i>Acrotriche patula</i>	western	
Jilakin Rock Mokine Nature Reserve	<i>Banksia elderiana</i>	western	Abbott (1984) Moore and Williams (1986)
	<i>Eucalyptus capillosa</i> ssp. <i>polyclada</i>	southern	
	<i>Grevillea petrophiloides</i>	western	
	<i>Kunzea pulchella</i>	western	
	<i>Verticordia gracilis</i>	southern	
	<i>Hakea corymbosa</i>	northern	
	<i>Verticordia habrantha</i>	northern	
	<i>Xanthorrhoea nana</i>	southern	
	<i>Calothamnus huegelii</i>	northern	
	<i>Eucalyptus incrassata</i>	northern	
	<i>Goodenia scapigera</i>	northern	
	<i>Eucalyptus marginata</i>	eastern	
	<i>Lomandra spartea</i>	eastern	
Mooradung Nature Reserve	<i>Eucalyptus decurva</i>	southern	Wallace and Moore (1985)
Pantapin Nature Reserve St Ronans Nature Reserve	<i>Acacia glaucoptera</i>	northern	Coates (1990b) Moore and Williams (1986)
	<i>Lomandra nutans</i>	northern	
Wambyn Nature Reserve	<i>Lomandra spartea</i>	eastern	Moore and Williams (1986)
	<i>Lomandra nutans</i>	northern	
	<i>Lomandra spartea</i> <i>Schoenus sesquispiculus</i>	eastern north-eastern	

\*Register of the National Estate listed, <sup>+</sup>interim listed

Four species of fauna were found at the limit of their range in the Wheatbelt in a total of three nature reserves (Table 6). One of these reserves, Yornaning Nature Reserves, is not on the Register.

**Table 6. Fauna which reach their range limit in the Central Wheatbelt**

Remnant	Species at limit of range	Limit	Reference
Dongolocking Nature Reserve <sup>+</sup>	<i>Delma grayii</i>	southeast	Chapman and Dell (1978)
Mt Stirling Nature Reserve*	<i>Diplodactylus maini</i>	southwest	Williams (undated)
	<i>Heleioporus psammophilus</i>	western	
	<i>Macropus robustus</i> (euro)	southern	
Yornaning Nature Reserve	<i>Varanus tristis</i>	southern	Dell and Harold (1979)

\*Register of the National Estate listed, <sup>+</sup>interim listed.

#### Refuges from Climate Change

Refuges from climatic change are defined as remnants which maintain niches reminiscent of earlier climatic regimes. Essentially, these are areas providing protection from two related, broad environmental trends, characterising the period since the last ice age. One of these is the trend towards warmer temperatures and the other is increased fire frequency. Any remnant considered, by experts, to be a refuge from climate change, was regarded as meeting this threshold. No refuges from climate change were identified in the Central Wheatbelt using the literature sourced.

#### Relictual Flora and Fauna

Relictual flora are phylogenetically ancient taxa. Remnants containing these met this threshold. Relictual or Gondwanan fauna species has been narrowed to invertebrates on the basis of expert opinion (Hopper *et al.*, 1996; Hopper and Western Australian Department of Conservation and Land Management, 1993; Main, 1996). The remnants of vegetation with faunal taxa identified as Gondwanan or relictual species, or to be species which have affinities with Gondwanan fauna, are considered above the threshold.

No relictual or Gondwanan fauna, based on the above definition, were identified for the Central Wheatbelt, although spiders with Gondwanic affinities have been studied further north and south in the Wheatbelt (Main, 1996).

#### Earthquake Activity

Signs of past earthquake activity are also considered important under this criterion. Any remnant showing signs of past earthquake activity was considered as meeting the threshold for this criterion. The Meckering Fault Scarp is the obvious example of past earthquake activity in the Central Wheatbelt. At present, a section of this has the status of indicative place on the Register.

## 2.5.2 Criterion A2: Importance of Existing Processes or Natural Systems

Criterion A2 relates to the importance of maintaining existing processes or natural systems at a regional or national level. Attributes include areas of remnant vegetation, succession, fauna habitat, refuges from drought and fire, and linking corridors.

### Areas of Remnant Vegetation

Remnant vegetation generally represents floristic communities which have been subject to widespread clearing. Many smaller remnants have been subject to edge effects and to uses which have adversely affected their conservation values. Therefore, the threshold for this criterion is an area greater than 1,000 ha, or smaller areas identified by experts. For the Central Wheatbelt, 20 remnants were identified as above 1,000 ha (Table 7). Of these, Boyagin, Dragon Rocks, North Kalgarin, Tarin Rock and Tutanning Nature Reserves and Dryandra Forest are already on the Register of the National Estate. Dongolocking Nature Reserve is interim listed.

### Succession

As succession is occurring in all vegetation types all the time, areas important for succession were identified as those where succession was reaching maturity. Some areas in the Wheatbelt, such as East Yuna Reserve, and possibly Mawson Siding, have not been burnt for many years and have unique plant life forms (Muir, 1985; B Muir personal communication, 1999). Remnants which have not been burnt for more than 60 years were considered to meet this threshold. It was difficult to determine the fire history of each remnant in the Central Wheatbelt in the time available for the study. In referring to the literature available, it was assumed that remnants had not been burnt since the reports were published. St Ronans Nature Reserve (Moore and Williams, 1986), Paper Bark Nature Reserves One and Two (Coates, 1990a), Corrigin Water Reserve and Aerodrome Reserve (Napier and Coates, 1986) and Meenaar Nature Reserve (Moore and Williams, 1986) were considered above the threshold for this attribute in the Central Wheatbelt. None of these reserves is listed on the Register at present.

### Fauna Habitat

Criterion A2 can also apply to places which provide habitat important for the maintenance of fauna species in the Wheatbelt, for example feeding, colonial roosting, colonial breeding, nursery areas and migration routes. An area with rare and endangered, or scheduled, fauna and wetlands, including rivers and streams, with colonial breeding or roosting birds, or migratory species was regarded as meeting this threshold.

Habitat supporting rare fauna in the Central Wheatbelt is found on Boyagin, Dongolocking, Dragon Rocks, Lake Toolibin, Mt Stirling, North Kalgarin, Tarin Rock and Tutanning Nature Reserves, and Belka Reserve and Dryandra Forest. These areas are all listed, or interim listed, on the Register. A number of other unlisted reserves and private property also provide habitat for rare fauna (Table 8).



**Table 7. Remnant vegetation in the Central Wheatbelt with an area greater than 1,000 ha**

Remnant	Area (ha)
Bendering Reserve	1,602
Boyagin Nature Reserve*	>1,000
Corrigin Water Reserve and Aerodrome Reserve	1,008
Dongolocking Nature Reserve <sup>+</sup>	1,761
Dragon Rocks Nature Reserve Area*	32,219
Dryandra Forest*	28,066
Emu Rock	1,906
Graham Rock Nature Reserve	1,573
Kondinin Salt Marsh Nature Reserve	1,915
Lake Hurlstone Reserve System	5,002
Lake King Nature Reserve	40,096
Little White Lake Nature Reserve (Arthur River)	3,451
Noondeening Hill	1,200
North Kalgarin Nature Reserve*	5,119
North Tarin Rock Nature Reserve	1,415
Reserve 28940	1,375
Seagroatt Nature Reserve and Reserve 25979	1,149
Tarin Rock Nature Reserve *	2,011
Tutanning Nature Reserve *	2,250
Yenyening Lakes (Beverley Lakes Nature Reserve)	3,116

\*Register of National Estate Listed, <sup>+</sup>interim listed.

**Table 8. Habitats important for the maintenance of rare fauna in the Central Wheatbelt**

Remnant	Species	Classification	Reference
Belka Nature Reserve	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	Williams (undated)
Bendering Reserve	<i>Phascogale calura</i> (red-tailed phascogale)	V, DT	Kitchener and Chapman (1977); Dell (1977)
	<i>Pseudomys occidentalis</i> (western mouse)	P4	
	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	
Blechynden-Haily Block	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	Beard and Hnatiuk (1981)
Boyagin Nature Reserve *	<i>Myrmecobius fasciatus</i> (numbat)	V, DT	Australian Heritage Commission (1999)
	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	
	<i>Calyptorhynchus latirostris</i> (short-billed black-cockatoo)	E, DT	
	<i>Falco peregrinus</i> (peregrine falcon)	SP	
Burracoppin Reserve	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	Muir (1979b)
Corrigin Water Reserve and Aerodrome Reserve	? <i>Leipoa ocellata</i> (mallee fowl)	V, DT	Napier and Coates (1986)
Dead Mans Swamp Nature Reserve	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Tringa hypoleucos</i> (common sandpiper)	JAMBA & CAMBA	
Dongolocking Nature Reserve <sup>+</sup>	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	Kitchener and Chapman (1978); Dell (1978)
	<i>Macropus irma</i> (western brush wallaby)	P4	
	<i>Calyptorhynchus latirostris</i> (long-billed black-cockatoo)	E, DT	
	<i>Falcunculus frontatus</i> (crested shrike-tit)	P4	
Dragon Rocks Nature Reserve*	<i>Pseudomys occidentalis</i> (western mouse)	P4	Coates (1992); Australian Heritage Commission (1999)
	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	

**Table 8. Habitats important for the maintenance of rare fauna in the Central Wheatbelt (cont.)**

Remnant	Species	Classification	Reference
Dryandra Forest*	<i>Myrmecobius fasciatus</i> (numbat)	V, DT	Friend <i>et al.</i> (1995)
	<i>Dasyurus geoffroii</i> (chuditch)	V, DT	
	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	
	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	
	<i>Calyptrorhynchus latirostris</i> (short-billed black-cockatoo)	E, DT	
	<i>Falco peregrinus</i> (peregrine falcon)	SP	
	<i>Morelia spilota imbricata</i> (carpet python)	SP	
Gundaring Lake Nature Reserve	<i>Calidris acuminata</i> (sharp-tailed)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	
	<i>Tringa hypoleucos</i> (common sandpiper)	JAMBA & CAMBA	
Ibis Lake Nature Reserve	<i>Tringa nebularia</i> (greenshank)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	
Karlgarin Hill Nature Reserve	<i>Stictonetta naevosa</i> (freckled duck)	P4	Muir (1978d)
	<i>Myrmecobius fasciatus</i> (numbat)	V, DT	
Kwolyin Nature Reserve	<i>Tringa nebularia</i> (greenshank)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
Lake Toolibin Nature Reserve*	<i>Stictonetta naevosa</i> (freckled duck)	P4	Jaensch <i>et al.</i> (1988)
	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	
Lake Towerrinning Nature Reserve	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Tringa hypoleucos</i> (common sandpiper)	JAMBA & CAMBA	
Little White Lake Nature Reserve (Arthur River Nature Reserve)	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
Mears Lake Nature Reserve	<i>Calidris ruficollis</i> (red-necked stint)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Stictonetta naevosa</i> (freckled duck)	P4	
	<i>Thinornis rubricollis</i> (hooded plover)	P4, JAMBA & CAMBA	
Mooraning Nature Reserve	<i>Bettongia penicillata</i> (woylie)	P4	Coates (1990b)

**Table 8. Habitats important for the maintenance of rare fauna in the Central Wheatbelt (cont.)**

Remnant	Species	Classification	Reference
Mt Stirling Nature Reserve*	<i>Petrogale lateralis</i> (rock wallaby)	V, DT	Williams (1980)
Nomans-Bokan Lakes Nature Reserve (Bokan Nature Reserve)	<i>Calidris ruficollis</i> (red-necked stint)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	
	<i>Stictonetta naevosa</i> (freckled duck)	P4	
Nonalling and Whitewater Reserve	<i>Stictonetta naevosa</i> (freckled duck)	P4	Jaensch <i>et al.</i> (1988)
	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	
	<i>Calidris ruficollis</i> (red-necked stint)	JAMBA & CAMBA	
	<i>Numenius minutus</i> (little curlew)	JAMBA & CAMBA	
	<i>Thinornis rubricollis</i> (hooded plover)	P4, JAMBA & CAMBA	
North Kalgarin Nature Reserve*	<i>Dasyurus geoffroii</i> (chuditch)	V, DT	Kitchener and Chapman (1977); Dell (1977)
	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	
	<i>Pseudomys occidentalis</i> (western mouse)	P4	
	<i>Macropus irma</i> (western brush wallaby)	P4	
	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	
	<i>Platycercus icterotis</i> (western rosella)	P2	
	<i>Morelia spilota imbricata</i> (carpet python)	SP	
North Tarin Rock	<i>Macropus eugenii</i> (tammar wallaby)	P4	Kitchener and Chapman (1976) Dell and Johnstone (1976)
	<i>Macropus irma</i> (western brush wallaby)	P4	
	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	
	<i>Calyptrorhynchus latirostris</i> (short-billed black-cockatoo)	E, DT	
Parkeyerring Lake Nature Reserve	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
Reserve 28940	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	Muir (1979b)
Reserve 29313	<i>Macropus irma</i> (western brush wallaby)	P4	Muir (1979i)
Seagroatt Nature Reserve	<i>Tringa hypoleucos</i> (common sandpiper)	JAMBA & CAMBA	Muir (1978c)

**Table 8. Habitats important for the maintenance of rare fauna in the Central Wheatbelt (cont.)**

Remnant	Species	Classification	Reference
Taarblin Lake Nature Reserve	<i>Calidris ruficollis</i> (red-necked stint)\	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Calidris acuminata</i> (sharp-tailed sandpiper)	JAMBA & CAMBA	
	<i>Stictonetta naevosa</i> (freckled duck)	P4	
Tarin Rock Nature Reserve*	<i>Pseudomys occidentalis</i> (western mouse)	P4	Kitchener and Chapman (1976); Dell and Johnstone (1976)
	<i>Macropus eugenii</i> (tammar wallaby)	P4	
	<i>Macropus irma</i> (western brush wallaby)	P4	
	<i>Lophoictinia isura</i> (square-tailed kite)	P4	
	<i>Platycercus icterotis</i> (western rosella)	P2	
	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	
Tutanning Nature Reserve*	<i>Myrmecobius fasciatus</i> (numbat)	V, DT	Australian Heritage Commission (1999)
	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	
Wardering Lake Nature Reserve	<i>Tringa nebularia</i> (greenshank)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	
	<i>Tringa hypoleucos</i> (common sandpiper)	JAMBA & CAMBA	
White Lake Nature Reserve (Quongunnerunding Nature Reserve)	<i>Calidris ruficollis</i> (red-necked stint)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Stictonetta naevosa</i> (freckled duck)	P4	
	<i>Calidris acuminata</i> (sharp-tailed sandpiper)	JAMBA & CAMBA	
	<i>Calidris ferruginea</i> (curlew sandpiper)	JAMBA & CAMBA	
	<i>Tringa nebularia</i> (greenshank)	JAMBA & CAMBA	
Yenyening Lakes (Beverley Lakes Nature Reserve)	<i>Calidris ruficollis</i> (red-necked stint)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Calidris acuminata</i> (sharp-tailed sandpiper)	JAMBA & CAMBA	
	<i>Tringa hypoleucos</i> (common sandpiper)	JAMBA & CAMBA	
	<i>Calidris ferruginea</i> (curlew sandpiper)	JAMBA & CAMBA	
	<i>Tringa nebularia</i> (greenshank)	JAMBA & CAMBA	
	<i>Thinornis rubricollis</i> (hooded plover)	P4, JAMBA & CAMBA	

**Table 8. Habitats important for the maintenance of rare fauna in the Central Wheatbelt (cont.)**

Remnant	Species	Classification	Reference
Yornaning Nature Reserve	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	Morris and Kitchener (1979) Harold and Dell (1979)
	<i>Falco peregrinus</i> (peregrine falcon)	SP	

\*Register of the National Estate listed, + interim listed; E = listed endangered on the Australian and New Zealand Environment Council [ANZECC] scheduled list of endangered and vulnerable fauna, V = vulnerable fauna (ANZECC); DT = declared threatened by the Western Australian Department of Conservation and Land Management (CALM); SP = CALM specially protected fauna; P2= CALM's priority 2 classified fauna; P4 = CALM's priority four classified fauna (See section 2.5.4 for definitions of categories of protection).

### Refuges from Fire and Drought

Refuges from frequent fire and drought are important for animals. Refuges from fire are considered here as areas burnt infrequently. Refuges from fire, or places which have not experienced fire for more than 60 years, as mentioned previously, are St Ronans Nature Reserve (Moore and Williams, 1986), Paper Bark Nature Reserves One and Two (Coates, 1990a), Corrigin Water Reserve and Aerodrome Reserve (Napier and Coates, 1986) and Meenaar Nature Reserve. None of these reserves is listed on the Register at present.

Permanent wetlands are a refuge from drought and, thus, all permanent wetlands met this threshold. Wetlands considered to be important refuges from drought are Lake Toolibin, Lake Towerinning and Red Lake Nature Reserves (Jaensch *et al.*, 1988).

### Linking Corridors

Areas considered to act as linking corridors between otherwise isolated remnants of vegetation were also regarded as meeting the threshold for this criterion. Eight remnants were reported by surveyors to act as linking corridors: Boyagin, Craig, Dangin, Glencluce, Mungerungcutting and Pantapin Nature Reserves, and Reserves 11024 and 14694. None is listed on the Register of the National Estate, except Boyagin Nature Reserve.

### **2.5.3 Criterion A3: Places of High Diversity of Flora and Fauna**

Criterion A3 identifies locations with a high diversity of flora and fauna. Floral richness was determined from species lists and written reports. Remnants were regarded as meeting the threshold for this criterion if the biologist, botanist or zoologist undertaking the survey of the reserve declared the vegetation community, flora or fauna to be diverse. Areas where the biologist mentioned an important ecotone were also considered to meet the threshold for these criteria. In the Central Wheatbelt, many reserves have been surveyed only once, briefly, meaning that species lists may be incomplete. This particularly applies to fauna. Few reserves have been surveyed using trapping and bird lists were often compiled only as a flora survey was carried out.

In the Central Wheatbelt, 18 remnants have diverse vegetation (Table 9). One of these, Avon Location 19769 is freehold. Dryandra Forest and Charles Gardner Reserve are listed on the Register, while Dongolocking Nature Reserve is an indicative place. Thirty-five of the 204 remnants assessed had diverse or fairly diverse flora (Table 10). Of these, only Charles Gardner Reserve, Dragon Rocks and Tutanning Nature Reserves, and Dryandra Forest, are on the Register, while Highbury and Dongolocking Nature Reserves are indicative places.

Twelve of the remnants are considered to support diverse fauna in general (Table 11). Two of these, North Kalgarin and Lake Toolibin Nature Reserves, have had trapping surveys and/or more than one visit. North Kalgarin, Lake Toolibin and Tutanning Nature Reserves are listed on the Register of the National Estate. In addition to general faunal diversity, Dongolocking Nature Reserve, an indicative place, supports a diverse population of frogs (Chapman and Dell, 1978). Wambyn Nature Reserve, which is not listed on the Register, supports a diverse community of reptiles (Moore and Williams, 1986).

A total of six Nature Reserve remnants provide important examples of ecotones (Table 12). Of these, only Mt Stirling is on the Register of the National Estate. Another four remnants are said to be important transition zones between the Wheatbelt and the Darling Range: Clackline and Mooradung Nature Reserves and Reserves 1864 and 29313. Of these, only Clackline is listed on the Register.

**Table 9. Remnant vegetation in the Central Wheatbelt with diverse vegetation**

<b>Remnant</b>	<b>Reference</b>
Avon Location 19769	George and Hnatiuk (1978)
Charles Gardner Reserve*	AHC (1999)
Corrigin Water Reserve and Aerodrome Reserve	Napier and Coates (1986)
Dangin Nature Reserve	Coates (1990b)
Dongolocking Nature Reserve <sup>+</sup>	Muir (1978f)
Dryandra Forest *	Coates (1993)
Gundaring Nature Reserve	Muir (1977a)
Jitarning Nature Reserve	Coates (1990c)
North Jitarning Nature Reserve	Coates (1990c)
Paper Bark Nature Reserve One	Coates (1990a)
Paper Bark Nature Reserve Two	Coates (1990a)
Reserve 15855	
Reserve 27639	Muir (1978d)
Reserve 27644	Coates (1990d)
Reserve 28940	Muir (1979b)
St Ronans Nature Reserve	Moore and Williams (1986)
Yandinilling Nature Reserve	Muir (1979d)
Yornaning Nature Reserve	Muir (1979i)

\*Register of the National Estate listed, <sup>+</sup>interim listed

**Table 10. Remnant vegetation in the Central Wheatbelt with diverse flora**

<b>Remnant</b>	<b>Remnant</b>
Avon Location 19769	Pikaring West Nature Reserve
Bendering Reserve	Reserve 10719
Boolanelling Nature Reserve	Reserve 15855
Burracoppin Reserve	Reserve 19119
Charles Gardner Reserve*	Reserve 19138
Corrigin Water Reserve and Aerodrome Reserve	Reserve 20878
Dongolocking Nature Reserve <sup>+</sup>	Reserve 26669
Dragon Rocks Nature Reserve*	Reserve 27644
Dryandra Forest*	Reserve 29313
Highbury Nature Reserve <sup>+</sup>	Reserve 34295
Jitarning Nature Reserve	Rose Road Reserve
Lake Hurlstone Reserve System	Scriveners Rock Hole Nature Reserve
Maublarling Nature Reserve	Sewell Rock Nature Reserve
Merredin Nature Reserve	Sorensens Nature Reserve
Mokine Nature Reserve	South Kulin Nature Reserve
Nangeenan Nature Reserve	Tutanning Nature Reserve*
North Jitarning Nature Reserve	Yandinilling Nature Reserve
North Woyerling Nature Reserve	

\* Register of the National Estate listed, <sup>+</sup>interim listed



**Table 11. Vegetation remnants in the Central Wheatbelt supporting diverse fauna in general**

<b>Remnant</b>	<b>Reference</b>
Bendering Reserve	Muir (1977b)
Cairn Nature Reserve	Muir (1978b)
Dryandra Forest*	Majer (1985)
Highbury Nature Reserve <sup>+</sup>	Muir (1979h)
Lake Toolibin Nature Reserve*	Jaensch <i>et al.</i> (1988)
North Kalgarin Nature Reserve*	Kitchener and Chapman (1977)
Paper Bark Nature Reserve One	Coates (1990a)
Paper Bark Nature Reserve Two	Coates (1990a)
Reserve 26669	Muir (1979h)
Reserve 29313	Muir (1979f)
Tutanning Nature Reserve*	Coates (1992)
Yornaning Nature Reserve	Chambers (1979)

\*Register of the National Estate listed, <sup>+</sup>interim listed

**Table 12. Remnant vegetation in the Central Wheatbelt with important examples of ecotones**

<b>Remnant</b>	<b>Reference</b>
Gundaring Nature Reserve	Halse <i>et al.</i> (1993)
Mt Stirling Nature Reserve*	Coates (1990b)
Paper Bark Nature Reserve One	Coates (1990a)
Reserve 13565	Muir (1978b)
Scriveners Rock Hole Nature Reserve	Muir (1978d)
Yornaning Nature Reserve	Muir (1979l)

\*Register of the National Estate listed

## 2.5.4 Criterion B1: Places Important for Rare or Uncommon Communities, Flora and Fauna

Criterion B1 refers to places important for rare, priority, endangered or uncommon species, communities, ecosystems, natural landscapes or phenomena. Also covered are the condition of the vegetation and its viability within the landscape, geological features and wilderness.

### Rare and Migratory Species

Rare species included some the Australian and New Zealand Environment Conservation Council's (ANZECC) threatened flora and fauna, Western Australian Department of Conservation and Land Management rare, declared threatened or priority flora and fauna, or declared specially protected fauna by the Department of Conservation and Land Management (CALM); listed under the Japan-Australian Migratory Birds Agreement (JAMBA) and/or the China-Australia Migratory Birds Agreement (CAMBA). ANZECC endangered flora includes a taxon that is endangered and facing a very high risk of extinction in the wild in the near future. ANZECC vulnerable flora refers to a taxon which is vulnerable, but not endangered facing a high risk of extinction in the wild in the medium-term future. ANZECC endangered fauna includes taxa that are not critically endangered, but are facing a very high risk of extinction in the wild in the near future. ANZECC vulnerable fauna is not critically endangered, or endangered but is facing a high risk of extinction in the wild in the medium-term future. ANZECC threatened species is a collective term embracing critically endangered, endangered and vulnerable species. CALM rare flora is specified as taxa that are extant and considered likely to become extinct or rare, and therefore in need of special protection. Priority one flora are flora known from one or a few (generally less than five) populations which are under threat. The threat is due to small population size, or from being on lands under immediate threat, for example the population being on a road verge in urban areas, farmland, or active mineral leases. Other threats include disease and grazing by feral animals. This category also includes taxa being considered as 'rare flora', but in urgent need of further survey (Briggs and Leigh, 1995). Priority two flora are taxa known from one or a few (generally less than five) populations, at least some of which are not believed to be under immediate threat (ie. not currently endangered). Such taxa are under consideration for declaration as 'rare flora' but are in urgent need of further survey (Briggs and Leigh, 1995). Priority three flora are those known from several populations, at least some of which are not believed to be under immediate threat. Such taxa are under consideration for declaration as 'rare flora' but are in need of further study (Briggs and Leigh, 1995). Priority four flora have been adequately surveyed and although rare, are not currently threatened throughout the whole state of Western Australia (Briggs and Leigh, 1995). CALM rare or declared threatened fauna is that which is rare or likely to become extinct, and is declared to be fauna that is in need of special protection. Fauna declared in special need of protection by CALM is wholly protected throughout the State at all times. The only priority fauna identified in the Central Wheatbelt during this study was Priority 2 and 4 fauna. Priority two fauna is that known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation. The group needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna. Priority four fauna are taxa considered to have been adequately surveyed, or for which sufficient knowledge is available, and are not currently threatened or in need of special protection, but could be if present circumstances change.

Disturbance was not used as a threshold for this attribute. All remnants with species in one or more of the categories above were regarded as meeting the threshold. A total of 13 remnants have rare flora (Table 13). Of these, Boyagin, Charles Gardner Reserve, Clackline, Dragon Rocks and Tarin Rocks Nature Reserves are listed on the Register of the National Estate. Dongolocking Nature Reserve is interim listed.

**Table 13. Remnant vegetation in the Central Wheatbelt with rare flora**

Remnant	Rare plant species	Classification	Reference
Avon Location 19769	undescribed <i>Isopogon</i>	Requires taxonomic review	George and Hnatiuk (1978)
Booraan Nature Reserve	<i>Acacia</i> sp. 11	Requires taxonomic review	Muir (1979b)
Boyagin Nature Reserve*	<i>Thomasia montana</i>	V, R	Briggs and Leigh (1995)
Charles Gardner Reserve*	<i>Hemigenia viscida</i>	V, R	Coates (1990f)
Clackline Nature Reserve*	<i>Acacia aphylla</i>	V, R	Briggs and Leigh (1995)
Corrigin Water Reserve and Aerodrome Reserve	<i>Grevillea dryandroides</i> <i>Lechenaultia pulvinaris</i>	V, R E, R	Napier and Coates (1986)
Dongolocking Nature Reserve†	<i>Lechenaultia pulvinaris</i>	E, R	Briggs and Leigh (1995); Napier, Keating and Trudgen (undated)
Dragon Rocks Nature Reserve*	<i>Eucalyptus olivacea</i> <i>Allocasuarina tortiramula</i> <i>Caladenia hoffmanii</i> <i>Calectasia</i> sp. (central wheatbelt) K Dixon 86 <i>Daviesia ?spiralis</i> <i>Grevillea involucrata</i> <i>Thelymitra psammophila</i>	V, R V, R, E, R V  V, R E, R V, R	Coates (1992); Briggs and Leigh (1995)
Kondinin Salt Marsh Nature Reserve	<i>Roycea pycnophylloides</i>	E, R	Mattiske Consulting Pty Ltd (1995d)
Lake Hurlstone Reserve System	<i>Calytrix</i> sp (MAB 4792) <i>Eucalyptus</i> sp (MAB 4770)	Requires taxonomic review Requires taxonomic review	Burgman (1985)
Mokine Nature Reserve	<i>Acacia aphylla</i>	V, R	Moore and Williams (1986)
Mt Stirling Nature Reserve*	<i>Tetradlea deltoidea</i>	E, R	Briggs and Leigh (1995)
Tarin Rock Nature Reserve*	<i>Acacia depressa</i>	V, R	AHC (1999)

\* Register of the National Estate listed; E = ANZECC endangered flora; V = ANZECC vulnerable flora; R = CALM rare flora.

Priority one flora occurs on four remnants (Table 14). Of the four reserves identified, two are registered or interim listed.

**Table 14. Remnant vegetation in the Central Wheatbelt with priority one flora**

Remnant	Species	Reference
Dragon Rocks Nature Reserve*	<i>Verticordia multiflora</i> ssp. <i>solox</i>	(Coates, 1992)
Lake King Nature Reserve	<i>Hydrocotyle hexaptera</i>	Mattiske Consulting (1995d)
Little White Lake Nature Reserve (Arthur River Nature Reserve)	<i>Stylidium rhipidium</i>	(Briggs and Leigh, 1995)
Reserve 25979	<i>Hydrocotyle hexaptera</i>	Mattiske Consulting (1995d)

\* Register of the National Estate listed, †interim listed

Priority two flora occurs on 13 remnants (Table 15). Of the reserves identified, eight are registered on the National Estate and Dongolocking Nature Reserve is an indicative place. Although *Acacia campylophylla*, *Acacia deflexa*, *Gastrolobium densifolium*, *Grevillea wittweri* and *Persoonia hakeiformis* are each found at two reserves, most of the other species are only known from one. Priority three species occurred on eleven remnants (Table 16). Five of these areas are listed on the Register. Apart from *Cryptandra polyclada*, which occurs on two of the reserves, the other taxa occur on only one reserve.

Priority four flora, or flora regarded as poorly known or geographically restricted by Briggs and Leigh (1995), occurred on 23 remnants (Table 17). Also included in Table 17, are taxa noted as vulnerable by the botanist who surveyed the area, or who interpreted the information from the surveys. Eight of the reserves with these taxa are listed on the Register and one is interim listed.

Rare mammals occur on 15 remnants. Rare mammals include *Dasyurus geoffroii* (western native cat or chuditch) *Phascogale calura* (red-tailed phascogale), *Pseudomys occidentalis* (western mouse), *Myrmecobius fasciatus* (numbat), *Bettongia pencillata* (woylie), *Petrogale lateralis* (rock wallaby), *Macropus irma* (western brush wallaby) and *M. eugenii* (tammar wallaby) (Table 18). All are declared endangered or threatened by ANZECC, or declared threatened by the Western Australian Government, except the western mouse, woylie, western brush wallaby and tammar, which are priority four species. Seven of the reserves are on the Register and one is interim listed. North Kalgarin Nature Reserve and Dryandra Forest support the specially protected reptile, *Morelia spilota* (carpet python) (Friend *et al.*, 1995; Kitchener and Chapman, 1977). Both of these reserves are on the Register.

Rare birds occur on 26 reserves (Table 19). Only Boyagin, Dongolocking, Lake Toolibin and North Kalgarin Nature Reserves, and Dryandra Forest, are listed or interim listed on the Register. Species include those declared endangered or threatened fauna by ANZECC or threatened by the Western Australian Government. These include *Leipoa ocellata* (mallee fowl) and *Calyptorhynchus latirostris* (short-billed black-cockatoo). Fauna which is specially protected by the Western Australian Government includes *Falco peregrinus* (peregrine falcon).

**Table 15. Remnant vegetation in the Central Wheatbelt with priority two flora**

<b>Remnant</b>	<b>Species</b>	<b>Reference</b>
Boyagin Nature Reserve*	<i>Acacia deflexa</i>	Briggs and Leigh (1995)
Charles Gardner Reserve*	<i>Acacia campylophylla</i>	Coates (1990f)
Clackline Nature Reserve*	<i>Stenanthemum grandiflorum</i>	Briggs and Leigh (1995)
Corrigin Water Reserve and Aerodrome Reserve	<i>Acacia deflexa</i>	Napier and Coates (1986)
Dongolocking Nature Reserve <sup>+</sup>	<i>Andersonia carinata</i>	Briggs and Leigh (1995)
Dragon Rocks Nature Reserve*	<i>Eucalyptus microschemata</i> <i>Gastrolobium densifolium</i> <i>Grevillea wittweri</i> <i>Persoonia hakeiformis</i>	Coates (1992)
Dryandra Forest*	<i>Acacia deflexa</i> <i>Andersonia bifida</i> <i>Dryandra subpinnatifida</i> var. <i>subpinnatifida</i> <i>Grevillea crowleyae</i> <i>Persoonia hakeiformis</i>	Coates (1993)
Emu Rock	<i>Grevillea wittweri</i>	Newby and Newby (1992)
Lake King Nature Reserve	<i>Haegiela tatei</i> <i>Astartea clavifolia</i>	Mattiske Consulting Pty Ltd (1995d)
Mokine Nature Reserve	<i>Acacia campylophylla</i>	Briggs and Leigh (1995)
Mt Stirling Nature Reserve*	<i>Acacia cowaniana</i>	Briggs and Leigh (1995)
Tarin Rock Nature Reserve*	<i>Dryandra foliosissima</i> <i>Gastrolobium densifolium</i> <i>Gastrolobium rigidum</i> <i>Jacksonia tarinensis</i> <i>Daviesia tortuosa</i>	Briggs and Leigh (1995)
Tutanning Nature Reserve*	<i>Stylidium coatesianum</i>	Briggs and Leigh (1995)

\* Register of the National Estate listed, <sup>+</sup>interim listed

**Table 16. Remnant vegetation in the Central Wheatbelt with priority three flora**

<b>Remnant</b>	<b>Species</b>	<b>Reference</b>
Bendering Reserve	<i>Cryptandra polyclada</i>	Muir (1977b)
Charles Gardner Reserve*	<i>Calothamnus brevifolius</i> <i>Dryandra horrida</i>	Coates (1990f); Briggs and Leigh (1995)
Corrigin Water Reserve and Aerodrome Reserve	<i>Dryandra ferruginea</i> subspecies <i>obliquiloba</i>	
Dongolocking Nature Reserve*	<i>Dryandra vestida</i>	Briggs and Leigh (1995); Napier, Keating and Trudgen (undated)
Dragon Rocks Nature Reserve*	<i>Acacia newbeyi</i> <i>Acacia sedifolia</i> subsp. <i>pulvinata</i> <i>Melaleuca polychcephala</i> <i>Pimelea graniticola</i> <i>Stylidium neglectum</i> <i>Verticordia gracilis</i>	Coates (1992)
Dryandra Forest*	<i>Thysanotus tenuis</i>	Coates (1993)
Kondinin Salt Marsh Nature Reserve	<i>Frankenia drummondii</i> <i>Sarcocornia globosa</i>	Mattiske Consulting (1995d)
Lake Hurlstone Reserve System	<i>Acacia repanda</i>	Burgman (1985)
Tarin Rock Nature Reserve*	<i>Boronia penicillata</i>	Briggs and Leigh (1995)
Tutanning Nature Reserve*	<i>Chorizandra multiarticulata</i> <i>Jacksonia epiphyllum</i> <i>Stenanthemum tridentatum</i> <i>Tetrateca retrorsa</i>	Briggs and Leigh (1995)
Yornaning Nature Reserve	<i>Cryptandra polyclada</i>	Muir (1979l)

\* Register of the National Estate listed

Table 17. Remnant vegetation in the Central Wheatbelt with priority four, poorly known, geographically restricted and vulnerable flora

Remnant	Species	Category	Reference
Badjaling Nature Reserve	<i>Banksia cuneata</i>	limited distribution	Briggs and Leigh (1995)
Bendering Reserve	<i>Santalum spicatum</i>	regionally rare	Muir, B. G. (1977b)
Boyagin Nature Reserve *	<i>Eucalyptus caesia</i>	priority 4	Briggs and Leigh (1995)
	<i>Eucalyptus exilis</i>	priority 4	
	<i>Boronia capita</i> ssp. <i>clavata</i>	limited distribution	
	<i>Calothamnus planifolius</i>	limited distribution	
	<i>Calothamnus rupestris</i>	priority 4	
	<i>Dryandra cynaroides</i>	priority 4	
	<i>Gastrolobium stipulare</i>	limited distribution	
	<i>Hakea loranthifolia</i>	limited distribution	
	<i>Hemigenia saligna</i>	limited distribution	
Charles Gardner Reserve*	<i>Cryptandra leucopogon</i>	geographic range <100 km and poorly known	Coates (1990f), Briggs and Leigh (1995)
	<i>Dampiera carinata</i>	poorly known	Briggs and Leigh (1995)
	<i>Dryandra spectosa</i>	vulnerable	Briggs and Leigh (1995)
	<i>Leidosperma ?leptophyllum</i>	poorly known	Coates (1990f)
	<i>Mesomelaena preissii</i>	vulnerable	Burgman (1985)
	<i>Platysace commutata</i>	poorly known	Briggs and Leigh (1995)
	<i>Stylidium scabrium</i>	priority 4	Coates (1990f)
	<i>Stylidium tenuicarpum</i>	priority 4	
Clackline Nature Reserve*	<i>Eremaea blackwelliana</i>	poorly known, <100 km	Briggs and Leigh (1995)
Corrigin Water Reserve and	<i>Dryandra cynaroides</i>	priority 4	Briggs and Leigh (1995)
Aerodrome Reserve	<i>Hakea baxteri</i>	poorly known	
	<i>Platysace commutata</i>	geographic range < 100km	
	<i>Eucalyptus astringens</i>	limited distributions	
	<i>Eucalyptus gardneri</i>	limited distributions	

Table 17. Remnant vegetation in the Central Wheatbelt with priority four, poorly known, geographically restricted and vulnerable flora (cont.)

Remnant	Species	Category	Reference	
Dongolocking Nature Reserve <sup>+</sup>	<i>Daviesia crassifolia</i>	priority 4	Briggs and Leigh (1995); Napier, Keating and Trudgen (undated)	
	<i>Pomaderris bilocularis</i>	priority 4		
	<i>Wurmbea drummondii</i>	priority 4		
	<i>Dryandra cynaroides</i>	priority 4		
	<i>Melaleuca conferta</i>	geographically restricted		
	undescribed <i>Baectea</i> sp.	poorly known		
	<i>Lasiopetalum microcardium</i>	poorly known		
	<i>Daviesia purpurascens</i>	priority 4		
	<i>Eucalyptus ornata</i>	poorly known		
	<i>Melaleuca fissurata</i>	priority 4		
Dragon Rocks Nature Reserve*	<i>Verticordia integra</i>	priority 4	Briggs and Leigh (1995)	
	<i>Verticordia multiflora</i> subsp. <i>multiflora</i>	priority 4		
	<i>Caladenia integra</i>	priority 4		
	<i>Darwinia thymoides</i> ssp. nov.	priority 4		
	<i>Darwinia</i> sp.	priority 4		
	<i>Dryandra cynaaroides</i>	priority 4		
	<i>Dryandra</i> (aff. <i>vestita</i> ), <i>dryandrensis</i> (ms)	priority 4		
	<i>Eucalyptus latens</i>	priority 4		
	<i>Hemigenia? platyphylla</i>	priority 4		
	<i>Hibbertia montana</i>	priority 4		
Lake King Nature Reserve	<i>Nemcia stipularis</i>	priority 4	Mattiske Consulting (1995d)	
	<i>Rinzia crassifolia</i>	priority 4		
	<i>Hydrocotyle hexaptera</i>	known from only 3 collections		
	<i>Erichsenia uncinata</i>	poorly known		
	<i>Daviesia microphylla</i>	priority 4		
	<i>Hibbertia montana</i>	priority 4		
	<i>Lomandra nutans</i>	poorly known		
	Meenaar Nature Reserve			Briggs and Leigh (1995)
	Mokine Nature Reserve			Moore and Williams (1986)
	Dryandra Forest*			Coates (1993)



**Table 17. Remnant vegetation in the Central Wheatbelt with priority four, poorly known, geographically restricted and vulnerable flora (cont.)**

Remnant	Species	Category	Reference
Mooradung Nature Reserve	<i>Grevillea cirsiifolia</i>	priority 4	Wallace and Moore (1985)
Mt Stirling Nature Reserve*	<i>Gastrobium callistachys</i>	priority 4	Briggs and Leigh (1995)
Reserve 15855	<i>Calothamnus planifolius</i>	poorly known, <100 km	Muir (1979h)
St Ronans Well	<i>Hakea baxteri</i>	poorly known	
	<i>Calothamnus rupestris</i>	priority 4	Briggs and Leigh (1995)
	<i>Darwinia thymoides</i>	priority 4	
Tarin Rock Nature Reserve*	<i>Calothamnus planifolius</i>	limited distribution	Briggs and Leigh (1995)
Tutanning Nature Reserve*	<i>Stylidium expeditionis</i>	priority 4	Brown and Hopkins, (1983)
	<i>Pomaderris bilocularis</i>	priority 4	Briggs and Leigh (1995)
	<i>Caladenia integra</i>	poorly known and distribution < 100 km	Briggs and Leigh (1995)
	<i>Dryandra proteoides</i>	poorly known	Briggs and Leigh (1995)
	<i>Eucalyptus ornata</i>	priority 4	Briggs and Leigh (1995)
	<i>Stylidium tenuicarpum</i>	priority 4	Briggs and Leigh (1995)
	<i>Calothamnus planifolius</i>	geographically restricted	Brown and Hopkins (1983)
	<i>Dryandra cynaroides</i>	priority 4	Brown and Hopkins (1983)
	<i>Melaleuca conferta</i>	geographically restricted	Brown and Hopkins (1983)
Wambyn Nature Reserve	<i>Lomandra nutans</i>	poorly known	Briggs and Leigh (1995)
Water Reserve 11029	<i>Acacia merrickae</i>	priority 4	E. M. Mattiske and Associates (1992a and b)
Water Reserve 13502	<i>Acacia merrickae</i>	priority 4	E. M. Mattiske and Associates (1992a and b)
Water Reserve 14171	<i>Acacia merrickae</i>	priority 4	E. M. Mattiske and Associates (1992a and b)
Yormaning Nature Reserve	<i>Daviesia "oxylobium"</i>	priority 4	

\* Register of the National Estate listed, \*interim listed

**Table 18. Remnant vegetation in the Central Wheatbelt with rare mammals**

Remnant	Species	Classification	Reference
Bendering Reserve	<i>Phascogale calura</i> (red-tailed phascogale)	V, DT	Kitchener and Chapman (1977)
	<i>Pseudomys occidentalis</i> (western mouse)	P4	
Boolanelling Nature Reserve	<i>Macropus irma</i> (western brush wallaby)	P4	Muir (1978c)
Boyagin Nature Reserve*	<i>Myrmecobius fasciatus</i> (numbat)	V, DT	Australian Heritage Commission (1999)
	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	
Dongolocking Nature Reserve <sup>+</sup>	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	Kitchener and Chapman (1978)
	<i>Macropus irma</i> (western brush wallaby)	P4	
Dragon Rocks Nature Reserve*	<i>Pseudomys occidentalis</i> (western mouse)	P4	Australian Heritage Commission (1999); Coates (1992)
	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	
Dryandra Forest*	<i>Myrmecobius fasciatus</i> (numbat)	V, DT	Friend <i>et al.</i> (1995)
	<i>Dasyurus geoffroii</i> (chuditch)	V, DT	
	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	
Karlgarin Hill Nature Reserve	? <i>Myrmecobius fasciatus</i> (numbat)	V, DT	Muir (1978d)
Mooraning Nature Reserve	<i>Bettongia penicillata</i> (woylie)	P4	Coates (1990b)
Mt Stirling Nature Reserve *	<i>Petrogale lateralis</i> (rock wallaby)	V, DT	Williams (1980)
North Kalgarin Nature Reserve*	<i>Dasyurus geoffroii</i> (western native cat)	V, DT	Kitchener and Chapman (1977)
	<i>Macropus irma</i> (western brush wallaby)	P4	
	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	
	<i>Pseudomys occidentalis</i> (western mouse)	P4	
North Tarin Rock	<i>Macropus eugenii</i> (tammar wallaby)	P4	Kitchener and Chapman (1976)
	<i>Macropus irma</i> (western brush wallaby)	P4	
Reserve 29313	<i>Macropus irma</i> (western brush wallaby)	P4	(Muir (1979I)

**Table 18. Remnant vegetation in the Central Wheatbelt with rare mammals (contd.)**

Remnant	Species	Classification	Reference
Tarin Rock Nature Reserve*	<i>Pseudomys occidentalis</i> (western mouse)	P4	Kitchener and Chapman (1976)
	<i>Macropus eugenii</i> (tammar wallaby)	P4	
	<i>Macropus irma</i> (western brush wallaby)	P4	
Tutanning Nature Reserve *	<i>Myrmecobius fasciatus</i> (numbat)	V, DT	Australian Heritage Commission (1999)
	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	
Yornaning Nature Reserve	<i>Phascogale calura</i> (red-tailed phascogale)	E, DT	Morris and Kitchener (1979)

\*Register of the National Estate listed, +interim listed; E = ANZECC endangered fauna, V = ANZECC vulnerable fauna, DT = CALM declared threatened fauna and P4 = CALM priority 4 fauna.

**Table 19. Remnant vegetation in the Central Wheatbelt with rare birds**

Remnant	Species	Classification	Reference
Belka Reserve	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	Williams (undated)
Bendering Reserve	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	Dell (1977)
Boyagin Nature Reserve*	<i>Calyptorhynchus latirostris</i> (short-billed black-cockatoo) <i>Falco peregrinus</i> (peregrine falcon)	E, DT SP	Australian Heritage Commission (1999)
Burracoppin Nature Reserve	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	Muir (1979b)
Corrigin Water Reserve and Aerodrome Reserve	? <i>Leipoa ocellata</i> (mallee fowl)	V, DT	Napier and Coates (1986)
Dead Mans Swamp Nature Reserve	<i>Egretta alba</i> (great egret) <i>Tringa hypoleucos</i> (common sandpiper)	JAMBA & CAMBA JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
Dongolocking Nature Reserve <sup>+</sup>	<i>Calyptorhynchus latirostris</i> (short-billed black-cockatoo) <i>Falcunculus frontatus</i> (crested shrike-tit)	E, DT P4	Dell (1978)
Dryandra Forest*	<i>Leipoa ocellata</i> (mallee fowl) <i>Calyptorhynchus latirostris</i> (short-billed black-cockatoo) <i>Falco peregrinus</i> (peregrine falcon)	V, DT E, DT SP	Friend <i>et al.</i> (1995)
Gundaring Lake Nature Reserve	<i>Calidris acuminata</i> (sharp-tailed sandpiper) <i>Egretta alba</i> (great egret) <i>Tringa hypoleucos</i> (common sandpiper) <i>Tringa nebularia</i> (greenshank)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
Ibis Lake Nature Reserve	<i>Egretta alba</i> (great egret) <i>Stictonetta naevosa</i> (freckled duck)	JAMBA & CAMBA P4	Jaensch <i>et al.</i> (1988)
Kwolyin Nature Reserve	<i>Tringa nebularia</i> (greenshank)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
Lake Toolibin Nature Reserve*	<i>Stictonetta naevosa</i> (freckled duck) <i>Egretta alba</i> (great egret) <i>Tringa nebularia</i> (greenshank) <i>Charadrius veredus</i> (oriental plover)	P4 JAMBA & CAMBA JAMBA & CAMBA JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)

**Table 19. Remnant vegetation in the Central Wheatbelt with rare birds (cont.)**

Remnant	Species	Classification	Reference
Lake Towerrinning Nature Reserve	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Tringa hypoleucos</i> (common sandpiper)	JAMBA & CAMBA	
Mears Lake Nature Reserve	<i>Stictonetta naevosa</i> (freckled duck)	P4	Jaensch <i>et al.</i> (1988)
	<i>Calidris ruficollis</i> (red-necked stint)	JAMBA & CAMBA	
	<i>Thinornis rubricollis</i> (hooded plover)	P4, JAMBA & CAMBA	
Nomans-Bokan Lakes Nature Reserve (Bokan Nature Reserve)	<i>Calidris ruficollis</i> (red-necked stint)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	
	<i>Stictonetta naevosa</i> (freckled duck)	P4	
Noonalling and Whitewater Reserve	<i>Stictonetta naevosa</i> (freckled duck)	P4	Jaensch <i>et al.</i> (1988)
	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	
	<i>Calidris ruficollis</i> (red-necked stint)	JAMBA & CAMBA	
	<i>Numenius minutus</i> (little curlew)	JAMBA & CAMBA	
	<i>Plegadis falcinellus</i> (glossy ibis)	JAMBA & CAMBA	
	<i>Thinornis rubricollis</i> (hooded plover)	P4, JAMBA & CAMBA	
North Kalgarin Nature Reserve *	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	Dell (1977)
	<i>Platycercus icterotus</i> (western rosella)	P2	
Parkeyerring Lake Nature Reserve	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
Reserve 28940	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	Muir (1979b)
Seagroatt Nature Reserve	<i>Tringa hypoleucos</i> (common sandpiper)	JAMBA & CAMBA	Muir (1978c)
Taarblin Lake Nature Reserve	<i>Calidris ruficollis</i> (red-necked stint)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Calidris acuminata</i> (sharp-tailed sandpiper)	JAMBA & CAMBA	
	<i>Stictonetta naevosa</i> (freckled duck)	P4	
Tarin Rock Nature Reserve	<i>Lophoictinia isura</i> (square-tailed kite)	P4	Dell and Johnstone (1976)
	<i>Platycercus icterotus</i> (western rosella)	P2	
	<i>Leipoa ocellata</i> (mallee fowl)	V, DT	

**Table 19. Remnant vegetation in the Central Wheatbelt with rare birds (cont.)**

Remnant	Species	Classification	Reference
Wardering Lake Nature Reserve	<i>Tringa nebularia</i> (greenshank)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Egretta alba</i> (great egret)	JAMBA & CAMBA	
	<i>Tringa hypoleucos</i> (common sandpiper)	JAMBA & CAMBA	
White Lake Nature Reserve (Quongunnerunding Nature Reserve)	<i>Calidris ruficollis</i> (red-necked stint)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Stictonetta naevosa</i> (freckled duck)	P4	
	<i>Calidris acuminata</i> (sharp-tailed sandpiper)	JAMBA & CAMBA	
	<i>Calidris ferruginea</i> (curlew-sandpiper)	JAMBA & CAMBA	
	<i>Tringa nebularia</i> (greenshank)	JAMBA & CAMBA	
Yenyening Lakes (Beverley Lakes Nature Reserve)	<i>Calidris ruficollis</i> (red-necked stint)	JAMBA & CAMBA	Jaensch <i>et al.</i> (1988)
	<i>Calidris acuminata</i> (sharp-tailed sandpiper)	JAMBA & CAMBA	
	<i>Tringa hypoleucos</i> (common sandpiper)	JAMBA & CAMBA	
	<i>Calidris ferruginea</i> (curlew sandpiper)	JAMBA & CAMBA	
	<i>Tringa nebularia</i> (greenshank)	JAMBA & CAMBA	
	<i>Thinornis rubricollis</i> (hooded plover)	P4, JAMBA & CAMBA	
Yomaning Nature Reserve	<i>Falco peregrinus</i> (peregrine falcon)	SP	Harold and Dell (1979)

\*Register of the National Estate listed, \*interim listed, E = ANZECC endangered fauna, V = ANZECC vulnerable fauna, DT = CALM declared threatened fauna, SP = CALM specially protected fauna, P2 = CALM priority 2 fauna and P4 = CALM priority 4 fauna.

Western Australian Government declared priority two fauna, *Platycercus icterotis* (western rosella), and priority four fauna, *Stricktonetta naevosa* (freckled duck), *Lophoictinia isura* (square-tailed kite) *Thinornis rubricollis* (hooded plover), *Platycercus icterotis* (western rosella) and *Falcunculus frontatus* (western shrike-tit), are also found in the Central Wheatbelt.

Species protected by international agreements between Australia and China and/or Japan include *Egretta alba* (great egret), *Tringa hypoleucos* (common sandpiper), *Calidris acuminata* (sharp-tailed sandpiper), *Tringa nebularia* (greenshank), and *Calidris ruficollis* (red-necked stint).

### Rare Communities

Part of this criterion rests on vegetation types which are endemic to the wheatbelt and have become extremely restricted through land clearance. Remnants with vegetation considered of conservation significance, or rare by the Department of Conservation and Land Management or in survey reports, were regarded as meeting this threshold. To date, rare plant communities have been recorded from 22 remnants in the Central Wheatbelt (Table 20). Communities include woodland, mallee, thickets, shrubland and heath. Only three of these remnants are listed on the Register: Dryandra Forest and Lake Toolibin and Tutanning Nature Reserves.

### Vegetation Condition

Disturbance includes weed invasion, fire wood collection, burning, logging, grazing, four wheel driving, trail bike riding, trampling and mining. Not included are wildfire, fuel reduction burns, pathogens and feral predators. Vegetation which has been minimally disturbed by humans was regarded as being in good condition while areas subject to greater human disturbance was regarded as being in poor condition. Those areas subject to disturbance as defined above were considered to be below the threshold.

Areas in an undisturbed condition at the time of surveying are listed in Table 21. In most cases they were undisturbed over their entire area. Boyagin Nature Reserve and Dryandra Forest are listed on the Register.

### Geological Features

Geological features met the threshold for this criterion if they were considered rare by a geologist. Three remnants possessed rare geological features (Table 22). All three places are listed as indicative places on the Register.

### Wilderness

Wilderness quality was also part of this criterion. No areas in the Central Wheatbelt are of sufficient size or remoteness to be considered wilderness and no Department of Conservation and Land Management lands (or part of them) have been classified as wilderness. Mt Stirling Nature Reserve was described as having wilderness qualities (Coates, 1990b).

**Table 20. Remnant vegetation in the Central Wheatbelt with rare plant communities**

Remnant	Species	Reference
Avon Location 19769	<i>Eucalyptus macrocarpa</i> shrubland	George and Hnatiuk (1978)
Bewnelling Nature Reserve	Grassy woodland York gum ( <i>Eucalyptus loxophleba</i> ) - jam ( <i>Acacia acuminata</i> ) - wandoo <i>Eucalyptus wandoo</i> woodland	Mattiske Consulting Pty Ltd (1995d)
Booraan Nature Reserve	<i>Ecdeiocolea monostachya</i> and <i>Melaleuca cordata</i> heath	Muir (1979b)
Cairn Nature Reserve	Temperate grassy woodland York gum ( <i>Eucalyptus loxophleba</i> ) - mallee woodland and <i>Acacia acuminata</i> woodland	Mattiske Consulting Pty Ltd (1995d)
Camping Reserve (12109)	Temperate grassy woodland York gum ( <i>Eucalyptus loxophleba</i> ) - jam ( <i>Acacia acuminata</i> ) woodland	Mattiske Consulting Pty Ltd (1995d)
Drummond Nature Reserve	Grassy woodland York gum ( <i>Eucalyptus loxophleba</i> ) - jam ( <i>Acacia acuminata</i> ) woodland	Mattiske Consulting Pty Ltd (1995d)
Dryandra Forest*	temperate grassy woodland wandoo ( <i>Eucalyptus wandoo</i> ) woodland	Mattiske Consulting Pty Ltd (1995d)
Glenluce Nature Reserve	<i>Callistemon phoeniceus</i> thicket	Muir (1979a)
Gorge Rock Nature Reserve	Grassy woodland York gum ( <i>Eucalyptus loxophleba</i> ) woodland over grass	Mattiske Consulting Pty Ltd (1995d)
Hotham River Nature Reserve	Temperate grassy woodland with <i>Eucalyptus wandoo</i>	Mattiske Consulting Pty Ltd (1995d)
Lake Hurlstone Reserve System	<i>Dryandra</i> heath sand heath	Burgman (1985)
Lake Toolibin Nature Reserve*	<i>Casuarina obesa</i> , York gum/jam and salmon gum/gimlet woodlands	E.M. Mattiske and Associates (1993)
Meenaar Nature Reserve	York-gum ( <i>Eucalyptus loxophleba</i> ) woodland	Moore and Williams (1986)
Mournucking Nature Reserve	<i>Eremaea</i> thicket and the mallee association	Muir (1979a)
Norpa Nature Reserve	Shrubland of <i>Allocasuarina acutivalvis</i>	Muir (1979b)
Private property, south Popanyinning	Temperate grassy woodland of wandoo ( <i>Eucalyptus wandoo</i> ) - salmon gum ( <i>Eucalyptus salmonophloia</i> ) and jam ( <i>Acacia acuminata</i> )	Mattiske of Consulting Pty Ltd (1995d)
Quairading Spring Nature Reserve	Salmon gum ( <i>Eucalyptus salmonophloia</i> ) woodland	Coates (1990b)



**Table 20. Remnant vegetation in the Central Wheatbelt with rare plant communities (cont.)**

Remnant	Species	Reference
Reserve 10719	Salmon gum ( <i>Eucalyptus salmonophloia</i> ) woodland	Muir (1979a)
St Ronans Well	grassy woodland of wandoo ( <i>Eucalyptus wandoo</i> ) and jam ( <i>Acacia acuminata</i> )	Mattiske Consulting Pty Ltd (1995d)
The Ovens	grassy woodland of York gum ( <i>Eucalyptus loxophleba</i> ) and jam ( <i>Acacia acuminata</i> )	Mattiske Consulting Pty Ltd (1995d)
Throssell Nature Reserve	salmon gum ( <i>Eucalyptus salmonophloia</i> ) woodland	Moore and Williams (1986)
Tutanning Nature Reserve*	grassy woodland	Mattiske Consulting Pty Ltd (1995d)

\*Register of the National Estate listed

**Table 21. Undisturbed areas in the Central Wheatbelt**

Site	Site
Avon Location 19769	Bewnelling Nature Reserve
Boyagin Nature Reserve*	Cairn Nature Reserve
Corrigin Water Reserve and Aerodrome Reserve	Drummond Nature Reserve
Dryandra Forest*	Gorge Rock Nature Reserve
Graham Rock Nature Reserve	Lake Toolibin Nature Reserve*
Maublarling Nature Reserve	Reserve 19119
Reserve 26661	Tutanning Nature Reserve*

\*Register of the National Estate listed, + interim listed

**Table 22. Sites in the Central Wheatbelt with rare geological features**

Remnant	Rare Geological Feature	Reference
Noondeening Hill <sup>+</sup>	Excellent exposure of typical rocks and geological structures of the Jimperding Metamorphic Belt, part of the Western Australian Yilgarn block.	Perrigo (1991a)
Wave Rock <sup>+</sup>	A granite monadnock with sides undercut due to erosion and present a beautiful wave like profile which is about 12 m high on the northern face.	Australian Heritage Commission (1999)
Windmill Hill Railway Cutting <sup>+</sup>	The site shows excellent exposures of the Jimperding Metamorphic Belt including gneiss, schist, amphibolite, quartzite and ultramafic schist. Zircons of about 3 340 million years old are found here.	Perrigo (1991b)

<sup>+</sup>Interim listed

### 2.5.5 Criterion C 1: Places Important for Teaching or Scientific Information

Criterion C1 is used to identify places that are important for teaching or where significant scientific information has been, or is being, obtained. Values assessed include type localities, teaching sites, research, reference and benchmark sites.

#### Type Localities

Type localities are the collection sites of 'voucher specimens' and geological specimens held by herbaria and museums. Species names are attached to these specimens. Type localities are used for taxonomic and species distribution research. A remnant known to be a type locality was regarded as meeting the threshold for this criterion.

North Kalgarin Nature Reserve is the type locality for *Baeckea*, *Chamelaucium* and *Hakea species* (Muir, 1977a). Nangeenan Nature Reserve is the type locality for the terrestrial molluscs *Bothriembryon sedgewicki*, *Westroloma aprica*, *W. expicta* and *Themapupa beltiana*. Windmill Hill Railway Cutting is a type locality for exposed rocks of the Jimperding Metamorphic Belt of the Archaean Western Gneiss (Perrigo, 1991b).

#### Teaching Sites

Teaching sites are places where research has been undertaken at the undergraduate level or places used for teaching about Australian natural history. Any remnant used for this type of teaching was regarded as meeting the threshold for this criterion. A level of significance was also attached to each assessment:

Very High: the site is used for formal education about Australian natural history and is used by a large number of people on a regular basis; or the site is used for formal education about

Australian natural history, and the characteristics of the site make it unique in its ability to facilitate teaching about an aspect of natural history.

**High:** the site is used for formal education about Australian natural history and is used for this purpose by many people on a regular basis; the site is used for formal education about Australian natural history, and the characteristics of the site make it one of few that can be used to facilitate teaching about an aspect of natural history; or an interpretation program exists at the site which is used regularly and by a large number of visitors.

**Moderate:** the site is used for formal education about Australian natural history and is used for this purpose on a regular basis;

**Low:** the site is used for formal education about Australian natural history and is used for this purpose on an occasional or one-off basis; or an interpretation program exists at the site which is used by a relatively low number of visitors, or on an occasional or irregular basis throughout the year.

Four remnants have been identified as teaching sites. Clackline Reserve and Dryandra Forest are both listed on the Register and Noondeening Hill and Windmill Hill Railway Cutting are indicative places (Table 23).

#### Research, Reference and Benchmark Sites

Research sites are places where research is taking place or has taken place; the aim of research is increasing understanding about Australian natural history; and where the research results have been documented and are available.

All research sites were regarded as meeting the threshold. Basic survey work was not included. Of the 12 sites identified as important for flora research, only two, Lake Toolibin and Tutanning Nature Reserves, are listed on the Register (Table 24). Of the 19 remnants recognised as important fauna research sites, North Kalgarin, Dragon Rocks, Tarin Rock, and Tutanning Nature Reserves and Dryandra Forest are listed on the Register (Table 25). Dongolocking Nature Reserve is an indicative place.

Reference or benchmark sites are places: with examples of biophysical characteristics or processes in a relatively undisturbed state; which allow the progression of natural processes to be measured and observed; and provide for comparisons with similar biophysical characteristics or processes in more disturbed environments. Reference or benchmark sites should be protected from further human disturbance and have baseline information available about the particular characteristic or process. The data sources for these sites are regional experts, databases, written reports, tertiary institutions and consultancies.

All reference or benchmark sites were regarded as meeting this threshold. Significance was also assigned, based on the rarity of the sites for the particular characteristic or process; the comprehensiveness of relevant information; and the existence and regularity of a monitoring program. No reference or benchmark sites were identified by this assessment.

**Table 23. Remnant vegetation in the Central Wheatbelt important as teaching sites**

Remnant	Level of Significance	Reference
Clackline Nature Reserve*	moderate	Moore and Williams (1986)
Dryandra Forest*	very high	Murdoch University, Curtin University of Technology and Edith Cowan University
Noondeening Hill <sup>+</sup>	very high	Perrigo (1991a)
Windmill Hill Railway Cutting <sup>+</sup>	very high	Perrigo (1991b)

\*Register of the National Estate listed, <sup>+</sup>interim listed

**Table 24. Sites in the Central Wheatbelt important for flora research and monitoring**

Remnant	Reference
Cairn Nature Reserve	Mattiske Consulting Pty. Ltd. (1995c)
Camel Peaks	Mattiske Consulting Pty. Ltd. (1995c)
Gorge Rock Nature Reserve	Mattiske Consulting Pty. Ltd. (1995c)
Lake Toolibin Nature Reserve	E. M. Mattiske and Associates (1986); E. M. Mattiske and Associates (1993); Froend <i>et al.</i> 1987; Froend and Storey (1996)
Mokine Nature Reserve	Mattiske Consulting Pty. Ltd. (1995c)
Nallian Nature Reserve	Mattiske Consulting Pty. Ltd. (1995c)
Reserve 13594	Mattiske Consulting Pty. Ltd. (1995c)
Reserve 19138	Mattiske Consulting Pty. Ltd. (1995c)
Reserve 29313	Mattiske Consulting Pty. Ltd. (1995c)
St Ronans Nature Reserve	Murdoch University
The Ovens (2023)	Mattiske Consulting Pty. Ltd. (1995c)
Tutanning Nature Reserve*	Brown and Hopkins (1983)

\*Register of the National Estate listed

**Table 25. Sites in the Central Wheatbelt important for fauna research or monitoring**

<b>Remnant</b>	<b>Reference</b>
Badjaling Nature Reserve	Chapman and Dell (1985)
Bendering Reserve	Chapman and Dell (1985); Kitchener (1981); Kitchener <i>et al.</i> (1980a); Kitchener <i>et al.</i> (1980b); Kitchener <i>et al.</i> (1982)
Dongolocking Nature Reserve <sup>+</sup>	Chapman and Dell (1985; Friend and Scanlon (1995); Friend <i>et al.</i> (1994); Kitchener (1981); Kitchener <i>et al.</i> (1980a); Kitchener <i>et al.</i> (1980b); Kitchener <i>et al.</i> (1982)
Dragon Rocks Nature Reserve*	Chapman and Dell (1985)
Dryandra Forest*	Friend (1990); Friend and Scanlon (1995); Friend <i>et al.</i> (1994); Garkaklis <i>et al.</i> (1998); Majer (1985); Ninnox Wildlife Consulting (1991); Recher and Davis (1998)
East Yorkrakine Nature Reserve	Chapman and Dell (1985); Kitchener <i>et al.</i> (1980a); Kitchener <i>et al.</i> (1980b); Kitchener <i>et al.</i> (1982); Saunders (1989)
Koberbin Nature Reserve	Kinnear <i>et al.</i> (1998)
Mt Stirling Nature Reserve*	Kinnear <i>et al.</i> (1998)
North Kalgarin Nature Reserve*	Chapman and Dell (1985); Kitchener (1981); Kitchener <i>et al.</i> (1980a); Kitchener <i>et al.</i> (1980b); Kitchener <i>et al.</i> (1982)
Querekin Rock Remnant (private property)	Kinnear <i>et al.</i> (1998)
Sales Rock Remnant	
South Badjaling Nature Reserve	Chapman and Dell (1985)
St Ronans Nature Reserve	Mattiske Consulting (1995d)
Tarin Rock Nature Reserve*	Chapman and Dell (1985); Kitchener <i>et al.</i> (1980a); Kitchener <i>et al.</i> (1980b)
Tutanning Nature Reserve*	AHC (1999); Friend <i>et al.</i> (1997); Friend and Scanlon (1995); Friend <i>et al.</i> (1994); Friend <i>et al.</i> (1993); Jones <i>et al.</i> (1994a); Jones <i>et al.</i> (1994b); Little and Friend (1993)
Yormaning Nature Reserve	Bradley (1997); Chapman and Dell (1985); Kitchener (1981); Kitchener <i>et al.</i> (1980a); Kitchener <i>et al.</i> (1980b); Kitchener <i>et al.</i> (1982)
Yoting Town Reserve	Chapman and Dell (1985); Kitchener <i>et al.</i> (1980a); Kitchener <i>et al.</i> (1980b); Kitchener <i>et al.</i> (1982)
Yoting Water Reserve	Chapman and Dell (1985); Kitchener <i>et al.</i> (1980a); Kitchener <i>et al.</i> (1980b); Kitchener <i>et al.</i> (1982)

\* Register of the National Estate listed, + interim listed

### **2.5.6 Criterion D 1: Places Important in Demonstrating a Range of Landscapes, Environments or Ecosystems**

Criterion D1 relates to the importance in demonstrating the principal characteristics of the range of landscapes, environments or ecosystems, the attributes of which identify them as being characteristic of their class. Given the complexity of analysis required for this criterion it was not applied in this assessment.

### ***2.6 Steps 5 and 6. Review of Draft Regional Assessment by Key Stakeholders and Preparation of Nominations to the Register of the National Estate***

The draft report was sent to 80 stakeholders for review. Stakeholders included State Government Departments, Local Authorities, Land Care Groups, Aboriginal Corporations, Naturalists' Clubs, Birds Australia, Wildflower Societies, Conservation groups, such as the Conservation Council and private landholders whose land was assessed. Replies were received from the Commonwealth Scientific and Research Organisation, Western Australian Department of Conservation and Land Management, Water and Rivers Commission, Water Corporation Shire of Northam, Noongar Land Council, River Conservation Society and Ms Laura Grey.

At a meeting of the Western Australian Natural Environment Evaluation Panel it was decided to nominate those remnants of vegetation which had reached the threshold of three or more criteria (see Table 1). This was mainly due to time constraints and ideally, all those areas which had reached the threshold of one or more criteria would be nominated, in the future. Nominations for the following ten remnants were prepared: Bending Nature Reserve, (once called West Bending Reserve and not to be confused with North Kalgarin Reserve which is listed in the Register under its old name of Bending Nature Reserve), Boolanelling Nature Reserve, Cairn Nature Reserve, Corrigin Water Reserve and Aerodrome Reserve, Kondinin Salt Marsh, Lake Hurlstone Reserve System, Mokine Nature Reserve, Reserve 29313, St Ronan's Nature Reserve and Yornaning Nature Reserve. Avon Location 19769 was considered for nomination, but reference to a GIS at the Western Australian Department of Environmental Protection revealed that the location had been cleared prior to 1996.

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**Regional Assessment of the Wheatbelt of Western  
Australia:  
Central Wheatbelt  
Appendices**

by

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1. Location of remnants assessed during the Regional Assessment of the Central Wheatbelt of Western Australia

Appendix 1. Location of remnant vegetation assessed as part of the Central Wheatbelt Regional Assessment

Town or shire	Remnant	Location Number	Direction/distance from nearest town
Aldersyde	Jingaring Nature Reserve	13797	10 km south-east of Aldersyde
Ardath Siding	Wandjagill Nature Reserve	25884	5.5 km south-east of Ardath Siding
Babakin Siding	Seagroatt Nature Reserve & Reserve 25979	A25062 & 25979	13.5 km east of Babakin Siding
Babakin Siding	Reserve 23637	23637	3.2 miles east of Babakin Siding
Babakin Siding	Red Lake Nature Reserve	16493	13.5 km south-east of Babakin Siding
Badjalung	Yoting Water Reserve		14 km north-north-east of Badjalung
Badjalung	South Badjalung Nature Reserve	12333	2.5 km south of Badjalung
Badjalung Siding	Moulien Nature Reserve	28289	19 km due north of Badjalung Siding
Baillie Farm, Northam	Noondeening Hill		Not given
Beverley	Yenyening Lakes (Beverley Lakes Nature Reserve)	31837, 28088	35 km east-south-east of Beverley
Boddington	Mooradung Nature Reserve	32448	12 km south-east of Boddington
Brookton	Blechynden-Haily Block		Private property owned by C. W. & K. I. Blechynden: Lake Mears Road
Brookton	Boyagin Nature Reserve	20610	South-west of Brookton
Bruce Rock	Sorensens Nature Reserve	16104	35 km south-west of Bruce Rock
Bruce Rock	Water Reserve 13327	13327	North-west of Bruce Rock
Bruce Rock	Reserve 18444	18444	North-north-east of Bruce Rock
Bruce Rock	Wulyaling Nature Reserve	978	36 km south-west of Bruce Rock
Bruce Rock	Wialkuting Nature Reserve	14194	50.5 km south-west of Bruce Rock

Appendix 1. Location of remnant vegetation assessed as part of the Central Wheatbelt Regional Assessment (contd)

Town or shire	Remnant	Location Number	Direction/distance from nearest town
Bruce Rock	Water Reserve 13035 and 15027	13035 and 15027	Adjacent to and north-east of Bruce Rock
Bruce Rock	Reserve 17420	17420	18 km south-west of Bruce Rock
Bruce Rock	Reserve 19138	19138	10 km south-east of Bruce Rock
Bruce Rock	Bruce Rock Nature Reserve	12277	At Bruce Rock
Bruce Rock	Kokerbin Hill	11043	41.6 km due west of Bruce Rock
Bruce Rock	Yilgerin Rock	35002	14.4 km south of Bruce Rock
Bruce Rock	Belka Reserve	A 22261	17.6 km north-north-west of Bruce Rock
Bruce Rock	Reserve 17824	17824	28.8 km west-south-west of Bruce Rock
Bruce Rock	Kumminin Reserve	16265	20.8 km south-south-east of Bruce Rock
Bruce Rock	Reserve 15199	15199	23.2 km north east of Bruce Rock
Bruce Rock	Reserve 14520	14520	41.6 km due east of Bruce Rock
Bruce Rock	Kwolyin Hill	11038 & 11046	33.6 km due west of Bruce Rock
Bruce Rock Shire	Reserve 24097	24097	4.8 km north-east of Bilbarin Siding
Bungulla Siding	Bungulla Nature Reserve	33990	Immediately south of Bungulla Siding
Burracoppin	Burracoppin Reserve	18198	2 km south-east of Burracoppin
Corrigin	Nonalling and Whitewater Reserve	24428	6 km north of Yealering
Corrigin	Boolanelling Nature Reserve	22792	25.5 km north-north-west of Corrigin
Corrigin	Corrigin Water Reserve and Aerodrome Reserve	16196 and 38131	West of Corrigin
Corrigin	Water Reserve 25002	25002	South-west of Corrigin



Appendix 1. Location of remnant vegetation assessed as part of the Central Wheatbelt Regional Assessment (contd)

Town or shire	Remnant	Location Number	Direction/distance from nearest town
Corrigin	Gorge Rock Nature Reserve	A1 16714	19 km south-south-east of Corrigin
Corrigin	Paper Bark Nature Reserve 2	12900	South-east of Corrigin
Corrigin	Wogelin Hill Reserve	34000	North-west of Corrigin
Corrigin	Reserve 30324	30324	Not given
Corrigin	Water Reserve 15668	15668	West-south-west of Corrigin
Corrigin	Sewell Rock Nature Reserve	9426	North-east of Yearlering
Corrigin	Water Reserve 14171	14171	North of Corrigin
Corrigin	Water Reserve 10644	10644	South-west of Corrigin
Corrigin	Overheu Nature Reserve	25546	Not given
Corrigin	Water Reserve 14014	14014	North-east of Corrigin
Corrigin	Water Reserve 9448	9448	Not given
Corrigin	Water Reserve 10125	10125	South of Corrigin
Corrigin	Water Reserve 10187	10187	South-south-west of Corrigin
Corrigin	Paper Bark Nature Reserve 1	12899	South-east of Corrigin
Corrigin	Water Reserve 12363	12363	West of Corrigin
Corrigin	Water Reserve 13536	13536	South-east of Corrigin
Cramphorn Siding, south of Merredin	Cairn Nature Reserve	9754	26 km north-east of Cramphorn Siding
Cramphorne Siding	Mt. Cramphorne Reserve	27521	41 km north-east of Narembbeen
Darkan	Lake Towerinning Nature Reserve	24917, A28014	32 km south of Darkan

Appendix 1. Location of remnant vegetation assessed as part of the Central Wheatbelt Regional Assessment (contd)

Town or shire	Remnant	Location Number	Direction/distance from nearest town
Datening	Datening Nature Reserve	28656	Located at Datening townsite.
Dulbeling Siding	Dulbeling Nature Reserve	30132	14 km south-south-west of Quairading.
Dumbleyung	Dongolocking Nature Reserve	19096, 19083, 19082, 10473, 19089, 19090, 26005	24 km north of Dumbleyung
Erikin Siding	Mokami Springs	23686	4 km south-east of Erikin Siding
Highbury	Highbury Nature Reserve	26668	14 km due south of Narrogin
Highbury	Reserve 26669	26669	14 km south of Narrogin
Highbury	Reserve 15855	15855	12 km south-east of Highbury
Hines Hill	Hines Hill Nature Reserve	23795	1 km north-north-east of Hines Hill
Hines Hill Siding	Reserve 25872	25872	2 km south of Hines Hill Siding
Hyden	Wave Rock	28832/2887, 28833/2886, 19929/2888, 29305/2936	North-east of Hyden
Hyden	Camel Peaks	23164	17 km north of Hyden
Hyden	Reserve 34295	34295	21 km east-north-east of Hyden
Hyden	Reserve 28715	28715	19 km due north of Hyden
Hyden	Reserve 28047	28047	54 km due east of Hyden
Hyden	Reserve 27639	27639	19 km east of Hyden
Hyden	Graham Rock Nature Reserve	27175	7 km east of Hyden
Hyden	Reserve 26661	26661	15 km due east of Hyden
Hyden	Dragon Rocks Nature Area	36128 'A' Class Reserve	South-south-east of Hyden
Hyden	Lake Hurlstone Reserve System	27837, A24417, A27927	50 km east of Hyden

Appendix 1. Location of remnant vegetation assessed as part of the Central Wheatbelt Regional Assessment (contd)

Town or shire	Remnant	Location Number	Direction/distance from nearest town
Hyden	Emu Rock	9753	51 km east of Hyden
Jura Siding	Jura Nature Reserve	27452	1 km west of Jura Siding
Karlgarin	Reserve 23366	23366	19 km west-south-west of Karlgarin
Karlgarin	Karlgarin Hill Nature Reserve	10716	14 km west of Karlgarin
Karlgarin	Serveners Rook Hole Nature Reserve	17662	8 km north of Karlgarin
Kauring Siding	Yandimilling Nature Reserve	16412	16 km south-east of Kauring Siding
Kauring Siding	Reserve 24179	24179	14 km north-east of Kauring Siding
Kauring Siding	Reserve 26897	26897	5 km south-south-east of Kauring Siding
Kellerberrin	Mournucking Nature Reserve	24897	Not given
Kondinin	Reserve 22906	22906	Located at Kondinin townsite
Kondinin	Kondinin Salt Marsh Nature Reserve	26905/26692	South-east of Kondinin
Kondinin	Bendering Reserve		16 km northeast of Kondinin
Kondinin	North Karlgarin Nature Reserve	A20338 & 25681	23 km north-north-east of Kondinin
Koorda	Water Reserve 13176	13176	38 km south-west of Koorda
Kulin	Jilakin Rock	15385	16 km east of Kulin
Kulin	Rose Road Reserve	34136	Not given
Kulin	Jitarning Nature Reserve	29988 'A' Class reserve	South-west of Kulin
Kulin	Maublarling Nature Reserve	29835	Not given
Kulin	North Jitarning Nature Reserve	27979 'A' Class Reserve	Not given

Appendix 1. Location of remnant vegetation assessed as part of the Central Wheatbelt Regional Assessment (contd)

Town or shire	Remnant	Location Number	Direction/distance from nearest town
Kulin	Kulin Nature Reserve		Not given
Kulin	Koolberin Nature Reserve	16763	Not given
Kulin	Avon Location 19769	Freehold: Doyle	Not given
Kulin	South Kulin Nature Reserve	34833	Not given
Kweda	Water Reserve 16582	16582	North of Kweda
Kweda	Water Reserve 244	244	South-east of Kweda
Kwolyin	Water Reserve 35598	35598	West of Kwolyin
Kwolyin	Reserve 16288	16288	1 km north-west of Kwolyin
Kwolyin Siding	Craig Nature Reserve	30903	16 km due north of Kwolyin
Kwolyin Siding	Reserve 10719	10719	21 km north of Kwolyin Siding
Kwolyin Siding	Kwolyin Nature Reserve	30960	6 km north-north-east of Kwolyin Siding
Lake Grace	North Tarin Rock Nature Reserve	29857 'A' Class Reserve	North-west of Lake Grace
Lake King	Lake King Nature Reserve	39422	North-west of Lake King
Lake King	Reserve 25979	25979	Not given
Meckering	Meckering Fault Scarp		Not given
Merredin	Ulva Nature Reserve	24835	14 km south-south-west of Merredin
Merredin	Reserve 28940	28940	48 km east-south-east of Merredin
Merredin	Water Reserve 11222	11222	North-west of Merredin
Merredin	Booraan Nature Reserve	29738	14 km east of Merredin

Appendix 1. Location of remnant vegetation assessed as part of the Central Wheatbelt Regional Assessment (contd)

Town or shire	Remnant'	Location Number	Direction/distance from nearest town
Merredin	Reserve A13594	A13594	26 km south-south-east of Merredin
Merredin	Reserve 13594	13594	26 km south-east of Merredin
Merredin	Merredin Nature Reserve	19476	6.5 km south-south-west of Merredin
Merredin	Norpa Nature Reserve	20504	21 km south-east of Merredin
Nangeenan Siding	Nangeenan Nature Reserve	24532	Immediately north of Nangeenan Siding
Narembeen	Emu Hill Reserve	A25039	South of Narembeen
Narembeen	Reserve 13565	13565	56 km east-north-east of Narembeen
Narembeen	Reserve 31091	31091	23 km due east of Narembeen
Narrogin	Nomans-bokan Lakes Nature Reserve	9551, 9628, 10631, 17339, 26785	32 km east of Narrogin
Narrogin	Ibis Lake Nature Reserve	9629	34 km east-south-east of Narrogin
Narrogin	Reserve 29906	29906	Not given
Narrogin	Reserve 27644	27644	Not given
Narrogin	Reserve 20878	20878	13 km west south-west of Narrogin
Narrogin	Dryandra Forest	State Forest 51 State Forest 53	North-west of Narrogin
Narrogin	Lake Toolibin Nature Reserve	Dulbinning Nature Reserve A27286 and A9617, Toolibin Nature Reserve A24556 and Walbyning Nature Reserve A14398.	East of Narrogin
Narrogin	Little White Lake Nature Reserve	9508, 26786, 26788, 26789, 26790	25 km east-south-east of Narrogin
Narrogin	Taarblin Lake Nature Reserve	9550, 20962	35 km east of Narrogin
Narrogin	White Lake Nature Reserve (Quongunundering Natur	10016	27 km east-south-east of Narrogin

Appendix 1. Location of remnant vegetation assessed as part of the Central Wheatbelt Regional Assessment (contd)

Town or shire	Remnant	Location Number	Direction/distance from nearest town
Narrogin	Reserve 1864	1864	14 km north-west of Narrogin
Narrogin	Reserve 29313	29313	22 km south-west of Narrogin
Northam	Clackline Nature Reserve	32400	1 km north of Clackline Siding
Northam	Meenaar Nature Reserve	A29977	21 km east of Northam
Northam	Throssell Nature Reserve	7220	15 km west of Meckering
Not given	Reserve 23137	23137	Not given
Not given	Koberbin Nature Reserve		Not given
Pantapin Siding	Glenluce Nature Reserve	25112, 26266	15 km due north of Pantapin Siding
Pantapin Siding	Pikaring Hill Reserve	976	17 km south-south-east of Pantapin
Pickaring Hill	Pikaring West Nature Reserve	23141	1.6 km west of Pickaring Hill
Pingelly	The Ovens (2023)	Reserve	16.7 km west of Pingelly
Pingelly	Boyer mucking Nature Reserve	A12098	42 km due east of Pingelly
Pingelly	Moorumbine Nature Reserve	6798	10 km due east of Pingelly
Pingelly	Hotham River Nature Reserve	8291 'A' Class Reserve	South of Pingelly
Pingelly	Tutanning Nature Reserve	36942, 25555, 31163	East of Pingelly
Pingelly	Petercarring Nature Reserve	20095	16 km due east of Pingelly
Pingelly	Noombing Nature Reserve	26150	8 km west of Pingelly
Pingelly	North Woyterling Nature Reserve	20066	30 km due east of Pingelly
Popanyinning	Lansdell's Property		Not given

Appendix 1. Location of remnant vegetation assessed as part of the Central Wheatbelt Regional Assessment (contd)

Town or shire	Remnant	Location Number	Direction/distance from nearest town
Popanyinning	Private property, south of Popanyinning		South of Popanyinning
Quairading	Reserve 30299	30299	22 km north-east of Quairading
Quairading	Dangin Nature Reserve	19570 'A' Class Reserve	Not given
Quairading	Pantapin Nature Reserve	18342 'A' Class Reserve	Not given
Quairading	Jennaberring Nature Reserve		Not given
Quairading	Mooraning Nature Reserve	11776 'A' Class Reserve	Not given
Quairading	Reserve 28319	28319	5 km south-east of Quairading
Quairading	Mt Stirling Nature Reserve	23187 (Nangeen Hill)	12 km northwest of Kwolyin townsite
Quairading	Gundaring Nature Reserve	11039 'A' Class Reserve	North-east of Quairading
Quairading	Reserve 2275	2275	Not given
Quairading	Mears Lake Nature Reserve	12398	25 km south-south-west of Quairading
Quairading	Badjalung North Nature Reserve	10121	9 km east-north-east of Quairading
Quairading	Reserve 13217	13217	13 km east-south-east of Quairading
Quairading	Quairading Spring Nature Reserve	11372 'A' Class Reserve	Not given
Quairading	Badjalung Nature Reserve	23758	10 km east of Quairading
Quairading	Water Reserve 1153	11153	South-west of Quairading
Quairading	Badjalung West Nature Reserve	28318	7 km east of Quairading
Quairading	Bugin Nature Reserve	28317	9 km south of Quairading
Shackleton	Water Reserve 11029	11029	West of Shackleton

Appendix 1. Location of remnant vegetation assessed as part of the Central Wheatbelt Regional Assessment (contd)

Town or shire	Remnant	Location Number	Direction/distance from nearest town
Shackleton	Water Reserve 11649	11649	North of Shackleton
Shackleton	Water Reserve 13502	13502	East of Shackleton
Shackleton	Querekin Rock Remnant		40 km south-east of Mt Stirling Nature Reserve
Shackleton	Water Reserve 13172	13172	South of Shackleton
Shackleton	Water Reserve 5314	5314	South of Shackleton
Shackleton Siding	Shackleton Nature Reserve	A24505	4 km due north of Shackleton Siding
Tammin	Sale's Rock Remnant		South of Tammin
Tammin	East Yorkrakine Nature Reserve	23085 'A' Class Reserve	30 km north-east of Tammin
Tammin	Tammin Railway Dam Nature Reserve	23566	5.5 km south-east of Tammin
Tammin	Mortlock River East Nature Reserve	24831	11 km west of Tammin
Tammin	Charles Gardner Reserve	A20041	15km south of Tammin.
Tammin	Noonying Lake Nature Reserve	10313	4 km south-west of Tammin
Tammin	Mooraning Nature Reserve and Water Reserve 14887	11776 & 14887	South of Tammin
Tarin Rock	Tarin Rock Nature Reserve	25711 'A' Class Reserve	North-west of Tarin Rock
Toodyay	Bewnell Nature Reserve		Not given
Toodyay	Drummond Nature Reserve	42808 'A' Class Reserve	Not given
Toodyay	Windmill Hill Railway Cutting	no number	Not given
Wagin	Parkeyerring Lake Nature Reserve	A24792, A10733	7 km south of Wagin
Wagin	Gundaring Lake Nature Reserve	24373	14 km east of Wagin



Appendix 1. Location of remnant vegetation assessed as part of the Central Wheatbelt Regional Assessment (contd)

Town or shire	Remnant	Location Number	Direction/distance from nearest town
Wagin	Nallian Nature Reserve	4458	11 km north-east of Wagin
Wagin	Casuarina Nature Reserve	2085-2088	Jaensch, et al., 1988
Wagin	Wardling Lake Nature Reserve	17258	17 km west-north-west of Woodanilling
West Arthur	Dead Mans Swamp Nature Reserve	A5456	28 km south of Darkan
Wickepin	Reserve 19119	19119	Not given
Wickepin	Reserve 14694	14694	Not given
Wickepin	Reserve 22967	22967	Not given
Wickepin	Camping Reserve (12109)	12109	Not given
Wickepin	Yormaning Nature Reserve	A 18952	12 km west-north-west of Wickepin
Wickepin	Mungerungcutting Nature Reserve	2175	Not given
Yarding Siding	Yarding Nature Reserve	27108	1 km east of Yarding Siding
Yilliminning	Reserve 29589	29589	7 km due north of Yilliminning
York	St Romans Nature Reserve	30591	17 km west of York
York	Wambryn Nature Reserve	21981	13 km west of York
York	Mokine Nature Reserve	31211	20 km north-west of York
York	St Romans Well, York		18 km west of York
Yoting Siding	Reserve 11024	11024	15 km north of Yoting Siding
Yoting Siding	Yoting Town Reserve	15123	10 km north-east of Badjalaing

2. National Estate values of remnants assessed as part of the Regional Assessment of the Central Wheatbelt of Western Australia

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt

Remnant	Threshold Met	Values	Status
Avon Location 19769	A1, A2, B1	This location is particularly diverse and supports EUCALYPTUS WANDOO woodland, E. SALMONPHLOJA and E. LONGICORNIS woodland, E. ASTRINGENS woodland, open scrub with mallee high shrubland and low open-woodland and scrubland. A rare flora community of EUCALYPTUS MACROCARPA shrubland is present. DAVESIA PACHYLINA, EUCALYPTUS SHEATHIANA and OLEARIA MUELLERI are at the western limit of their range here. ACACIA GLAUCOPTERA is at the northern limit of its range. Flora requiring taxonomic review by the Western Australian Department of Conservation and Land Management include an undescribed ISOPOGON. An undescribed BAECKEA is thought to be an endemic. This remnant was in very good condition when surveyed.	not listed
Badjalung Nature Reserve	B1, C1	BANKSIA CUNEATA occurs here and it is known to have a geographic range of less than 100 km and this species is considered vulnerable. The relative richness of birds on this reserve is due to the presence of a salt complex. The reserve has been the subject of a study into the biology and zoogeography of amphibians and reptiles.	not listed
Badjalung North Nature Reserve		Salt marsh vegetation is present on this reserve. Disturbance could cause further encroachment onto farmland.	not listed
Badjalung West Nature Reserve		This reserve is of little value for conservation purposes but is valuable for soil conservation in an area becoming progressively salt-prone.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Belka Reserve	A2, B1	This reserve is in excellent condition both from a botanical and ornithological perspective. It is relatively undisturbed and free from rubbish. The mallee fowl (LEIPOA OCELLATA), declared vulnerable at a national level has been reported on the reserve.	not listed
Bendering Reserve	A2, A3, B1, C1	This reserve has a diverse flora. The Western Australian gazetted priority three species CRYPTANDRA POLYCLADA occurs on this reserve. In addition sandalwood SANTALUM SPICATUM occurs abundantly at this reserve, but elsewhere in the Wheatbelt it has all but disappeared.  It has a great diversity of fauna with the nationally vulnerable PHASCOGALE CALURA (red-tailed phascogale), and LEIPOA OCELLATA, mallee fowl, both living in the reserve. PSEUDOMYS OCCIDENTALIS (western mouse) has only recently been deleted from the State Government's declared threatened fauna list. It is now priority 4 fauna. The red-tailed phascogale, white-tailed dunnart (SMINTHOPSIS GRANULIPES), Mitchell's hopping mouse (NOTOMYS MITCHELLI), western mouse and mallee fowl are known to breed at the reserve.  The reserve plays an important role in faunal and vegetation processes in an environment in which much clearing for agriculture has taken place. A total of 30% of its trees were senescent (Muir senescence index = 10.6) in 1978 providing important breeding hollows for animals.  The reserve is considered significant in maintaining existing processes or natural systems because of its large area.  The reserve has been the subject of a study into the biology and zoogeography of amphibians and reptiles and another into lizard assemblages and reserve size and structure. Other studies include investigations into the conservation value for mammals and birds of reserves in the wheatbelt. One study was into the breeding, diet and habitat preferences of the red-tailed phascogale (PHASCOGALE CALURA).	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Bewndelling Nature Reserve	B1	This reserve has temperate grassy woodland, one of the most threatened ecosystems in Australia due to widespread agricultural development. Grassy woodlands are defined as a woodland where the understorey consists predominantly of grass species (also includes sedges, rushes and other grass-like plants). These grasslands have been dramatically altered and are poorly represented in conservation reserves. It is one of the few reserves on which York gum (EUCALYPTUS LOXOPHEBA) - jam (ACACIA ACUMINATA) - wandoo (EUCALYPTUS WANDOO) woodland occurs. This remnant of vegetation is in very good condition.	not listed
Blechnynden-Huily Block	A2, B1	This remnant of vegetation is thought to provide habitat for the nationally vulnerable malleec fowl (LEIPOA OCELLATA).	not listed
Boolarcelling Nature Reserve	A1, A3, B1	The tall mixed heath found on this reserve is not encountered in the Tammin, Kellerberrin, Merredin or Narembeen Shires to the north and east and appears to represent a heath type more commonly found further to the south. The reserve may be the northern limit of the range of these species and is considered important in evolutionary and genetic studies. Further studies are required to support this idea. The reserve is reported to support the western brush wallaby (MACROPUS IRMA), declared priority four fauna by the Western Australian Government.  The reserve carries a rich vegetation both structurally and floristically and represents some of the dominant vegetation types of the region prior to clearing.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Booraan Nature Reserve	B1	<p>The MELALEUCA CORDATA heath and the ECDEIOCOLEA MONOSTACHYA and MELALEUCA CORDATA low heath which occur on this reserve are unusual in several aspects. ACACIA sp. 11, which is emergent in the MELALEUCA heath, has not been found in the wheatbelt at other reserves although it may exist elsewhere. The ECDEIOCOLEA MONOSTACHYA and MELALEUCA CORDATA low heath is a little unusual in that ECDEIOCOLEA MONOSTACHYA has most commonly been encountered in the moister heath sites and MELALEUCA CORDATA most commonly in the drier heath sites. Their combined occurrence at this reserve is of interest.</p> <p>This reserve contains the best representative area of heath in the region. Additionally there appears to be some unusual plant assemblages in the heath and this may indicate a peculiar soil type.</p>	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Boyagin Nature Reserve	A2, A3, B1, C1, D1	<p>The Boyagin Nature Reserve is of major significance in maintaining on-going ecological processes within the Wheatbelt region of Western Australia. The area is one of the few pockets of uncleared land which is large and varied enough to continue to provide a habitat for the remaining species of the Wheatbelt. The area therefore plays a critical role in the maintenance of the faunal and floral biodiversity of the Wheatbelt region and the State. The site is also likely to act as a stepping stone reserve for a number of bird species.</p> <p>This site contains patches of kwongan which are of considerable significance for the high level of endemism and high species richness which is a major contributor to the region's rich biodiversity. This community contains the highest number of vascular plant species per unit area than any other sclerophyllous vegetation type in southern Australia.</p> <p>The Boyagin Nature Reserve contains a number of rare, geographically restricted endemics and unnamed plant species. THOMASIA MONTANA gazetted rare by the Department of Conservation and Land Management is one of these. The area's flora includes the Western Australian Government's priority two species ACACIA DEFLEXA and priority four species EUCALYPTUS CAESIA and E. EXILIS. The geographically restricted species BORONIA CAPITA ssp. CLAVATA, CALOTHAMNUS PLANIFOLIUS, CALOTHAMNUS RUPESTRIS, DRYANDRA CYNAROIDEES, GASTROLOBIUM STRIPULARE, HAKEA LORANTHIFOLIA and HEMIGENIA SALIGNA also grows here.</p>	Registered
		<p>The Boyagin Nature Reserve contain a number of rare, threatened and regionally uncommon vertebrate species including the nationally threatened red-tailed phascogale (PHASCOGALE CALURA), the numbat (MYRMECOBIUS FASCIATUS) and Carnaby's cockatoo (CALYPOTORHYNCHUS LATIROSTRIS). Western Australian State Government declared priority four fauna the woylie (BETTINGIA PENICILLATA), tamar wallaby (MACROPUS EUGENII), brush wallaby (MACROPUS IRMA) are found here. The peregrine falcon (FALCO PEREGRINUS) specially protected fauna at a state level is also at the reserve. Many of these species have all but disappeared from the wheatbelt region and are now found in only a few locations.</p> <p>The area contains expressions of a number of vegetation communities in excellent condition which are characteristic of the Wheatbelt region. This includes kwongan, powder-bark wandoo woodlands and allocasuarina woodlands.</p>	

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Boyerrnocking Nature Reserve		This reserve is heavily disturbed and of little value for flora conservation . It is a useful resting and nesting site for birds. It is salt prone and removal of timber will expand the influence of the salty creek.	not listed
Bruce Rock Nature Reserve		The woodlands on this reserve are important for nest sites of a number of species of birds. It is also an important resting and breeding site for migratory species as it is fairly isolated.	not listed
Bugin Nature Reserve		It is of value for slowing salt encroachment onto adjacent farmland.	not listed
Bungulla Nature Reserve		Although degraded this reserve is probably an important stepping stone for migratory birds and carries quite a few species of plants despite its small size.	not listed
Burracoppin Reserve	A2, A3, B1	Burracoppin Reserve is in excellent condition and has quite a high diversity of plants considering its area. It supports the nationally vulnerable mallee fowl (LEIPOA OCELLATA).	not listed





Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Casuarina Nature Reserve		The information available about this reserve did not indicate significant values.	not listed
Charles Gardner Reserve	A1, A3, B1	<p>The Kwongan vegetation associations in the Charles Gardner Reserve are rich in plant species. The floristic diversity of the reserve is approximately 75 species per square kilometre. This makes the reserve of outstanding value. The vegetation is also diverse with 17 associations covering the 580 ha.</p> <p>The reserve has one species of Western Australian Government declared rare flora, <i>HEMIGENIA VISCIDA</i>. The Western Australian Government declared priority two flora species <i>ACACIA CAMPYLOPHYLLA</i> and the priority three species <i>CALOTHAMNUS BREVIFOLIUS</i> and <i>DRYANDRA HORRIDA</i> are found here. Likewise the priority four species <i>STYLIDIUM SCABRUM</i> and <i>STYLIDIUM TENUICARPUM</i>. Other flora include <i>CRYPTANDRA LEUCOPOGON</i> with a geographic range less than 100 kilometres and poorly known. The poorly known, <i>LEIDOSPERMA LEPTOPHYLLUM</i> and <i>PLATYSACE COMMUTATA</i> grow here. Vulnerable species here include <i>DRYANDRA SPECIOSA</i> and <i>MESOMELAENA PREISSII</i>.</p>	registered
Clackline Nature Reserve	A1, A3, B1, C1	<p>The Western Australian Government declared rare <i>ACACIA APHYLLA</i> and priority two species, <i>STENANTHEMUM GRANDIFLORUM</i> are found at this reserve. <i>EREMAEA BLACKWELJANA</i> has a distribution of less than 100 km and is poorly known. The reserve is also the northernmost limit of <i>LOMANDRA NUTANS</i> and the easternmost limit of the distribution of <i>LOMANDRA SPARTEA</i>.</p> <p>The area is of considerable importance because the topography reflects a somewhat complex geological structure and a major vegetation change.</p> <p>The reserve is frequently visited by local naturalist and conservation groups.</p>	Registered

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Corrigin Water Reserve and Aerodrome Reserve	A1, A2, A3, B1	<p>These reserves are located in a shire which has the lowest percentage area of nature reserve for any shire in the Narrogin district.</p> <p>The occurrence of a large area of uncleared, and in many parts almost pristine, bushland is rare and for this reason alone the reserves are of some importance in vegetation processes. The reserves contain a wide range of typical wheatbelt vegetation formations including woodland, mallee, mallet, thicket and heathlands and in doing so support an extensive and diverse flora. The species richness compares very favourably with other reserves surveyed in the wheatbelt. Brown mallet (<i>EUCALYPTUS ASTRINGENS</i>) and blue mallet (<i>E. GARDNERI</i>) which both have limited distributions occur here. The heath associations are very diverse. The families Myrtaceae and Proteaceae are well represented in the reserves, 56 and 43 species respectively. A total of 42 families are represented in the reserves. <i>GREVILLEA DRYANDROIDES</i> and <i>LESCHENAUTIA PULVINARIS</i>, both Western Australian gazetted rare plants, are found there. <i>GREVILLEA DRYANDROIDES</i> was known previously only between Cadoux and Ballidu, 190 km north west of Corrigin before a survey undertaken in 1986 was completed. It has limited distribution. A species of the Western Australian Department of Conservation and Land Management's priority two flora occur at the reserves this being <i>ACACIA DEFLEXA</i>. Priority three flora includes <i>DRYANDRA FERRIGINEA</i> subspecies <i>OBLIQUILOBA</i>, <i>HAKEA BAXTERI</i> and <i>PLATYSACE COMMUTATA</i> are also worth noting although they are not listed by the Western Australian Department of Conservation and Land Management on its rare and priority flora list. <i>HAKEA BAXTERI</i> is poorly known and information on its distribution is inadequate. <i>PLATYSACE COMMUTATA</i> also lacks information on its distribution and is thought to have a geographic range less than 100 km. <i>DRYANDRA CYNAROIDES</i> is a priority four species and is considered to have been adequately surveyed but whilst rare, is not currently threatened in Australia. <i>DODONAEA DIVARICATA</i> is a the southernmost end of its range and <i>PULTENAEA VERRUJOSA</i> var. <i>BRACHYPHYLLA</i> at the northernmost end of its range in the reserves.</p> <p>Mallee fowl (<i>LEIPOA OCELLATA</i>) has been reported to occur at the reserves by a neighbouring farmer. This bird is considered vulnerable at a national level. This reserve is thus important in faunal processes.</p> <p>The reserves are considered significant in maintaining existing processes or natural systems because of their large area. When surveyed in 1986 the reserves had not been</p>	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Craig Nature Reserve	A2	burnt in any part for twenty years and had reached a level of maturity which does not occur in areas of wheatbelt bushland. Mallet species are very fire sensitive being killed by fire and only regenerating from seed.	not listed
Dangin Nature Reserve	A2, A3	Reserve 30903 forms an important part of the corridors of vegetation which connect other reserves and uncleared land, thus forming a network suitable for use by migratory birds. Otherwise the reserve is too degraded to support much fauna.  This reserve has quite a high diversity of plant associations considering its size. It forms important linking corridors with other remnant vegetation.	not listed
Dattening Nature Reserve		This reserve is valuable as a rest area for transient fauna and supports a few birds all year. The water course is seasonal but provides watering points for fauna in winter. The land is low-lying and salt-prone.	not listed
Dead Mans Swamp Nature Reserve	A2, B1	The great egret (EGRETTA ALBA) and common sandpiper (TRINGA HYPOLEUCOS), species protected by the JAMBA & CAMBA international agreement, between Australia and Japan, and Australian and China respectively occur at this wetland.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Dongolooking Nature Reserve	A1, A2, A3, B1, C1	<p>All wheatbelt vegetation formations except for salt complex are present here. Two hundred and thirty plant species have been recorded though the actual number of large perennials and annuals is probably about 300. The diversity of plant species is as high as has been recorded for any wheatbelt reserves, with 28 species per square kilometer. The Western Australian Government classified rare <i>LECHENAULTIA PULVINARIS</i> is found here along with <i>ANDERSONIA CARINATA</i> classified as priority one flora by the Western Australian Government. Similarly <i>DAVIESIA CRASSIFOLIA</i>, <i>DRYANDRA CYNAROIDES</i>, <i>POMADERIS BILOCULARIS</i> and <i>WURMBEA DRUMMONDII</i> all priority four species, grow here. Geographically restricted species, <i>DRYANDRA VESTITA</i> and <i>MELALEUCA CONFERTA</i> are also here. Other plants include the poorly known <i>LASIOPELALUM MICROCARDIUM</i> and an undescribed, poorly known <i>BAECKEA</i> species. The reserve is thus important in vegetation processes. <i>ACACIA BRACHYCLADA</i>, and an undescribed <i>BAECKEA</i> are at the south-western limit of their range here. <i>HAKEA LAURINA</i> is at its northern limit of its range.</p> <p>Woodland occupies 60 percent of the Reserve, which is a high proportion and probably accounts for the relative abundance of arboreal mammals such as the brush-tailed possum (<i>TRICHOSURUS VULPECULA</i>) and the nationally vulnerable red-tailed phascogale (<i>PHASCOGALE CALURA</i>). The brush wallaby (<i>MACROPUS IRMA</i>) declared priority four fauna by the Western Australian Government has been recorded here. Woodland birds present at Dongolooking, but now absent from most of the wheatbelt, include the western shrike-tit (<i>FALCUNCULUS FRONTATUS</i>), priority four fauna, and rufous tree-creeper (<i>CLIMACTERIS RUFA</i>). The Western Australian gazetted rare white-tailed black cockatoo (<i>CALYPTORHYNCHUS LATROSTRIS</i>) has been observed here. The number of frogs in this reserve is high although the diversity of other groups of animals is comparable with that of other wheatbelt reserves. <i>DELMA GRAYII</i> is at the southeast limit of its distribution and <i>DIPLODACTYLUS MAINI</i> the southwest limit of its distribution in this reserve.</p> <p>The reserve is important for the breeding of the red-tailed phascogale <i>PHASCOGALE CALURA</i>, which is declared vulnerable by the Australian Government, the white-tailed dunnart, <i>SMINTHOPSIS GRANULIPES</i>, honey possum <i>TARSIPIES ROSTRATUS</i>, pygmy possum <i>CERCARTETUS CONCINNUS</i>, reptiles and birds.</p> <p>The reserve has conservation potential for the red-tailed phascogale and is important as</p>	indicative place

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
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fauna habitat. About eight percent of its trees are senescent with a Muir senescence index of 13.8. Consequently it has good potential for breeding hollows. The reserve is thus important in faunal processes.

In all, this reserve plays an important role in faunal and vegetation processes in an environment in which much clearing for agriculture has taken place. It is considered significant in maintaining existing processes or natural systems because of its large area.

The reserve has been the subject of a study into the biology and zoogeography of amphibians and reptiles and another study into lizard assemblages and reserve size and structure. Other studies include investigations into the conservation value for mammals and birds of reserves in the Wheatbelt and into the breeding, diet and habitat preferences of the red-tailed phascogale (PHASCOGALE CALURA). Dongolocking Nature reserve was one of nine reserves used as a study site for a study of the effect of fox control on populations of the red-tailed phascogale.

The reserve is important for the conservation of vegetation associations and plant species, especially considering the extensive clearing for agriculture that has taken place in the surrounding areas. The exceptionally good condition of the reserve adds to its conservation value as many of the reserves in the wheatbelt are highly degraded.

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Dragon Rocks Nature Area	A1, A2, A3, B1, C1	<p>The area displays an unusually high diversity of flora with 576 identified plant species including 43 different ACACIA species, 28 EUCALYPTUS species, 27 MELALEUCA species, 20 HAKEA species, 18 VERTICORDIA species, 16 DAVIESIA species, 16 GREVILLEA species, 14 STYLIDIUM species, 10 LEPIDOSPERMA species, 10 LEUCOPOGON species and 9 CALADENIA species. There are 28 different mapped and described vegetation associations including heaths, woodlands, low forests, mallee, kwongan and lithic complexes. The large number of plant associations form a complex mosaic, which is characteristic of Wheatbelt vegetation. The Dragon Rocks area is significant as a large remnant of Wheatbelt vegetation. It is also a very good representative of high landscape laterite vegetation of that part of the wheatbelt. Eight of the recorded plant species are gazetted as rare plants. They are ALLOCASUARINA TORTIRAMULA, Hoffman's Spider Orchid (CALADENIA HOFFMANII), CALECTASIA spp. (K. Dixon 86), Spiral-leaved DAVIESIA (DAVIESIA SPIRALIS), EUCALYPTUS OLIVACEA, Lake Varley Grevillea (GREVILLEA INVOLUCRATA), Pallarup Grevillea (G. PROSTRATA) and Sandplain Sun Orchid (THELYMITRA PSAMMOPHILA). Another fourteen of the plant species are considered by the Department of Conservation and Land Management, in Western Australia, as priority taxa. These include: VERTICORDIA GRACILIS, VERTICORDIA MULTIFLORA, EUCALYPTUS MICROSCHEMA, GREVILLEA WITTWERI, MELALEUCA FISSURATA, PERSOONIA HAKEIFORMIS, PIMELEA GRANITICOLA, GASTROLOBIUM DENSIFOLIUM, ACACIA NEWBEYI, ACACIA SEDIFOLIA SUSSP. PULVINATA, DAVIESIA PURPURASCENS, MELALEUCA POLYCHEPHALA, STYLIDIUM NEGLECTUM, MELALEUCA FISSURATA V. MULTIFLORA subsp. MULTIFLORA and V. INTEGRATA. The poorly known EUCALYPTUS ORNATA is reported here.</p> <p>The reserve also supports limit of range flora, namely ACROTRICHE PATULA and BANKSIA ELDERIANA (western), EUCALYPTUS CAPILLOSA ssp. POLYCLADA, GREVILLEA PETROPHILOIDES, KUNZEA PULCHELLA, VERTICORDIA GRACILIS, and XANTHORRHOEA NANA (southern limit); CALOTHAMNUS HUEGELII EUCALYPTUS INCRASSATA, GOODENIA SCAPIGERA, HAKEA CRASSIFOLIA, HAKEA CORYMBOSA and VERTICORDIA HABANTHA (northern limit).</p> <p>The reserve is also significant because it contains the Red-tailed phascogale (PHASCOGALE CALURA) which is declared vulnerable at a national level. The</p>	registered

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Drummond Nature Reserve	B1	<p>western mouse (<i>PSEUDOMYS OCCIDENTALIS</i>) is also present and was only removed from the Western Australian gazetted rare species list in 1998. It is now declared priority four fauna. With both rare flora and fauna and excellent faunal habitat the reserve is also important for floral and faunal processes.</p> <p>The reserve is considered significant in maintaining existing processes or natural systems because of its large area.</p> <p>The reserve has been the subject of a study into the biology and zoogeography of amphibians and reptiles.</p> <p>This reserve has temperate grassy woodland, one of the most threatened ecosystems in Australia due to widespread agricultural development. Grassy woodlands are defined as a woodland where the understorey consists predominantly of grass species (also includes sedges, rushes and other grass-like plants). These grassland have been dramatically altered and are poorly represented in conservation reserves. It is one of the few reserves on which York gum (<i>EUCALYPTUS LOXOPHLEBA</i>) -jam (<i>ACACIA ACUMINATA</i>) - wandoos (<i>EUCALYPTUS WANDOO</i>) woodland occurs. The vegetation is in very good condition.</p>	not listed



Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (cont'd)

Remnant	Threshold Met	Values	Status
Dryandra Forest	A2, A3, B1, C1	<p>Twelve distinct vegetation associations occur in the Dryandra woodland remnants, which are amongst the largest and most diverse of the Central Wheatbelt and is thus of major conservation significance. The remnants are in good condition.</p> <p>It supports temperate grassy wandoos (EUCALYPTUS WANDOO) woodland, one of the most threatened ecosystems in Australia due to widespread agricultural development. Grassy woodlands are defined as a woodland where the understorey consists predominantly of grass species (also includes sedges, rushes and other grass-like plants). These grasslands have been dramatically altered and are poorly represented in conservation reserves. It is one of the few reserves on which wandoos woodland occurs.</p> <p>Six species of The Western Australian Government's priority two flora occur here. These are ACACIA DEFLEXA, ANDERSONIA BIFIDA, DRYANDRA CYNAROIDES, DRYANDRA SUBPINNATIFIDA var SUBPINNATIFIDA, GREVILLEA CROWLEYI and PERSOONIA HAKEIFORMIS. Three priority three species occur in the forest, namely, ACACIA SEMITRULLATA, DRYANDRA SUBPINNATIFIDA, and TYSANOTUS TENUIS. Eight priority four flora species also occur; DARWINIA THYMOIDES ssp nov, DARWINIA sp. DRYANDRA (aff. VESTITA), DRYANDRENSIS (ms), CALADENIA INTEGRATA, EUCALYPTUS LATENS, HEMIGENIA? PLATYPHYLLA, HIBBERTIA MONTANA, NEMCIA STIPULARIS and RUNZIA CRASSIFOLIA. The forest is thus important in vegetation processes.</p>	registered
		<p>The forest supports three species of mammals which are declared vulnerable at a national level. These are the numbat (MYRMECOBIUS FASCIATUS), ohoditch (DASYURUS GEOFFROID), and red-tailed phascogale (PHASCOGALE CALURA). Two species of birds are also vulnerable at a national level, the mallee fowl (LEIPOA OCELLATA) and short-billed black cockatoo (CALYPTORHYNCHUS LATIROSTRIS). Two species are specially protected by the Western Australian government, the peregrine falcon (FALCO PEREGRINUS) and carpet pythons (MORELIA SPIOLOTA IMBRICATA). The forest is thus important in faunal processes.</p>	
		<p>The forest is considered significant in maintaining existing processes or natural systems because of its large area.</p>	
		<p>The forest has been the subject of a study of the woylie (BETTONGIA PENICILLATA) about foraging and soil water repellency and water infiltration. Studies on termites, litter</p>	

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (cont'd)

Remnant	Threshold Met	Values	Status
		<p>and ground-surface arthropods and arboreal spiders and the influence of fire on invertebrates have also been conducted here. The reserve is the site of a study into the decline and subsequent recovery of the nurnbat. Animals from Dryandra have been used to restock Boyagin Nature Reserve. The foraging profile of a wandoo woodland avifauna in early spring has also been studied here.</p>	
		<p>Dryandra Forest was one of nine reserves used for a study of the effect of fox control on populations of the red-tailed phascogale. A comparison of the vertebrate fauna of selected mallet plantations and natural vegetation communities has been carried out here.</p>	
		<p>The forest is extensively used by tourists and visitors for recreation and by university, school and naturalists groups as a venue for ecological field studies.</p>	
Dulbellin Nature Reserve		<p>The reserve has substantial stands of woodland which provide abundant nest sites for birds.</p>	not listed
East Yorkrakine Nature Reserve	C1	<p>This reserve has been the subject of studies into changing avifauna as a result of fragmentation of native vegetation and lizard assemblage and reserve size and structure. Other studies include investigations into the conservation value for mammals and birds of reserves in the Wheatbelt.</p>	not listed
Emu Hill Reserve		<p>The reserve has heath with conservation value. The woodland provides habitat for a few species of birds. The bushland is important to nomadic species of birds and as temporary resting and feeding sites.</p>	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Emu Rock	A2, B1	The reserve contains GREVILLEA WITTWERI a priority two species gazetted by the Western Australian Department of Conservation and Land Management. The reserve is considered significant in maintaining existing processes or natural systems because of its large area.	not listed
Glenluce Nature Reserve	A2, B1	This reserve is important because it contains a least one assemblage of plants uncommon elsewhere (CALLISTEMON PHOENICEUS thicket). Additionally, it is close to Mts. Stirling and Caroline, both of which are important Reserves known to contain interesting or unusual assemblages of plants and animals. Thus, these reserves together with others nearby (including Reserve 11024) form a group of reserves which may well represent an area of unusual floral and faunal assemblage.	not listed
Gorge Rock Nature Reserve	B1, C1	This reserve has temperate grassy woodland, one of the most threatened ecosystems in Australia due to widespread agricultural development. Grassy woodlands are defined as a woodland where the understorey consists predominantly of grass species (also includes sedges, rushes and other grass-like plants). These grasslands have been dramatically altered and are poorly represented in conservation reserves. It is one of the few reserves on which York Gum (EUCALYPTUS LOXOPHLEBA) Forest over grass occurs. Generally the vegetation is in good condition.	not listed
Graham Rock Nature Reserve	A2, B1	The reserve has been subject to a study investigating the temporal changes in York gum (EUCALYPTUS LOXOPHLEBA) - jam (ACACIA ACUMINATA) communities.	not listed
Gundaring Nature Reserve	A3	The reserve has value for the conservation of flora and fauna typical of the area and is in good condition.  The reserve is considered significant in maintaining existing processes or natural systems because of its large area.  This reserve has a fairly diverse vegetation and is of great value in a shire where large reserves, and reserves with vegetation other than salt complex, are scarce. It has important examples of ecotones, contains nest hollows and is of value as a resting site for transient birds.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Gundaring Lake Nature Reserve	A2, B1	Sharp-tailed sandpiper (CALIDRIS ACUMINATA), great egret (EGRETTA ALBA), common sandpiper (TRINGA HYPOLEUCOS) and greenshank (TRINGA NEBULARIA), all protected by the international JAMBA & CAMBA agreements between Australia and Japan and between Australian and China respectively have been recorded here.	not listed
Highbury Nature Reserve	A3	A DAMPIERA and a LEPYRODIA of uncertain affinities were collected here in 1979. The reserve is in very good condition considering its proximity to a townsite and some disturbance. It is quite rich in flora and fauna and is a valuable resting site for transient fauna.	indicative place
Hines Hill Nature Reserve		This reserve is an important wildlife refuge.	not listed
Hotham River Nature Reserve	B1	This reserve has temperate grassy woodland, one of the most threatened ecosystems in Australia due to widespread agricultural development. Grassy woodlands are defined as a woodland where the understorey consists predominantly of grass species (also includes sedges, rushes and other grass-like plants). These grasslands have been dramatically altered and are poorly represented in conservation reserves. It is one of the few reserves on which wandoo (EUCALYPTUS WANDOO) woodland occurs.	not listed
Ibis Lake Nature Reserve	A2, B1	A high number of waterbirds have been recorded here including the JAMBA & CAMBA protected great egret (EGRETTA ALBA), and the Western Australian Government gazetted priority four freckled duck (STICTONETTA NAEVOSA).	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Jennaberring Nature Reserve		This reserve is of value in a shire where a large percentage of reserved land is salt affected. Nest hollows are present and the reserve is important as a resting place for transient birds.	not listed
Jilakin Rock	A1	Jilakin Rock features a biogeographically significant stand of jarrah EUCALYPTUS MARGINATA about 115 km east of the nearest jarrah forest. The stand represents a relict of formerly wider distribution. In 1981, 129 individuals were located, of which 43 % had been killed by fire in 1967. The largest trees in the stand were 150 cm in diameter.	not listed
Jingaring Nature Reserve		The reserve has floristically rich heath and an area of woodland. It is a valuable conservation reserve.	not listed
Jitarning Nature Reserve	A3	The reserve has a fairly diverse vegetation. It contains nest hollows and is of value as a resting site for transient birds.	not listed
Jura Nature Reserve		The information available about this reserve did not indicate significant values.	not listed
Karlgarin Hill Nature Reserve	A2, B1?	The reserve supports a wide variety of associations, plant species and habitat types. There is a slim possibility that this reserve may support a population of the nationally vulnerable numbat (MYRMECOBIUS FASCIATUS).	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Koberbin Nature Reserve	C1	This reserve carried a population of rock wallaby ( <i>PETROGALE LATERALIS</i> ) until 1969-70. A study focused on fox control and rock-wallaby population dynamics has been conducted at this place.	not listed
Kokerbin Hill	C1	This area provides excellent habitat for birds and mammals, but is used as a recreation site by the Bruce Rock Shire Council.	not listed
Kondinin Salt Marsh Nature Reserve	A2, B1	This reserve has gypsum dunes and populations of <i>ROYCEA PYCNOPHYLLOIDES</i> , declared rare flora by the Government of Western Australia. <i>FRANKENIA DRUMMONDII</i> and <i>SARCOCORNIA GLOBOSA</i> , priority three species, occur here. The reserve is considered significant in maintaining existing processes or natural systems because of its large area.	not listed
Koolberin Nature Reserve		Little is known of the significance of this reserve.	not listed
Kulin Nature Reserve		Little is known of the significance of this reserve.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Kumminin Reserve		Of little value on its own. Its value could be enhanced by including Water Reservoir Site No. 12712 which has more lush vegetation and more abundant birdlife. However, little is known about the Water Reservoir Site.	not listed
Kwoiyin Hill	A2, B1	This becomes an important reserve when taken together with reserve 30969. It supports several species of resident birds as well as acting as a resting area for migratory species. The reserve acts as a suitable habitat for a small population of the euro MACROPUS ROBUSTUS which are reported to move back and forth from here to Kokerbin Hill.	not listed
Kwoiyin Nature Reserve	A2, B1	The JAMBA and CAMBA protected greenshank (TRINGA NEBULARIA) occurs at the reserve.	not listed
Lake Hurlstone Reserve System	A2, A3, B1	Two plant communities at this reserve system are of significance. A stand of dryandra heath (G) which is relatively small in area occurs on the western boundary of reserve A27927. The community is relatively rich in numbers of species per unit area and contains many that do not occur in other parts of the reserve. One of these species is EUCALYPTUS sp. nov 2, which is probably a new taxon. There is also an unusual sand heath growing on the aeolian dune near the southern edge of Lake Hurlstone. Many of the species here do not occur elsewhere on the reserve and one of them, CALYTRIX sp. is probably a new species requiring taxonomic review. ACACIA REPANDA a priority three flora species declared by the Western Australian Government is found at the reserve.	not listed

The reserve is considered significant in maintaining existing processes or natural systems because of its large area.

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Lake King Nature Reserve	A2, B1	Reserve 39422 lies on gypsum dunes and has the Western Australian Government's priority two species HAEGIELA TATEI and ASTARTEA CLAVIFOLIA. Another species, HYDROCOTYLE HEXAPTERA is known from only three collections at Lake King and is listed as priority one flora by the Western Australian government. ERICHSENIA UNCINATA is a poorly known species and the reserved population is poorly known.	not listed
		The reserve is considered significant in maintaining existing processes or natural systems because of its large area.	



Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Lake Toolibin Nature Reserve	A2, A3, B1, C1	<p>The Lake Toolibin catchment has been largely cleared for agriculture and the lake has a long history of secondary salinization. The waters of Lake Toolibin are completely fresh, however, and unaffected by salinity. It is therefore regarded as an important habitat for flora and fauna, particularly waterfowl and for wetland processes.</p> <p>Lake Toolibin is the only remaining example in south-western Australia of a wetland with extensive thickets of living <i>CASUARINA OBESA</i>. The York gum/jam woodlands and salmon gum/gimlet woodlands surrounding Lake Toolibin are of very great importance because of the extent of clearing of these associations.</p> <p>Lake Toolibin is the most significant wetland in the Western Australian Wheatbelt for waterbirds. It has the highest number of waterbird species recorded at any inland wetland in the south-west and has the highest number of breeding species known at any wetland in Western Australia, with twenty-four species recorded as breeding here over the past twenty years. It is particularly important as a breeding area for the freckled duck (<i>STICTONETTA NAEVOSA</i>), the great cormorant (<i>PHALACROCORAX CARBO</i>), little black cormorant (<i>PHALACROCORAX SULCIROSTRIS</i>), little pied cormorant (<i>PHALACROCORAX MELANOLEUCOS</i>), pacific heron (<i>ARDEA PACIFICA</i>), great egret (<i>EGRETTA ALBA</i>), rufous night heron (<i>NYCTICORAX CALEDONICUS</i>), yellow billed spoonbill (<i>PLATALEA FLAVIPES</i>), blue billed duck (<i>OXYURA AUSTRALIS</i>) and great grebe (<i>PODICEPS CRISTATUS</i>). Because of extensive clearing for agriculture and resultant waterlogging and salinity, freshwater wetland ecosystems and woodlands such as occur at Lake Toolibin are now uncommon.</p> <p>As mentioned earlier the freckled duck has been recorded here and this species was gazetted rare by the Western Australian Government until 1997. It is now priority four fauna. This species was also found at nearby Lake Walbyring during the south-west waterbird survey. In addition the JAMBA protected great egret (<i>EGRETTA ALBA</i>) was found here. The freckled duck was reported in large numbers at Lake Toolibin during the South-west Waterbird Study along with the JAMBA and CAMBA protected great egret (<i>EGRETTA ALBA</i>), greenshank (<i>TRINGA NEBULARIA</i>) and the JAMBA protected oriental plover (<i>CHARADRIUS VEREDUS</i>).</p> <p>Lake Toolibin has been the subject of a study on the effects of salinity and waterlogging on the vegetation of the lake and a number of studies on investigating the water quality and hydrology of the area. The fauna of the area has also been monitored. A recovery</p>	registered

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Lake Towerinning Nature Reserve	A2, B1, C1	<p>plan has been designed to reduce salinization and a ground water pumping system has been installed at Lake Toolibin. The recovery plan aims to ensure the long-term maintenance of Toolibin Lake and its surrounding nature reserves as a healthy and resilient freshwater ecosystem, suitable for continued waterbird usage at current high levels. The Lake Toolibin area is an important research site for studies on waterbird ecology, the effects of salinity and waterlogging on freshwater ecosystems and the rehabilitation of such systems.</p> <p>It is possible that cultural values, both indigenous and non-indigenous, of National Estate significance may exist in this place. As yet, the Australian Heritage Commission has not identified, documented or assessed these values.</p> <p>Because the lake holds water permanently it is important as a drought refuge for waterbirds. However, there has been a pronounced decline in the fringing rush and tree vegetation which is vital for waterbird habitat. The water quality in the lake is declining. There has been a gradual increase in salinity, turbidity and odour. This has led to a study of the water quality and decline of the lake.</p>	not listed
Lansdell's Property		<p>Towerinning Lake supports 35 species of waterbirds and has been shown to support up to 809 individual waterbirds at one time in May 1983. This is a moderate number for the wetlands of the south-west of Western Australia. The reserve also supports a high number of breeding waterbird species. It is an important reserve for the blue-billed duck (OXYURA AUSTRALIS) and the musk duck (BIZIURA LOBATA) in terms of numbers of ducks counted at the lake. A count of 370 blue-billed ducks in July 1983 was exceeded only by Peel Inlet Nature Reserve. The numbers of musk ducks at the lake in May 1983 only exceeded by numbers counted at Warden Lake Nature Reserve during the South-west Waterbird Study. The great egret (EGRETTA ALBA) and common sandpiper (TRINGA HYPOLEUCOS), both protected under the JAMBA &amp; CAMBA international agreements, have been recorded at this wetland.</p> <p>This remnant has no significant flora values.</p>	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Little White Lake Nature Reserve	A2, B1	STYLIJDIUM RHIPIDIUM a plant species classified as priority one by the Western Australian Government and the JAMBA & CAMBA protected great egret (EGRETTA ALBA) occur at this lake. This reserve is considered important in ecosystem processes and natural systems because of its large area.	not listed
Maublaring Nature Reserve	A3, B1	The reserve has diverse plant associations and habitat types and is also rich in plant species. It is also in good condition.	not listed
Mears Lake Nature Reserve	A2, B1	The JAMBA & CAMBA protected red-necked stint (CALIDRIS RUFICOLLIS) is found at this wetland, as is the freckled duck (STICTONETTA NAEVOSA) gazetted rare until 1997 by the Western Australian Government and now priority four fauna. The hooded plover (THINORNIS RUBRICOLLIS) also priority four fauna has been recorded here.	not listed
Meckering Fault Scarp	A1	This earthquake fault line is an excellent example of the results of earth movements which damaged Meckering townsite in 1969.	indicative place

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Meenaar Nature Reserve	A2, B1	Although small and somewhat degraded, Meenaar Nature Reserve is important for a number of reasons. It is the only nature reserve in the York-Norham area which supports a significant area of York gum (EUCAL YPTUS LOXOPHEBA) woodland. York gum is poorly represented on nature reserves. The sandplain communities on the reserve are also poorly represented on conservation reserves. This is the only nature reserve in the Shires of Northam and York which has a relatively large area of sandplain. This association becomes more dominant towards the east of the two shires and is typical of much of the Wheatbelt.	not listed
		Meenaar Nature Reserve has not been burnt for many years and ancient grass trees on the reserve stand 2-3 m in height with leaves reaching the ground.	
		DAVIESIA MICROPHYLLA a priority four flora species as classified by the Western Australian Government grows here.	
		Of a total of 61 bird species recorded in this reserve, 18 of these have not been recorded at the other nature reserves in the Northam-York area. Although Meenaar is small it is used for nesting by at least 17 species of birds.	
		The heath provides a food source for birds and an attractive display of wildflowers in the spring months.	
Merredin Nature Reserve	A3	Reserve 19476 is of low diversity at formation and association levels, but is fairly rich in plant species. The isolation of the reserve makes it a significant feeding and resting place for migratory bird species. The reserve represents a vegetation type largely cleared in the region.	not listed
Mokami Springs		Primarily a samphire area, but this reserve does have considerable tracts of MELALEUCA scrub and EUCAL YPTUS woodland. It supports a sizeable population of resident birds and acts as a resting area for migratory species. It is relatively undisturbed except for some rubbish dumped in one corner.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Mokine Nature Reserve	A1, A3, B1, C1	This reserve has a population of ACACIA APHYLLA gazetted rare flora by the Western Australian Government. In addition, ACACIA CAMPYLOPHYLLA Western Australian Government declared priority two species, occurs here. HIBBERTIA MONTANA which is geographically restricted and a gazetted priority four species and the poorly known LOMANDRA NUTANS are found here. The reserve is the easternmost limit of LOMANDRA SPARTEA. The numerous rocky outcrops provide habitat for many reptile species with both dragons and geckos well represented. Dead grasses provide favourable habitat for reptiles, particularly racehorse goannas. The rich understorey of the powderbark wandoo provides a reliable source of pollen and nectar for numerous birds and mammals. The seasonal streams which form a system of pools at the northern end of the reserve support at least four frog species. Streams retaining freshwater into the summer months are rarely found on nature reserves.	not listed
Mooradung Nature Reserve	B1	This reserve has been the subject of a study into the temporal changes in the York gum (EUCALYPTUS LOXOPHLEBA) - jam (ACACIA ACUMINATA) communities on the reserve.  The reserve provides a sample of the wildlife, both flora and fauna, within the transition zone between the forested land of the Darling Range to the west and woodland in the lower rainfall areas to the east. The vegetation and landforms are closely allied to those found on the eastern edge of the Darling Range, but species on the reserve indicate that it is influenced by proximity to the Wheatbelt. These species include jam (ACACIA ACUMINATA), sheoak (ALLOCASUARINA HUEGELIANA), red-capped robin (PETROICA GOODENOVI) and jaecky winter (MICROECA LEUCOPHAEA), although none of these species are at their most western limit on the reserve.  GREVILLEA CIRSIIFOLIA, a Western Australian government priority four flora species occurs here, as does EUCALYPTUS DECURVA which is regionally uncommon. The eucalypt is also a southern outlier of the northern population of the species, but more southern populations occur at Hopetoun, Kalgan and east of Cranbrook.  The reserve provides habitat for resident, nomadic and migratory birds.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Mooraning Nature Reserve	A1, A2, B1	There are spectacular displays of wildflowers here during spring. The Woylie ( <i>BEITONGIA PENICILLATA</i> ), until recently gazetted rare in Western Australia, has been reported at the reserve. It is now priority 4 fauna. There are nest hollows for birds and the reserve is important as a resting site for transient birds.	not listed
Mooraning Nature Reserve and Water Reserve 14887		Little is known of the significance of this reserve.	not listed
Moorumbine Nature Reserve	A2	This reserve is small and contains woodland only. It is poor in nest hollows, but is a valuable resting place for transient fauna. The understorey is mostly gone probably as a result of grazing and grass now prohibits much of the native plant regeneration.	not listed
Mortlock River East Nature Reserve		This reserve is of little value in itself being of poor habitat diversity and part of a much larger similar drainage system. The man-made ponds on the reserve are important for birdlife.	not listed
Moulien Nature Reserve		Although of little value in itself the reserve is important in allowing salt effected land to remain undisturbed. It contains some unusual assemblages of plants on raised mounds.	not listed
Mourmucking Nature Reserve	B1	This reserve is one of the best in the Kellerberrin Shire and contains an interesting assemblage of plants and many animals. There is a wide range of habitats on the reserve. The <i>EREMAEA</i> thicket and the mallee association on the ridges of the reserve are both endangered.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Mt Stirling Nature Reserve	A1, A2, A3, B1, C	<p>TETRAECA DELTOIDEA, has a distribution less than 100 km and is listed as rare by the Western Australian Government. ACACIA COWANIANA, a plant species gazetted priority two by the Western Australian Department of Conservation and Land Management occurs here, as does the priority four species GASTROLOBIUM CALLISTACHYS. A number of ecotone areas add to the diversity of the vegetation.</p> <p>Western Australian Department of Conservation and Land Management's gazetted priority four brush-tailed rock wallaby (PETROGALE LATERALIS) is present in this reserve. It is also the southern range limit of the euro (MACROPUS ROBUSTUS).</p> <p>This reserve is of great value as a nesting and feeding site for resident and transient bird species. It is most significant in an area where much of the original habitat has long since been turned into farmland. With mixed eucalyptus woodland, casuarina dominated thickets and the rocky hill, the reserve provides a variety of habitats suitable for birds, mammals and reptiles. No small mammal trapping has been conducted at this reserve but possibly Dasyurids could be expected to occur here.</p> <p>A study focused on fox control and rock-wallaby population dynamics has been conducted here.</p>	registered
Mt. Cramphorne Reserve		<p>This reserve is the place where two species of frog PSEUDOPHYNE GUENTHERI and PSEUDOPHYNE OCCIDENTALIS were first shown to co-habit (sympatry). Previously both species had been recorded at different places, but not together.</p> <p>Because of the isolation of this reserve it is a critically important site for migratory birds.</p>	not listed
Mungerngcutting Nature Reserve	A2	<p>This reserve contains nest hollows and is of importance as a resting site for transient birds. It is thus important in faunal processes. The reserve acts as a linking corridor between other pieces of vegetation which would otherwise be completely isolated. The reserve is considered significant in maintaining existing processes or natural systems. This is because deep-rooted vegetation assists to lower the salt-laden water table through transpiration.</p>	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (cont'd)

Remnant	Threshold Met	Values	Status
Nallian Nature Reserve	C1	This reserve has been the subject of a study into the temporal changes in the York gum (EUCALYPTUS LOXOPHLEBA) - jam (ACACIA ACUMINATA) communities on the reserve.	not listed
Nangeenan Nature Reserve	A3, C1	Reserve 24532 is of considerable scientific importance as the type locality of some terrestrial molluscs. These are BOTHRIEMBRYON SEDGEWICKI, WESTRALAOMA APRICA, WESTRALAOMA EXPICTA and THEMAPUPA BELTIANA.	not listed
Nomans-bokan Lakes Nature Reserve	A2, B1	Although the understorey of the reserve is quite disturbed and some areas cleared, there is still a good stand of woodland present. It is important as a resting and feeding site for birds. The reserve is quite species rich for its area, 0.53 species/ha.	not listed
Nonalling and Whitewater Reserve	A2, B1	The JAMBA & CAMBA protected species red-necked stint (CALIDRIS RUFICOLLIS) and great egret (EGRETTA ALBA) have been recorded at the reserve. The freckled duck (STICTONETTA NAEVOSA), gazetted rare by the Western Australian Government until 1997, and now priority four fauna has been recorded here.	not listed
		Little is known of the significance of this reserve.	
		The JAMBA and CAMBA protected species the great egret (EGRETTA ALBA), red-necked stint (CALIDRIS RUFICOLLIS) and little curlew (NUMENIUS MINUTUS) are found at the wetland. The CAMBA protected glossy ibis (PLEGADIS FALCINELLUS) has also been recorded here. This was the only wetland that was found to support the little curlew during the South-west Waterbird Survey. It was also found to support the highest number of red-kneed dotterel (ERYTHROGONYX CINCTUS) for any lake surveyed. It supports the freckled duck (STICTONETTA NAEVOSA) gazetted rare by the Western Australian Department of Conservation and Land Management until 1997 now priority four fauna. The hooded plover (THINORNIS RUBRICOLLIS) a priority four species has also been recorded here. The reserve maintains wetland processes in an area greatly cleared for agriculture.	



Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Noombling Nature Reserve		The area is low lying and salt prone. The woodland provides abundant nest sites.	not listed
Noondeering Hill	A2, B1, C1	The Noondeering Hill displays excellent exposures of a variety of typical rocks of the Precambrian Jimpending Metamorphic Belt. The area is an important teaching site used by geology students in Western Australia, especially valuable for its good rock exposure and complex geology.  The reserve is considered significant in maintaining existing processes or natural systems because of its large area.	indicative place
Noonying Lake Nature Reserve		This reserve is partly degraded and disturbed, but it still forms an important sanctuary for several species of birds, particularly waterbirds during the winter months. The reserve supports an interesting assemblage of plants.	not listed
Norpa Nature Reserve	B1	Reserve 20504 is in excellent condition, little disturbed and is a good representative area of ALLOCASUARINA ACTIVAVIS shrubland, a formation poorly represented elsewhere in the region.	not listed
North Jitarning Nature Reserve	A3	The vegetation is diverse and rich in plant species. It contains some nest hollows and is of value as a resting site for transient birds.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
North Kalgarin Nature Reserve	A2, A3, B1, C1	<p>This reserve is reported to have four plant species listed as rare or endangered or of particular interest, although the identity of these is not given. It is the type locality for a BAECKEA, a CHAMELAUCIUM and a HAKEA.</p> <p>This reserve is also significant because it has diverse and rare fauna. There are at least 13 native mammal, 85 bird, 4 frog and 29 reptile species in the reserve. The western native cat (DASYURUS GEOFFROID), the red-tailed phascogale (PHASCOGALE CALURA), and mallee fowl (LEIPOA OCELLATA) all nationally threatened fauna occur and breed here. The western mouse (PSEUDOMYS OCCIDENTALIS) was also recorded and this species was only removed from the gazetted rare species list in 1998. It is now priority four fauna. Other priority four fauna occurring here are the western brush wallaby (MACROPOUS IRMA) and the western rosella (PLATYCERCUS ICTEROTIS). The carpet python (MORELIA SPILOTA IMBRICATA), which is declared specially protected fauna by the Western Australian Government, has also been found here. Other fauna that have restricted distribution or are infrequently recorded in the wheatbelt include white-tailed dumart (SMINTHOPSIS GRANULIPES), chestnut quail-thrush (CINCLOSOMA CASTANOTUM) and painted button quail, (TURNIX VARIA).</p>	registered
		<p>The reserve is relatively large and it plays an important role in faunal, vegetation and ecosystem processes in an environment in which much clearing for agriculture has taken place.</p>	
		<p>The reserve has been the subject of a study into the biology and zoogeography of amphibians and reptiles and another into lizard assemblages and reserve size and structure. Others studies include investigations into the conservation value for mammals and birds of reserves in the wheatbelt. Another study was into the breeding, diet and habitat preferences of PHASCOGALE CALURA.</p>	

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
North Tarin Rock Nature Reserve	A2, B1, C1	The nationally vulnerable mallee fowl ( <i>LEIPOA OCELLATA</i> ) and nationally endangered short-billed black cockatoo ( <i>CALYPTORHYNCHUS LATIROSTRIS</i> ) occur at the reserve. Western Australian Department of Conservation and Land Management priority two fauna include the western rosella ( <i>PLATYCERCUS ICTEROTIS</i> ) and priority four fauna the tamarar ( <i>MACROPUS EUGENII</i> ) and western brush wallaby ( <i>MACROPUS IRMA</i> ).	not listed
North Woyterling Nature Reserve	A3	The reserve has been the subject of a study into the biology and zoogeography of amphibians and reptiles and another into lizard assemblages and reserve size and structure. Others studies include investigations into the conservation value for mammals and birds of reserves in the Wheatbelt. It is important in vegetation and ecosystem processes in an area where much clearing for agriculture has taken place. It is significant in maintaining existing processes or natural systems because of the reserve's large area.	not listed
Overheu Nature Reserve		This reserve is in excellent condition and supports valuable stands of woodland, some areas with a rich understorey. The reserve is probably well used by birds in the breeding season. There is little human disturbance and the reserve is isolated, increasing its value for transient fauna.	not listed
Pantapin Nature Reserve	A1, A2	Little is known of the significance of this reserve.	not listed
		This reserve may be the northernmost limit of <i>ACACIA GLAUCOPTERA</i> . It forms important linking corridors with other remnant vegetation.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Paper Bark Nature Reserve 1	A2, A3	Of great value. Diverse vegetation and ecotones provide numerous habitats for fauna. Supports a large number of resident and migratory bird species. The reserve has importance as an example of bushland which has not been burnt for many years.	not listed
Paper Bark Nature Reserve 2	A2, A3	Of great value. Diverse vegetation and provides numerous habitats for fauna. Supports a large number of resident and migratory bird species. The reserve has importance as an example of bushland which has not been burnt for many years.	not listed
Parkeyerring Lake Nature Reserve	A2, B1	The JAMBA & CAMBA protected great egret (EGRETTA ALBA) occurs at this lake.	not listed
Petercarring Nature Reserve		Reserve 20095 provides a valuable resting place and nesting area for birds.	not listed
Pikaring Hill Reserve	B1	BANKSIA PRIONOTES grows in unusual soils here. It is found on shallow granite derived sandy clays with abundant supplies of water from runoff of rain from the granite outcrop. Normally this banksia grows in deep well drained yellow sands.  The reserve has a gnamma hole which local legend suggests has significance to the aboriginals.  As the reserve supports woodlands and dense thickets it is important as a rest area for migrating birds.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Pikaring West Nature Reserve		The reserve is small in area, but quite diverse in associations and rich in plant species. It contains nest hollows and is valuable as a resting site for transient birds.	not listed
Private property, south of Popanyinning	B1	This property has temperate grassy woodland, one of the most threatened ecosystems in Australia due to widespread agricultural development. Grassy woodlands are defined as a woodland where the understorey consists predominantly of grass species (also includes sedges, rushes and other grass-like plants). These grasslands have been dramatically altered and are poorly represented in conservation reserves. It is one of the few reserves on which wandoo (EUCALYPTUS WANDOO) - salmon gum (EUCALYPTUS SALMONOPHLOIA) - jam (ACACIA ACUMINATA) woodland occurs.	not listed
Quairading Spring Nature Reserve	B1	The salmon gum (EUCALYPTUS SALMONOPHLOIA) woodland on this reserve is of great value as this association is poorly represented in the Wheatbelt. The reserve contains nest hollows and is of value as a resting site for transient birds.	not listed
Querekin Rock Remnant	C1	A study focused on fox control and rock-wallaby population dynamics has been conducted at this place.	private property
Red Lake Nature Reserve	A2	The gimlet (EUCALYPTUS SALUBRIS) woodland on this reserve is relatively intact and little disturbed. A BAECKEA and HAKEA of uncertain affinities were collected here. Some old trees contain nest hollows used by birds. They provide useful roosting and feeding areas for transient and migratory birds. The lake supports waterfowl most of the year as the water is usually present even in the dry season.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Reserve 10719	A3, B1	This reserve contains a small but quite good stand of salmon gum (EUCALYPTUS SALMONOPHLOJA) woodland, an association poorly represented in the Wheatbelt. Although small in size, the reserve is quite rich in plant species and is a good nesting site for birds. It is probably important as a "stepping stone" of vegetation for migratory birds, particularly as other woodland is fairly scarce in the area.	not listed
Reserve 11024	A2	The margins of a salt complex adjacent to this reserve form a belt of vegetation which connects indirectly to Mts Caroline and Stirling and Reserves 25112 and 26266. Mts Caroline and Stirling contain unusual assemblages of plants and fauna.	not listed
Reserve 13217		Reserve 13217 is valuable in slowing further salt encroachment onto adjacent farmland and is useful as a wind break. In its present form it is utilized by some fauna and is of value as a rest site and nesting area.	not listed
Reserve 13565	A3	This reserve is in excellent condition and very diverse in its vegetation. Woodlands, mallee and shrubland are all represented by fairly large areas and have quite a high number of plant species.  The vegetation is typical of the wheatbelt (Avon Botanical District) although it lies in the Coolgardie Botanical District and the South-western Botanical Districts. The woodland area has some indication of Eremaean species and structure. Reserve 13565 appears in fact to be very close to the transition from the Avon to Coolgardie districts and is of interest botanically for this reason.	not listed
Reserve 13594	C1	This reserve had been the subject of a study into the temporal changes in the York gum (EUCALYPTUS LOXOPHLEBA) - jam (ACACIA ACUMINATA) communities.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (cont'd)

Remnant	Threshold Met	Values	Status
Reserve 14520		This reserve should be treated along with Kokerbin Hill Reserve No. 11043. The statement of significance for reserve 11043 should be applied to reserve 14520.	not listed
Reserve 14694	A2	Reserve 14694 is fairly varied in vegetation associations and habitat types. It contains nest hollows and is of value as a resting place for transient birds. It provides important linking corridors with other remnant vegetation.	not listed
Reserve 15199		This reserve is of little value. It is small and has been badly damaged. However it does act as a refuge for some birds and galahs are known to nest in a hollow eucalyptus.	not listed
Reserve 15855	A3, B1	This is one of the more valuable nature reserves of the Narrogin Shire. It has extremely rich heaths and a wide variety of habitats in a small area, rivalled only by such outstanding reserves at Tutanning. HAKEA BAXTERI, found here, is poorly known. CALOTHAMNUS PLANIFOLIUS is also poorly known and its geographical range is less than 100 km.	not listed
Reserve 16288		The information available on this place did not indicate significant values.	not listed
Reserve 17420		Not significant in many ways but a useful resting site for birds.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Reserve 17824		The reserve has been badly damaged by human misuse and is beyond repair. It is too small to be of any value.	not listed
Reserve 18444		The information available on this place did not indicate significant values.	not listed
Reserve 1864		The reserve is in good condition and the northern part is particularly little disturbed. The woodlands are valuable as nest sites and resting areas for transient bird species. Many understorey plants reflect a transitional character between forest block and wheatbelt and are of biogeographical interest. The reserve is of considerable conservation value.	not listed
Reserve 19119	A3	Reserve 19119 is isolated and in good condition. The only access is through neighbouring farm land. The reserve has varied vegetation for its size and is rich in plant species.  Nest hollows are present in woodland areas and consequently the reserve is of value as a resting and breeding site for resident, transient and migratory birds. It is thus important in faunal processes.	not listed
Reserve 19138	A3, C1	There are a high diversity of plant associations and species considering the small size of the reserve. It is an important site for resting birds as the reserve is isolated from other bushland.  The reserve has been the subject of a study into the temporal changes in the York gum (EUCALYPTUS LOXOPHLEBA) - jam (ACACIA ACUMINATA) woodland on the reserve.	not listed



Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Reserve 20878	A3	The reserve is in good condition and is little disturbed. There are valuable areas of woodland present and the understorey is fairly rich. The reserve is valuable as a resting place for transient fauna and provides some nest hollows.	not listed
Reserve 2275		Most of this reserve is badly salt affected and of little use. Four species of birds were noted in the reserve and it may still be of value as a resting place for birds.	not listed
Reserve 22906		Of little use for nature conservation, this reserve does provide a resting area for transient bird species.	not listed
Reserve 22967		The reserve is of value for flora conservation and trees contain nest hollows and so is of value as a resting and feeding site for birds. It is thus important in vegetation and faunal processes.	not listed
Reserve 23137		This reserve had been cleared and was under crop when surveyed in 1978.	not listed
Reserve 23366		The information about this reserve did not indicate significant values.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Reserve 23637		The only value in this reserve is the mature EUCALYPTUS woodland. Stock grazing has destroyed the understorey.	not listed
Reserve 24097		For its size the reserve supports a very large number of eucalyptus species. It provides good shelter and food for birds.	not listed
Reserve 24179		The information available about this reserve did not indicate significant values.	not listed
Reserve 25872		Reserve 25872 supports an interesting assemblage of plants and is a significant conservation area.	not listed
Reserve 25979	B1	This reserve lies on gypsum dunes and has a population of HYDROCOTYLE HEXAPTERA, known only from three collections at Lake King and gazetted priority one flora by the Western Australian Government.	not listed
Reserve 26661	B1	Although this reserve has ephemeral weeds on wet areas adjacent to the granite rock, it is in excellent condition.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Reserve 26669	A3	The reserve is in very good condition considering its proximity to a townsite and some disturbance. It is quite rich in flora and fauna and is a valuable resting site for transient fauna.	not listed
Reserve 26897		The trees in the reserve provide nest hollows and a resting place for transient birds. In the long term, however, the reserve is of little value. The salt creek and the nature of the reserve suggest the land is salt-prone and any clearing is likely to be detrimental.	not listed
Reserve 27639	A3	The reserve supports a wide variety of vegetation formations, associations and species. It is probably of considerable value to fauna.	not listed
Reserve 27644	A3	Reserve 27644 has a varied vegetation and is relatively rich in plant species providing a variety of habitats for fauna. It is thus important in vegetation and faunal processes. Nest hollows are present in the trees and the reserve is of value as a resting and feeding place for sedentary and transient birds.	not listed
Reserve 28047		The information available about this reserve did not indicate significant values.	not listed
Reserve 28319		The reserve is valuable for soil conservation in salt land. The information available about this reserve did not indicate significant values.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Reserve 28715		The reserve is valuable as a resting site for migratory birds.	not listed
Reserve 28940	A2, A3, B1	Reserve 28940 is in excellent condition and has virtually no disturbance from humans or exotic fauna. It carries a wide variety of vegetation types and hence habitat types for fauna. Its fairly large area, diversity make it a valuable conservation resource. The reserve supports the mallee fowl ( <i>LEIPOA OCELLATA</i> ) declared vulnerable at a national level.	not listed
Reserve 29313	A2, A3, B1, C1	The reserve is considered significant in maintaining existing processes or natural systems because of its large area.  This reserve is in excellent condition and supports one of the largest and least disturbed areas of woodland in the wheatbelt. The presence of jarrah, marr, wandoo and jam suggests the reserve is in the transition zone between the jarrah forest block and the Wheatbelt. It is therefore of interest biogeographically. The richness of the understory and geological and topographic variation suggest that the reserve should be quite rich in fauna. The western brush wallaby ( <i>MACROPUS IRMA</i> ), Western Australian Department of Conservation and Land Management priority four fauna has been recorded here.	not listed
Reserve 29589		This reserve has been the subject of a study into the temporal changes in the York gum ( <i>EUCALYPTUS LOXOPHLEBA</i> ) - jam ( <i>ACACIA ACUMINATA</i> ) communities on the reserve.  Reserve 29589 is disturbed by cattle and other human influences, but supports an extremely rich bird community, considering its size.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Reserve 29906		Little is known about this reserve.	not listed
Reserve 30299		The main value of the reserve lies in soil conservation and prevention of salt encroachment.	not listed
Reserve 30324		Little is known of the significance of this reserve.	not listed
Reserve 31091		Published information on the reserve appears to indicate it has no great significance.	not listed
Reserve 34295	A3	This reserve supports an excellent representative area of shrubland and heath. It is rich in plant species and probably also rich in fauna which favours these habitats.	not listed
Reserve A13594		Reserve A13594 is in excellent condition and little disturbed. Its isolation makes it a significant resting and feeding site for migratory birds. A dam on the site provides an important water point for wildlife, as it is well surrounded by trees.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Rose Road Reserve	A3	The reserve has a diverse vegetation providing numerous habitats for fauna. The reserve is isolated and supports a large number of resident and transient bird species.	not listed
Sale's Rock Remnant	C1	A study focused on fox control and rock-wallaby population dynamics has been conducted at this place.	
Sortveners Rock Hole Nature Reserve	A3	Diverse flora occurs in this reserve, both floristically and structurally. The granite outcrops and watercourses have created an extremely mosaic vegetation providing many faunal habitats and ecotones.	not listed
Seagroatt Nature Reserve & Reserve 25979	A2, B1	Good stands of woodland are preserved here and several other types of vegetation represented. This reserve is important as a resting place for birds including water fowl. The common sandpiper ( <i>TRINGA HYPOLEUCOS</i> ) protected by JAMBA and CAMBA is found here.	not listed
Sewell Rock Nature Reserve	A3	The reserve is considered significant in maintaining existing processes or natural systems because of its large area.  This reserve is isolated and supports diverse plant associations including woodlands and heath. Nest hollows are present in woodland areas and the reserve is important as a resting and breeding site for transient and migratory birds. It is rich in plant species.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
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Shackleton Nature Reserve		The information available about this reserve did not indicate significant values.	not listed
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Sorensens Nature Reserve	A3	This reserve has excellent representative areas of two types of heath as well as mallee and woodland. It is also quite rich in plant species, many being represented in the heath.	not listed
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As the reserve is isolated it is of considerable importance to transient birds as a resting and feeding site.

The reserve is considered significant in maintaining existing processes or natural systems. This is because deep-rooted vegetation assists to lower the salt-laden water table through transpiration.

South Badjaling Nature Reserve	C1	The reserve has been the subject of a study into the biology and zoogeography of amphibians and reptiles.	not listed
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South Kulin Nature Reserve	A3	The reserve, although small in size, is quite diverse in plant associations and habitat types. It is of value as a resting site for transient birds.	not listed
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Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
St Romans Nature Reserve	A1, A2, A3, C1	<p>Although small in area this nature reserve supports a diversity of vegetation types. Plant communities range from powderbark woodland on the plateau through to mixed woodlands of marri, wandoo, jam and allocasuarina. Stands of wandoo occur in the valleys and allocasuarina fringe areas of outcropping granite. This reserve is considered important for succession because it has not been burnt for many years.</p> <p>This reserve along with Clackline and Wamblyn Nature Reserves is the northern limit of LOMANDRA NUTANS. It is also the most eastern limit of LOMANDRA SPARTEA which is also found nearby at Clackline, Wamblyn and Mokine Nature Reserves.</p> <p>The diversity of plant communities ensure plentiful supply of nectar is available all year. This supports at least 10 species of honeyeater, and the western pigmy-possum (CERCARTETUS CONCINNUS).</p> <p>Murdoch University has conducted studies of the flora and fauna at the reserve providing a firm basis for future management.</p>	not listed
St Romans Well, York	B1	<p>This reserve has temperate grassy woodland, one of the most threatened ecosystems in Australia due to widespread agricultural development. Grassy woodlands are defined as a woodland where the understory consists predominantly of grass species (also includes sedges, rushes and other grass-like plants). These grasslands have been dramatically altered and are poorly represented in conservation reserves. It is one of the few reserves on which wandoo (EUCALYPTUS WANDOO) - jam (ACACIA ACUMINATA) woodland occurs.</p> <p>Western Australian Government classified priority 4 species DARWINIA THYMOIDES AND CALOTHAMNUS RUPESTRIS grow here.</p>	not listed
Taarblin Lake Nature Reserve	A2, B1	<p>The JAMBA &amp; CAMBA protected red-necked stint (CALIDRIS RUFICOLLIS) and sharp-tailed sandpiper (CALIDRIS ACUMINATA) occur at this reserve. The freckled duck (STICTONETTA NAEVOSA), reported at this reserve, was gazetted rare by the Western Australian Government until 1997. This duck is now priority four fauna in Western Australia.</p>	not listed



Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Tammin Railway Dam Nature Reserve		This reserve is one of the best in the vicinity and has great conservation value. It is of reasonable size and supports a good variety of plant association types and species. It is important for birds and particularly migratory species, such as the bee-eater (MEROPS ORNATUS).	not listed
Tarin Rock Nature Reserve	A2, B1, C1	Rare flora including ACACIA DEPRESSA occur here. DRYANDRA FOLIOSISSIMA, GASTROLOBIMUM DENSIFOLIUM, GASTROLOBIMUM RIGIDUM, DAVIESIA TORTUOSA and JACKSONIA TARINENSIS, all declared Western Australian Government priority two plant species are reported. BORONIA PENICILLATA a Western Australian Government declared a priority three species, grows here. They have been classified priority flora by the Western Australian Government. CALOTHAMNUS PLANIFOLIUS a species of plant which has a distribution of less than 100 km is reported. Other species include the western mouse (PSEUDOMYS OCCIDENTALIS) gazetted rare by the Western Australian Government until 1998 and now priority four fauna. The tamar wallaby (MACROPUS EUGENII) and western brush wallaby (MACROPUS IRMA) also priority four fauna are also here. This reserve is thus important in faunal, vegetation and ecosystem processes in an area where much clearing for agriculture has taken place. Birds include the Mallee fowl (LEIPOA OCELLATA) declared vulnerable fauna at a national level and the western roseella (PLATYCERCUS ICTEROTIS) Western Australian Government priority two fauna and square-tailed kite (LOPHOICTINIA ISURA), Western Australian Government priority four fauna.	registered

The reserve has been the subject of a study into the biology and zoogeography of amphibians and reptiles and another into lizard assemblages and reserve size and structure. Another study includes investigations into the conservation value for mammals of reserves in the Wheatbelt.

The reserve is considered significant in maintaining existing processes or natural systems because of its large area.

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
The Owens (2023)	B1, C1	This reserve has temperate grassy woodland, one of the most threatened ecosystems in Australia due to widespread agricultural development. Grassy woodlands are defined as a woodland where the understorey consists predominantly of grass species (also includes sedges, rushes and other grass-like plants). These grasslands have been dramatically altered and are poorly represented in conservation reserves. It is one of the few reserves on which York gum ( <i>EUCALYPTUS LOXOPHLEBA</i> ) -jam ( <i>ACACIA ACUMINATA</i> ) woodland occurs.	not listed
Throssell Nature Reserve	B1	The reserve has been the subject of a study into the temporal changes of York gum ( <i>EUCALYPTUS LOXOPHLEBA</i> ) - jam ( <i>ACACIA ACUMINATA</i> ) communities.	not listed
		The woodland and open woodland on this nature reserve provide refuge and nesting sites for numerous bird species. Many of these species survive most of the year in the cleared wheatbelt habitat, only requiring trees as an occasional refuge and for nesting. The mature trees provide hollows for nesting for some species.	
		This reserve is the only reserve in the York-Northam area on which salmon gum ( <i>EUCALYPTUS SALMONOPHLOIA</i> ) occurs. Consequently the reserve is of great value because of the stands of these trees.	



Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Ulva Nature Reserve		<p>phascogale.</p> <p>The reserve it is considered significant in maintaining existing processes or natural systems because its large area.</p> <p>Reserve 24835 is in excellent condition and supports sizeable stands of woodland and two shrubland associations. It is significant as a refuge for fauna and a good representative of shrubland in the area.</p>	not listed
Wambyn Nature Reserve	A1, B1	<p>This reserve carries extensive stands of powderbark (EUCALYPTUS ACCEDENS) many of which provide nest hollows for birds and small mammals. The small areas of heath in the centre of the reserve, the granite outcrops and standing dead blackboys are rich in reptile species. The reserve also supports large numbers of echidnas (TACHYGLOSSUS ACULEATUS). This is the only nature reserve in the Shires of York and Northam shown to support the echidna during a survey in 1986.</p> <p>This reserve, along with Claackline and St Romans Nature Reserves, is the northern limit of LOMANDRA NUTANS which is poorly known. It is also the most eastern limit of LOMANDRA SPARTEA which is also found nearby at Claackline, St Romans and Mokine Nature Reserves. In addition Wambyn Nature reserve is the most north-easterly limit of SCHOENUS SESQUIPICULUS.</p>	not listed
Wandjagill Nature Reserve		<p>Important as a resting place for birds, it is also a significant feeding area for waterfowl.</p>	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Wardering Lake Nature Reserve	A2, B1	Wardering Lake supports a moderate number of species of waterbirds, a high number of breeding species and a high number of individual waterbirds. It is an important reserve for the breeding of the little pied cormorant (PHALACROCORAX MELANOLEUCOS). This species has been found breeding at only nine other reserves in the south-west of Australia. More than 1000 waterbirds can use the lake in autumn. The greenshank (TRINGA NEBULARIA), great egret (EGRETTA ALBA) and common sandpiper (TRINGA HYPOLEUCOS), species protected by the JAMBA & CAMBA agreements, use this lake. This reserve is considered important for wetland processes.	not listed
Water Reserve 10125		The information available on this place did not indicate significant values.	not listed
Water Reserve 10187		The information available on this place did not indicate significant values.	not listed
Water Reserve 10644		The information available on this place did not indicate significant values.	not listed
Water Reserve 11029	B1	The Western Australian Government's gazetted priority four flora ACACIA MERRICKAE has been found on this reserve.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Water Reserve 11222		The information available on this place did not indicate significant values.	not listed
Water Reserve 1153		The information available on this place did not indicate significant values.	not listed
Water Reserve 11649		The information available on this place did not indicate significant values.	not listed
Water Reserve 12363		The information available on this place did not indicate significant values.	not listed
Water Reserve 13035 and 15027		The information available on this place did not indicate significant values.	not listed
Water Reserve 13172		The information available on this place did not indicate significant values.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Water Reserve 13176		The information available on this place did not indicate significant values.	not listed
Water Reserve 13327		The information available on this place did not indicate significant values.	not listed
Water Reserve 13502	B1	ACACIA MERRICKAE, a species declared priority four flora by the Western Australian Government, occurs on this reserve.	not listed
Water Reserve 13536		The information available on this place did not indicate significant values.	not listed
Water Reserve 14014		The information available on this place did not indicate significant values.	not listed
Water Reserve 14171	B1	DAVIESIA "OXYLOBIUM", a Western Australian Government gazetted priority flora species, has been found on this reserve.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Water Reserve 15668		The information available on this place did not indicate significant values.	not listed
Water Reserve 16582		The information available on this place did not indicate significant values.	not listed
Water Reserve 244		The information available on this place did not indicate significant values.	not listed
Water Reserve 25002		The information available on this place did not indicate significant values.	not listed
Water Reserve 35598		The information available on this place did not indicate significant values.	not listed
Water Reserve 5314		The information available on this place did not indicate significant values.	not listed



Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Water Reserve 9448		The information available on this place did not indicate significant values.	not listed
Wave Rock	B1	Insufficient information was gathered on the flora and fauna of Wave Rock. It is significant because of a granite monadnock with sides undercut due to erosion. This presents a beautiful wave-like profile which is about 12 m high on the northern face.	indicative place
White Lake Nature Reserve (Quongunerunding Nature Reserve)	B1	The freckled duck ( <i>STICTONETTA NAEVOSA</i> ), has been recorded at the wetland. This duck was gazetted rare by the Western Australian Government until 1997 and is now priority four fauna. The JAMBA & CAMBA protected red-necked stint ( <i>CALIDRIS RUFICOLLIS</i> ), sharp-tailed sandpiper ( <i>CALIDRIS ACUMINATA</i> ), curlew sandpiper ( <i>CALIDRIS FERRUGINEA</i> ) and greenshank ( <i>TRINGA NEBULARIA</i> ) were also recorded. It is therefore important as a resting area and habitat for migratory waders.	not listed
Wialkutting Nature Reserve		The reserve is important as a resting place for birds and for providing refuge for the resident Wheatbelt species. The reserve is quite habitat-diverse considering its size. The runoff areas providing refuges for frogs and aquatic invertebrates. A species of eucalypt tentatively identified as <i>EUCALYPTUS WEBSTERIANA</i> may be an undescribed species.	not listed
Windmill Hill Railway Cutting	B1, C1	The site is an important geological research site providing excellent exposures of the rocks of the Archaean Jimperding Metamorphic Belt, including cross-bedded quartzite which contains zircons dated at 3 340 million years.  It is used regularly as a teaching locality for university geology students in Perth. It featured as an excursion site used on field trips associated with International Archaean Symposia held in Perth in 1980 and 1990.	indicative place

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Wogerlin Hill Reserve		Little is known of the significance of this reserve.	not listed
Wulyaling Nature Reserve		ACACIA ACUMINATA and ACACIA MICROBOTRYA flower abundantly on the reserve and are an important food source for honeyeaters. The many small watercourses on the reserve provide refuge for frogs and a water supply for mammals and birds.	not listed
Yandimilling Nature Reserve	A3	The reserve is fairly rich in associations and plant species.	not listed
Yarding Nature Reserve		No values are recorded for this reserve.	not listed
Yenyening Lakes (Beverley Lakes Nature Reserve)	A2, B1	Red-necked stint (CALIDRIS RUFICOLLIS), sharp-tailed sandpiper (CALIDRIS ACUMINATA), common sandpiper (TRINGA HYPOLEUCOS), curlew sandpiper (CALIDRIS FERRUGINEA) and greenshank (TRINGA NEBULARIA) all protected by the JAMBA & CAMBA international agreements, have been recorded at these wetlands. The hooded plover (THINORNIS RUBRICOLLIS), priority four fauna is also found here. They are important habitat for migratory birds. This reserve is important in ecosystem processes and natural systems because of its large area.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (cont'd)

Remnant	Threshold Met	Values	Status
Yilgerin Rock		Potentially a good reserve, but past human usage has to some extent impacted on the area adversely.	not listed
Yornaning Nature Reserve	A1, A2, A3, B1, C1	This reserve supports the Western Australian Government's priority three flora species CRYPTANDRA POLYCLADA and priority four flora DAVIESIA OXYLOBIUM. A disjunct population of NUYTSIA FLORIBUNDA is also found. There is high vegetation diversity and there are important ecotones in this reserve.  It has been the subject of a fauna study which found VARANUS TRISTIS is at the southernmost limit of its range here. The reserve has diverse fauna and has the potential to help conserve a breeding population of the nationally vulnerable red-tailed phascogale (PHASCOGALE CALURA). The peregrine falcon (FALCO PEREGRINUS) specially protected by the Western Australian government, has been recorded here. In general, the reserve provides excellent habitat for migratory and sedentary fauna. There are numerous breeding hollows in the trees in the reserve, with a high Muir tree senescence index of 13.8.  The reserve was the site of a study into the diet, habitat preferences, reproduction and life history in PHASCOGALE CALURA. The reserve has also been the subject of a study into the biology and zoogeography of amphibians and reptiles and another into lizard assemblages and reserve size and structure. Others studies include investigations into the conservation value for mammals and birds of reserves in the Wheatbelt.	not listed
Yoting Town Reserve	C1	The reserve has been the subject of a study into the biology and zoogeography of amphibians and reptiles and another study into lizard assemblages and reserve size and structure. Other studies include investigations into the conservation value for mammals and birds of reserves in the Wheatbelt.	not listed

Appendix 2. Values of remnant vegetation assessed as part of the Regional Assessment of the Central Wheatbelt (contd)

Remnant	Threshold Met	Values	Status
Yoting Water Reserve	C1	The reserve has been the subject of a study into the biology and zoogeography of amphibians and reptiles and another into lizard assemblages and reserve size and structure. Other studies include investigations into the conservation value for mammals and birds of reserves in the Wheatbelt.	not listed

3. Information sources consulted during the  
Regional Assessment of the Central Wheatbelt  
of Western Australia

Appendix 3. Information sources for this project.

Attribute	Criteria	Data Source
Disturbance	A.1, A.2, A.3, B.1, D.1	Published reports (those mentioned under flora and fauna).
Fauna species	A.1, A.2, A.3, B.1, D.1	Published reports (Abensperg Traun and Smith, 1993; Arnold <i>et al.</i> , 1994; Blakers <i>et al.</i> , 1984; Bradley, 1997; Butler, 1972; Cale, 1990; Chambers, 1979; Chapman and Dell, 1977; Chapman and Dell, 1978; Chapman and Dell, 1985; Chapman <i>et al.</i> , 1978; Coates, 1990a; Coates, 1990b; Coates, 1990c; Coates, 1990d; Coates, 1990e; Dell, 1977; Dell, 1978; Dell and Harold, 1979; Friend, 1993; Friend <i>et al.</i> , 1997; Friend, 1990; Friend and Scanlon, 1995; Friend <i>et al.</i> , 1994; Friend <i>et al.</i> , 1992; Friend <i>et al.</i> , 1995; Friend <i>et al.</i> , 1993; Garkaklis <i>et al.</i> , 1998; Graham, 1988; Harold and Dell, 1979; Jaensch <i>et al.</i> , 1988; Job, 1969; Jones <i>et al.</i> , 1994a; Jones <i>et al.</i> , 1994b; Kinnear <i>et al.</i> , 1998; Kitchener, 1981; Kitchener, 1982; Kitchener and Chapman, 1977; Kitchener and Chapman, 1978; Kitchener <i>et al.</i> , 1977; Kitchener <i>et al.</i> , 1980a; Kitchener <i>et al.</i> , 1980b; Kitchener <i>et al.</i> , 1982; Lobry de Bruyn and Conacher, 1994; Lobry de Bruyn and Conacher, 1995; Lovell, 1977a; Lovell, 1977b; Lovell, 1978; Main, 1996; Majer, 1985; Moore and Williams, 1986; Morris and Kitchener, 1979; Muir, 1978a; Muir, 1978b; Muir, 1978c; Muir, 1978d; Muir, 1978e; Muir, 1979a; Muir, 1979b; Muir, 1979c; Muir, 1979d; Muir, 1979e; Muir, 1979f; Muir, 1979g; Muir, 1979h; Muir, 1979i; Muir, 1979j; Muir, 1979k; Muir <i>et al.</i> , 1978; Ninox Wildlife Consulting, 1991; Orell and Morris, 1994; Recher and Davis, 1998; Saunders and Ingram, 1995; Smith, 1998; Start <i>et al.</i> , 1995; Storr <i>et al.</i> , 1981; Storr <i>et al.</i> , 1983; Storr <i>et al.</i> , 1986; Storr <i>et al.</i> , 1990; Tyler <i>et al.</i> , 1984; van Schagen <i>et al.</i> , 1992; Wallace and Moore, 1985; Williams, 1980; Williams, undated) Dell, 1980; Dell and Johnstone, 1976; Kitchener and Chapman, 1976)

Appendix 3. Information sources for this project (contd)

Attribute	Criteria	Data Source
Gondwanic flora and fauna	A.1, A.2, B.1	Published reports (Hopper <i>et al.</i> , 1996; Hopper and Western Australia Department of Conservation and Land Management, 1993; Main, 1996).
Flora species (rare endemic)	A.1, A.3, B.1	CALM rare flora database, published reports (Briggs and Leigh, 1995).
Geomorphology	A.1, A.2, B.1, D.1	Published reports (Bradbury, 1993; Carter, 1987; Joyce, 1995; Perrigo, 1991a; Perrigo, 1991b)
Landforms	A.3, A.2, A.3, D.1	Published reports (see references for fauna and vegetation this table).
Soil	A.3, D.1	Published reports, see fauna and vegetation reports.
Vegetation	A.2, A.3, B.1, D.1	Western Australian Herbarium for identification of unidentified flora. Published reports (Abbott, 1984; Beard, ; Beard, 1981; Beard and Hnatiuk, 1981; Briggs and Leigh, 1995; Brown and Hopkins, 1983; Burgman, 1985; Butler, 1972; Chambers, 1979; Chapman <i>et al.</i> , 1978; Coates, 1990a; Coates, 1990b; Coates, 1990c; Coates, 1990d; Coates, 1990e; Coates, 1990f; Coates, 1992; Coates, 1993; Coates and Napier, 1986; Coates, 1987; Dames & Moore, 1985; E. M. Matiske & Associates, 1986; E. M. Matiske & Associates, 1992a; E. M. Matiske & Associates, 1992b; E. M. Matiske & Associates, 1993; Farrington <i>et al.</i> , 1994; Friend, 1993; Friend <i>et al.</i> , 1995; Froend <i>et al.</i> , 1987; Froend and McComb, 1991; Froend and Storey, 1996; George and Hnatiuk, 1978; George <i>et al.</i> , 1995; George <i>et al.</i> , 1986; George and McFarlane, 1993; Grein, 1994; Grein, 1995; Gunness and Volunteers of the Bushland Plant Survey Project, 1998; Halse <i>et al.</i> , 1993; Kelly and Coates, 1995; Lambeck and Wallace, 1993; Lovell, 1977b; Lovell, 1978; Matiske Consulting Pty. Ltd., 1995a; Matiske Consulting Pty. Ltd., 1995b; Matiske Consulting Pty. Ltd., 1995c; Matiske Consulting Pty. Ltd., 1995d; McIntosh, 1991; Moore and Williams, 1986; Muir, 1977a; Muir, 1977b; Muir, 1978a; Muir, 1978b; Muir, 1978c; Muir, 1978d; Muir, 1978e; Muir, 1978f; Muir,

		1979a; Muir, 1979b; Muir, 1979c; Muir, 1979d; Muir, 1979e; Muir, 1979f; Muir, 1979g; Muir, 1979h; Muir, 1979i; Muir, 1979j; Muir, 1979k; Muir, 1979l; Napier, undated; Napier and Coates, 1986; Napier <i>et al.</i> , undated; Newby and Newby, 1992; Norton <i>et al.</i> , 1995; Porter and Dunlop, 1984; van Schagen <i>et al.</i> , 1992; Wallace and Moore, 1985; Weaving, 1994a; Weaving, 1994b; Weaving, 1995; Weaving and Grein, 1994; Williams, 1980; Williams, undated; Yates <i>et al.</i> , 1994).
Wetlands	A.1, A.2, A.3, D.1	Museum of Western Australia databases, published reports (Jaensch <i>et al.</i> , 1988).



4. List of experts contacted concerning the natural environment values of the Central Wheatbelt of Western Australia

Appendix 4. List of experts contacted concerning the natural environmental values in the Central Wheatbelt of Western Australia

Name	Institution	Expertise
Atkins, K.	Department of Conservation and Land Management	Rare and priority flora
Caroll, S.	Department of Conservation and Land Management	Flora
Collis, S.	Department of Conservation and Land Management	Vesting and purpose of reserves
Cowan, M.	Museum of Western Australia	Fauna
Davis, J.	Murdoch University	Wetland and stream ecology
Dell, J.	Museum of Western Australia	Birds and fauna
Gunness, A.	Wildflower Society	Flora
Hamilton-Brown, S.	Department of Conservation and Land Management	Threatened ecological communities
Harvey, J.	Department of Conservation and Land Management	Conservation significance of vegetation communities
Hopkins, A.	Department of Conservation and Land Management	Flora
Huismann, J.	Murdoch University	Fauna
Keighery, G.	Department of Conservation and Land Management	Flora
Kenneally, K.	Department of Conservation and Land Management	Flora
Lambeck, R.	CSIRO	Fauna
Majer, J.	Curtin University of Technology	Invertebrates
Major, G.	Water and Rivers Commission	Rivers and streams
Marchant, N.	Department of Conservation and Land Management	Unidentified flora
McKenzie, N.	Department of Conservation and Land Management	Fauna
McNamara, K.	Museum of Western Australia	Gondwanan fauna
Muir, B.	Consultant	Ecosystem processes, flora and fauna
Pettitt, L.	Wheatbelt Aboriginal Corporation	Aboriginal significance

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Appendix 4. List of experts contacted concerning the natural environmental values in the Central Wheatbelt of Western Australia (contd)

Name	Institution	Expertise
Riley, J.	Department of Conservation and Land Management	Rare and priority flora
Smith, R.	Water and Rivers Commission	Rivers and streams
Wooller, R.	Murdoch University	Birds and fauna

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