LANE POOLE RESERVE
ISSUES PAPER

Introduction

The Department of Conservation and Land Management (CALM), on behalf of the Conservation Commission of Western Australia (Conservation Commission), is in the process of preparing a management plan for Lane Poole Reserve and its proposed conservation estate additions. The management plan will determine how the reserve is managed over the next 10 years, or until another plan is prepared.

This issues paper highlights the values and main issues to be considered in developing a management plan for Lane Poole Reserve. It has been prepared to (a) enable the Conservation Commission to guide strategic decision-making for the reserve, and (b) to inform and assist the public in participating in the management planning process. These issues have been collated from meetings and workshops within CALM as well as preliminary discussions with the Lane Poole Reserve Community Advisory Committee. CALM welcomes feedback on ways in which it can address these issues or any others that have direct relevance to the management of Lane Poole Reserve.

Brief Overview

Lane Poole Reserve is vested in the Conservation Commission and comprises six class A reserves that were gazetted in 1984. A management plan for the reserve was approved in 1990 in accordance with the *Conservation and Land Management Act 1984* (CALM Act). The Conservation Commission, through the agency of CALM is now reviewing the management plan for the reserve and proposed conservation estate additions as proposed in the Forest Management Plan (Conservation Commission of WA 2004).

Lane Poole Reserve is located approximately 100 km south east of Perth and 24 km east of Pinjarra (Map 1). The nearest township is Dwellingup, just a few kilometres to the north. The major attraction of the reserve is perhaps the Murray River, which flows through the northern part of the reserve, and which is the last of the major valleys in the northern jarrah forest not to be flooded for water supply. The southern section of the reserve forms part of the Harris River catchment.

The reserve is situated on the Darling Plateau, at an average elevation of 300 metres. It protects a portion of WA's jarrah forest, encompasses a variety of ecosystems and vegetation types, and contains significant flora and fauna species and habitats, as well as landscapes that provide opportunities for conservation, education, interpretation, recreation and scientific research. It was named after C.E. Lane-Poole the State's first Conservator of Forests and a devoted conservationist.

Lane Poole Reserve has long been a favourite recreation destination for locals, and is also extremely popular with residents from the Perth metropolitan area. It provides opportunities for a range of recreation activities including camping, fishing, marroning, bushwalking, swimming, canoeing, rafting, mountain biking, sightseeing and four wheel driving. The reserve is unique in the south-west because of a combination of two key attributes: it is within an easy one and a half hours drive from Perth and readily accessible to nearby communities including Bunbury, Mandurah and Pinjarra, and the Murray River flows permanently through the northern part of the reserve, providing a diverse range of aquatic recreation opportunities.

The reserve forms part of the monitoring grids for the ForestCheck program, an integrated monitoring system that has been developed to provide information about any changes and trends in key elements of

forest biodiversity associated with a variety of management activities. ForestCheck provides a framework to quantify, record, interpret and report on the status of key forest organisms, communities and processes in response to both forest management activities and natural variations.

The most important issues concerning the future management of the reserve include:

- provision and management of sustainable recreation opportunities and services;
- management of the habitats (and threats to these) for the suite of threatened and priority species inhabiting Lane Poole Reserve;
- management of the visual landscape amenity, particularly with regard to timber harvesting operations;
- protection of sites of cultural importance; and
- development of opportunities for the involvement of Aboriginal people in management of the reserve.

Key Values

Lane Poole Reserve is highly valued for its many environmental, recreation, scenic and cultural values, including:

Conservation

- large tracts of Jarrah forest, including old-growth forest;
- valuable habitats supporting a variety of threatened and priority fauna;
- rare and priority flora species.

Cultural

- registered sites of indigenous significance;
- non-indigenous cultural heritage associated with the timber industry.

Recreation

- vast array of both aquatic and terrestrial based recreational opportunities;
- the Murray River – the only undammed river system in the northern jarrah forest;
- Icy Creek Environmental Education Camp.

These values provide the basis for the interpretive themes and messages of the reserve's interpretation and communication plan.

Regional Context

Located in the south-west of Western Australia, Lane Poole Reserve and its proposed additions encompass just under 80 000 hectares, ranging from the steeply forested valley slopes and rock-rimmed pools of the Murray River near the Darling Scarp, to the more open, undulating jarrah and wandoo woodlands further east. The reserve lies partially within six shires: Murray, Waroona, Collie, Williams, Boddington and Harvey.

The town of Dwellingup is located less than 10 km from the northern section of the reserve, which is the focus for most recreational activity, whilst the town of Collie, approximately 12 km south west and with a population of 8500, is the nearest town to the southern section. The recreation opportunities provided by the Murray River are the key attraction to Lane Poole Reserve. Most of the visitors to the reserve are from Perth (72%), whilst visitor surveys indicate that 15% of visitors live locally. The annual visitation to Lane Poole is just over 161 000 people.

Lane Poole Reserve partially encompasses two of the Western Australian Planning Commission's regions, Peel and South West. The northern section of the reserve is in the Peel region and the southern section is in South West.
The South West Region covers 12 local government areas and is divided into three subregions - Bunbury Wellington (Preston), Vasse and Warren Blackwood. Lane Poole Reserve lies in the Bunbury Wellington subregion. A characteristic of the South West Region is the complexity and intensity of land use, which can be attributed to its abundance of natural resources and proximity to Perth and regional population centres. Major urban centres include Bunbury, Busselton, Collie and Manjimup, and smaller towns include Harvey, Dardanup and Boyanup.

The Peel Region has one of the fastest growing populations in WA, with a growth rate of 5.3%, compared to the state average of 1.5% (Peel Development Commission webpage), which adds to the increasing pressures on Lane Poole Reserve from visitors. The major urban centre is Mandurah, followed by Pinjarra, Dwellingup, Serpentine and Jarrahdale. The region has a diverse economy based predominantly on mining and mineral processing, although tourism, agriculture, timber production, fishing and manufacturing also make valuable contributions.

In terms of recreation, the 'jewel in the crown' of Lane Poole Reserve is the Murray River, which attracts thousands of visitors each year for canoeing, fishing and the like. The reserve also contains a section of the Bibbulmun Track and the Mundabiddi Mountain Bike Trail. Furthermore, it is situated near the main travel route from Perth to the south-west of the state, further adding to its tourism potential.

Given its location, attractions, an expected population growth rate of nearly 5% in the Peel region and 2% in the south-west of the state, and an increase in nature based recreation and tourism activities, human pressures on the environment will need to be carefully considered in the management of the reserve.

Management Plan Area and Land Tenure

Lane Poole Reserve is currently comprised of six class A reserves that encompass an area of 51 643 ha. The size and purpose of these reserves is detailed in Table 1.

Table 1 Reserves comprising Lane Poole Reserve

Reserve No.	Tenure	Size (ha)	Reserve Purpose
39819	Conservation Park	1755.4	Conservation Park and the agreement defined in S. 2 of the Alumina Refinery Agreement Act 1961
39820	Conservation Park	3028.0	Conservation Park and the agreement defined in S. 2 of the Alumina Refinery Agreement Act 1961
39821	S. 5(1)(g) Reserve	29 331.1	Conservation and the agreement defined in S. 2 of the Alumina Refinery Agreement Act 1961
39822	Conservation Park	2593.3	Conservation Park and the agreement defined in S. 2 of the Alumina Refinery Agreement Act 1961
39823	Conservation Park	2582.5	Conservation Park and the agreement defined in S. 2 of the Alumina Refinery Agreement Act 1961
39827	S. 5(1)(g) Reserve	12 352.9	Recreation and Enjoyment of the Natural Environment and the agreement defined in S. 2 of the Alumina Refinery Agreement Act 1961

The Government's *Protecting Old Growth Forests Policy* (2001) recommended investigating upgrading Lane Poole Reserve to a national park. The Forest Management Plan (2004) proposes several land tenure changes and land additions to the Reserve (Map 2). The land additions include all of Stene and

Stockyard Forest Blocks and part of Hillman, Godfrey, Chalk, Bell, George and Bednall blocks. These tenure issues, along with community consultation over the proposed boundaries, will be addressed during the management planning process. The proposed additions will increase the area of the existing reserve by over 28 000 hectares.

Indigenous Involvement in Management

The Government recognises the need for development and implementation of meaningful joint management strategies for conservation reserves in full consultation with indigenous people. The Government's Consultation Paper '*Indigenous Ownership and Joint Management of Conservation Lands in WA*' (Government of WA 2003) proposes to amend the CALM Act to include reference to indigenous people and joint management in the objects of the Act. This will mean increased consultation and liaison with indigenous people as well as greater involvement in decision-making and management. This may provide greater opportunity to protect cultural heritage through joint land management planning and practices.

The Government has shown a commitment to joint management arrangements with traditional owners. A consultation paper outlining options for ownership, administration and joint management of conservation lands in Western Australia has been released for public comment (http://www.naturebase.net/projects/aboriginal_involvement.html#consult_paper). The future involvement of Aboriginal people in management of the planning area will be considered in light of the Government determining a policy position. This policy position will lead to amendments to the CALM Act, enabling proposed joint management provisions of the Act to apply to conservation lands and Aboriginal-held lands irrespective of the status of Native Title.

The management planning process for Lane Poole Reserve will continue to seek establishment of formal processes for Aboriginal consultation and interaction in management planning.

There is one current native title claim that covers Lane Poole Reserve, by the Gnaala Karla Booja people.

Managing the Natural Environment

Biogeography

The Interim Biogeographic Regionalisation for Australia (IBRA) (Thackway and Cresswell 1995) provides a planning framework for selecting a comprehensive, adequate and representative (CAR) system of protected areas to conserve and protect Australia's biodiversity.

The IBRA divides Australia into 80 separate bioregions, based on lithology, geology, landform, and vegetation. Lane Poole Reserve lies within the Jarrah Forest Interim Biogeographic Region, which is subdivided into two subregions: the Northern Jarrah Forest and the Southern Jarrah Forest, differentiated principally by the slight variations in climate, geology and understorey species composition. Lane Poole is part of the 'Northern Jarrah Forest' sub-region. The area of conservation estate in the Northern Jarrah Forest sub-region is 134 131 ha or 7.04%. The proposed conservation estate additions detailed in this Issues Paper would raise the figure by approximately 24 140 ha to 8.3%.

To protect the biodiversity of the south-west, and the bioregions within it, the CAR reserve system was established as part of the *Regional Forest Agreement 1999* (RFA). The CAR reserve system was designed to contain samples of all forest ecosystems discernible at an appropriate regional scale and set a reservation target of 15% of their pre-1750 distribution. This ensures that viable examples of each ecosystem are included in the protected reserve system. To assist in decisions on areas for reservation, information provided at a finer scale was also considered, including vegetation complexes, species richness, relictual and disjunct species and the presence or absence of mature growth vegetation.

Both the RFA and the *Forest Management Plan* (2004) identify ecosystems in terms of 'forest ecosystems', 12 of which have been identified within the Jarrah Forest Bioregion. Of these, nine are represented in Lane Poole Reserve: Jarrah Forest – North East, North West and Sandy Basins, Jarrah Open Woodland, Rocky Outcrops, Shrub, Herb and Sedgelands, Swamps, Wandoo Forest and Wandoo Open Woodland. Jarrah Forest – North East and North West are the dominant ecosystems, and the rocky outcrops and swamps the least dominant, covering approximately 78 hectares and five hectares respectively, but still providing important habitat for a range of fauna species.

Climate Change

The Commonwealth Scientific Institute Research Organisation (CSIRO) predicts that climate change in the south-west of Western Australia could see rainfall decline by a further 60% and temperatures increase by up to 5°C by 2070 (CSIRO 2001). Climate change may have implications for landscapes (particularly wetlands and granite outcrops), many flora and fauna species of conservation significance, and fire.

The potential impacts of climate change, particularly on natural values, will require consideration in the plan.

Geology

Lane Poole Reserve is situated within the Yilgarn Craton geological province. This is separated from the Perth Basin to the west by the Darling Fault. The western part of the Yilgarn block, in the vicinity of the reserve, consists of high-grade metamorphic belts partially enveloped by complex granite associations. The belts contain remnants of older sedimentary and volcanic rocks, and metamorphosed granite rocks, and it is these granite rocks on which most of the southern section and approximately half of the northern section of Lane Poole Reserve lies. Granite outcrops occur at a number of places throughout the northern part of the reserve and are important fauna habitats, providing areas of refugia particularly for small mammals and reptiles, and for flora species that are confined to such habitats. These outcrops are easily damaged by human uses and it is important that visitors are managed so as to protect the outcrops. Hence, visitor management is an issue, especially if the outcrops are accessible.

Over time, the Yilgarn Craton has been uplifted relative to the Perth Basin, resulting in rejuvenated drainage along joints and fractures and the erosion of more easily weathered rocks. The consequence of this geological activity was the formation of the Murray River and its valley.

Laterization, which occurred on the western erosion slope of the Plateau and on the younger deposits of the western margin of the Yilgarn block, produced bauxite deposits, which occur as alumina-rich lenses within the lateritic uplands. Alcoa Australia has mined areas to the north and west of the reserve since 1972, and Worsley Alumina the area east of the reserve since 1982.

Landform and Soils

The major geomorphological feature of Lane Poole Reserve is the Darling Plateau, which sits at an average elevation of 300 metres above sea level. The reserve lies in the western part of the plateau, near the Darling Scarp. It comprises two contrasting tracts of land: a gently undulating Darling Plateau landscape in the southern section, and a variety of landscapes in the north with recreation and aesthetic values. The most striking of these is the Murray River valley, which provides opportunities for recreation, but which also needs to be carefully managed to protect the riparian zones from such uses. Large rock outcrops occur sporadically, which are also favoured for recreation. In drier areas, the run-off from these provides a moist environment that may support unusual plant or animal communities (CALM 1990).

Soil formation in Lane Poole Reserve is influenced by the ridges which are extensively occupied by a laterite mantle, and by valleys showing morphology and soil development dependant on the amount of

relief, degree of stripping of the weathered mantle and the geological nature of the substrate (CALM 1986).

One of the issues at Lane Poole is the management of erosion. There are two types of erosion occurring in the reserve: natural and accelerated. Natural erosion is that which occurs under natural conditions, whereas accelerated erosion is that which occurs at a faster rate, in disturbed areas. Examples of accelerated erosion in the reserve include that occurring along riparian zones as a consequence of paddlers and marron fishers putting in and taking out canoes and fishing nets, and along the roads, particularly where vegetation is removed or damaged, soils are compacted and/or water is concentrated.

An erosion hazard rating, which is a subjective assessment derived from interaction between a number of different components of the landscape, has been applied to the landforms of the reserve. Both Dwellingup and Yarragil landforms have a high erosion hazard rating, Murray (which encompasses much of the Murray Valley) and Helena have a moderate rating, and Goonaping and Pindalup are rated low (CALM 1990).

Landscape

Landscape[1] management is based on the premise that the visual quality of any landscape is a resource in its own right and can be assessed and managed in much the same way as other resource values such as fauna, flora, water and recreation. The role of landscape management is to ensure that all uses and activities are planned and implemented to complement rather than detract from the inherent visual quality of the environments in which they occur.

CALM's Policy Statement No. 34 - *Visual Resource Management of Lands and Waters Managed by CALM* is applied to all aspects of land management, particularly when assessing, planning and implementing any proposed management activities and new facilities such as buildings, recreation sites, signs and infrastructure, to determine their impact on landscape values.

It is important to ensure that visual landscape management is considered for all developments within the reserve and for timber harvesting operations within and directly adjacent to the reserve, to alleviate, or at least minimise, visual impacts of the operations. This issue is currently imminent at the Baden Powell campsite and at other areas along major travel routes through the reserve where timber harvesting has either already occurred or is proposed to occur. CALM is in the process of preparing a Visual Resource Assessment of the Baden Powell site, which is a heavily used and popular campsite within a pine plantation that is soon to be harvested by the Forest Products Commission. It is essential that steps be taken to ensure the impacts on the visual landscape are minimised as much as possible.

Native Plants and Plant Communities

Approximately 2450 native flora species (including vascular plants, lichens and mosses) have been recorded in Lane Poole Reserve (Western Australian Herbarium 2003). The reserve forms part of the northern jarrah forest IBRA region and comprises a tall, open forest dominated by jarrah (*Eucalyptus marginata*) and marri (*Corymbia calophylla*) complexes, and including important populations of fringing vegetation bordering the banks of the Murray River. It also contains *Agonis* swamp shrublands with sedge understorey, which are densely vegetated swamps to which forest populations of the quokka are restricted (Hayward *et al.* 2002), and which are the preferred habitat of the noisy scrub bird (Allan Burbidge pers. comm.).

The vegetation of Lane Poole has been mapped in a number of different surveys. The nine forest ecosystems in the reserve were classified at a finer scale in 1998 by Mattiske and Havel as part of the

[1] 'Landscape' refers to the appearance or visual quality of an area. For many, visual appearance is the most direct way visitors will experience an area and, therefore, is often the criteria by which land management practices are judged.

RFA process. Their survey identified twenty vegetation complexes in Lane Poole, the distribution of which is outlined in Appendix 1.

As a general criterion, CALM (2003) recommends that 15% of the pre-1750 distribution of each forest ecosystem should be protected in the CAR reserve system. The pre-1750 distribution of nine of the twenty vegetation complexes found in Lane Poole are therefore considered to be poorly represented (11% or less) in formal reserves, with less than 5% of each of these being represented in the planning area. According to the CAR reserve system criteria, which can also be applied in the south west of WA for vegetation complexes, there are three complexes that are not adequately represented either in the planning area or in other formal or informal reserves vested in the Conservation Commission – Darkin 1, Darkin 2 and Williams. More than 90% of each of these complexes remain on lands not vested in the Conservation Commission.

The most poorly represented vegetation complexes in Lane Poole are Cooke – rocky slopes, and Williams (both 0.5%), Darkin 1 and 2 (both 1%), Michibin and Yarragil 1 (both 3%) and Dwellingup, Yalanbee 5 and Murray 2 (all 4%). Although poorly represented in the planning area, all are well represented in other reserves vested in the Conservation Commission except for Darkin 1 and 2 (10% and 6% respectively) and Williams (4%). These complexes should be a priority for future reservation where possible.

Threats to the floristic values of the reserve, such as dieback, environmental weeds and erosion, are exacerbated by human activity in the area, particularly in the recreation areas and along the riparian zone of the Murray River. Protection of habitat values is a key issue for management that will be highlighted in the management plan.

Despite the geological and geomorphic uniformity and structural homogeneity of the jarrah forest environment, the area contains locally patchy biota, resulting in a number of endemic, relict and disjunct species. One such species in Lane Poole Reserve is blackbutt (*Eucalyptus patens*) (McKenzie *et al.* 1996).

Lane Poole Reserve contains one species of Declared Rare Flora[2] (DRF) and 15 priority species, comprising three Priority 2[3] species, one Priority 3[4] species and 11 Priority 4[5] species. These are detailed in Appendix 2.

Native Animals and Habitats

Lane Poole Reserve contains approximately 29 native mammal species, 120 bird species, 40 reptile species, 16 amphibian species, nine fish species and an unknown number of species of mollusc and invertebrate species. The level of knowledge about many native animals in Lane Poole Reserve, particularly the distribution, ecology and conservation status of reptiles, amphibians and invertebrates, is incomplete and may need further survey.

The *Wildlife Conservation Act 1950* (Wildlife Conservation Act) provides for the Minister to declare species to be 'specially protected' for a variety of reasons, viz:

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[2] DRF - Taxa which have been adequately searched for and are deemed to be either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.

[3] Priority Two flora - Poorly Known Taxa: taxa which are known from one or a few (generally <5) 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 need of further survey.

[4] Priority Three flora – Poorly Known Taxa: taxa which are known from several populations, and the taxa are not believed to be under immediate threat, either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.

[5] Priority Four flora – Rare Taxa: taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5 – 10 years.

- they are threatened (i.e. they are rare or likely to become extinct);
- they are presumed to be extinct but may be rediscovered;
- they are covered by an international agreement (e.g. Japan – Australia Migratory Bird Agreement); or
- they are uncommon or have commercial value, and even though they are not currently threatened, could become so because of their commercial or intrinsic value.

CALM's Policy Statement No. 33 – *Conservation of Endangered and Specially Protected Fauna in the Wild* also allows for species to be categorised as 'priority' taxa. These are species that are either considered to no longer be 'threatened', have a restricted distribution or are declining in range or abundance and do not quite meet the 'threatened' criteria.

Lane Poole Reserve provides important habitat for many fauna species of conservation significance, including several threatened species and 12 species listed on CALM's Priority Fauna list. These are detailed in Appendix 3.

CALM has recently purchased an 81 ha enclave of private land in the southern section of the reserve, which contains most of Lake Yourdamung. The property will be added to the existing Lane Poole Reserve. Lake Yourdamung is an important wetland, and one of only two lakes of its kind in the Northern Jarrah Forest. It is an excellent example of a near natural wetland for the Jarrah Forest IBRA. Some of the fringing vegetation has been cleared, but the lake maintains good water quality and a high diversity of plants, birds and aquatic fauna. The property also contains suitable habitat for reintroduction of uncommon fauna such as the tammar wallaby, woylie and chuditch.

Insufficient knowledge about the fauna, coupled with threats such as *Phytophthora cinnamomi*, feral animals and inappropriate fire regimes, pose challenges for fauna conservation in Lane Poole Reserve. Operation Foxglove research has shown the abundance and distribution of the suite of resident fauna within the northern jarrah forest, and Lane Poole Reserve, is not a function of fox predation alone and habitat factors are equally important. This is also supported by the more recent findings from the quokka research (Paul de Tores, pers. comm.).

Mammals

Lane Poole Reserve provides diverse and valuable habitats for a range of fauna, including several threatened and priority species. One of the key issues and challenges for management is to manage such habitats and maintain the suitability of them for a range of fauna species. The large size of the reserve, and the fact that it is buffered by State forest, is advantageous for reducing edge effects and minimising disturbance to fauna by providing a buffer for protection of many of the habitat values of the reserve.

Western Ringtail Possums

The western ringtail possum (*Pseudocheirus occidentalis*) is listed as a threatened species under the Wildlife Conservation Act and the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). Between 1996 and 1999 approximately 130 western ringtail possums were translocated to Lane Poole Reserve. The outcome of this translocation is yet to be determined, but evidence suggests that predation by the chuditch (*Dasyurus geoffroii*) may be limiting translocation success. The translocation is now part of a larger study examining whether translocation is a viable management option for displaced western ringtail possums.

If the translocation is successful, Lane Poole Reserve will become the northern-most known location for the species, exclusive of populations translocated to Karakamia Wildlife Sanctuary in the Avon Valley. Given the extent of habitat fragmentation and population fragmentation elsewhere within the western ringtail possums' range, populations established within Lane Poole Reserve have the potential to be of major conservation significance for the species.

Woylie (or Brush-tailed Bettong)
Lane Poole Reserve is within the former geographic range of the woylie (*Bettongia penicillata*). However, by the 1970s the species was restricted to three isolated locations: Perup Forest near Manjimup and two wheatbelt reserves, Dryandra Forest and Tutanning Nature Reserve. Woylie translocations began in the 1980s, with further translocations commencing in 1995 as part of CALM's Operation Foxglove[6] to 19 sites in the northern jarrah forest including Lane Poole Reserve (de Tores 1999). These latter translocations were consistent with the Woylie Recovery Plan (Start *et al.* 1995).

The level of survivorship of woylies at different translocation sites has varied at both four and six baitings per year. The implications from these findings are that the standard aerial baiting regime for large areas of forest, such as Lane Poole Reserve, may need to be amended to ensure survivorship of predation sensitive species such as the woylie (Paul de Tores, pers. comm.).

Quokka
Lane Poole Reserve contains a suite of habitats suitable for quokkas (*Setonix brahyurus*), which are endemic to the south-west of Australia and are specially protected under the Wildlife Conservation Act. A four-year quokka research program has recently being completed for the northern jarrah forest, with study sites within Lane Poole Reserve. The research was conducted within Lane Poole and the northern jarrah forest as these sites represented the northern extent of the quokka's geographic range and is where the species was perceived to be at greatest risk from human-induced disturbances (de Tores *et al.* in review; Hayward *et al.* 2003).

The research found that quokka populations had not responded to the 6 year baiting program and concluded that the northern jarrah forest quokka populations were the terminal remnants of a collapsing metapopulation (Hayward *et al.* 2003). Specific habitat requirements were also examined and the quokka was shown to have a preferred habitat of a complex mosaic of *Agonis* swamp habitat (de Tores *et al.* in press). An active adaptive management program is currently being prepared, wherein fire is proposed as a tool to manipulate habitat to create a suite of sites supporting this preferred mosaic (Paul de Tores, pers. comm.).

Lane Poole Reserve also contributes to the conservation of the chuditch (*Dasyurus geoffroii*) which is under threat due to habitat alteration resulting from the wide-scale clearing for agriculture and the subsequent removal of suitable den logs and den sites. Other threatening processes to chuditch include introduced predators such as the fox and cat, competition for food, and frequent wildfire.

Further, the southern extremities of the proposed additions to the reserve (ie. portions of Godfrey and Hillman Blocks) lie within the Batalling fauna recovery area, which includes recovering populations of numbat (*Myrmecobius fasciatus*) and tammar wallaby (*Macropus eugenii derbianus*). A portion of the proposed additions to Lane Poole Reserve encroaches this area and hence may support these two mammal species.

Birds
Approximately 120 species of native birds have been recorded within Lane Poole Reserve, which is comparable to the (approx.) 150 species known to occur across the entire jarrah forest (Nichols and Muir 1989). Distribution of species is generally attributed to structural differences rather than variations in floristics. A study by Wykes (1983) found that the greatest abundance of birds in the jarrah forest

[6] A pilot trapping and telemetry monitoring study of foxes and cats within the unbaited and highest baiting frequency (six baitings per year) treatments of the northern jarrah forest. The project involves fox and cat density estimates and survivorship and home range estimates in the presence of 1080 baiting within the northern jarrah forest.

generally occurred along watercourses and adjacent vegetation, where food, shelter and water is available. Such habitats in Lane Poole Reserve include the riparian vegetation along the Murray River and adjoining creek systems, as well as Lakes Yourdamung and Nalyerin in the southern section. Disturbance to riparian vegetation is likely to have adversely affected the majority of bird species on the Darling Scarp.

Lane Poole Reserve also contains suitable habitat for the specially protected noisy scrub bird (*Atrichornis clamosus*), which has been reintroduced to parts of Lane Poole Reserve and the surrounding forest. Noisy scrub birds were released in the southern end of Lane Poole, on King Jarrah West, one of eight translocation sites in the Darling Range. Since 2000 six males and three females have been released at this site, but as yet there is no evidence of breeding. A key threatening process for the species is fire, as scrub-birds have a requirement for long unburnt habitat. The species remains extremely vulnerable to a single large wildfire and thus habitat protection and maintenance of appropriately aged vegetation is essential. Clearance of habitat could fragment and prevent the potential for dispersal of the species. Pigs are also a threat to these birds in Lane Poole as they cause disturbance to swampy and riparian habitat areas, as are black rats (*Rattus rattus*) which predate on eggs and young.

The red tailed black cockatoo (*Calyptorhynchus magnificus*) and two species of white-tailed black cockatoos — Baudin's cockatoo (*Calyptorhynchus baudinii*) and Carnaby's cockatoo (*C. latirostris*) — have also been recorded in the reserve. Carnaby's cockatoo is a specially protected species under the Wildlife Conservation Act as 'fauna that is rare or is likely to become extinct'. A recovery plan for the species has been prepared, which seeks to promote the maintenance of significant breeding areas adjacent to feeding areas.

The peregrine falcon (*Falco peregrinus*) has also been recorded in the reserve. It is listed under the Wildlife Conservation Act as 'other specially protected fauna'.

Reptiles and Amphibians

Approximately 40 species of reptiles and 16 frog species have been recorded in Lane Poole Reserve. This includes 31 lizard species and nine species of snakes. The wetland areas, particularly along the rivers and streams, swampy areas and the two natural lakes, Yourdamung and Nalyerin, provide important habitat for frogs.

Aquatic fauna

The Murray River dissects the northern section of Lane Poole Reserve and is very popular with recreational fishers. A survey by Hutchison (1991) found 13 species of fish in the Murray River and its jarrah forest tributary streams, of which four are introduced species. Other sources have indicated an additional two introduced species. Native species recorded within the boundaries of Lane Poole include the western minnow (*Galaxias occidentalis*), western pigmy perch (*Edelia vittata*) and nightfish (*Bostockia porosa*), which are endemic to the south west of Australia, as well as freshwater cobbler (*Tandanus bostocki*), pouched lamprey (*Geotria australis*) and Swan River (or blue spot) goby (*Pseudogobius olorum*).

Brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) have been introduced into the river, and the Murray is one of the few rivers where trout fishing is permitted all year round. Other introduced species include redfin perch (*Perca fluviatilis*), mosquito fish (*Gambusia affinis*), goldfish (*Carassius auratus*) and European carp (*Cyprinus carpio*).

The section of Murray River dissecting Lane Poole Reserve is extremely popular for marron (*Cherax tenuimanus*) fishing. Marron are the third largest freshwater crayfish in the world, and are endemic to WA. Overfishing of this species is a threat to its survival. Hence, to sustain marron populations, Fisheries WA regulate size and bag limits, gear controls, closed seasons and licensing. The activity is

now only permitted for two weeks of the year, spanning late January to early February, although illegal marroning out of season still occurs. In 1999/2000 Fisheries WA issued 22 275 licences for marron fishing.

The influx of people to the reserve during the marroning season can have a significant impact on the riparian zone of the river, as people put in and retrieve their nets. Management of these impacts will be considered during the planning process. Other threats to marron include predation by redfin perch, salinity and water eutrophication.

Invertebrates

Invertebrate data for Lane Poole Reserve was collected by CALM as part of the river health sampling program that took place between 1994-1999. The general conclusions of this study were that sites in forested areas were in good condition with what appeared to be a natural invertebrate fauna, while sites in farmland (and in downstream parts of the catchment) were degraded. The Murray catchment rivers and streams as a whole were rated as Band C (Band A is 'pristine', Band D is very impacted) due to agricultural activities on the coastal plain. However all but one of the sites in Lane Poole Reserve were in pretty good, or natural, condition (Stuart Halse pers. comm.). While there is occasionally localised impacts from logging and mining, the northern jarrah sites overall are in good condition and most rate as Band A.

Surveys have found that there are no invertebrate families of special importance in the Murray or its tributaries. Providing that the fringing vegetation remains intact and that there are surrounding trees to provide shade, stabilise soil and drop leaves and branches into the stream, water quality and macroinvertebrate life in forested parts of the Murray system, such as at Lane Poole Reserve, should continue to remain pretty natural (Stuart Halse pers. comm.).

Environmental Weeds

Environmental weed invasion is a major threat to natural ecosystems and native species. CALM's draft Policy Statement No. 14 - *Environmental Weed Management* guides the approach and priority setting for the control of environmental weeds on CALM estate. CALM has a legal responsibility to control declared weeds under section 35 of the *Agriculture and Related Resources Protection Act 1976* (ARRP Act) where practicable. Weeds are 'declared' under the ARRP Act when they are considered to pose a significant threat to agriculture. In addition, CALM also has management responsibility for controlling environmental weeds. The *Environmental Weed Strategy for Western Australia* (CALM 1999) classifies weeds in relation to their invasiveness, distribution and environmental impacts, and has classes with High, Moderate, Mild and Low ratings.

Approximately 65 introduced species have been recorded in Lane Poole Reserve, including many environmental weed species as identified in the *Environmental Weed Strategy for WA*. Three species are rated 'High', with two of particular concern within Lane Poole being arum lily (*Zantedeschia aethiopica*) and bridal creeper (*Asparagus asparagoides*). Introduced bulrush (*Typha orientalis*), also rated High, is also present in the reserve, particularly around the lakes and wetlands. According to the Herbarium of Western Australia (2003), a further 28 weed species rated as 'Mild' and 20 weed species rated as 'Low' have been recorded in the reserve. Of these, of most concern is blackberry (*Rubis fruticosus*), particularly around the recreation sites and in riparian zones, and numerous pasture species, particularly along boundaries.

Of particular significance is the infiltration of wildlings of Monterey pine (*Pinus radiata*) into native vegetation from adjoining plantations. Other weeds of concern are black wattle (*Acacia mearnsii*), tree ferns, *Watsonia spp.* and Mexican poppy (*Argemone ochroleuca*) (identified in the strategy as a potential environmental weed). Many of these weeds may have been introduced into the planning area via the

Murray River and its tributaries, adjoining private property, public roads or other areas of public use. Areas most susceptible to weed invasion include the old mill townsites and the riparian zones.

Another consideration within the old townsites is introduced species such as poplar and eastern states eucalypts that now have cultural values.

Introduced and Other Problem Animals

The specially protected and priority fauna species inhabiting Lane Poole Reserve face many threats from feral animals, as well as from insect pests such as feral honeybees. Feral animals such as the cat (*Felis catus*), fox (*Vulpes vulpes*), rabbit (*Oryctolagus cuniculus*) and pig (*Sus scrofa*) are prevalent in the area and cause widespread environmental problems. The dingo (*Canis lupus dingo*) (although now locally extinct), black rat (*Rattus rattus*) and house mouse (*Mus musculus*) have also been recorded in the reserve.

Feral pigs are a major threat to the values of the reserve, and were listed in 2001 under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as a key threatening process to the conservation of threatened species and ecological communities nationally (Commonwealth of Australia 2003). Feral pigs cause widespread environmental damage such as erosion and destruction of habitats, particularly those in riparian zones, as well as harbouring disease. Their impacts can be direct through predation of native animals and destruction and consumption of native flora, or less direct by spreading weeds and the fungus that causes dieback, *Phytopthora cinnamomi*. They also have the potential to be a threat to visitors. CALM is in the process of preparing a draft strategy for feral pig control as well as a field manual for monitoring numbers and distribution.

Foxes predate on native fauna and have contributed to the widespread decline of critical weight range mammals (0.35-8 kg) across Australia. CALM's Western Shield Program involves the control of feral predators and translocations of significant fauna (eg. chuditch and woylie) to fox-controlled areas within their former range. Fox predation is one of the biggest threats to survival of the quokka population in Lane Poole Reserve. They also prey on other small mammals including the western ringtail possum, brushtail possum and southern brown bandicoot (see Native Animals and Habitats).

Self-sustaining, wild populations of feral honeybees are established throughout most of the south-west, after being introduced from England in 1846 to pollinate plants grown by early settlers for food and honey production. Apiary sites exist in Lane Poole Reserve and its proposed additions (see Beekeeping section) which utilise bees for the production of honey. Feral bees may displace native species, either from tree hollows where they form hives or through competition for pollen and nectar resources. They may also cause physical damage to flowers and adversely affect the pollination of native species. Although these affects may occur, quantitative evidence to support it is lacking. Feral bees are also a potential nuisance to visitors around picnic sites.

Diseases

The major plant disease of concern in Lane Poole Reserve is dieback, which is caused by the introduced soil-borne fungus *Phytopthora cinnamomi* (Dames and Moore 1987). Along with salinity, this disease is the most serious ecological problem in south-western Australia and is fatal to many native plant communities on lateritic or poorly drained soils. The disease cannot be eradicated once it is established at a site. Therefore control measures concentrate on preventing the disease from establishing or spreading further. Visitor access and the type of recreational activities within the reserve must be carefully managed. Current dieback management is guided by a series of Departmental manuals.

Soil and Catchment Protection

Rivers and streams draining Lane Poole Reserve belong to two major catchment systems. The Harris and Bingham Rivers drain the southern area of the reserve, with water flowing from the reserve into the

Collie River. In the northern section, two stream networks of the Murray River catchment carry water into the reserve from surrounding areas, including agricultural land. Hence, management of the surrounding land heavily influences water quality of the Murray River, whereas management within the reserve influences the water quality of the Harris, Bingham and Collie Rivers.

Fire

Fire is a natural disturbance factor of the vegetation complexes within the reserve, and together with climate and geomorphology, has operated over many millions of years to shape the biodiversity of the ecosystems in this area. The biota has evolved in this fire-prone environment and consequently species have developed adaptive traits that enable them to persist with, and in some cases, rely upon a variety of fire regimes.

Early records indicate that fires were common in the jarrah forest prior to European settlement. They occurred naturally as a result of lightening storms, and also from deliberate burning by Aborigines for hunting and to improve access. Fire records for Lane Poole Reserve show a high incidence of intense and damaging fires during the 30 years of fire exclusion in the jarrah forest prior to 1953. The adoption of a fuel reduction policy in the eight years succeeding this exclusion period was not sufficiently advanced to prevent the severe fires in the Dwellingup area in January 1961 (CALM 1990).

Fire is a fundamental management tool to maintain and enhance the biodiversity of forest ecosystems and ecological processes. Future fire management will aim primarily to prevent large, damaging wildfires and deliver biodiversity outcomes. Setting clear fire management objectives for the protection of life, property and biodiversity is fundamental in the development of fire management plans and standards, and in determining management strategies. In order to protect biodiversity, CALM will aim to implement fire regimes that result in a fire mosaic at a variety of spatial scales.

To this end, CALM has established a number of pilot studies in the south-west. The most relevant to Lane Poole is that conducted in the northern jarrah forest. Fire management will become more focused on delivering biodiversity outcomes. Initially, CALM is intending to develop fire regimes that aim to protect biodiversity at the landscape scale (30-100 000 ha), and then apply a systematic wildfire threat analysis to determine the threat posed by the regime to life, property and other values. It is imperative that biodiversity conservation is considered at the landscape scale to maintain flexibility within the burn regime (eg to take into account of impacts of wildfires), and to maximize the efficient use of CALM's resources.

Biological indicators and other vital attributes (eg. juvenile period of obligate seeders, longevity of obligate seeders with seed stored in the canopy, habitat requirements of key fauna species) will be used to estimate the range of desirable age classes and fire frequencies in the landscape. This may mean that flammable, drier habitats may be burnt more frequently and fire sensitive habitats less frequently according to these vital attributes. Protection of fire sensitive habitats and patchiness is intended to be promoted by applying mainly low intensity fires under moist conditions, with occasional moderate intensity fires under dry conditions, to promote regeneration of obligate and facultative seed species and associated habitats (eg. thicket structures). Wildfires that occasionally occur are intended to be accommodated into the fire mosaic.

Some of the factors to be considered in the development of the fire management plan for Lane Poole Reserve include:

- fire sensitive flora, fauna and habitats such as riverine and wetland communities, granite outcrops and the noisy scrub bird and quokka habitats;
- the effect of high intensity fires on old growth forest values;

- translocation areas for threatened species;
- the provision of strategic fire protection from potentially large intense fires that will adversely affect conservation values;
- the townsites of Dwellingup and Collie;
- neighbouring farmlands and pine plantations;
- visitors within the reserve; and
- developed recreation sites such as Baden Powell, Nanga Townsite, Nanga Mill, Stringers, Scarp Pool and Lookout, Charlie's Flat, Island Pool, Tony's Bend, Yarragil and Chuditch, and the huts along the Bibbulmun Track and Munda Biddi Trail.

Managing Our Cultural Heritage

Indigenous Heritage

The earliest known inhabitants of the region in which Lane Poole lies were Aborigines of the Pindjarup dialect group of the Noongar people. At the time of colonisation in the area in 1830, this community of Aborigines was thought to have numbered around 100. They lived in three main groups near the Murray River and along the coastal plain.

The area that now comprises Lane Poole Reserve was once occupied by the Wilmen Aborigines, with possibly some influence from the Binjeb people, although they tended to be more coastal. Both of these groups were part of the Noongar language group.

The Murray River, which dissects Lane Poole Reserve, is regarded by Noongar people to be a symbol of life. The area comprising Lane Poole is considered to be rich in Noongar culture and its importance for traditionally linked contemporary cultural activities is recognised. Artefacts and other remnants in the reserve indicate that the area was heavily populated and utilised by Aborigines.

There are a number of registered sites of indigenous heritage significance within Lane Poole Reserve as listed on the register of the Department of Indigenous Affairs. These include the entire Murray River, which is registered as a mythological site, and Lakes Yourdamung (a mythological site) and Nalyerin (a burial site), in the southern section of the reserve. There are also a number of artefact sites. Any proposed works or developments in proximity to such sites and along the riparian zones of rivers and lakes will need to be planned in consultation with the local Aboriginal people.

The reserve is covered by one native title claim, that of the Gnaala Karla Booja people.

Non-Indigenous Heritage

The history of the Lane Poole region post colonisation has not specifically been documented. There are, however, a number of historical features within the reserve that may require management, including remains of historic constructions, such as Nanga, Long Gully and Dawn Creek Bridges, and railway formations, and historic locations including Nanga Townsite and Treesville. These post-settlement heritage sites are located predominantly in the southern section of the reserve, and are relics of previous land uses within the reserve, such as timber harvesting. There are former timber mill sites and townships, and associated infrastructure.

Such sites need to be protected from further degradation, and even enhanced and interpreted for visitors to the reserve.

Managing Recreation and Tourism

Lane Poole Reserve is a popular destination for tourists. Over 161 000 people, 72% of whom are from the Perth metropolitan area, visit Lane Poole annually, seeking a camping and/or outdoor recreation

experience within a short drive from home. The economic role of tourism in the area is important to the people of Dwellingup, as many businesses derive a proportion of their income from the tourism-based activities in Lane Poole Reserve. This is assisted by the primary access route to the reserve going through the town.
Recreational use presents perhaps the most contentious management issue for Lane Poole Reserve. The reserve is a widely known, high profile recreation area, for which there has long been a heavy demand for and use of recreation facilities. The reserve has a history of misuse by visitors and has, over the years, developed a culture of unsociable behaviour, to the point that an alcohol restriction has been introduced to the reserve at peak times (see Visitor Behaviour).

The concentration of recreation along the Murray River has had a negative impact on riverine habitat that is important for western ringtail possums in particular. The management plan, and consequently the Recreation Masterplan, will need to address the issues of visitors launching canoes and walking ad hoc along the banks of the river. Any recreation along the riparian zones of tributaries and swamps and associated creek-line truncations could potentially impact on the habitat of quokkas. Noisy scrub birds are not known from within the Murray River catchment and therefore are not impacted by recreation. There is, however, the potential for this to change should noisy scrub birds move into the catchment in the future. Consequently, further consideration may need to be given to this during the planning process.

Recreation Use and Opportunities

The combination of the Murray River and surrounding forest provide a variety of opportunities for visitors to experience recreation within a short drive of the Perth metropolitan area. The reserve has long been a popular destination, offering a wide range of activities and experiences such as camping, bushwalking, swimming, marron and trout fishing, canoeing, rafting, mountain biking, sightseeing, four wheel and scenic driving. These activities are primarily located in the designated recreation sites in the northern section of the reserve, and along a 50 km (approximately) stretch of river used by canoeists.

The Lane Poole Reserve Recreation Masterplan (CALM 1998 unpubl.) identified that Lane Poole could offer a broad spectrum of unique nature-based recreation and tourism opportunities, and that they should be developed and managed so as to ensure that its recreation, conservation and cultural values were maintained in perpetuity. However, the masterplan requires updating to reflect current usage and future demands and visitor patterns. This will be done concurrently with the management planning process.

Management will also need to consider conflict that may arise between different visitor groups in the park. There has been an increase over the past decade in the adventure tourism/recreation industry (eg. trailbiking and rafting) which has implications for the need for greater regulation.

The southern 'conservation' section of the reserve provides quite a different experience than the more developed and highly used northern 'recreation' section.

Visitor Access

Road access to and within Lane Poole Reserve is already well developed with a network of roads servicing all of the visitor precincts. The only sealed road is a section of Park Road from the entry station to past the Baden Powell campsite and day use area. All others are unsealed roads such as River Road, Nanga Road and Murray Valley Road, which provide access to popular campsites and day use areas including Charlies Flat, Tony's Bend, Island Pool and Yarragil.

The current road network in Lane Poole includes several roads that are most probably reminiscent of historical timber harvesting operations, which no longer serve a management or visitor access purpose. The road system appears to be ad hoc and needs to be rationalised to make it less confusing for visitors,

and many roads are in need of directional signs. Any obsolete roads could possibly be converted to walk and/or cycle trails, and potentially link up with the Munda Biddi Trail and the Bibbulmun Track.

Dust from the gravel roads creates visitor safety issues for park users, particularly on tight corners, and diminishes the aesthetics and visitor experience within many of the campsites. This is an issue for a number of the major roads within the reserve and management responses will need to be considered during the planning process. Part of Park Road has already been sealed past the Baden Powell campsite and day use area in response to these issues, and sealing of other roads throughout the reserve may also need to be considered.

There are opportunities to improve existing trail networks and provide a greater range of experiences. The latter includes the increasing demand for cycling trails. CALM, in consultation with the Munda Biddi Trail Foundation, the Department of Sport and Recreation, the Western Australian Mountain Bike Association and other representatives of the cycling community, is designing and planning the development of a mountain bike trail that, when complete, will cover 900 km from Mundaring to Albany. The first stage of the trail to be constructed is from Mundaring to Collie. The Mundaring to Dwellingup section is already finished and opened in April 2003, and the Dwellingup to Collie section, part of which will traverse the northern part of Lane Poole, is due for completion by Easter 2004. The Munda Biddi Trail is expected to complement the Bibbulmun Track, without the conflicts that may arise from dual or multi-use trails.

The southern part of the reserve is less developed than the north, and subsequently has less visitor access. An issue to be discussed during the planning process is that of developing some of the historic sites in the south as day use sites. This would require improved access. The Bibbulmun Track traverses the southern section of the park, providing access for walkers.

Day Use Sites

Within Lane Poole Reserve there are two day use only areas and another six that are both day use and camping areas. These are all located along the Murray Valley (map 3). Each day use site has picnic tables, barbeques and toilets, and some also provide canoe launching sites and swimming access. With the reserve being so accessible from Perth and nearby regional centres, there are now as many, if not more, day visitors than campers (I. Hunt, pers. comm.). Hence the management planning process and development of a Recreation Master Plan will need to evaluate whether existing day-use facilities are sufficient for the increasing number of day visitors to the reserve, and whether or not they need to be, or can be, expanded and/or upgraded, taking into consideration any environmental constraints.

Overnight Stays

Camping

There are eight campsites within the reserve including the newly developed Chuditch site (due to open June 2004). All of these are heavily used, and packed to capacity during peak periods such as Easter and on long weekends such as the Queen's Birthday in September and Australia Day in January, which are the busiest times in the reserve. However all weekends through summer are generally very busy, and numerous school groups stay in the reserve during the week all year round.

The most popular of the campsites are Baden Powell, Nanga Mill, Stringers and Charlies Flat, followed by Tony's Bend and then Yarragil. There are also many people still opting to camp in non-designated campsites. Overuse from camping, and use of the river bank for launching and retrieving canoes and marron nets, is degrading the fragile riverine vegetation, particularly in the vicinity of the recreation sites. It is estimated by staff that in the last year 15 000 visitors camped in non-designated sites along the river, and revenue figures indicate that there was between 25-30 000 campers in designated sites.

At present there is no booking system for campsites. Allocation is on a first come, first served basis, and the entry gates are closed when the reserve is deemed full. The idea of managing the allocation of campsites via a booking system has been raised, however this is potentially an onerous task, due to the cost of managing it and the potential conflicts it can cause between campers. The issue will need to be discussed further during the planning process.

Built Accommodation
Built accommodation exists within the reserve at the Icy Creek Environmental Education Camp, which was purpose built in 1984 for environmental studies by schools and community groups. During the 2002/2003 financial year, the camp accommodated just over 2500 visitors over 126 booking nights. This facility is perhaps currently under-utilised. Strategies to address this may need to be considered in the planning process.

Tourism and Commercial Operations

A licence or lease fee is levied for all commercial operations carried out in the reserve. There are currently 84 commercial tour operators (CTOs) that are licensed to take groups into Lane Poole Reserve for a number of different activities and experiences, ranging from canoeing and kayaking, to bushwalking and camping. All operators have standard T class licences, except for one T+ licence for an operator that provides horseriding tours subject to additional license conditions.

There may be a demand for an increase in services provided by commercial operators during the life of the management plan. They will not, however, be permitted to the point where other users become excluded or compromised, or where they have an impact on the natural and cultural values of the reserve. The management planning process may also need to consider whether any of the licences (eg. for rafting operators) should be restricted (ie. E class) licences. E class licences are issued where there are safety, environmental or management concerns, and the number of licences hence needs to be restricted.

There are currently no leases within the reserve. This will be considered during the planning process, particularly in relation to accommodation options.

Visitor Behaviour

Lane Poole Reserve is a high profile recreation area, for which there has long been a high demand for, and use of, recreation facilities. The culture of the reserve has developed such that it has a history of misuse by many visitors. Over-consumption of alcohol by some visitors has led to very unsociable and antagonistic behaviour towards staff and other users of the reserve. This culture of unsociable behaviour, including damage to facilities, littering, theft and failure to control dogs, has led to management taking such action as to introducing alcohol restrictions at peak visitor times.

Strategies in the management plan will be aimed at changing the culture and visitor demographics of the reserve and making it a more enjoyable place for families to visit.

Visitor Safety

Other issues that will need to be addressed in the management plan include those of visitor safety including:

- the proximity of the main access road (Nanga Road) to the Nanga Townsite campsite;
- the risk of injury to visitors from domestic dogs; and
- the potential of injury and/or property damage from falling limbs and trees, particularly in the campsites. This is currently being addressed at Nanga Mill campsite, and may need to be assessed at all campsites in the reserve.

Domestic Animals

The permittance of dogs in designated areas of the conservation estate under the CALM Regulations 2002 is an acknowledgment that dogs are important companions for many people and are often considered part of the family. Dogs have been allowed on a leash throughout the northern section of Lane Poole Reserve for many years. The presence of dogs in the reserve is, however, a contentious issue. Dogs can impact on native fauna, particularly threatened species such as the quokka, western ringtail possum and noisy scrub bird. Dogs in Lane Poole have also been known to conflict with other visitors, create noise problems, cause personal injury to staff and interfere with the enjoyment of the area by other users. There can also be problems of dog excrement in the recreation sites as a result of people not cleaning up after their pets. However, perhaps the biggest impact of allowing dogs into Lane Poole Reserve is that fox baiting cannot be undertaken in some areas, which in turn reduces the level of protection afforded to threatened species that are predated by foxes. This will be a major consideration during the management planning process.

Another potential impact to both wildlife and reserve visitors is from dogs that accompany recreational pig hunters, particularly in the areas proposed to become national park. This issue will also need to be addressed in the management plan.

Firewood Collection

Firewood collection is a major issue at Lane Poole Reserve with campers' in particular collecting firewood from adjacent forest. This is an ongoing and serious problem and has impacts on fauna habitat, especially in the riparian zone of the Murray River, with canopies, hollows and ground refuse being inadvertently removed by firewood collectors. The provision of firewood to visitors is an issue for management that needs to be addressed through the planning process. It has been suggested that visitors could purchase firewood from the entry station as they enter the reserve, or buy it from a local supplier in Dwellingup. On a wider scale, there is also a problem with illegal firewood collection across the reserve for domestic use. This will also need to be addressed in the management plan.

Managing Sustainable Resource Use

Mining

Mining includes exploration, fossicking, prospecting and mining operations. Mining on land and waters managed by CALM is subject to the *Mining Act 1978* (Mining Act), the *Petroleum Act 1967*, the *Environmental Protection Act 1986*, the Wildlife Conservation Act and various State Agreement Acts.

State Agreements between developers and the State are generally enacted for major resource projects (such as bauxite, coal and iron ore) that require large capital investments and usually significant infrastructure. These State Agreements are ratified by Parliament as State Agreement Acts. Of relevance within Lane Poole Reserve is the *Alumina Refinery Agreement Act 1961*. Under a State Agreement Act, the Government cannot change land tenure within the mining lease that could prejudice the rights of the Agreement Act company, unless both parties agree.

The whole of Lane Poole Reserve is subject to a State Agreement Act (ML 1SA) that is held by Alcoa of Australia Ltd. Alcoa have, however, undertaken to defer mining in certain areas of Lane Poole, namely part of the southern section that has significant conservation values is subsequently proposed to become national park. CALM is currently exploring further options with Alcoa with regards to the Government's policy commitment to 'investigate upgrading Lane Poole Reserve to national park'.

The exploration for, and subsequent mining of minerals in Western Australia is primarily administered by the Department of Industry and Resources (DOIR) through the granting of various tenements including prospecting licenses, exploration licences and mining leases.

Eight exploration licence applications include Lane Poole Reserve and its proposed additions. Following resolution of the applications with respect to interference with Alcoa's rights to access bauxite, these applications will require consideration by the Minister for the Environment in accordance with the Mining Act.

Rehabilitation

Rehabilitation is the establishment of a stable, self-regulating ecosystem following disturbance, consistent with the purpose for which the area is managed. Rehabilitation within the planning area may be necessary as a result of gravel pit works, mining, road works, previous silviculture activities, track closure, recreation site closure or redevelopment, or activities associated with fire suppression. To ensure that rehabilitation works have the greatest degree of success as well as limiting the introduction of exotic (non-local) plants and enabling new vegetation to blend into the existing environment, native species of local providence (ie within 5 km of planting site) must be used whenever possible.

CALM's Policy Statement No. 10 - *Rehabilitation of Disturbed Land* provides guidelines for the rehabilitation of lands managed by CALM based on the following principles:

- land should be managed as far as possible to avoid disturbance;
- rehabilitation should be the last option in a series of management decisions designed to protect environmental values; and
- rehabilitation should aim to restore original values and help to enhance all potential uses provided the priority uses are not adversely affected.

Where areas of the reserve have been disturbed as a result of mining operations for example, consideration could be given to the potential for such areas to be converted to recreation sites, where deemed appropriate, as part of the rehabilitation process.

Some of the areas proposed as additions to Lane Poole are currently cleared farmland, which, as acquired, will need to be rehabilitated. The recently acquired Lake Yourdamung property contains areas that were cleared for agriculture that should be restored via rehabilitation as a priority to enhance its conservation values.

Beekeeping

There are currently 29 apiary sites registered within the existing and proposed boundaries of Lane Poole Reserve. Many of the apiary sites in Lane Poole are within the area that is proposed to become national park. In accordance with CALM Policy Statement No. 41 - *Beekeeping on public land* (which is currently under review), CALM will maintain the existing sites but no new permits will be issued within the national park tenure or on other land that has been identified to become national park or conservation park. Beekeeping will be considered through the management planning process for the Reserve.

Forest Products

Lane Poole Reserve contains a number of pine plantations covering approximately 174 ha, that are managed by the Forest Products Commission. Harvesting of these has already occurred in some areas, which has resulted in negative impacts on the visual landscape, particularly around some of the recreation sites (see Landscape section). It is important that future harvesting operations within the reserve are managed in such a way to minimise any visual and environmental impacts.

The existing management plan for Lane Poole Reserve (CALM 1990) states that pines will be phased out of the reserve and that the pine plantations at Baden Powell, Nanga and Tumlo campsites will be used for recreation facilities until the establishment of satisfactory trees. The plan also states that local jarrah forest

eucalypts will be planted to replace the pine plantations. These actions need to be taken into consideration during this planning process.

However, it should also be noted that many visitors prefer camping under pine trees, and hence, after harvesting operations, consideration could be given to replanting some pine trees for amenity reasons.

Involving the Community

Information, Education and Interpretation

CALM provides information and interpretation to visitors to Lane Poole through a variety of means including:

- printed material, distributed from the entry station, CALM offices and local tourist bureaus;
- information on CALM's NatureBase webpage;
- personal contact with rangers and other CALM staff;
- information given by CTOs;
- Icy Creek Environmental Education Camp; and
- the Forest Heritage Centre in Dwellingup

There is scope for developing further interpretation opportunities and facilities in Lane Poole Reserve, particularly along the trails and around the existing camping and day use sites, and at the old mill sites in the southern section of the reserve (see Visitor Access). CALM's 'Nearer to Nature' environmental education program has developed a pilot program at Lane Poole Reserve for school and community groups, which will begin in 2004. Initially the program will be run out of the Icy Creek Environmental Education Camp, but there is potential for the programs to be expanded to other areas of the reserve and to other target audiences, including the general public and other reserve visitors.

The Forest Heritage Centre located nearby in Dwellingup enhances interpretation within the reserve. It is used as an education centre for forest education and interpretation, and its proximity to Lane Poole makes it an ideal place to inform people about the reserve. Local tourist bureaus also provide valuable pre-visit information to reserve visitors.

The development of an interpretation and communication plan for Lane Poole Reserve will be considered during the planning process. It is anticipated that one will be prepared during the life of the management plan.

Working with the Community

Community involvement is an integral component of CALM's operations. The community, as groups and individuals, and including the indigenous community, is encouraged to be involved in both planning and management, and is indeed, an important component in preparing the Lane Poole Reserve Management Plan. Community involvement in the planning process will be formally facilitated through the Lane Poole Reserve Community Advisory Committee. Other input will be facilitated through public participation such as community and stakeholder meetings and through submissions to the draft plan.

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Personal Communication

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APPENDIX 1 REPRESENTATION OF THE VEGETATION COMPLEXES IN LANE POOLE RESERVE[7]

Vegetation Complex	Pre-1750 distribution in Lane Poole Reserve (%)	Pre- 1750 distribution represented in both proposed and existing reserves[8]		Extant distribution within existing and proposed formal and informal reserves vested in the Conservation Commission (%)	Extant distribution within other lands vested in the Conservation Commission (%)	Extant distribution within Lane Poole Reserve (%)
		Formal reserves (%)	Other reserves (%)			
Cooke – rocky slopes	0.4	28	6	43	43	0.5
Dwellingup and Hester	5	10	5	17	79	5
Dwellingup	4	20	3	26	52	4
Dwellingup, Yalanbee and Hester	12	24	3	30	54	13
Yalanbee 5	3	22	7	47	28	4
Darkin 1	0.1	1	0	10	0	1
Dalmore 2	1	8	0.1	43	4	7
Goonaping	17	53	3	72	20	22
Swamp	8	30	18	64	26	11
Helena 1	8	31	5	47	9	11
Murray 1	16	27	10	49	37	21
Murray 2	3	20	8	40	20	4
Yarragil 1	2	11	19	35	55	3
Yarragil 2	1	9	11	34	63	10
Pindalup	5	26	9	45	40	6
Coolakin	1	12	3	48	23	5
Lukin 2	2	7	0	53	0	19
Darkin 2	0.1	0.4	0	6	0	1
Michibin	0.5	5	1	37	3	3
Williams	0.05	0.4	0	4	0	0.5

The data presented in this table is current as at October 2003.

[7] Includes the existing reserve and proposed additions as per the *Forest Management Plan* (2004) (see Map 2)
[8] Includes new parks proposed under the *Protecting Old Growth Forests Policy* (2001).

APPENDIX 2 DRF AND PRIORITY FLORA SPECIES OF LANE POOLE RESERVE

DRF
Caladenia bryceana subsp. *bryceana*
Priority 2
Grevillea manglesii subsp. *ornithopoda*
Pithocarpa corymbulosa
Lasiopetalum cardiophyllum
Priority 3
Stenanthemum coronatum
Priority 4
Drosera occidentalis subsp. *occidentalis*
Boronia tenuis
Villarsia submersa
Pultenaea skinneri
Hydrocotyle lemnoides
Schoenus natans
Calothamnus graniticus subsp. *leptophyllu*
Parsonia diaphanophleba
Stylidium ireneae
Villarsia submersa
Darwinia pimelioides

APPENDIX 3 THREATENED AND PRIORITY FAUNA SPECIES OF LANE POOLE RESERVE

Species listed as Threatened under Schedule 1 of the Wildlife Conservation Act (Fauna that is rare or is likely to become extinct):

- Chuditch (*Dasyurus geoffroii*);
- Quokka (*Setonix brachyurus*) – vulnerable;
- Western Ringtail Possum (*Pseudocheirus occidentalis*) – vulnerable;
- Numbat (*Myrmecobius fasciatus*);
- Baudin's Black Cockatoo (*Calyptorhynchus baudinii*); and
- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*).

Species listed as Threatened under Schedule 4[9] of the Wildlife Conservation Act (Other specially protected fauna):

- Peregrine Falcon (*Falco peregrinus*); and
- Carpet Python (*Morelia spilota imbricata*).

(Department of CALM 2003a)

Priority 1[10]

- *Austromerope poultoni*: a species of scorpion fly that is associated with forest litter and appears to be active after rain. Little is known of its biology and habitat requirements.

Priority 2[11]

- Barking Owl (southwest population) (*Ninox connivens connivens*): this species inhabits forest and woodland and is becoming increasingly rare in the south-west. It may occur in the Lane Poole area.

Priority 3[12]

- Brush-tailed Phascogale (*Phascogale tapoatafa*): an arboreal marsupial that occurs in forests and woodlands where suitable tree hollows are available. Populations fluctuate dramatically in response to invertebrate prey abundance.
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*): This subspecies of the red-tailed black cockatoo is restricted to the south-wet forests. It requires tree hollows for nesting and breeding and is totally dependent on jarrah-marri forest, such is at Lane Poole.
- Masked Owl (south-west subspecies) (*Tyto novaehollandiae novaehollandiae*): This species is an inhabitant of forests and woodlands and has declined in the south-west. Its large talons are adapted for preying on small to medium size mammals. It may occur in the Lane Poole area.

Priority 4[13]

- Woylie (*Bettongia pennicillata ogilbyi*): This species of rat-kangaroo has been reintroduced to a number of sites within the northern jarrah forest including Lane Poole Reserve, as part of research into the effectiveness of aerial fox baiting regimes (Operation Foxglove).
- Quenda (*Isoodon obesulus fusciventer*)
- Tammar Wallaby (*Macropus eugenii derbianus*): This species is currently not known to be present in Lane Poole Reserve but is a candidate for future reintroduction to the extensive creek systems in the

[9] Schedule 4 – being fauna that is in need of special protection.

[10] Priority One Fauna – Taxa with few, poorly known populations on threatened lands – Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation. These taxa need urgent survey and evaluation.

[11] Priority Two Fauna - Taxa with few, poorly known populations on conservation lands: Taxa which are known from a few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation. The taxa need urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

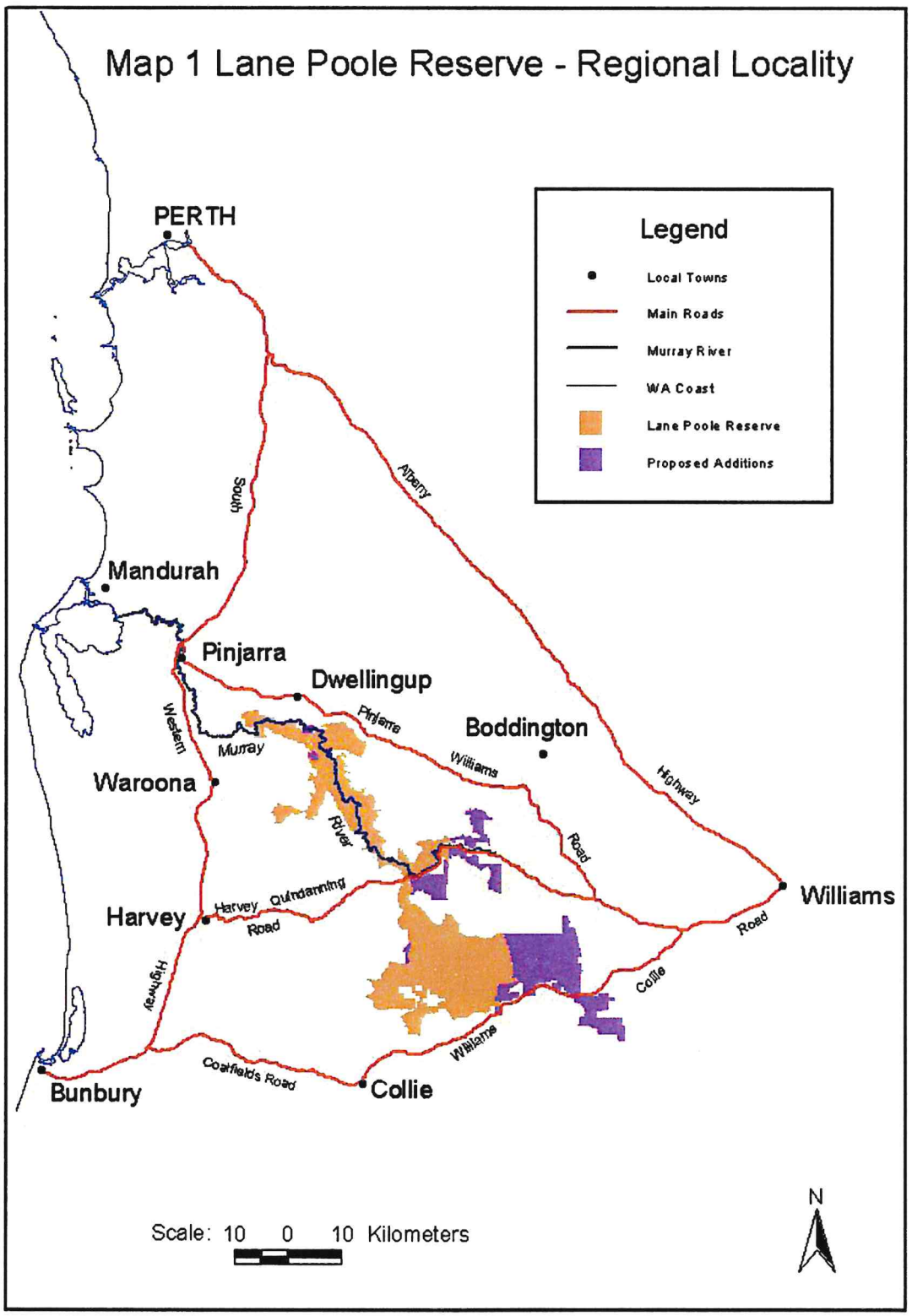
[12] Priority Three Fauna – Taxa with several, poorly known populations, some on conservation lands: Taxa which are known from a few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. These taxa need urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

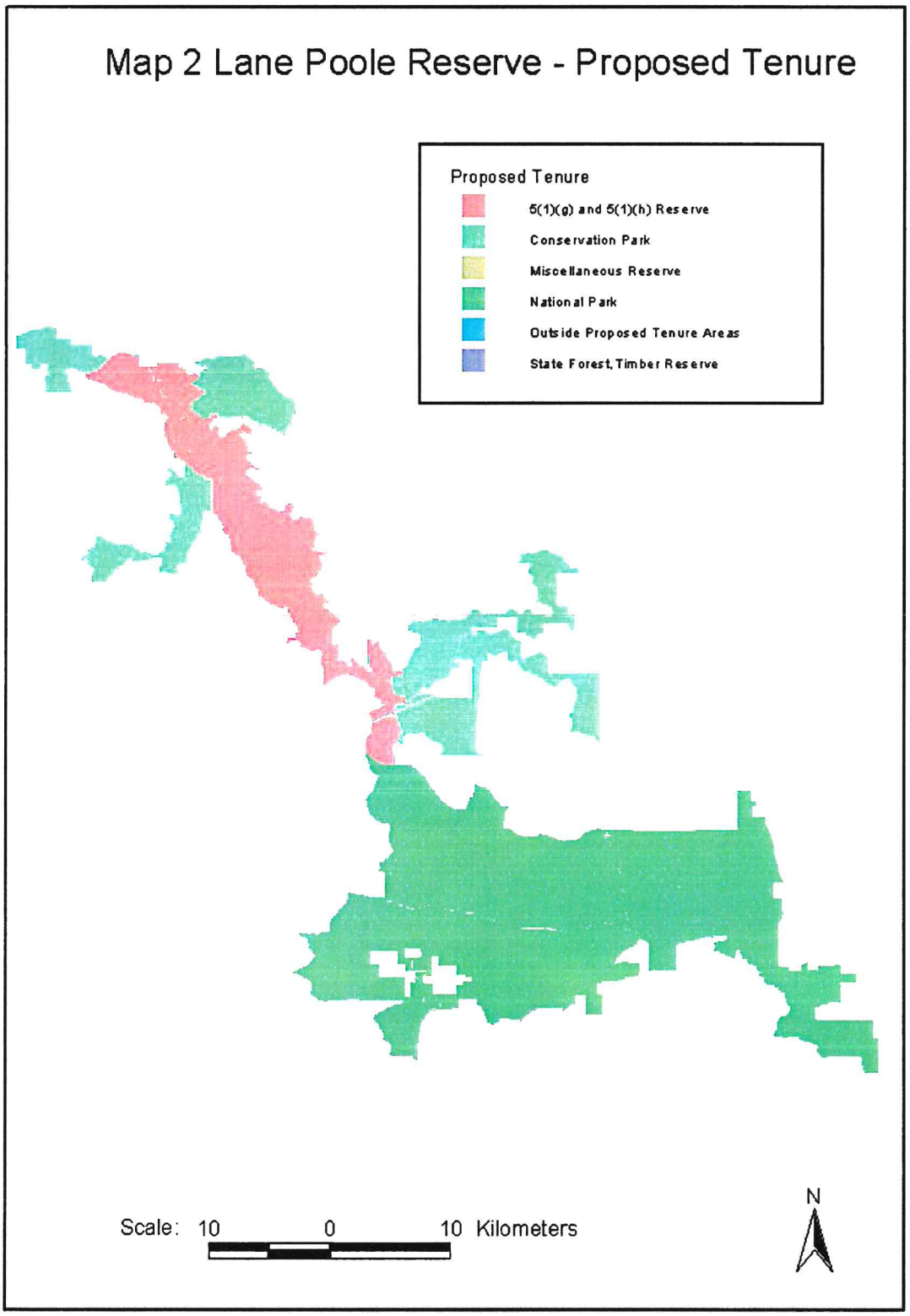
[13] Priority Four Fauna – Taxa in need of monitoring: Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection. These taxa are usually represented on conservation lands.

southern part of the reserve. It has been translocated to Alcoa rehabilitation sites immediately north-west of Dwellingup, just outside Lane Poole.

- Western Brush Wallaby (*Macropus irma*): This species is widely distributed in Lane Poole Reserve, preferring areas of forest and woodland with a dense shrub layer.
- Western False Pipistrelle (*Falsistrellus mackenziei*): this species of bat occurs is high rainfall jarrah forest and coastal woodlands, roosting in small colonies in tree hollows.
- Water Rat (Rakali) (*Hydromys chrysogaster*): occurs in waterways and wetlands that support its main prey such as molluscs and crustaceans.
- Dell's Skink (*Ctenotus delli*): occurs in the higher rainfall zone close to the Darling Scarp.

(Department of CALM 2003a)


Map 1 Lane Poole Reserve - Regional Locality
Legend
Local Towns
Main Roads
Murray River
WA Coast
Lane Poole Reserve
Proposed Additions
PERTH
Mandurah
Pinjarra
Dwellingup
Boddington
Waroona
Harvey
Williams
Bunbury
Collie
South
Albany
Western
Murray
River
Pinjarra
Williams
Road
Highway
Harvey
Quindanning
Road
Coalfields Road
Collie
Williams
Road
Scale: 10 0 10 Kilometers
N


Map 2 Lane Poole Reserve - Proposed Tenure
Proposed Tenure
5(1)(g) and 5(1)(h) Reserve
Conservation Park
Miscellaneous Reserve
National Park
Outside Proposed Tenure Areas
State Forest, Timber Reserve
Scale: 10 0 10 Kilometers
N

Map 3. Lane Poole Reserve and Proposed Additions-Recreation Use