

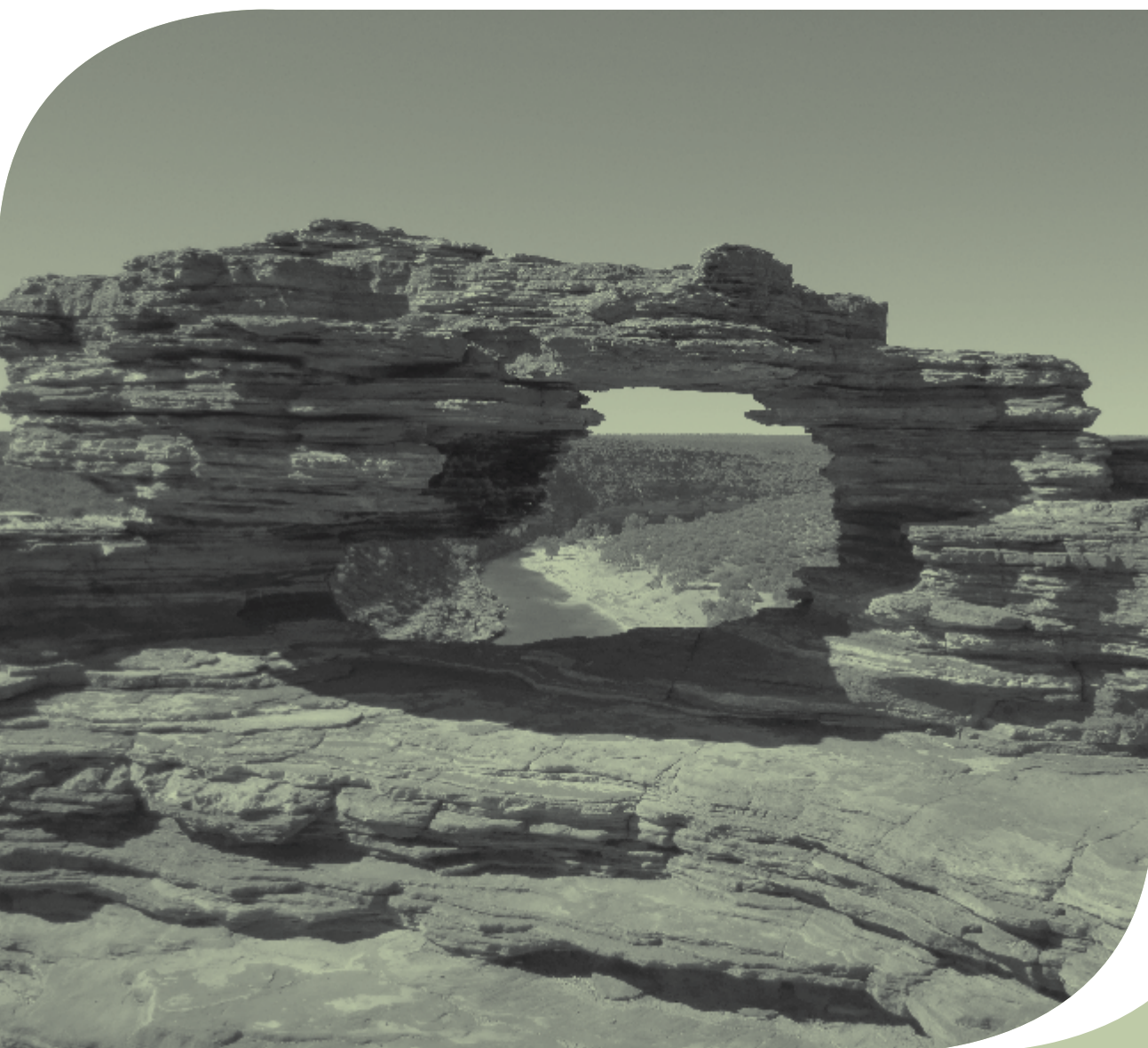


# Kalbarri National Park

'nature's window'

draft management plan

2014



Department of  
Parks and Wildlife



Conservation  
Commission  
WESTERN AUSTRALIA

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**Front cover photos**

**Main** Natures Window at The Loop. Photo – Melissa Mazzella (DPaW)

**Top left** Red kangaroo. Photo – Rory Chapple (DPaW)

**Top right** Coastal cliffs. Photo – Rory Chapple (DPaW)

**Header photo Caption** - View of The Loop from Natures Window. Photo – Clare Atkins (DPaW)

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**Conservation Commission of Western Australia  
Department of Parks and Wildlife**

## Acknowledgments

### Planning team

This draft management plan was prepared by a Department of Parks and Wildlife planning team consisting of Melissa Mazzella, Clare Atkins, David Rose, Sue Hancock, Mike Paxman, Anthony Desmond and Rory Chapple.

The planning team would like to thank the many other department staff who contributed to the preparation of, and commented on, the management plan, particularly Michelle Rumball, Laurina Bullen, Penny Wood, Ian Herford, Dave Atkins and Nigel Sercombe.

Figure 1 was prepared by Burke Stephens and the maps by Aaron Rivers and Sam Hamill.

### Aboriginal people

Thank you to the members of the Yamatji Marlpa Aboriginal Corporation and Nanda who contributed to the preparation of this plan.

## Invitation to comment

The Kalbarri National Park draft management plan is an opportunity to provide information, express your opinion, suggest alternatives and have your say on how the planning area will be managed during the next 10 years.

## Make your comments count

### What to consider

In making your submission, it is important to understand that legislation and policy impose certain obligations on the Department of Parks and Wildlife (the department) to manage lands and waters vested in the Conservation Commission of Western Australia (the Conservation Commission) and that there may be little room to manage some issues outside of these constraints and responsibilities. Nevertheless, it is important to hear from the public about the management of these issues. There are also some issues that may have a number of management options over the life of the plan, or issues for which the department has developed a proposal and wants to gauge public opinion about management.

Issues that the Conservation Commission and the department would particularly like to seek feedback on during the public comment period of this draft management plan include:

- key performance indicators mentioned through various sections of the plan
- management actions identified for sections of interest to you
- the addition of adjacent land to the conservation reserve system
- knowledge gaps
- values not identified.

## How to make effective comments

It is important to indicate those strategies and recommendations you agree with as well as those with which you disagree. Each submission is important, but those that give reasons for concerns, give support where appropriate, and offer information and constructive suggestions are most useful.

If you prefer not to write your own submission, you could make a joint submission with others. To ensure your submission is as effective as possible:

- make it clear and concise
- list your points according to the subject sections and page numbers in the plan
- describe briefly each subject or issue you wish to discuss
- say whether you agree or disagree with any or all of the aims or strategies within each subject or just those of specific interest to you. Clearly state your reasons (particularly if you disagree) and provide supporting information where possible
- suggest alternatives to deal with issues with which you disagree.

## Where to send your comments

Submissions are welcome for two months after the release of the draft management plan. An electronic copy of the plan and a submission form can be found online at: [www.dpaw.wa.gov.au/parks/management-plans/draft-plans-open-for-public-comment](http://www.dpaw.wa.gov.au/parks/management-plans/draft-plans-open-for-public-comment) or by writing to:

Planning Coordinator  
Kalbarri National Park draft management plan  
Department of Parks and Wildlife  
Locked Bag 104  
Bentley Delivery Centre  
BENTLEY WA 6983

## How your comments will be considered

All submissions will be summarised according to topics discussed. The management plan will then be reviewed in the light of submissions, according to established criteria (see below). A summary of the submissions will be prepared along with the final management plan.

The draft management plan *will* be amended if a submission:

- a) provides additional information of direct relevance to management
- b) provides additional information on affected user groups of direct relevance to management
- c) indicates a change in (or clarifies) government legislation, management commitment or management policy
- d) proposes strategies that would better achieve management objectives
- e) indicates omissions, inaccuracies or a lack of clarity.

The draft management plan *will not* be amended if a submission:

- a) clearly supports proposals in the plan
- b) makes general statements and no change is sought
- c) makes statements already in the plan or which were considered during the plan preparation
- d) addresses issues beyond the scope of the plan
- e) is one among several widely divergent viewpoints received on the topic but the actions in the plan are still considered the preferred option
- f) contributes options that are not feasible (generally because of conflict with existing legislation, government policy, lack of resource capacity or lack of research knowledge to make decisions)
- g) is based on unclear/factually incorrect information
- h) provides details that are not appropriate or necessary for inclusion in a document aimed at providing management direction over the long term.

All submissions are treated as public documents, unless the submitter clearly indicates to the contrary by marking all or part of the submission as 'confidential'. It is important to note that confidence cannot be guaranteed under the *Freedom of Information Act 1992*.

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# Summary

Kalbarri National Park, created in 1963, is situated on the lower reaches of the Murchison River, about a six and a half hour drive north of Perth, and is the hinterland for the coastal tourist town of Kalbarri. Nestled in Western Australia's Coral Coast, the park's spectacular wildflowers, majestic Murchison Gorge, coastal landscapes and vast rolling sandplains provide a stunning setting for visitors to enjoy and engage in a wide range of recreational activities. The park's Aboriginal cultural landscape and the fascinating history of 17th century European exploration and more recent pastoral station life provide a wealth of stories that enhance visitor's appreciation and experiences.

The Kalbarri National Park draft management plan has been prepared to address present management issues and plan for future needs, ensuring the values are conserved in the long term. It does this by providing a summary of policies and guidelines and the operations proposed to be undertaken in the park over the next 10 years. This plan also provides guidance for subsidiary operational documents that provide more specific management direction regarding control of environmental weeds and introduced animals, fire and recreation site development.

Throughout the plan, desired outcomes, management actions and key performance indicators are used to highlight management priorities, with a focus on:

- managing cultural heritage
- managing visitor use
- involving the community
- managing the natural environment
- managing resource use
- research and monitoring.

These are used by the Conservation Commission to assess the department's implementation of the plan.

Lands identified for their significant conservation values adjacent to Kalbarri National Park are included within the scope of this plan.

## Managing cultural heritage

The park is located within the traditional lands of the Nanda and has many Aboriginal heritage sites including artefacts, mythological places, paintings, a quarry, and midden sites. Ethnographic and archaeological surveys have been conducted over a relatively small portion of Kalbarri National Park and it is therefore highly unlikely that all sites have been officially recorded. The department will continue to work with Nanda in protecting Aboriginal heritage sites and values within Kalbarri National Park.

Management arrangements with Aboriginal people may change over the life of this management plan. Joint management may be identified as a priority, and, if resources and capacity allow, a joint management agreement under the *Conservation and Land Management Act 1984* (CALM Act) may be considered. Joint management arrangements will require the amendment or review of this management plan. While formal joint management is explored, the department will continue to work to foster cooperative and consultative management arrangements with Nanda.

There is also a range of sites associated with historic development between Perth and Carnarvon. These include stock routes, telegraph lines, the State Barrier Fence and sites associated with early European exploration.

The focus of managing cultural heritage in this management plan is to minimise any adverse effects of management activities on Aboriginal and other cultural and heritage values.

## Managing visitor use

With around 300,000 visits per year, Kalbarri National Park is one of WA's highest profile tourist destinations. Key visitor attractions are the spectacular wildflower displays from late winter through to early spring and the natural rock formation, Nature's Window.

Visitors make good use of the recreation sites within the park for viewing the landscape from lookouts or as a starting point for exploration through activities such as bushwalking, overnight hiking and abseiling. However, much of the park is not accessible by vehicle and is seldom visited.

The focus for managing visitor use in this management plan is to:

- improve access within the park with the sealing of The Loop/Z-Bend road to Murchison Gorge recreation sites
- continue to maintain and improve existing recreation sites and opportunities as indicated in Tables 1 and 2.



View of Murchison Gorge near Ross Graham Lookout.  
Photo – Clare Atkins (DPaW)

## Involving the community

With its proximity to the Kalbarri townsite, it is not surprising that the local community has a long-standing involvement with management of Kalbarri National Park. Dating back to the 1960s, local community member and Kalbarri's first school headmaster, Ross Graham, was instrumental in the push to establish the national park to ensure the conservation and future enjoyment of the area for many years to come. Today, involvement of the local community includes working with Nanda to foster cooperative and consultative management arrangements. It also includes the school-based Bush Rangers program, State Emergency Service Volunteers Association, the Kalbarri Fire and Rescue Service, the local tourism industry and neighbouring land managers.

The focus for involving the community in this management plan is to have the support and involvement of the community in park planning and management.

## Managing the natural environment

Kalbarri National Park has an array of natural values including unique geological features and sites of geoheritage significance and important botanical diversity, being a transition zone for south-west and arid zone flora and fauna. It features a variety of landscapes including coastal areas, cliffs, gorges, sandplains and rangelands, and is a translocation site for locally-extinct fauna species.

Threats to these values include introduced animals, in particular feral goats (*Capra hircus*); environmental weeds and inappropriate fire regimes.

The focus for managing the natural environment in this management plan is to:

- conserve areas of geological significance, flora and fauna
- minimise the impacts of introduced animals, environmental weeds and inappropriate fire regimes on the park's key values.

## Managing resource use

This plan identifies the management of mining, beekeeping and water extraction and other utilities.

The focus for managing resource use is to minimise the impacts of these activities on the park's key values.

## Research and monitoring

Management of Kalbarri National Park should be based on up-to-date and sound knowledge. Ongoing research and monitoring will assist in the conservation of the park's key values. It will also aid in evaluating the effectiveness of management actions in protecting these values. Priority for research and monitoring include areas where:

- the quality of base data is the poorest
- understanding of the effect of management actions is poorest
- there have been unanticipated changes in factors affecting the park, such as access or adjacent land uses
- the rates of resource or social change are the highest.

The focus for research and monitoring in this management plan is to increase the knowledge and understanding of key values and management issues.

## Adjacent lands of conservation significance

Lands adjacent to Kalbarri National Park (see Map 1) has been identified as having conservation significance and this plan proposes their consideration for inclusion in the conservation reserve system and management under the CALM Act. Their reservation will be considered after discussion with relevant stakeholders and is likely to involve the negotiation of an Indigenous land-use agreement (ILUA). An ILUA may include provisions for a joint management agreement; the conduct of customary activities; improved access for management and recreation; protecting Nanda's culture and heritage and development of interpretive material and tourism and other commercial or employment opportunities. If these lands are added to the conservation reserve system, this plan will also apply to those areas or the plan will be amended to apply to them.

# Introduction

## 1. Management plan area overview

This draft management plan has been prepared by the department on behalf of the Conservation Commission. The plan covers Kalbarri National Park<sup>1</sup> (183,004ha) and considers adjacent lands for addition to the conservation reserve system, comprising about 239,778ha (see maps 1 and 2 and *Consideration of adjacent lands*). These areas are collectively referred to as the planning area (422,782 ha).

The planning area is located about 160km north of Geraldton on Western Australia's central coast, within the local government areas of the Shire of Northampton and the Shire of Shark Bay.

It is situated at the northern limit of the internationally recognised south-west biodiversity hotspot and sits within the Geraldton to Shark Bay Sand Plains national biodiversity hotspot. The planning area is located within the traditional lands of the Nanda (see *Managing cultural heritage*).



The declared rare flora species, *Caladenia bryceana* subsp. *cracens*. Photo – Gemma Phelan (DPaW)



Release of tammar wallaby to establish new populations in the park. Photo – DPaW

Kalbarri National Park is located on the lower reaches of the Murchison River, which has cut an 80km-long red and white-banded gorge through the rocks underlying the sandplain, as it makes its way to the Indian Ocean (see Map 1). The varied features of the park provide visitors with an array of things to see and do. These features include the Murchison Gorge, a coastal landscape, a vast rolling sandplain, and fossils, as well as the cultural history of Aboriginal Dreamtime, 17th century European exploration and more recent pastoral station life.

The town site of Kalbarri is located at the mouth of the Murchison River and is surrounded by Kalbarri National Park to the south and east (see Map 1). The town site provides goods and services to a growing tourist trade (the main economic contributor for the town), the local fishing industry and surrounding agricultural and pastoral activities. With new residential subdivisions, and promotion of Kalbarri as a holiday destination, it is expected that residential and tourist numbers will grow in the long term (see *Managing visitor use*).

<sup>1</sup> Reserve 27004, Class 'A', vested in the Conservation Commission with the purpose of national park.



Some areas adjacent to Kalbarri National Park, characterised by their natural values, are identified in this management plan for inclusion in the conservation reserve system. These areas comprise unallocated Crown land (UCL) including former pastoral leases acquired for conservation, unmanaged reserves, and a reserve vested in the Shire of Northampton. Most of these areas straddle the North West Coastal Highway and adjoin Toolonga Nature Reserve and Eurardy Station to the east and Zuytdorp Nature Reserve and Murchison House Station to the west (see Map 2 and *Consideration of adjacent lands*). Knowledge and



Eagle Gorge. Photo – Terese Dimascia (DPaW)

understanding of the values, threats and management issues associated with these areas, particularly those to the north and east of the park, is more limited than that of the national park. Strategies in this plan aim to close knowledge gaps and integrate the management of the park and the adjacent lands to be considered for addition to the conservation reserve system.

This management plan has been prepared to address present management issues and plan for future needs, ensuring the values are conserved in the long term.

## 2. Key values and threats

### Key values

#### **Cultural**

The key cultural values of Kalbarri National Park are:

- a long history of Nanda's use of the area and many Aboriginal heritage sites including artefacts, mythological places, paintings, a quarry, and midden sites
- permanent river pools of the Murchison River which are significant to Nanda culture and history, highlighted by the concentration of cultural sites along the river
- a range of sites associated with historic development between Perth and Carnarvon (for example stock routes, telegraph lines, the State Barrier Fence and sites associated with 17th century European exploration).

#### **Recreation and tourism**

The key recreation and tourism values of Kalbarri National Park are:

- spectacular and varied landscapes that provide opportunities for a diverse range of nature-based and geo tourism experiences including hiking; nature appreciation (for example, wildflowers; coastal and gorge scenery); fishing; canoeing; adventure tourism (for example, abseiling); and commercial tourism operations
- being one of the State's tourism icons (around 300,000 visits per year), underpinning the local area's tourism-dependent economy.

## Community

The key community values of Kalbarri National Park are:

- a strong inter-relationship between the Kalbarri community and Kalbarri National Park, with a long history of extensive community involvement in nature conservation and visitor service activities and experiences. This dates back to the park's vesting in 1963, which was instigated by community interest.
- an opportunity for the provision of adventure activities, with the area being used by schools and special-interest recreational groups
- a successful partnership with Kalbarri District High School, through Parks and Wildlife and the Department for Communities' Bush Rangers WA program
- cooperative arrangements with emergency groups such as the Western Australian Police, Kalbarri Volunteer Bushfire Service, local government volunteer bushfire brigades, State Emergency Service Volunteers Association, Department of Fire and Emergency Services (DFES) and St John Ambulance
- protection of part of the Kalbarri Water Reserve Public Drinking Water Source Area
- opportunities for education about and interpretation of natural and cultural values
- a study site for tertiary and other educational institutions.

## Natural

The key natural values associated with Kalbarri National Park are:

- unique geological features and sites of geoheritage significance, including the Tumblagooda Sandstone, the Murchison Gorge and fossils
- botanical significance with the third-highest number of plant species recorded in a Western Australian park after Fitzgerald River and Lesueur national parks, and many species at the northern limit of their distribution
- populations of threatened flora, especially along the Murchison Gorge
- a variety of landscapes including coastal areas, cliffs, gorges, sandplains and rangelands
- a transition zone for south-west and arid zone species of flora and fauna
- a large diversity of reptiles, with 75 species in total. The sandplain is a particularly important reptile habitat
- a translocation site for the locally extinct chuditch (*Dasyurus geoffroii*), woylie (*Bettongia penicillata*) and tammar wallaby (*Macropus eugenii* subsp. *derbianus*), and the potential to re-introduce other species formerly known in Kalbarri National Park
- an area free of *Phytophthora cinnamomi*, which provides a refuge for plant species affected by *Phytophthora* in the north of the South West Botanical Province
- permanent river pools of the Murchison River and the only river in the south-west land division with no known introduced fish species
- an area located on the boundary of two significant biogeographic regions, which contributes to a comprehensive, adequate and representative system of protected areas.

## Economic

The key economic values of Kalbarri National Park are:

- the main attraction for tourists to Kalbarri, who visit the park to appreciate its natural, cultural and recreational values. Tourism is the biggest contributor to the town's economy, resulting in Kalbarri being one of the highest earners of tourism revenue of all towns along the Coral Coast (Cervantes to Exmouth). Many local businesses have a tourism focus, with some operating in Kalbarri National Park
- the potential to develop new opportunities in the park (for example, meeting the demand for Aboriginal tourism experiences), which could see greater economic development in the town of Kalbarri, as a result of visitors staying longer.

## Threats

The main threats to the key values of Kalbarri National Park are:

- damage to natural values by introduced animals, in particular goats (*Capra hircus*), as well as pigs (*Sus scrofa*), foxes (*Vulpes vulpes*), cats (*Felis catus*) and rabbits (*Oryctolagus cuniculus*)
- damage to important cultural and heritage sites by weeds, introduced animals, visitor and management activities, fire and mining
- impacts from upstream activities in the Murchison River Catchment (for example, the potential introduction of fish and weeds, salinity, siltation and water extraction)
- threat to life and community assets from bushfire
- inappropriate fire regimes which may alter species composition and threaten fauna habitats
- changing climate, resulting in declining rainfall and higher temperatures, which may impact on species composition and increase the frequency, scale and intensity of bushfires
- environmental impacts from inappropriate and/or poorly managed recreation facilities and activities
- a lack of infrastructure to support sustainable recreation and tourism use.



# Management context

This management plan identifies and guides long-term management directions by providing a summary of operations proposed to be undertaken in Kalbarri National Park, as required under the *Conservation and Land Management Act 1984* (CALM Act). This plan will also apply to the adjacent lands to be considered for reservation, if they are added to the conservation reserve system (see *Reservation process*). This plan provides guidance for subsidiary operational documents that provide greater management detail regarding control of environmental weeds and introduced animals, fire and recreation site development.

## 3. Vision

*The outstanding natural values and rich cultural heritage of Kalbarri National Park will be conserved for the appreciation and enjoyment of the community, in cooperation with Nanda.*

## 4. Legislation and policy

The department administers the park in accordance with the provisions of the:

- CALM Act, which provides for the protection of native flora and fauna and Aboriginal culture and heritage on lands and waters to which the CALM Act applies
- *Wildlife Conservation Act 1950* (Wildlife Conservation Act), which provides specific protection for native flora and fauna within Western Australia.

These acts and other relevant legislation are referred to throughout the plan and can be found on the State Law Publisher's website ([www.slp.wa.gov.au](http://www.slp.wa.gov.au)).

Parks and Wildlife has two memoranda of understanding (MoUs) with the Department of Lands that relate to the planning area. The first MoU provides interim guidance for the acquisition and management of pastoral leases for the conservation reserve system before reservation of the land can be completed (Map 2, ID 1–3). The second provides guidance for the management of other areas of UCL (Map 2, ID 4–13, 19) and unmanaged reserves that are outside the Perth metropolitan area, regional centres and town sites (Map 2, ID 14–17). Both MoUs are under review in accordance with the 2011 amendments to the CALM Act that enable the transfer of management functions in relation to Crown land.

## 5. Management arrangements with Aboriginal people

Traditional owners have a strong desire to care for country, to be involved in the management of lands and waters managed by the department in Western Australia and to strengthen cultural ties to the land. Working with Aboriginal people to manage the land will bring cultural, spiritual and economic benefits to Aboriginal people, and will enhance the department's management of the land.

The planning area lies within the traditional lands of the Nanda. The Nanda native title claim (WC00/13 / WAD6136/1998) is still to be determined, although native title has been extinguished over Kalbarri National Park.



An Indigenous land-use agreement (ILUA)<sup>2</sup> between Nanda and the department may be considered to enable the management of lands in the planning area for which native title has not been extinguished. An ILUA may include provisions for a joint management agreement; the conduct of customary activities; improved access for management and recreation; protecting Nanda's culture and heritage; development of interpretive material; and tourism and other commercial or employment opportunities.



Consultation with Nanda prior to park development.  
Photo – Rory Chapple (DPaW)

Management arrangements with Aboriginal people may change over the life of this management plan. If joint management is identified as a priority and resources and capacity allow, a joint management agreement under the CALM Act may be considered. Joint management arrangements will require the amendment or review of this management plan. In the meantime, the department will continue to work to foster cooperative and consultative management arrangements with Nanda.

### Desired outcome

- Nanda are involved in the management of land in the planning area.

### Management actions

1. Determine the level of interest in and feasibility of pursuing an ILUA and joint management arrangements with Nanda for the planning area.
2. Work with Nanda to promote their participation in commercial activities, employment and training opportunities.
3. Ensure consultation with Nanda for activities that may impact on cultural and heritage values.

## 6. Administration

The day-to-day implementation of the final management plan will be the responsibility of the department's Geraldton District, within the Midwest Region. The Geraldton District coordinates the operational management of Kalbarri National Park and, where applicable, the adjacent lands considered for reservation. Operational management is also supported by staff from the Midwest Region and the department's specialist branches.

As it is not feasible to simultaneously implement all management actions, the progressive implementation of this plan will be guided by priorities and resource availability.

## 7. Term of the plan

This management plan will guide the department's management of the planning area for a period of 10 years from the date that a notice is published in the *Government Gazette*. During this time, amendments to the final management plan are allowed under section 61 of the CALM Act. If an amendment is necessary,

<sup>2</sup> An ILUA is a voluntary agreement about the use and management of lands and/or waters between a native title group and any other people, organisations or government agencies. It can be negotiated at any time and it is not necessary to have a determination by the Federal Court about the existence of native title. Once finalised, an ILUA can be registered with the National Native Title Tribunal, binding all parties.

the proposed changes will be released for public comment. At the end of the 10-year period, the management plan may be reviewed and a new management plan prepared. In the event that the plan is not reviewed and replaced by the end of the 10 year period, it will remain as the primary guiding document for the area.

## 8. Assessing performance

The Conservation Commission will measure the success of this plan in accordance with section 19(1)(g) (iii) of the CALM Act by using key performance indicators and other mechanisms as appropriate. A set of key performance indicators have been chosen to highlight performance targets for key components of the plan. These indicators are identified throughout the plan and are presented with a performance measure, target and reporting requirements.

The department is required to implement this plan and provide information to the Conservation Commission to enable an assessment of its implementation.

## 9. Consideration of adjacent lands



Floodwaters at Hardabut Pool (2006), an adjacent area to be considered for reservation. Photo – Anthony Raudino (DPaW)

Lands adjacent to Kalbarri National Park have been identified as having conservation significance and this plan proposes they are considered for inclusion in the conservation reserve system and managed under the CALM Act. These lands will make a contribution towards a conservation reserve system that is comprehensive, adequate and representative (CAR) and their reservation will provide protection of cultural and heritage values. Their reservation will be considered after discussion with relevant stakeholders and is likely to involve

the negotiation of an ILUA (see *Reservation process and Management arrangements with Aboriginal people*). Reservation will assist in meeting obligations under the International Convention on Biological Diversity<sup>3</sup> and *Australia's strategy for the national reserve system 2009–2030* (National Reserve System Task Group 2009). The benchmark reservation level for CAR reserve systems is that at least 15 per cent of each bioregion and any subregions within it should be managed as part of the conservation reserve system (see *Appendix 1 – Consideration of adjacent lands – further detail*) (CALM 2003).

### Reservation process

Any proposals for additions to the conservation reserve system, or changes in the classification of existing reserves or the category of land, will be subject to government consideration and determination. Native title is still to be determined over the adjacent lands considered for reservation. In order to have an 'affect' on native title, the reservation process needs to comply with the 'future act' provisions of the *Native Title Act 1993* (Cth) (Native Title Act). Reserve creation is likely to involve the negotiation of an ILUA (see *Management arrangements with Aboriginal people*).

<sup>3</sup> (Rio Convention) at the United Nations Conference on Environment and Development (also known as the 'Rio Earth Summit') in Rio de Janeiro, Brazil in 1992.

Once the areas identified for inclusion in the conservation reserve system have been considered and agreed to by key stakeholders, reservation of those areas may proceed. These lands will then become a part of the conservation reserve system. There is a range of vesting options for the potential additions to the conservation estate, and the land will be managed in accordance with the relevant desired outcomes and management actions identified in this management plan. If necessary, the plan will be amended to ensure its relevance to them.

Land of conservation significance, areas that provide linkages to other conservation areas such as the Shark Bay World Heritage Property or that would improve the management of the planning area (such as introduced species control), will be considered for addition to the conservation reserve system, subject to the usual government consideration and determination. This land would contribute to a national network of wildlife corridors.

Further detail about the adjacent lands, a description of their current land tenure, their conservation significance and a rationale for their inclusion in the conservation reserve system is provided in Appendix 1.

### **Desired outcome**

- The adjacent lands of conservation significance are considered for reservation.

### **Management actions**

1. Implement the proposed tenure changes outlined in Tables 3 to 5 in Appendix 1, subject to consultation and negotiation associated with the reserve creation process.
2. Liaise with relevant stakeholders in planning and managing activities on adjacent lands considered for reservation.
3. Manage land identified in Tables 3 to 5 in Appendix 1 in accordance with this management plan if they become vested in a responsible body and if necessary amend the plan to apply to them.

## 10. Neighbouring land use

The planning area is influenced by activities and events beyond its boundary. Therefore, effective management of the planning area cannot be achieved in isolation, but must be integrated in the broader landscape. The planning area is bordered by the ocean to the west and by the Kalbarri town site, pastoral leases and nature reserves to the north, south and east. It is also cut by road reserves (see Map 2). Activities occurring on these lands and upstream along the Murchison River can influence the success of implementation of this management plan and conservation of values.

The department works with neighbours on issues such as dividing fences, fire management, control of weeds and introduced animals, straying stock and access to lands managed by the department. Complementary recreation planning and management, and visual landscape management are also important issues affecting neighbours.

Neighbouring lands of particular relevance include:

- a number of residential subdivisions
- the Shire-vested reserve (No. 12996) known locally as the river reserve
- an area of UCL located between Kalbarri town site and the park along a 15km section of the river corridor, known locally as Paradise Flat<sup>4</sup>
- unvested Crown reserve 656.

<sup>4</sup> Paradise Flat is popular for bush camping and other various recreational use and is of particular interest for the Nanda community.

Impacts on the environment are particularly significant along the interface between the park and the Kalbarri town site (see insert on Map 2) and reserve 656 (see Map 2). Off-road vehicles enter the park from adjacent lands such as the river reserve, Paradise Flat and the rubbish tip and often drive off designated roads. The increased risk of fire associated with the proximity of the urban area also requires careful planning and management (see *Fire*). Cooperative working relationships between the department and neighbouring land managers are most important at this interface.

Introduced animals (including goats, pigs and foxes) impact natural values within the planning area and on neighbouring land (see *Introduced and other problem animals*). Effective control requires a cooperative approach with neighbouring land managers.

Eurardy Station, which borders Kalbarri National Park to the north-east (see Map 1), was purchased by Bush Heritage Australia in 2005 and is managed for conservation. This provides an important link between the park and adjacent lands considered for reservation to the north and east of the park. The department and Bush Heritage Australia work collaboratively to ensure management is complementary.

In some places, boundary fences do not coincide with officially registered boundaries. Fences may need to be realigned or boundaries altered. This will require consultation with neighbouring land managers and the Department of Lands.

### **Desired outcome**

- Improved cooperative working arrangements between the department and neighbouring landowners.

### **Management actions**

1. Continue to work cooperatively with neighbouring land managers to ensure complementary management of lands adjoining the planning area.
2. Undertake surveys and consultation in cases where boundary fences do not align with cadastral boundaries, and seek to make required changes through the Department of Lands.

# Managing cultural heritage

## Aboriginal culture and heritage

Kalbarri National Park lies within Nanda country. For thousands of years, Nanda have lived in the area around Kalbarri, from Woomerangee Hill in the north to Northampton in the south (Jackson & de Grand 1996). Their traditional ways of life are dependent upon an intimate knowledge of the land.

Nanda believe the landscape and features on it were formed by the activities of their ancestors during the Dreamtime, and that spiritual power resides in the landscape. They hold traditional knowledge associated with many prominent features of the park. As part of Nanda culture, the landscape is a living being, and must be treated with respect. Traditionally, Nanda utilise natural resources both inland and along the coast. Such resources are an important aspect of contemporary Nanda associations with their traditional lands.

Sixty-seven Aboriginal sites within the park are recorded on the Department of Aboriginal Affairs' *Register of Aboriginal Sites*.

Ethnographic and archaeological surveys have been conducted over a relatively small portion of Kalbarri National Park and it is therefore highly unlikely that all Aboriginal sites have been officially recorded.



Nanda carrying out a heritage survey prior to park development.  
Photo – Rory Chapple (DPaW)

Under the *Aboriginal Heritage Act 1972*, Aboriginal sites are protected whether registered or not and it is an offence to alter an Aboriginal site unless permission is granted in accordance with the *Aboriginal Heritage Act*. Where management actions that may disturb an Aboriginal site (registered or not) are to occur, an assessment is required before the operation proceeds. DPaW will work with the Department of Aboriginal Affairs, Nanda and the Yamatji Marlpa Aboriginal Corporation (which represents the Nanda) to ensure Aboriginal sites are not damaged. This will include

determining what level of assessment is required before ground-disturbing management actions proceed. In addition, DPaW will ensure compliance with the State Government's *Cultural Heritage Due Diligence Guidelines* when these actions are proposed.

DPaW will also work with Nanda in protecting Aboriginal sites and values within Kalbarri National Park. This may be through managing access to those sites identified by Nanda.

Management arrangements may change over the life of the plan. This may involve the development of an ILUA. See *Management arrangements with Aboriginal people* for more information.

### Activities for Aboriginal customary purposes

Customary activities by Aboriginal people can take a number of forms, including hunting for food, preparing medicine and engaging in artistic and ceremonial events.<sup>5</sup> These activities are an important

<sup>5</sup> Aboriginal customary purpose is defined by section 103A of the CALM Act.



part of Aboriginal culture, enabling the maintenance of traditional relationships with the land and water; sharing of knowledge; engagement in traditional practises; and accessing and looking after places of significance.



Aboriginal stone tools and artefacts. Photo – Sue Hancock (DPaW)

Special guidelines exist for the taking of certain plants and animals by Aboriginal people in conservation reserves (for example, threatened or specially protected flora and fauna species). A list of flora and fauna that should not be hunted or gathered is available from the department's office in Geraldton or on the department's website ([www.dpaw.wa.gov.au/parks/aboriginal-involvement/92-customary-activities](http://www.dpaw.wa.gov.au/parks/aboriginal-involvement/92-customary-activities)).

Wildlife cannot be taken for a commercial purpose. The activity must also be carried out safely and be consistent with this management plan and relevant legislation (for example, regarding the use of fire, firearms and fishing).

Aboriginal people can access most lands and waters managed by the department for customary activities, except areas that pose a safety risk or are environmentally sensitive and where permission is required.

More information on Aboriginal customary activities can be found in the *Guide to Aboriginal customary activities on DEC-managed lands and waters* (DEC 2012b), which can be found on the department's website (<http://www.dpaw.wa.gov.au/parks/aboriginal-involvement/92-customary-activities>).

The department acknowledges the aspirations of Nanda to obtain native title over their traditional lands and waters. The Yamatji Marlpa Aboriginal Corporation is the native title representative body appointed under the Native Title Act for the Nanda's native title claim (WC00/13 / WAD6136/1998) that extends over the planning area. The department will continue to recognise the interests of Nanda and their desire to continue cultural activities and customs in the planning area, irrespective of whether native title has been determined.

## Other cultural heritage

The Kalbarri area has a rich European history that spans a period of nearly 400 years. Encounters by early Dutch ships along the coast near Kalbarri began in the 17th century. In 1629 two survivors of the *Batavia* shipwreck are thought to have been marooned in the area as punishment for their role in a mutiny and massacre at the nearby Abrolhos Islands, prompting speculation that these men were the first Europeans to live in Western Australia (Playford 1998). Dutch exploration of the coastline occurred in 1697 when Willem de Vlamingh charted the Western Australian coast, naming numerous features including Red Bluff, a prominent coastal feature in Kalbarri National Park.

Little further European exploration occurred in the area until almost two centuries later when the fledgling Swan River Colony (now the city of Perth) was beginning to expand and pioneering explorers began to travel north to report on the area's mineral and pastoral potential. George Grey was one such explorer. In 1839 he undertook an epic sea voyage with a party of 11 to explore the coastline around Carnarvon. On their return journey the party became wrecked on a beach near the mouth of the Murchison River. In so doing they made the first official visit by Europeans to what is now Kalbarri. More importantly, Grey made very significant recordings of Nanda life that greatly expanded the European understanding of Aboriginal people.

In the years following Grey's expedition, there was increased European activity in the area. Augustus Gregory explored the area in 1848 and discovered lead, promoting the subsequent development of mines at Geraldine, Galena and Mary Springs, which lie to the east of today's Kalbarri National Park. Around this time, the development of the pastoral industry was accelerating and in 1848 Murchison House Station was established to the north of what is now Kalbarri National Park.

In 1894, a telegraph line was constructed between Geraldton and Hamelin Pool which passed through what is now the park. While this was maintained, its easement was also used as a bridle path and provided a stock route used by drovers to transport sheep and cattle between Tamala and Murchison House stations and Northampton. On the way, drovers camped at a number of locations, including Junga Dam and Emu Springs (Mitchell 2009; Patrick 2001).

Despite increasing pastoral and mining interests in the area, there was very little settlement around Kalbarri at this time. In the 1900s, small numbers of fishermen visited the mouth of the Murchison River and, by 1944, some had set up permanent camps. The fishing industry started developing and over the ensuing decades it became one of the largest economic contributors to the town. Throughout the 1940s, the number of fishing camps grew and by 1951 the town of Kalbarri was officially gazetted.

While fishing was a major drawcard, some visitors to Kalbarri were attracted by the area's natural beauty. One person in particular, school teacher Ross Graham, passionately lobbied for the area to be declared a national park. His efforts were rewarded in 1963 when Kalbarri National Park was gazetted and his dedication has been recognised with the naming of the Ross Graham Lookout in his honour.

Today, tourism is the largest economic contributor to Kalbarri, which has a population of about 1,500 people.

### Desired outcomes

- Work with Nanda to protect and conserve the cultural and heritage values of Aboriginal people.
- Assist Aboriginal people in conducting customary activities.
- Protect other cultural heritage values.
- Improved cross-cultural awareness for Parks and Wildlife staff and other groups using Kalbarri National Park.

### Management actions

1. Continue to work with Nanda to facilitate the practice of customary activities.
2. Support the improvement of cross-cultural awareness through Parks and Wildlife staff training and visitor information.
3. Carry out management actions in a manner which is sensitive to the cultural and heritage values of Nanda.
4. Minimise any adverse effects of management activities on Aboriginal and other cultural and heritage values.

### Key performance indicator

Performance measure	Target	Reporting
Protection of known Aboriginal or other cultural heritage sites	No adverse impacts on known Aboriginal or other cultural heritage sites because of management activities	Every five years

# Managing visitor use

Kalbarri National Park is located in Tourism Western Australia's Coral Coast region. Tourism in Kalbarri makes the largest economic contribution of any town (based on domestic and international visitor nights and day trips) in the Coral Coast region (Tourism Western Australia 2010).

The Kalbarri town site is enclosed by Kalbarri National Park, one of WA's high profile tourist destinations. The park offers visitors spectacular wildflower displays and dramatic river gorge and coastal landscapes. Nature's Window, located at The Loop recreation site on the Murchison Gorge, is one of the State's major tourism icons.

The number of visits to Kalbarri National Park has varied over the past 10 years, but about 300,000 visits per year have been recorded since 2008–09. The department's visitor statistics indicate that the number of visits is highest between April and October, when weather is mild and wildflower displays are at their peak. Peak numbers are also experienced during school holidays.



Visitors enjoying the view of the Murchison River Gorge from the lookout at Nature's Window. Photo – Clare Atkins (DPaW)

There are 14 formal recreation sites in the park (see Map 3) and two entry stations. Visitors make good use of these sites for viewing the landscape from lookouts or as a starting point for exploring the landscape through activities such as bushwalking, overnight hiking and abseiling. However, much of the park is not accessible by vehicle and is seldom visited.

The department's Policy Statement No. 18 *Recreation, tourism and visitor services* (DEC 2006) outlines the principles, operational guidelines, procedures and administrative arrangements in relation to recreation and tourism within Kalbarri National Park.

## Planning for visitor use

Planning for future visitor use needs to protect key values and ensure maintenance of the experiences that attract people to the area. Planning can assist in highlighting areas under pressure from overuse, and identifying opportunities to enhance visitor experiences. It also considers future visitor needs and surrounding areas, in ways that can alleviate pressure on, or protect values of, the area.

In Kalbarri National Park a number of factors need to be considered before new sites or access is developed, or existing sites or access upgraded. These include (but are not limited to):

- physical environment (for example, climate, geology, landforms, visual landscape, soils, hydrology and catchments)
- biological environment (for example, threatened native plants, animals and communities)
- threats to the physical and biological environment (for example, weeds, introduced animals, altered hydrology, disease and fire)



- other management programs (for example, areas baited as part of the *Western Shield* program)
- culture and heritage (including Nanda's aspirations)
- existing and future visitor use, including opportunities outside Kalbarri National Park (for example, site carrying capacity and demand)
- visitor safety
- resource use (for example, mineral exploration, utilities)
- policy, tenure and legislation
- research and scientific reference areas.

Consideration of these factors will form an important part of detailed visitor planning, comprehensive site assessment, and consultation with stakeholders and user groups, as well as construction of recreation sites, facilities, trails and roads.

A proposed recreation site hierarchy (major, medium and minor<sup>6</sup>) shown on Map 3 and Table 1 indicates the range of developments proposed across the park. This tool is used as part of visitor planning to ensure a range of recreation opportunities is provided across the landscape.

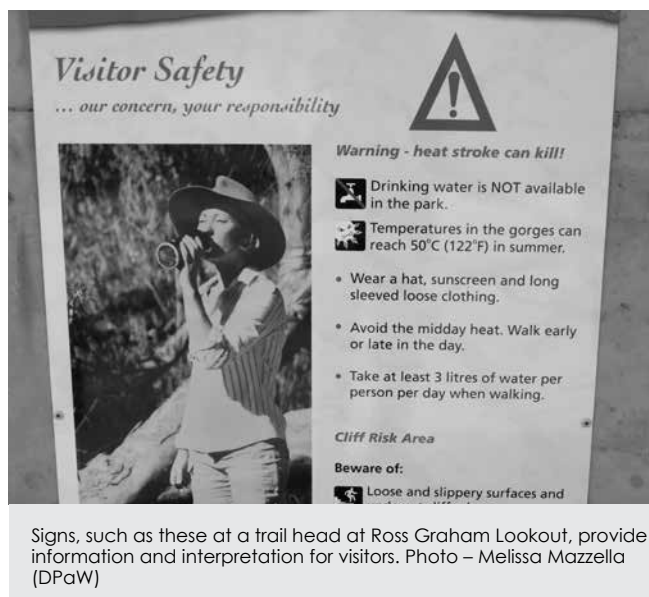
Potential recreation opportunities in the adjacent lands considered for reservation are described in *Consideration of adjacent lands*.

## Visitor safety

The department's visitor risk management program is implemented in Kalbarri National Park to identify and manage risks that may cause injury or misadventure. This is done in a way that does not render the environment sterile or unnecessarily diminish visitor enjoyment in the process.

Specific risks to visitors within Kalbarri National Park include:

- extreme temperatures (which increase the risk of dehydration and heat exhaustion), particularly within the Murchison Gorge
- falls and slips from cliff edges and overhangs if visitors stray from formal lookouts and walk trails
- visitors becoming injured or lost in remote areas in challenging terrain and having limited communication for emergency assistance
- delays in emergency response due to road conditions and difficulties with communication
- risks associated with water activities (for example, swimming and rock fishing).



Signs, such as these at a trail head at Ross Graham Lookout, provide information and interpretation for visitors. Photo – Melissa Mazzella (DPoW)

In recent years, several accidents resulting in serious injury and death have occurred in the park. Most have involved heat exhaustion and dehydration in the Murchison Gorge, but rock fishers have also been washed off the rocks by large waves. Consequently, the department has put considerable effort into ensuring visitors have adequate information about the conditions and risks in the park before their visit, as well as providing signage within the park to highlight risks. The seriousness of many visitor risks can be reduced through attention to personal safety, maintenance of facilities and provision of information about risks and how to avoid them.

<sup>6</sup> A major site has a greater range of services, facilities and experiences than a medium or minor site.

The department works closely with the Western Australian Police, State Emergency Service Volunteers Association, St John Ambulance and volunteer bushfire brigades in managing visitor safety within Kalbarri National Park. Parks and Wildlife is also a member of the Local Emergency Management Committee, which has developed local emergency management arrangements for the Locality of Kalbarri which outlines policies, procedures, strategies and priorities for emergency management in Kalbarri and roles and responsibilities of those involved.

In addition, long distance hikers must register with the park ranger and be provided with information on safety. The department also works with local tour operators and tourism businesses to ensure information is provided to visitors about risks in the park and appropriate safety precautions.

Improved mobile phone communications would help to improve emergency response times and emergency incident outcomes. Options for provision of improved communications within the Murchison Gorge need to be investigated.

## Information, interpretation and education

With the high number of visitors to Kalbarri National Park, it is important to continue to provide information and education about the values and management of the area. Raising community awareness, appreciation and understanding of values fosters a sense of community ownership, engenders support for management and encourages appropriate behaviour.

Information, interpretation and education currently available includes pre-visit information on the department's website and at departmental offices, as well as brochures, signage, smartphone apps (for example, EveryTrail guides), information provided by commercial tourism operators and opportunities for community involvement.



Signs, such as these at a trail head at Ross Graham Lookout, provide information and interpretation for visitors.  
Photo – Melissa Mazzella (DPaW)

An interpretation plan, prepared for Kalbarri National Park in 2001, guides the ongoing development of information, education and interpretation for visitors. The interpretation plan identifies three main themes about the park:

- history has shaped the way we live
- it is a special place worth caring for
- it is a dynamic environment from coastal cliffs to the Murchison Gorge.

Further to this, interpretation will include information about:

- hiking in the Murchison Gorge
- Aboriginal cultural heritage (names, stories and language)
- flora, fauna and other natural values
- geological values
- other cultural heritage
- visitor safety.

### Desired outcomes

- The range of suitable nature-based recreation opportunities is maintained and enhanced.
- Risks to visitors are minimised and appropriate visitor behaviour is encouraged.
- Community awareness, understanding and appreciation of values are improved through the provision of interpretation and education.

### Management actions

1. Provide for recreation and tourism opportunities consistent with this management plan.
2. Undertake annual visitor risk assessments to identify and manage risks associated with all recreation use, using specialist advice if necessary (for example, geotechnical specialists).
3. Provide visitor information regarding appropriate behaviour and risk minimisation.
4. Fulfil the department's obligations under the Local Emergency Management Committee's local emergency management arrangements.
5. Investigate options for improving emergency communications in Kalbarri National Park and implement appropriate solutions.
6. Update and implement the information and interpretation plan for the Kalbarri National Park to improve visitor experiences and safety.
7. Involve Nanda in the communication of cultural and heritage values, including using Nanda language in interpretation materials and the names of places and trails, where appropriate.

### Key performance indicator

Performance measure	Target	Reporting
Number of incidents reported to the department	The number of serious incidents <sup>7</sup> reported remains stable or decreases from the commencement of the plan	Annual

## 11. Visitor access

### Vehicle access

Access to Kalbarri National Park is via two sealed roads:

- George Grey Drive (managed by Main Roads WA), provides access to all eight coastal recreation sites
- Ajana–Kalbarri Road (managed by the Shire of Northampton) provides access inland to the gorge sites.

All other roads within Kalbarri National Park are managed by the department and comprise spur roads to the coastal and gorge sites, many of which are sealed. Public road access into and within Kalbarri National Park and the wider planning area is shown on Map 1.

The 32km unsealed road to The Loop, West Loop and Z-Bend has been a major cause of dissatisfaction among visitors to Kalbarri National Park. In dry weather, road surfaces become powdery and corrugated, making access for two-wheel-drive vehicles difficult. These unsealed roads often need to be closed during wet weather, preventing visitors from accessing iconic sites within the park.

Maintenance of the unsealed The Loop/Z-Bend access roads (in accordance with their type, category and function) also has an environmental impact as basic raw materials for road maintenance are sourced from within the park. Regular maintenance work also comes at a significant cost to the department. To alleviate the impacts on the environment, improve visitor amenity, and reduce visitor risk, work started in 2013 to seal a section of The Loop/Z-Bend road access to the Murchison Gorge recreation sites.

<sup>7</sup> Serious incidents are those requiring medical treatment

The feasibility of a coastal road between Kalbarri and Shark Bay/Steep Point was considered in the late 1990s by Main Roads WA as a long-term goal (Main Roads Western Australia 1997). With regard to the northern section of any coast road proposal, the *Shark Bay terrestrial reserves and proposed reserve additions management plan* (DEC 2012c) notes that ‘the department believes the two-wheel drive proposal has significant environmental, cultural and social implications and is not consistent with the management settings or wilderness quality of the area. Therefore the proposal is not supported by the department.’ This position is maintained in this management plan.



Sealed roads to many of the recreation sites within the park provides easy access for all vehicles, including cars with caravans. Photo – Melissa Mazzella (DPaW)

There are many four-wheel-drive tracks available only for fire and other management purposes within Kalbarri National Park. Opening some of these to the public may be considered, although many of these tracks do not go to places of interest for visitors. Benefit to the environment or to visitors would need to be identified before any of these tracks are opened to the public.

The need for new vehicle access options will be assessed during visitor planning.

All motor vehicles accessing Kalbarri National Park need to be registered under the *Road Traffic Act 1974* and all drivers must possess a current driver’s licence. Vehicles are restricted to roads and tracks open to the public.

## Boat access

Boat access within Kalbarri National Park is limited to non-motorised recreational watercraft such as canoes and kayaks (see *Visitor activities*).

## Access for people with disability

Since 2001, many recreation sites within Kalbarri National Park have been upgraded to provide improved access. The department seeks to ensure that everyone in the community including people with disability can access the facilities, where possible<sup>8</sup>.

Existing and future facilities within Kalbarri National Park may be reviewed over the life of the plan to determine the possibility of providing universal access. Sites with potential for enhanced access include The Loop, West Loop, Meanarra Hill and the Z-Bend lookout.

<sup>8</sup> Depending on people’s disability, they might need the aid of a carer or helper to get to and from the facilities.

### Desired outcome

- To provide safe access that facilitates visitor appreciation of natural, cultural and recreation values without having significant adverse impacts on those values, where possible.

### Management actions

- Complete the sealing of road access (including car parks) to The Loop, West Loop and Z Bend.
- Work cooperatively with Main Roads Western Australia and the Shire of Northampton regarding roads that provide access to Kalbarri National Park.
- Continue to provide access that considers the needs of people with disability.
- Close and rehabilitate tracks that are not required, or that have an unacceptable impact on key values.

## 12. Visitor activities

### Day-use sites

Recreation sites within Kalbarri National Park are shown on Map 3. Table 1 identifies the proposed changes to existing sites, including upgrade of facilities and access.

**Table 1. Existing day-use sites in Kalbarri National Park**

Site	Site hierarchy	Proposed changes
The Loop <sup>#</sup>	Major	<ul style="list-style-type: none"> <li>seal and expand parking area</li> <li>provide new facilities including toilets, shelters, lookout and picnic furniture</li> <li>update signage and interpretation and upgrade access to Nature's Window and The Loop Trail</li> </ul>
Z-Bend	Major	<ul style="list-style-type: none"> <li>seal and expand parking area</li> <li>provide new facilities including toilets, shelters and picnic furniture</li> <li>update signage and interpretation for, and upgrade access to the Z-Bend Gorge Trail, Z-Bend Lookout Trail and Four Ways Trail</li> </ul>
Meanarra Hill	Medium	<ul style="list-style-type: none"> <li>seal parking area</li> <li>upgrade lookout and develop a short walk trail from parking area to the lookout</li> <li>update signage and interpretation</li> <li>consider development of a walk trail and a mountain bike trail connecting with Kalbarri town ship</li> </ul>
Hawks Head	Medium	<ul style="list-style-type: none"> <li>continue to maintain existing facilities</li> <li>consider development of gorge access to facilitate emergency evacuation for hikers and a day-hike option from Ross Graham Lookout</li> </ul>
Ross Graham Lookout	Medium	<ul style="list-style-type: none"> <li>continue to maintain existing facilities</li> </ul>



Site	Site hierarchy	Proposed changes
West Loop <sup>9</sup> #	Medium	<ul style="list-style-type: none"> <li>relocate, seal and expand parking area</li> <li>provide new facilities including shelters, lookout, walk trail, picnic facilities, toilets and interpretation</li> </ul>
Entry station (The Loop/Z-Bend)	Minor	<ul style="list-style-type: none"> <li>redevelop facilities as part of the road realignment and sealing works</li> <li>update signage and information</li> </ul>
Entry station (Ross Graham Lookout/ Hawks Head)	Minor	<ul style="list-style-type: none"> <li>continue to maintain existing facilities</li> </ul>
Red Bluff	Major	<ul style="list-style-type: none"> <li>continue to maintain existing facilities</li> <li>complete the sealing of spur roads and parking area</li> </ul>
Mushroom Rock	Minor	
Rainbow Valley	Minor	
Pot Alley	Medium	
Eagle Gorge	Medium	
Shell House and Grandstand Rock Gorge	Medium	
Island Rock	Medium	
Natural Bridge/Castle Cove	Major	

# Redevelopment of these sites has commenced and will be completed in 2014



Day use shelter at Ross Graham Lookout provides shade and seats for visitors. Photo – Clare Atkins (DPaW)

Kalbarri National Park is listed as a high priority for amenity enhancement (that is, sealing roads to major attractions and providing parking spaces, areas of shade and signage) in the *Draft Mid West regional planning and infrastructure framework* (DoP & WAPC 2011). Existing sites within the park have limited capacity to expand and cater for an increase in the number of peak-time visitors. New recreation sites may be required to take pressure off existing sites and to add to the range of experiences on offer to visitors. The potential development of new sites and opportunities throughout the life of the plan should be considered (see *Planning for visitor use*).

## Bushwalking

Trails within Kalbarri National Park are of varying degrees of difficulty and provide visitors with a range of walking and hiking opportunities. The Bigurda Coastal Trail (a three-hour, one-way, 8km walk with views of seascapes) is one of the most popular within the park. Increased use of this trail is anticipated as adjacent residential areas continue to develop. Other trails include the Mushroom Rock Nature Trail (a 2km loop) and The Loop Trail (a three to four-hour, 8km loop walk starting at Nature’s Window). Hikes along the Murchison Gorge may also involve overnight stays (see *Overnight hiking and canoeing*).

<sup>9</sup> The department is seeking Nanda endorsement for renaming the West Loop recreation site.



Visitors enjoy views of the ocean and coastal cliffs on the Bigurda Trail at Natural Bridge and Castle Cove.  
Photo – Nathan Greenhill (DPaW)

More specific detail on trails and trail condition can be found on the department’s website and through smartphone apps (such as EveryTrail guides).

Bushwalking is an increasingly popular activity in national parks. Opportunities for new trails and experiences will be considered, subject to demand and the protection of natural and cultural values. There is scope for new medium to long distance walk trails in Kalbarri National Park as an alternative to the challenging Loop Trail. Map 3 and Table 2 show existing and potential walk trails in the park.

**Table 2. Walk trails within Kalbarri National Park**

Trail*	Length (km)	Class+	Action
<b>Coastal trails</b>			
Mushroom Rock Nature Trail	2	3	<ul style="list-style-type: none"> <li>maintain and consider hardening surface</li> </ul>
Bigurda Coastal Trail	8	3	<ul style="list-style-type: none"> <li>maintain</li> </ul>
Potential: Natural Bridge to Red Bluff	TBD	TBD	<ul style="list-style-type: none"> <li>investigate demand and feasibility for a trail, possibly dual use</li> </ul>
<b>Inland trails</b>			
Nature’s Window Trail	0.5	2/3	<ul style="list-style-type: none"> <li>maintain as a class 2 trail with a transition to class 3 through to Nature’s Window</li> <li>seal remainder of the trail from The Loop to the transition point</li> <li>develop a node at the trail transition point, installing a new shelter, lookout point and seating</li> </ul>
The Loop Trail	8	4	<ul style="list-style-type: none"> <li>maintain as a class 4 trail with trail markers</li> </ul>
West Loop Lookout Trail	0.5	1	<ul style="list-style-type: none"> <li>develop, in partnership with the Nanda community, a universally accessible loop trail at the redeveloped West Loop site to a lookout over the Murchison River Gorge</li> </ul>

Trail*	Length (km)	Class+	Action
Z-Bend Lookout Trail	1.2	3	<ul style="list-style-type: none"> <li>maintain as a class 3 trail</li> <li>investigate if assisted access can be provided down to the Z-Bend lookout via a raised boardwalk</li> </ul>
Z-Bend River Trail	2.6	4	<ul style="list-style-type: none"> <li>maintain as a class 4 trail</li> <li>continue to monitor the rocky outcrops for visitor safety issues</li> <li>investigate extending the trail through to Placid Pool (~4.5km) downstream, including developing facilities such as ladders to aid access</li> </ul>
Four Ways Trail	4	4	<ul style="list-style-type: none"> <li>formalise the Four Ways access track to the Four Ways Gorge Junction</li> <li>undertake site planning for a day-length trail from Z-Bend to Placid Pool</li> <li>maintain track to Four Ways Junction for access by commercial tour operators</li> </ul>
Ross Graham River Trail	0.7	3	<ul style="list-style-type: none"> <li>maintain as a class 3 trail</li> </ul>
River Gorge Hike (Ross Graham Lookout to The Loop via the Z-Bend)	38	5	<ul style="list-style-type: none"> <li>maintain as a class 5 trail (natural, low-key walk trail for overnight hiking)</li> <li>investigate the development of facilities at Z-Bend to aid access to Placid Pool</li> <li>manage user numbers by requiring registration at Park Headquarters<sup>10</sup> before undertaking the hike</li> <li>develop a new trail guide</li> </ul>
Potential: walk trail from Meanarra Hill to Kalbarri town site	TBD	3 <sup>#</sup>	<ul style="list-style-type: none"> <li>investigate demand and feasibility</li> </ul>

\* This table does not include several shorter walks which provide access to lookouts and around the vicinity of recreation sites.

+ The department uses Standards Australia (AS2156.1 2001) classification of walk trails (see [www.standards.org.au](http://www.standards.org.au)).

# Walk trail class is indicative.

TBD – to be determined.

<sup>10</sup> The Park Headquarters is located on the park boundary, approximate 4km from the Kalbarri townsite



## Overnight stays

### Vehicle-based camping

Currently, there are no formally designated vehicle-based camping sites within Kalbarri National Park. Informal vehicle-based camping<sup>11</sup> is not permitted within the park. There is, however, a high demand for camping throughout the Midwest Region. Opportunity for camping will be considered, including on the former part Murchison House Station.

### Nature-based accommodation

A number of sites within the park have potential for development including through Naturebank<sup>12</sup> (see *Commercial operations and tourism*).

### Overnight hiking and canoeing

Overnight hiking and canoeing<sup>13</sup> occur in association with long-distance hiking and canoeing through the Murchison Gorge, predominantly by organised groups. A hike between Ross Graham Lookout and The Loop takes four days, with shorter hikes possible between Ross Graham Lookout and Z-Bend or Z-Bend and The Loop. Locations for overnight camping on these routes are not defined and visitors must be prepared to be fully self sufficient. Facilities are not provided for overnight hikers or canoeists and visitors are encouraged to apply 'Leave No Trace' practices. Overnight hikers and canoeists are required to obtain lawful authority from Parks and Wildlife to camp overnight in the park and obtain advice (including the code of conduct and safety information) from the park ranger well before commencing their trip. Registration and authorisation are ways of managing hiker numbers, the experience and the impacts.

Key attractions for long distance hikers in the park are the solitude and remote qualities of the Murchison Gorge away from the main visitor sites. Access needs to be carefully controlled to maintain this experience and minimise any associated environmental impacts. Overnight hiking and canoeing are currently not having a marked impact on values or visitor experiences. The burying of toilet waste is not known to have caused environmental or health issues, as the Murchison Gorge is periodically flushed during flood events. Visitor impacts should, however, be monitored over the life of the plan and action taken if required.

### Campfires

Campfires and firewood collection can have detrimental effects on the natural environment. Campfire escapes can start bushfires, and firewood collecting can result in a loss of vegetation cover. For these reasons camp fires are discouraged within Kalbarri National Park. Overnight hikers and canoeists must obtain lawful authority from the department to light campfires and this is arranged with the park ranger at the time of registration.

## Cycling

Cycling is a growing recreational activity in the Kalbarri town site. Sealing the roads to coastal recreation sites has significantly improved cycle access to and within Kalbarri National Park. With increasing residential development adjacent to the park, cycle trails with linkages to Kalbarri town site are likely to be well used. There is potential to develop a mountain bike trail near Meanarra Hill, with a link to the Kalbarri town site. Meanarra Hill is a highly disturbed environment with significant management issues (for example, erosion). Development of a trail at this site may assist in managing these problems.

There is also potential to develop a dual-use path from Red Bluff to Natural Bridge.

<sup>11</sup> Informal vehicle-based camping is in areas that are not signposted for camping or designated as a camping area.

<sup>12</sup> Naturebank is a government initiative that aims to assess and release sites within protected areas for the development of low-impact visitor accommodation and experiences.

<sup>13</sup> Overnight hiking or canoeing is sometimes referred to as remote, 'wild' or backpack camping.

## Wildflower and wildlife viewing

The most spectacular wildflower display in Kalbarri National Park is usually from late winter, through spring and into early summer. Where possible, wide road shoulders should be incorporated in road design so visitors can safely stop to photograph wildflowers and wildlife. Signage in the park provides visitors with some information about wildflowers in the area. Additional brochures, publications and online resources would assist those visitors seeking more detailed information.



Spring time sees spectacular wildflower displays, including this *Verticordia monadelpha*. Photo – Aberline Attwood (DPaW)

Kalbarri National Park provides opportunities for visitors to view a range of native fauna. Birdwatching and viewing whales and dolphins from coastal sites in the park are particularly popular.

Further reintroduction of fauna species will provide greater opportunity for wildlife viewing in the park.

Australian sea lions (*Neophoca cinerea*) are occasionally sighted off the coast in Kalbarri National Park (see *Native animals and habitats*).

## Water-based activities

There are relatively low levels of canoe and kayak use in the Murchison River within Kalbarri National Park. Access to the Murchison Gorge is difficult, river flows are highly seasonal and better opportunities are available near the Murchison River mouth, closer to the Kalbarri town site. However, canoeing is carried out by commercial tour operators in the Murchison Gorge when water levels are high enough.

A number of river pools within Kalbarri National Park are suitable for swimming at various times, when water levels are high enough. Visitors also use access within the park to get to areas outside the park for swimming (for example, access through the park at Red Bluff Point to the ocean).



Rock fishing is a popular but risky activity along the coast. Fishers are made aware of the risks through pre-visit information and signs. Photo – Rory Chapple (DPaW)

Rock fishing for a range of species occurs along the coast and has a long history in the area. Large, unpredictable swells make both rock fishing and swimming along this stretch of the coastline hazardous, and the activity entails significant risk. A number of fatalities have occurred. Fishing and crabbing occur along the Murchison River, although not in the Murchison Gorge.

Pre-visit information and signage highlights the risks associated with water-based activities in the park (see *Visitor safety*).

## Abseiling and rock climbing

Abseiling and rock climbing occur in Kalbarri National Park with existing use occurring mainly in the Murchison Gorge near the Z-Bend recreation site. These activities are carried out at designated sites by a commercial tour operator as well as by school groups, climbers, and the State Emergency Service Volunteers Association (for training purposes). Regular liaison with user groups will assist information exchange and management of potential impacts of these activities on natural and cultural values.

### Desired outcomes

- A range of activities and facilities that allow visitors to enjoy key features and attractions with minimal adverse impacts on natural and cultural values.
- Opportunity to experience remoteness and solitude is maintained.



Abseiling is a popular adventure activity in the park, carried out by commercial tour operators, school and climbing groups and State Emergency Service volunteers. Photo – Sue Hancock (DPaW)

### Management actions

1. Maintain and progressively upgrade day-use sites as indicated in Table 1, as resources allow.
2. Maintain a registration system for visitors camping remotely, in association with long distance hiking and canoeing in the Murchison Gorge, and limit numbers as required, to maintain the quality of this experience and management of environmental and other impacts.
3. Develop information for overnight hikers and canoeists to help minimise safety risks and environmental impacts.
4. Progressively upgrade existing walk trails and consider the development of new trails (for walking/ hiking cycling and mountain biking) as indicated in Table 2.
5. Manage water-based activities in a manner that minimises environmental impacts, safety risks, and conflict with other visitors.
6. Monitor impacts associated with visitor activities and manage these to minimise unacceptable impacts.
7. Consider providing for vehicle-based camping in or around Kalbarri National Park.
8. Repair and manage areas of degraded land, including disturbance around Meanarra Hill.
9. Continue to record visitor numbers, conduct visitor surveys, encourage other social research and use the information collected to improve management.

**Key performance indicator**

Performance measure	Target	Reporting
Community enjoyment of park facilities and services, wildlife and the natural environment displayed in parks	Greater than 85% visitor satisfaction levels	Year one, then every five years

## 13. Commercial operations and tourism

Commercial concessions, such as leases and licences for commercial tourism operations, allow private businesses to offer high-quality tourism and recreation opportunities, facilities and services to the public. This can assist the department in providing quality visitor experiences in Kalbarri National Park. Commercial concessions are granted in consultation with the Conservation Commission, and must be consistent with the purpose of the park, the protection of its values and with the objectives of this management plan.

Local, intrastate and interstate commercial tour operators provide for a range of activities including bushwalking, canoeing, abseiling, scenic flights, and wildflower and general sightseeing tours. All commercial visitor services operating on lands and waters managed by the department require a licence or lease issued by the department. The number of concessions issued may be restricted if necessary to protect natural or cultural values or maintain the quality of the visitor experience.

Leases can be granted for commercial services that occupy land, require exclusive rights of access and require substantial infrastructure. No leases currently exist within Kalbarri National Park.

A number of areas within Kalbarri National Park have the capacity to support low-impact nature-based accommodation. Naturebank is a state government initiative that aims to assess and release sites within protected areas for the development of low-impact visitor accommodation and experiences. Any site chosen as a Naturebank project would need to undergo a detailed assessment and consultation process.

**Desired outcome**

- Commercial activities are complimentary to the department's facilities and services, and are provided in a way that enriches visitor experiences.

**Management actions**

1. Evaluate proposals for licences and commercial tourism leases and allow their establishment, if appropriate, according to departmental policy.
2. Monitor commercial tour operations and ensure compliance with licence and lease conditions.
3. Consider development of nature-based accommodation opportunities.



# Involving the community

## 14. Community involvement and support

Effective community involvement and support is a cornerstone of the department's management of Kalbarri National Park.

It is a priority for the department to encourage and facilitate community involvement in order to:

- raise awareness of, encourage input to, and generate greater public acceptance of decisions about the area's management
- garner additional resources for the area's management and enhance our ability to respond to emergencies
- provide information, education and interpretation about the area's values to the wider community.

The community of Kalbarri, being surrounded by Kalbarri National Park, has a long-standing involvement with management of the area. Examples of current community involvement in the area's management include:

- Nanda community participation in discussions about issues pertaining to their culture. This includes protecting heritage sites, undertaking heritage surveys, interpreting Aboriginal culture and using Nanda language in the naming of recreation sites (see *Managing cultural heritage*)
- the State Emergency Service Volunteers Association and Kalbarri Fire and Rescue Service aid in the suppression of bushfires and assistance with search and rescue operations
- the creation and maintenance of a herbarium, located at the Park Headquarters, by a small but active group of volunteers
- school and university education programs conducted in the park. The Kalbarri District High School Bush Rangers program has a long and active history in the park. Activities have included revegetation works, fauna research and weed removal programs
- engagement with the Kalbarri tourism industry. Tourism is a key income earner for the community and park managers engage with local tour operators, accommodation providers and visitor centre staff to keep them informed about park management issues
- consultation with neighbouring land managers that is crucial to the effective management of the park and the wider planning area (see *Neighbouring land use*).



Bushrangers from Kalbarri District High School work on walk trail construction between Natural Bridge and Island Rock.  
Photo – Sue Hancock (DPaW)

Community engagement was a critical component in the preparation of this management plan and the community has had a number of opportunities to provide input. This included the distribution of a 'have your say' brochure to encourage individuals and organisations to register their interest in the planning process and identify issues to be considered during the development of the plan. Visitor satisfaction surveys and general discussions with departmental staff also provided valuable input. The submissions in response to the 'have your say' brochure and discussions with Nanda and visitors to Kalbarri National Park were taken into consideration in the development of this plan.

**Desired outcome**

- Community involvement and support benefits park planning and management.

**Management actions**

1. Continue to provide and promote opportunities for the community to be involved in the planning and management of Kalbarri National Park.
2. Continue to support volunteer involvement in departmental programs.



# Managing the natural environment

## 15. Climate

The planning area has a warm semi-arid to arid Mediterranean climate with a winter-dominant rainfall pattern. The area receives an average of 250–500mm rainfall annually, with rainfall averages increasing from north to south. Evaporation is highest during the summer months of January and February and lowest during the winter months, with an average annual evaporation of 2,500mm, which exceeds average rainfall (DoW 2006). Average daily maximum and minimum temperatures at Kalbarri in January are 31°C and 20°C, and in July are 20°C and 10°C, respectively.

Climate is expected to change over time with predicted increasing temperatures and lower rainfall. This, in turn, is likely to lead to an increased risk of bushfire frequency and intensity (Government of Western Australia 2012). Recent droughts have resulted in a decrease in surface and groundwater available for plants. This has resulted in mass plant deaths across Kalbarri National Park, especially in *Banksia* species (see *Native plants and plant communities*) and may be an indicator that the Kalbarri area is experiencing an early effect of climate change. Vegetation of the Murchison Gorge is vulnerable, particularly species that are geographically restricted, at their range extent or sensitive to fire (for example, malleefowl (*Leipoa ocellata*) and orchids).

Accurately determining that a species, community or habitat has been directly and adversely affected by varying climatic conditions is difficult. Further research will be important in gaining a greater understanding of the impacts of climate change at a species and community level and management will be adapted on the basis of these findings. Uncertainty about appropriate responses to the effects of a changing climate mean that increasing areas held in conservation reserves and managing other threats (such as weeds, introduced animals, fire and disturbance) may be the best options to protect biodiversity in the immediate future. Management must aim to improve the resilience of species and decrease their vulnerability to a changing climate.

A landscape-scale approach that links large, contiguous habitats and enables maintenance of ecological processes, especially those across a range of environmental gradients, is important for responding to varying climatic conditions.

### **Desired outcome**

- Management actions at regional, community and species level consider and adapt to a changing climate.

### **Management actions**

1. Support research into identifying and monitoring the impacts of climate change.
2. Implement adaptive management techniques (particularly in relation to fire management) to respond to impacts of climate change on vulnerable species, communities and ecosystems.
3. Improve the resilience of species and communities vulnerable to a changing climate by limiting non-climate stresses (for example, disturbance, introduced animals, weeds and inappropriate fire regimes).

## 16. Geology, landforms and soils

The geology of Kalbarri National Park is one of its key values and standout features. The forces of weathering and erosion have shaped the area, creating features such as the Murchison Gorge, Nature's

Window and the Natural Bridge. Landforms and geological features are key attractions, for their scenic value and for the setting they provide for visitors to undertake a wide range of recreational activities.



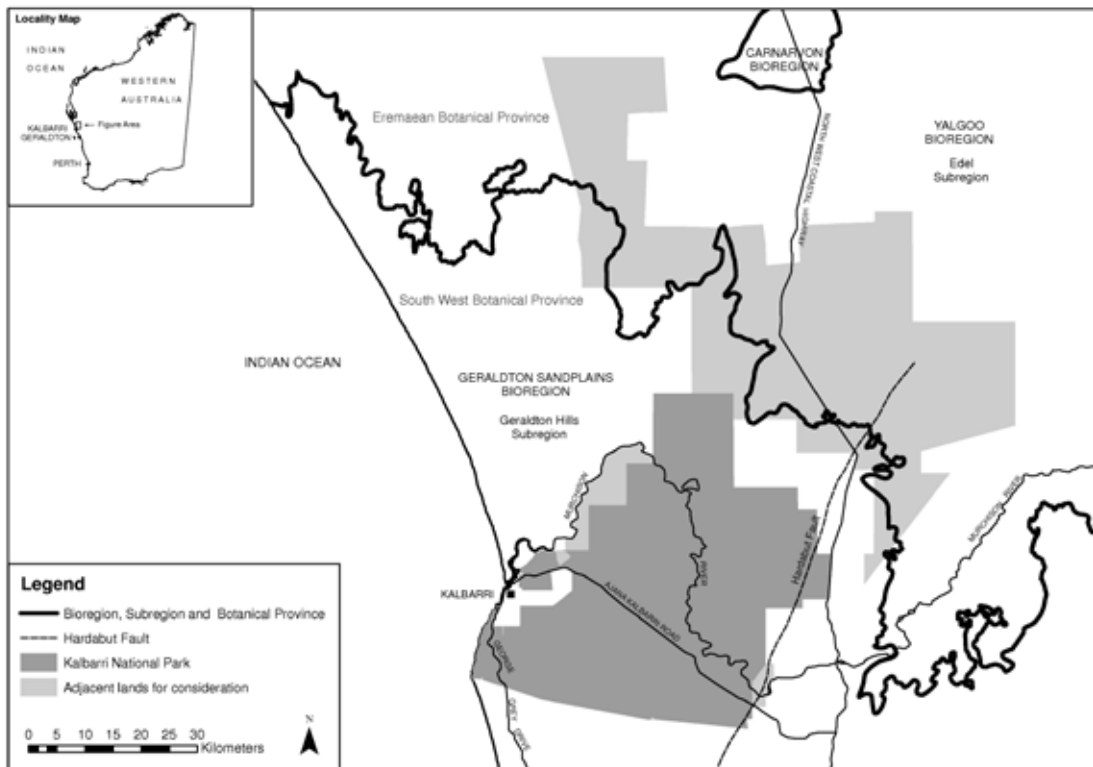
Tumblagooda sandstone at The Loop.  
Photo – Rory Chapple (DPaW)

These features are also areas of significance for Nanda.

Geoheritage sites acknowledge the national significance of geological features of the area (Department of Mines and Petroleum 2010). The geological importance of the park is recognised by the two geoheritage sites (site 97 – Murchison Gorge and site 119 – Shell House Coastal Cliffs).

The park's most dramatic geological feature, the Murchison Gorge, is composed of exposed Tumblagooda Sandstone.<sup>14</sup> The gorge is 85km long and has a maximum depth of 150m. The Tumblagooda Sandstone dominates the Murchison Gorge as far inland as Hardabut Pool. This is the location of the Hardabut Fault, which defines the boundary between the Perth and Carnarvon basins (see Figure 1). Here, there is an abrupt transition from sandstone to granite, with an abundance of granite outcrops south of the fault. Granite does not occur within the current park boundary.

**Figure 1. Biophysical features of the planning area**



The rocky coastal cliffs of the park are mostly sediments of the Tumblagooda Sandstone, as well as deposits of Wittecarra Sandstone, Kockatea Shale<sup>15</sup> and Tamala Limestone.<sup>16</sup> These cliffs are vulnerable to erosion during storm events as well as undercutting by wave action, with both processes making them unstable.

<sup>14</sup> Deposited during the Silurian period (410–435 million years ago).

<sup>15</sup> Formed during the early Triassic period (241–251 million years ago).

<sup>16</sup> Cretaceous and Pleistocene deposits (55–141 million years ago).



Mobile dunes, composed of loose siliceous sands<sup>17</sup> with occasional outcrops of laterite<sup>18</sup>, are found along the coast, south of the Kalbarri town site (Hocking et al. 1982). These sand dunes can become unstable in areas where vegetation is damaged. Revegetation is often required to prevent erosion on areas which have been degraded or impacted by fire and following site works or track closures. Fencing to prevent grazing by rabbits, western grey kangaroos (*Macropus fuliginosus*) and red kangaroos (*Macropus rufus*) and brushing on coastal dunes are important strategies in the rehabilitation of these areas.

The remainder of the park is characterised by an undulating sandplain plateau, composed of white and yellow quartz sands. The sandplain is steeply divided by the Murchison River and moderately divided at Wittecarra Gully. It is also vulnerable to erosion, especially in disturbed areas, where soil loss can be rapid once the vegetation is removed. Priorities for rehabilitating disturbed areas on the sandplain plateau are:

- access tracks around Meanarra Hill
- disused areas for the extraction of basic raw materials such as pits along The Loop/Z-Bend Road that will not be required once the road is sealed (see *Basic raw materials*)
- existing recreation sites where there is soil loss in cleared areas
- protection of scenic landscapes.

The geology and landforms of the park produce a dramatic and scenic landscape for visitors. Management of this landscape is important, particularly because of the predominantly low vegetation which causes any visual impacts to the landscape to become obvious. Any proposed recreation site, infrastructure or access developments in the park will require careful planning to ensure that visual impacts are minimised (see *Managing visitor use*).

Geological features within Kalbarri National Park provide valuable insights into geo-evolution and the earliest life forms on land. Fossil impressions (trace fossils) of long-extinct large arthropods have been found in the Tumblagooda Sandstone. These trace fossils are of particular scientific interest, providing unique clues to the evolution of the land's first inhabitants. It is believed that the trace fossils near the



Fossil impressions of extinct arthropods known as *Eurypterids*.  
Photo – Melissa Peake (DPaW)

Z-Bend recreation site were made by ancient arthropods known as *Eurypterids*, possibly one of the Earth's earliest land dwellers. Fossil evidence of peculiar worm burrows called *Skolithos* are also found in the park. Trace fossils are a major attraction to visitors. Fossil sites are, however, vulnerable to human disturbance and activities that may result in damage should be directed to more appropriate areas to ensure the protection of geological values.

Marine invertebrate fossils (mainly sponges, but also molluscs, coral, sea urchins and bryozoans) are found in marine sedimentary layers on a sandstone breakaway near Junga Dam. These fossils, dating back to

the Eocene (38–55 million years ago) are mainly deep-water species but, because many are broken and rolled, they are thought to have washed into shallower water where they were deposited. These fossils provide insights into the environmental and climatic conditions of the time and have great scientific and historic value (Darragh & Kendrick 2008).

<sup>17</sup> Siliceous sands are whitish in colour and composed of silica.

<sup>18</sup> Laterite soil types are reddish in colour and rich in iron and aluminium.

**Desired outcome**

- The significant features of the geology, landforms and soils are conserved.

**Management actions**

1. Ensure geological features (including fossils), visual landscape qualities and soil types vulnerable to environmental damage are protected during management activities and proposed developments.
2. Rehabilitate disturbed areas where required.
3. Provide opportunities for visitors to increase their awareness and appreciation of geological values.
4. Restrict access to significant geological features which are vulnerable to damage.

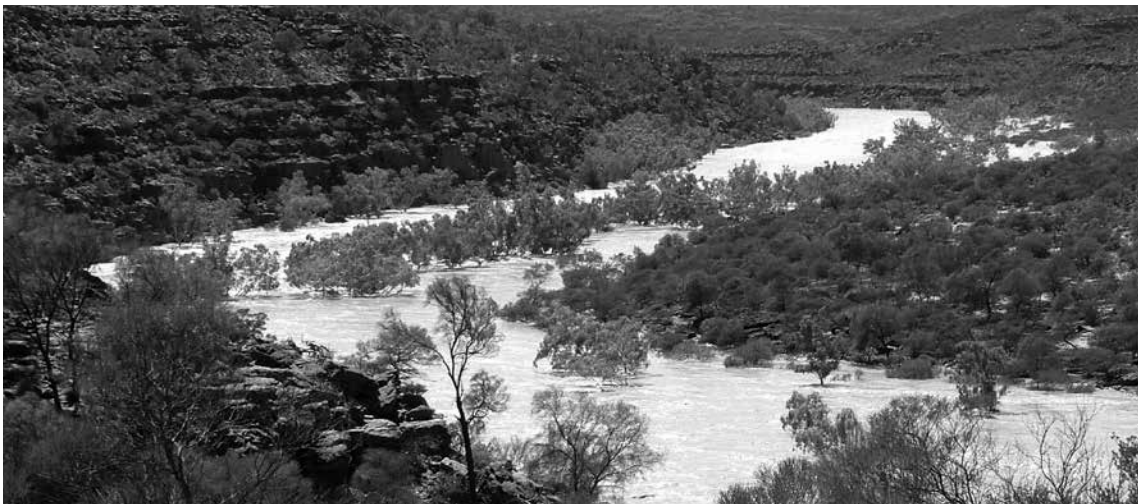
## 17. Hydrology

### Surface water

The dominant hydrological feature of Kalbarri National Park is the Murchison River. It is the second longest river in WA (after the Gascoyne River), extending nearly 800km inland from the coast. The 82,000km<sup>2</sup> Murchison River Catchment forms part of the Murchison River Basin. Within the park, this basin also includes portions of the Wittecarra Gully, Hutt River and coastal catchments.

A water monitoring station at Emu Springs<sup>19</sup> (on the Murchison River) indicates that flow rates are highly variable from year to year, depending on the rainfall over the catchment.<sup>20</sup> The peak annual flow occurred in 2006, when a flow of 1.8 million megalitres was recorded by the Department of Water, making the Murchison the largest river by flow volume in the area (DoW 2010).

Water in the Murchison River is usually brackish with a mean salinity of 2,000mg per litre (total dissolved solids) and the river exports 149,000 tonnes of salt each year. This is quite low when compared to other rivers around the state (DoE 2005). While relatively little of the Murchison Basin has been cleared, the recorded salinity and sediment load has been attributed to clearing and/or grazing in the catchment (DoE 2005).



View of the Murchison River in flood, from Ross Graham Lookout, 2006. Photo – Tony Raudino (DPaW)

The lower reaches of the Murchison River<sup>21</sup> are located in the Geraldton Sandplain Bioregion and are listed in the federal government's Directory of Important Wetlands. They are impacted by management actions within Kalbarri National Park and throughout the wider catchment.

<sup>19</sup> Gauging station 702-001.

<sup>20</sup> Monitoring data can be obtained from the Department of Water's 'Water resource information catalogue'.

<sup>21</sup> Reference number WA037.

Permanent river pools are set in the long, narrow, steep-sided gorge of the Murchison River. Many of these pools have heritage value as camps used by Nanda, 17th century European explorers, and drovers (see *Managing cultural heritage*).

Surface and groundwater are affected by variations in climate. A change in hydrological regimes will influence species abundance (particularly those species at the end of their range), vegetation structure and, in turn, animal habitats in the park.

## Groundwater

Groundwater aquifers occur in the porous and fractured Tumblagooda Sandstone and Wittecarra Sandstone, which underlie the park. Recharge of the aquifer is through infiltration of rainfall, run-off from outcrops and river flows (when these intersect a sandstone outcrop) during flood events. Groundwater is fresh to brackish where there are sandstone outcrops, with salinity increasing with depth and distance from these outcrops (Johnson & Commander 2006). Groundwater flows westward towards the ocean south of Kalbarri and towards the river valley near the Murchison River. Groundwater from the Tumblagooda Sandstone aquifer provides public drinking water for the Kalbarri town site (see *Water resource use*).

Groundwater seeps and soaks occur in the Tumblagooda Sandstone, particularly near the Ross Graham Lookout. These provide valuable habitat for frogs, waterbirds, fish and small mammals, especially during dry periods. These springs and seeps are of ongoing cultural importance for the Nanda, being central to the life of Nanda ancestors. For Nanda, it is important these seeps and soaks are kept free of weeds and introduced animals.

## Catchment management

Water quality is a catchment-wide issue, with actions occurring outside lands and waters managed by the department impacting on water quality downstream. Management therefore requires an integrated whole-of-catchment approach.

Potential threats to water quality include:

- introduced animal activity (for example, goats and pigs trampling/browsing vegetation and fouling water)
- floods which deposit large amounts of sediment into the Murchison River and affect the water quality within river pools
- nutrients and non-nutrient contaminants from land use within the catchment
- potential introduction of pollutants and inappropriate visitor activity in public drinking water source areas and wellhead protection zones
- increases in salinity caused by upstream management practices
- groundwater abstraction for mining.

### **Desired outcome**

- Maintain the natural and cultural values of ground and surface water.

### **Management actions**

1. Ensure that proposed developments or operations and activities (for example, recreational use) are managed in a way to minimise impacts on hydrological values.
2. Support the Department of Water in continuing water quality monitoring of the Murchison River Basin.
3. Support relevant authorities and land managers within the Murchison River Catchment in considering the impacts of activities on hydrological values.

## 18. Native plants and plant communities

Kalbarri National Park is botanically significant and lies within several broader areas recognised nationally and internationally for their diversity of flora. The park is part of:

- the South West Australia international biodiversity hotspot<sup>22</sup>, one of 34 in the world and the only one in Australia
- the Geraldton Hills to Shark Bay Sand Plains national biodiversity hotspot<sup>23</sup>, one of 15 in Australia
- a transition zone between the South West (temperate and eucalypt dominated) and Eremean (arid and acacia dominated) botanical provinces (see Figure 1).

One thousand and twenty-nine native plant species have been recorded within the park. This is comparable to the botanical significance of the Stirling Range (1,543 species) and the Fitzgerald Biosphere Reserve (1,557 species) (Keighery & Gibson 1999).<sup>24</sup>

The species in the park come from 180 families; with the best represented being Myrtaceae (eucalypts and paperbarks – 188 species), Fabaceae (legumes, peas and wattles – 115 species), Proteaceae (banksias and grevilleas – 78 species) and Asteraceae (daisies – 65 species).

Nineteen species are known to be endemic to the park, including Kalbarri catspaw (*Anigozanthos kalbarriensis*), Kalbarri lepidosperma (*Lepidosperma rupestre*) and *Xanthoparmelia kalbarriensis*. Given its location in a transition zone, the total number of endemic plant species is likely to be higher.

In addition, of all species known from the park, approximately 21 per cent (215 species) are at the northern limit of their natural range, making the health of the Kalbarri environment vital to their genetic diversity. The large proportion of the park's flora at the limit of its range (in particular species at their northern limit) makes the area particularly vulnerable to the impacts of climate change (see *Climate*) and changes to hydrological regimes (see *Hydrology*). Keighery et al. (2000) report that many native plant species—predominately from the Myrtaceae, Proteaceae and Orchidaceae families—were at the northern limits of their range (28, 26 and 25 species respectively). These families make up a large proportion of the overall flora in the park and are showing signs of decline already.

The widespread death of several proteaceous sandplain species has been reported anecdotally in recent years. The cause of this is unknown, although it has coincided with recent years of drought. The continuation of drought and other climate change impacts will exacerbate this situation, possibly causing large proportions of the area's flora to disappear. Therefore, more research and monitoring and the implementation of strategies to protect the area's flora are important.

Kalbarri National Park is renowned for its colourful wildflowers, which attract a large number of visitors every year. Wildflower appreciation is further discussed in *Visitor activities*.

<sup>22</sup> International biodiversity hotspots are areas with exceptional concentrations of endemic species (at least 1,500 plant species) and experiencing exceptional loss of habitat (more than 70 per cent), as identified by Conservation International. (Myers et al. 2000; Conservation International 2012).

<sup>23</sup> National biodiversity hotspots are locations in Australia with particularly high levels of biodiversity under threat.

<sup>24</sup> Data obtained from NatureMap [naturemap.dec.wa.gov.au](http://naturemap.dec.wa.gov.au) in April 2012 and Keighery et al. 2000. NatureMap is a spatial database that can be used to find up-to-date records.



## Flora of conservation significance

The park contains a number of flora species of conservation significance including:

- nine species listed as ‘threatened flora’ under the Wildlife Conservation Act (*Wildlife Conservation (Rare Flora) Notice 2012 (2)*)—*Caladenia barbarella*, *Caladenia hoffmanii*, Beard’s mallee (*Eucalyptus beardiana*), *Caladenia bryceana* subsp. *cracens*, Kalbarri spider orchid (*Caladenia wanosa*), *Drakaea concolor*, Kalbarri leschenaultia (*Lechenaultia chlorantha*), *Stachystemon nematophorus*, and short-petalled beyeria (*Beyeria lepidopetala*). All these species, with the exception of *B. lepidopetala*, are also listed as threatened or vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- 89 priority species including seven Priority 1 species, 38 Priority 2 species, 34 Priority 3 species and 10 Priority 4 species
- 220 species (nearly 21 per cent of all recorded species in the park) recorded at the end of their range. Of these, 98 per cent are at their northern limit (Keighery *et al.* 2000)
- one relic species<sup>25</sup>, *Psilotum nudum*, a primitive species of fern. The Murchison River is its only known location in southern Western Australia (Jaensch & Lane 1993).

Threats to flora of conservation significance include grazing by goats and rabbits; digging and trampling by pigs; competition from weeds; inappropriate fire regimes; disturbance from management activities; and changes in river flow affecting riparian vegetation (Patrick 2001; May & McKenzie 2002). Patrick (2001)



The declared rare flora species, *Drakaea concolor*.  
Photo – Kiera Foster (DPaW)



The declared rare flora species, *Stachystemon nematophorus*. Photo – Kiera Foster (DPaW)

identifies a range of strategies for protecting rare flora in the Geraldton District, many of which apply to the protection of species in the park.

These include:

- undertaking more survey and mapping work
- adding lands on which rare species are represented to the conservation reserve system

<sup>25</sup> Ancient and primitive taxa, of which other members are now extinct, that was abundant over a large area, but now only occurs over a very restricted area.



- managing the impacts of pigs, rabbits and weeds
- managing recreation and other activities where rare flora is located
- undertaking more research into rare species (for example, population biology, breeding systems and fire responses)
- managing fire regimes
- seed collection and long-term storage (providing a source of seeds for future re-establishment).

An interim recovery plan has been prepared for the threatened species *B. lepidopetala* and *Caladenia bryceana* subsp. *cracens*. Guidance for the management and protection of threatened and priority flora is also provided by the department's *Declared rare and poorly known flora of the Geraldton District* (Patrick 2001).

## Vegetation associations

The park is dominated by scrub heath on sandplain, with compositional variation. To the south of the Murchison River, the vegetation overlies an undissected plateau, with wide expanses of gently undulating yellow sandplain. Undulating sandplain also lies to the north of the Murchison River, with both areas supporting rich flora. The Murchison Gorge is dominated by low woodland with the jam tree (*Acacia acuminata*) and *Jacksonia cupulifera* scrub with small trees of rock sheoak (*Allocasuarina huegeliana*) in rocky areas, jam tree and scattered river gum (*Eucalyptus camaldulensis*) in the lower flats of the gorge and river swamp sheoak (*Casuarina obesa*) lining the river (Beard 1976).

Other shrubland associations found in the park include: summer-scented wattle (*Acacia rostellifera*) scrub/heath; York gum (*Eucalyptus loxophleba*) mallee scrub; umbrella bush (*A. ligulata*) mallee open scrub and heath on coastal limestone. The following associations are found both within Kalbarri National Park and the adjacent lands considered for reservation: acacia thickets, bowgada and jam scrub with scattered York gum and red mallee; tree heath between the sandhills with banksia, grevillea, acacia and melaleuca species and thickets of umbrella bush and broom bush (*Melaleuca uncinata*) on dark brown loamy soil.

Twelve vegetation associations occur in the park. The addition of the adjacent lands considered for reservation would result in the protection of eight under-represented vegetation associations (see *Consideration of adjacent lands*).

## Ecological communities

The Kalbarri ironstone community is a Priority 1 Ecological Community, consisting of winter-wet melaleuca/mallee shrublands over herbs, surrounded by sandplains (in the vicinity of Z-Bend and Junga Dam). This community also occurs at Yerina Springs to the south of the park and on Eurardy Station to the north. Generally, ironstone communities occur on shallow red soils (less than 10cm in depth). Many plants that occur in these communities are endemic or near endemic to them, a situation that applies more broadly to all ironstone communities. In the south-west, ironstone soils with unusual plant communities occur in only a small number of places (English & Blyth 2000).

The vegetation of the Directory of Important Wetlands site – Murchison Gorge (lower reaches) has also been identified as an ecosystem at risk, as it contains a range of threatened flora including *Drakaea concolor*, Kalbarri spider orchid, *Kalbarri leschenaultia*, *Stachystemon nematophorus* and *Hypocalymma longifolium*, and priority flora such as *Calytrix harvestiana*, *Malleostemon* sp. Hardabutt Rapids and *Murchisonia fragrans*.

Drought and drying conditions may be a threat to a number of communities within the park, including river gum communities along the Murchison River and the vegetation of the sandplain. Changes to groundwater are also thought to be impacting sandplain communities (see *Hydrology*). Plant communities in the vicinity of Wittecarra Gully are likely to be groundwater dependent and impacted by drier conditions.

## Plant disease

One positive sample of *Phytophthora arenaria* was confirmed on the southern boundary of Kalbarri National Park from a single plant over 20 years ago (C Dunn pers. comm. 2012). The disease has not been subsequently identified and does not appear to be a significant threat to the park. Unlike the more destructive *P. cinnamomi*, *P. arenaria* is thought to be endemic to the northern sandplains of WA and episodic following extreme rainfall events (Rhea *et al.* 2011). However, using appropriate hygiene practices during soil disturbance activities is still important in keeping the area free of *Phytophthora*, other plant diseases and weeds. In addition, sealing the Loop/Z-Bend access road will reduce road maintenance requirements; therefore reducing the risk of introduction and spread of *Phytophthora* and other plant diseases. No other plant diseases have been detected in the park.

### Desired outcomes

- Native plants and ecological communities are conserved.
- The range of existing native plant species and vegetation associations is maintained.
- No outbreaks of plant disease result from management actions.

### Management actions

1. Maintain records of plant species and communities of conservation interest.
2. Develop, update and implement recovery plans for threatened flora and ecological communities.
3. Undertake an assessment of the conservation status of, and threats to, the Kalbarri Ironstone ecological community and the vegetation of the Murchison Gorge (lower reaches).
4. Conduct condition monitoring and evaluation programs for the Kalbarri Ironstone ecological community and the vegetation of the Murchison Gorge (lower reaches), where required.
5. Continue to apply hygiene practices to minimise the spread of plant disease resulting from management activities.
6. Continue regular observation for outbreaks of plant disease and in particular for any occurrences of *Phytophthora* species. If required, prepare and implement a disease control plan consistent with Parks and Wildlife management approaches.

### Key performance indicators

Performance measure	Target	Reporting
The presence of populations of threatened flora	Maintain or increase viable populations of threatened flora, subject to natural variation, from the commencement of the plan	Every five years, or as per recovery plan
The introduction of plant disease	No plant diseases are introduced and/or spread	Annually

## 19. Native animals and habitats

While fauna research has been carried out in Kalbarri National Park, no comprehensive survey has been conducted. Two hundred and seventy native fauna species<sup>26</sup> have been recorded in the park. This includes

<sup>26</sup> Data obtained from district records and NatureMap ([naturemap.dec.wa.gov.au](http://naturemap.dec.wa.gov.au)) in January 2012. This spatial database can be used to find up-to-date records.

18 mammal, 144 bird, 70 reptile, eight amphibian, 18 invertebrate and 10 fish<sup>27</sup> species. It is anticipated that additional survey work across the park will identify more species.

## Fauna of conservation significance

The park contains many fauna species of conservation significance, including:

- four threatened species listed under the Wildlife Conservation Act (*Wildlife Conservation (Specially Protected Fauna) Notice 2012 (2)*) – the chuditch, Carnaby’s cockatoo (*Calyptorhynchus latirostris*), malleefowl, and shield-backed trapdoor spider (*Idiosoma nigrum*), and two species listed under the Wildlife Conservation Act as specially protected – the peregrine falcon (*Falco peregrinus*) and the Australian sea lion<sup>28</sup>
- three threatened species listed under EPBC Act – the endangered Carnaby’s cockatoo and the vulnerable chuditch and malleefowl
- 15 migratory bird species on the national List of Migratory Species under the EPBC Act, which are listed under international agreements
- six Parks and Wildlife priority species – the Priority 2 fish golden gudgeon (*Hypseleotris aurea*), the Priority 2 reptile stripe-sided robust slider (*Lerista axillaris*), the Priority 3 reptile *Pletholax gracilis* subsp. *edelensis*, the Priority 4 birds Australian bustard (*Ardeotis australis*) and bush stone-curlew (*Burhinus grallarius*) and the Priority 5 mammal tammar wallaby
- four species endemic to Kalbarri National Park (the invertebrates *Austrogomphus gordonii* and *Harrisius* sp., the reptile stripe-sided robust slider and the golden gudgeon)
- 17 species at the northern limit of their range (five amphibian, two bird, two fish, three mammal and five reptile) and one reptile species at the southern limit of its range – micro slider.

## Fauna reconstruction

Kalbarri National Park has been identified as a fauna reconstruction site. This is part of the department’s *Western Shield* program, which proposes to reconstruct native vertebrate fauna as far as possible through predator control, habitat management and translocation of species no longer found in the park. Three species have been reintroduced to Kalbarri National Park to date. The chuditch was introduced in 2000, the woylie between 2000 and 2005 and the tammar wallaby in 2010. These introductions have varied in their success. While the chuditch reintroductions have proven to be successful, woylies and tammar wallabies have not met success criteria.

In other parts of Western Australia, woylie populations have experienced significant declines. At a species level, the woylie has declined by around 90 per cent between 1999 and 2010 and, for some populations in the south west, there have been overall declines of up to 95 percent (Wayne 2011). Within the park, woylies have not been recorded since 2006 (the year after translocation ceased), suggesting that the population is now extinct. Tammar wallabies are known to



A chuditch trapped during an annual program to monitor the population health and density of this threatened mammal living in the Murchison Gorge.  
Photo – Melissa Peake (DPaW)

<sup>27</sup> These fish species occur throughout the Murchison River and, although it is likely that these records occur within the planning area, it is difficult to determine.

<sup>28</sup> Australian sea lions have been recorded on beaches within Kalbarri National Park. It is likely this part of the coast is used by individuals passing through rather than as a more permanent ‘haul-out’ site or breeding colony.

persist but population numbers are low (J Renwick *pers. comm.* 2012). Fox baiting in the park has also led to an increase in other species such as malleefowl.

The black-footed rock wallaby (*Petrogale lateralis*) and the quenda (*Isoodon obesulus*) may also be considered for reintroduction (based on their historic range). These species disappeared in the park because introduced animals, such as goats, pigs, foxes and cats, out-competed them for food and shelter and/or preyed upon them. The historic range of the western barred bandicoot or marl (*Perameles bougainville*); burrowing bettong or boodie (*Bettongia lesueur*); rufous hare-wallaby or mala (*Lagorchestes hirsutus*) and banded hare-wallaby or mernine (*Lagostrophus fasciatus*) also once included the park. These species are very sensitive to predation and past reintroductions to unfenced areas have had limited success. Therefore their reintroduction to the park is not a priority. However, if reintroduction technologies and predator control (especially cat control) improves significantly over the life of the plan, the reintroduction of these species may be considered. With better methods for cat and other predator control, such introductions are more likely to be successful.

Recovery plans exist for a number of threatened species that occur in the park or species that have been or are proposed to be reintroduced to the park: the chuditch (Orell & Morris 1994); woylie (Yeatman & Groom 2012); Carnaby's cockatoo (DEC 2012a); malleefowl (Benshemesh 2007); and for five species of rock wallaby, including the black-footed rock wallaby (Pearson 2009).

## Habitats

The Murchison River is recognised as an important fauna habitat. It contains fish species from tropical and southern WA and marks the southern boundary of many northern fish species (Allen 1982; Allen et al. 2005). The river is the only known habitat for the Murchison River hardyhead (*Craterocephalus cuneiceps*); is the only other habitat for the golden gudgeon apart from the Gascoyne River; and is the northern limit for the black bream (*Mylio butcheri*) (Mitchell 2009). Importantly, no introduced fish species have been recorded in the Murchison River. This is unusual considering all other major river systems from the Gascoyne River (near Carnarvon) south to the Pallinup River (east of Albany) contain introduced species (Mitchell 2009). The absence of introduced fish species in the Murchison River is important and this status needs to be maintained (see *Introduced and other problem animals*). This requires a whole-of-catchment approach, as any species introduced upstream will impact on the whole river system.

The permanent waterholes of the Murchison River are also inhabited by a variety of frog species and numerous freshwater invertebrates, mainly small crustaceans. The mudflats along the river are an attractive feeding ground for seagulls, terns and a variety of migrant waders and the river's permanent pools support a large diversity of waterbirds and terrestrial birds which are dependent on fresh water.

The ecology of the Murchison Gorge and associated riparian zones is not well understood, but these areas provide a strong contrast to the surrounding sandplain and so are likely to support a range of species not found in the sandplain. The gorge contains many micro-habitats that provide protection for water-dependent and fire-sensitive fauna. Birds, particularly Carnaby's cockatoo, use nesting hollows in river gum and other tree species growing in the gorge. A number of surveys have recorded locally endemic invertebrate species, so it is likely the gorge supports relict invertebrates, with restricted geographical ranges. Chuditch were translocated to the gorge and annual monitoring suggests they are predominantly found in this area. The gorge also provides a hunting and nesting ground for the peregrine falcon.

The sandplain provides important habitat for a range of fauna species. The sandplain plateau is home to several genera of burrowing and opportunistic breeding frogs including species of *Neobatrachus* and *Heleioporus*, the sandhill frog (*Arenophryne rotunda*) and the turtle frog (*Myobatrachus gouldii*). It is also a hotspot for reptiles, supporting a wide variety of species. Many bird species are also found on the sandplain plateau, in particular a large number of honeyeater species that are attracted to the sandplain flowering plants, which provide an abundance of nectar during the flowering season. Malleefowl also inhabit the sandplain plateau. Tammar wallabies were translocated to the sandplain and have a preference for patches of dense thicket.

## Animal diseases

The extent of animal disease within Kalbarri National Park is unknown. There is, however, a range of animal diseases that have the potential to be introduced to the park. In particular:

- mammal diseases – potentially pathogenic organisms have been linked to recent woylie declines (Thompson *et al.* 2008)
- *Chytridiomycosis*, an infectious disease caused by the amphibian chytrid fungus. Two species of frog occurring in the park (*Lymnodynastes dorsalis* and *Crinia pseudinsignifera*) have been reported with this disease in other parts of Australia (Australian Wildlife Health Network 2009)
- diseases present in fauna populations that are expressed when individuals or populations become stressed. For example, a wart-like growth disease in western barred bandicoots and the parasites *Toxoplasma*, *Trypanosoma* and *Theileria* identified in woylies.

Diseases can be exposed to, and spread within, animal populations through the transportation, trapping and handling of animals, and can be transferred to and from humans and stock. The department's *Minimising disease risk in wildlife management: Standard operating procedures for fauna translocation, monitoring, and euthanasia in the field* (Chapman *et al.* 2011) provides guidance for appropriate hygiene and quarantine protocols.

### Desired outcomes

- Native animals and habitats are conserved.
- The range of native fauna species is maintained.
- Locally extinct mammal fauna are re-established.
- No outbreaks of animal disease result from management actions.

### Management actions

1. Maintain records of fauna species and habitats of conservation significance (in particular chuditch, woylie, tamar wallaby, Carnaby's cockatoo and malleefowl).
2. Develop, update and implement recovery plans for threatened fauna as required.
3. Assess proposed development operations and activities for potential impacts on fauna.
4. Continue to implement the *Western Shield* program including:
  - continuing the control of introduced predator species
  - assessing appropriate fauna reintroductions
  - carrying out relevant fauna reconstruction activities for identified species
  - monitoring threatened fauna and threatening processes.
5. Continue to apply hygiene protocols to management actions undertaken to minimise the spread of animal disease.
6. Report identified animal diseases and implement appropriate management if required.

### Key performance indicators

Performance measure	Target	Reporting
Presence of threatened and priority fauna species	Maintain or increase populations of threatened and priority fauna species	Every five years
The protection of fauna from animal disease	No animal diseases are introduced and/or spread as a result of management activities	Annually



## 20. Environmental weeds

Weeds displace native plants, particularly on disturbed sites, by competing with them for light, nutrients and water. Other impacts include the prevention of native seedling recruitment, changes to soil nutrients, and changes to the abundance of native fauna. Weeds can also have a significant adverse impact on other natural values by altering animal habitats, harbouring pests and diseases, and altering fire regimes.

Weed species within the park are recognised as a threat that needs to be managed. The department has undertaken an invasive plant prioritisation process as a progression from the *Environmental weed strategy for Western Australia* (CALM 1999), which provides an integrated approach to weed management in WA. The prioritisation process provides a ranking of the threat posed by weed species on a statewide basis against specific criteria. Information on the process and assessment for the department's Midwest Region can be found on the department's website (see [www.dpaw.wa.gov.au/plants-and-animals/plants/weeds/156-how-does-dpaw-manage-weeds](http://www.dpaw.wa.gov.au/plants-and-animals/plants/weeds/156-how-does-dpaw-manage-weeds)).

Eighty-four weed species have been identified in Kalbarri National Park. Most of the park is weed free and infestations tend to be along the river and access roads and tracks and in the vicinity of recreation sites.

Of the weeds recorded:

- 11 are rated as high priority in the Midwest Environmental Weed Assessment, as part of the *Invasive plant prioritisation process for the Midwest* (DEC 2010). These are: castor oil plant (*Ricinus communis*), ice plant (*Mesembryanthemum crystallinum*), Mediterranean turnip (*Brassica tournefortii*), Paterson's curse (*Echium plantagineum*), ruby dock (*Acetosa vesicaria*), verbesina (*Verbesina enceloides*), African love grass (*Eragrostis curvula*), *Lapeirousia anceps*, buffel grass (*Cenchrus ciliaris*), capeweed (*Arctotheca calendula*) and Brazilian pepper (*Schinus terebinthifolius*). These will be the focus for weed control in the park
- six are rated as having a high impact on biodiversity in the Environmental Weed Strategy (Mediterranean turnip, buffel grass, African love grass, sandplain lupin (*Lupinus cosentinii*), ruby dock and great brome (*Bromus diandrus*))
- three are declared under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) (saffron thistle (*Carthamus lanatus*), Paterson's curse and doublegee (*Emex australis*))
- there are no Weeds of National Significance<sup>29</sup> (although there are three that have been nominated: Paterson's curse, African love grass and Brazilian pepper).



*Verbesina enceloides* is a weed often found growing along road verges in the park.  
Photo – Tony Raudino (DPaW)

Weeds have entered Kalbarri National Park and spread via the Murchison River, pedestrian and vehicle access, introduced animals (especially goats and pigs), past grazing and escaped stock from adjoining properties. The banks of the Murchison River have been particularly vulnerable to invasion by capeweed.

The development of a weed control plan for the park will be important in prioritising weed species for control effort. The control plan should:

<sup>29</sup> The Weeds of National Significance (WoNS) program coordinates the national effort against 20 of Australia's worst invasive plants (Commonwealth of Australia 2010).

- identify weed control priorities and map those identified as a high priority for control
- include measures to limit opportunities for the introduction and establishment of new weeds that have potential to significantly impact on key values
- include measures for monitoring, evaluating and documenting weed control effectiveness
- be consistent with and complementary to regional weed management approaches
- provide a coordinated approach with neighbours and other stakeholders across the broader landscape
- include hygiene protocols for management activities to limit the spread of weeds
- allow for adaptive management.

### Desired outcomes

- Impacts of weeds upon key values are minimised.
- No introductions of new weed species or new infestations of existing weed species that impact on key values.

### Management actions

1. Prepare, maintain and implement a weed control plan as outlined above.
2. Regularly monitor areas of new recreation site and road developments and other disturbances to ensure any new weed infestations are quickly detected and controlled.
3. Develop opportunities to educate the community and visitors about identifying priority weeds species and appropriate hygiene practices.
4. Liaise with neighbouring land managers and implement measures to prevent weeds from adjacent areas becoming established.

### Key performance indicators

Performance measure	Target	Reporting
Protection against the establishment of new weed species	No new weed species introduced	Every two years
Infestations of high priority weed species	Infestations of established high priority weed species are contained or reduced	Every two years

## 21. Introduced and other problem animals

Introduced and other problem animals have the potential to seriously impact on native species and natural systems directly through predation; habitat destruction; competition for food and territory; introduction of disease; and environmental degradation caused by grazing, accelerated erosion and pollution of waterways. The presence of introduced predators within Kalbarri National Park also limits the potential for fauna reconstruction (see *Native animals and habitats*).

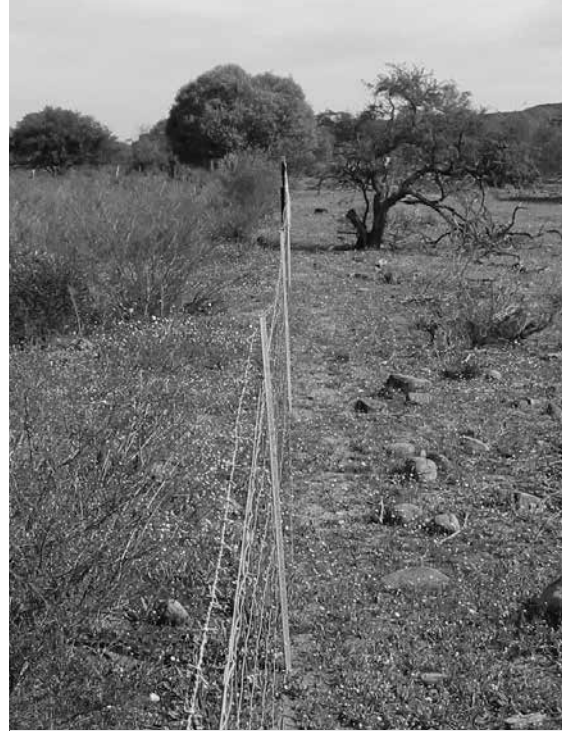
The control of introduced animals requires a planned and prioritised approach. Eradication or even control of all introduced species is not feasible. Priorities for action include species declared under the BAM Act and introduced animals significantly impacting important habitats or threatened species and communities.

The most significant threats to values of the park are caused by goats, pigs, rabbits, foxes and cats.

Feral goats are the most significant introduced herbivorous species in Kalbarri National Park and across the region. They have a marked impact on the environment, especially within the Murchison Gorge, where there is shelter and where control options are limited. Goats graze and trample native vegetation; increase soil erosion; cause sedimentation and fouling of waterways; and continually move into the park from surrounding lands. The impact of goats is exacerbated by other declared animals including pigs, rabbits and native herbivores such as kangaroos.



Goats are the most significant introduced herbivore in the park. Their impacts include grazing and trampling vegetation, increased soil erosion and sedimentation and fouling in the Murchison River.  
Photo – David Pearson (DPaW)



An area where vegetation has been fenced clearly demonstrates the impacts of grazing by goats. Vegetation on the fenced side (on the left) is flourishing where goats have been excluded. Heavy grazing is evident on the unfenced side (on the right) where goats have not been excluded. Photo – Mike Paxman (DPaW)

In the 20 years before 2005, goat control in the park was sporadic. Since 2006, aerial culling operations have been carried out annually. This control method is used because others, such as trapping and mustering, are not effective due to the rugged and inaccessible terrain of the area. The culling operation occurs in the warmer months when goats tend to congregate along the Murchison River. Where possible, shootings are also coordinated to coincide with goat mustering on Murchison House Station to maximise the effectiveness of the control operations. This type of control has proven to be very effective and goat numbers in the park are significantly lower following a shoot. The establishment of goat exclusion plots and the subsequent monitoring of vegetation recovery provide information on the effectiveness of control operations.

Feral pigs have been sighted in Kalbarri National Park since the 1960s and, like goats, they trample vegetation (particularly threatened orchids because pigs seek out their tubers); disturb soil; spread disease; increase sedimentation and fouling of waterways; and compete with native fauna. Numbers are difficult to estimate, but impacts are concentrated in the Murchison Gorge. Shooting occurs opportunistically during the annual aerial goat control program in the park and poison baits have also been used. To date, no monitoring has been carried out to assess the outcome of these control measures.

Rabbits are widespread, but their impacts are greatest on the coast where grazing on native vegetation is most evident. The success of rehabilitation at coastal sites in the park has been limited because of grazing pressure from rabbits. Rehabilitation sites must be fenced to prevent rabbits from grazing on seedlings.

Foxes and cats are found throughout Kalbarri National Park and the wider region. Preying on native fauna, they have severely reduced the distribution and abundance of native animal species. Foxes are controlled as part of the department's *Western Shield* fox baiting program. Baiting using 1080 fox baits is implemented at a density of one bait per 20ha. The success of the baiting program is measured by a fauna monitoring program. Monitoring of fox and cat numbers before and after baiting has occurred in recent years (2011–12) to determine whether the baiting is effective. This monitoring demonstrated much lower fox numbers in the park than in surrounding (non-baited) areas. Monitoring should also consider

mesopredator<sup>30</sup> release, in which an increase in one or more subordinate predators (for example, feral cats) occurs after the removal or reduction in numbers of a dominant predator (for example, foxes).

To date there is no specific method of control for cats, although extensive research is being carried out by the department towards the development of an effective cat bait. Anecdotally, it has been suggested that there are more cats in the park than in surrounding areas and their impacts are more significant.

Other introduced animals within Kalbarri National Park include:

- feral bees (*Apis mellifera*) that are present near permanent water, particularly around the Murchison River. Here they inhabit rocky caves, overhangs and tree hollows used for nesting, possibly displacing native fauna and competing for nectar. Management will focus on controlling colonies and swarms around recreation sites
- the house mouse (*Mus musculus*) which is common close to the Kalbarri town site. Currently, no control measures are used.

Goats, pigs, foxes and other feral animals move across tenures in and out of Kalbarri National Park and neighbouring land. Coordinated control of introduced animals must be undertaken cooperatively with neighbouring land managers to ensure maximum success.

The Murchison River is free from any introduced fish species and needs to remain this way to protect the park's natural values. Introduced fish species can breed rapidly, be aggressive, displace native species and disrupt aquatic ecosystems. Once established, introduced fish can be virtually impossible to eradicate. Public education is important to prevent the introduction of fish species and to encourage recreational fishers and visitors to report any introduced fish seen in the Murchison River (DoF 2010). Given the length of the Murchison River and its tributaries, any action will require a coordinated effort.

The development of an introduced animal control plan for Kalbarri National Park will be important in prioritising introduced animal species on which to focus control effort. In particular the control plan should:

- identify control priorities (for example, introduced animals declared under the BAM Act and those impacting on threatened species and communities or areas of high natural value)
- include measures to limit opportunities for the introduction and establishment of new introduced animals with the potential to significantly impact key values
- include measures for monitoring, evaluating and documenting control effectiveness
- be consistent with and complementary to regional management approaches (that is, consider the adjacent lands considered for reservation)
- provide a coordinated approach with neighbours and other stakeholders across the broader landscape
- include capacity for adaptive management.

No domestic animals including dogs (*Canis spp.*), cats and horses (*Equus caballus*) are permitted within Kalbarri National Park.

### Desired outcomes

- Impacts of introduced and other problem animals upon key values are minimised.
- No new introduced animal species.

### Management actions

1. Prepare and implement an introduced animal control plan as outlined above.
2. Continue to control goats, seeking support and assistance from Murchison House Station.
3. Continue to control foxes and other introduced animals in collaboration with neighbouring land managers.

<sup>30</sup> Medium-sized predator.

4. Continue to undertake research and monitoring of introduced animals and their effects on and interactions with native species, and adapt management accordingly.
5. Consider fencing and rehabilitation of high-value areas to protect them from the impacts of grazing and trampling, particularly from introduced animals.
6. Monitor the severity of impacts caused by other introduced and other problem animals such as feral bees and house mice and investigate methods of control, if required.
7. Maintain and expand the use of goat exclusion plots and conduct an associated monitoring program to measure vegetation recovery, as an indicator of control effectiveness.
8. Work with neighbouring land managers, catchment groups, local government, other relevant agencies and the wider community to increase awareness of the ecological impacts that can result from the release of introduced fish species into natural waterways in Kalbarri National Park.
9. Prohibit domestic animals, except when used as:
  - guide dogs for visitors with visual impairments
  - animals required for emergency search and rescue.

### Key performance indicators

Performance measure	Target	Reporting
The number of goats shot per cull, over consecutive years, in relation to effort	The number of goats shot per cull, over consecutive years decreases in relation to effort	Annually
Vegetation recovery in areas where goats have been removed	Vegetation recovery is recorded in areas where goat control occurs	Annually

## 22. Fire

Organisational responsibility for fire management is shared between the department, DFES and local government. The relevant arrangements are stipulated in the *Emergency Management Act 2005*, the accompanying regulations and the *State emergency plan for bushfire (Westplan Bushfire)* (FESA 2011). These documents define four aspects of emergency management: prevention, preparedness, response and recovery. The department's fire management activities, including prescribed fire, bushfire prevention and fire suppression are regulated by legislation (for example *Bush Fires Act 1954* and CALM Act). Further guidance is provided by departmental policy (which is under review) and the Conservation Commission's Position statement No. 1 *Fire management* (Conservation Commission 2011).

The department will incorporate guidance from this management plan, the local emergency management arrangements and interested stakeholders in its 'Prescribed fire planning process'. This process identifies areas where prescribed fire is to be applied over the coming three years (six seasons) (see [www.dpaw.wa.gov.au/management/fire/prescribed\\_burning](http://www.dpaw.wa.gov.au/management/fire/prescribed_burning)). Prescribed burns may be undertaken for a number of purposes, including the protection of park visitors and surrounding residents, the management of the natural environment and for scientific research. Prescribed fire plans are updated twice a year and the public are given an opportunity to view the proposed prescribed burn areas and provide feedback.

During a bushfire emergency, priority will be given to the protection of human life, critical infrastructure and community assets. Following their consideration, protection of conservation and environmental values will be factored into incident action plans. Where possible, mitigation measures will be applied in a way that does not compromise the integrity of the natural environment.





Wildfires in the park are commonly started by lightning strikes. Photo – Sue Hancock (DPaW)

## Fire behaviour

Fuel, weather and topography are the main factors influencing fire behaviour; together they determine the rate of spread and intensity of a fire. In Kalbarri National Park, the main fuel types are coastal heath and scrub-heath vegetation. Research on fire behaviour specific to the park is limited but some information is available from anecdotal observations and from experiments conducted in similar fuels near Eneabba (Westcott 2010) and on the south coast (McCaw 1997).

The shrublands of Kalbarri National Park are characterised by a discontinuous ground fuel layer, meaning fires predominantly spread by direct flame contact between canopies. This mode of fire spread makes it unusual for fires to propagate in fuels that are less than eight years old, except during severe fire weather conditions. In particular, fire behaviour is heavily influenced by wind speed and direction, with relatively strong winds required to facilitate the spread of fire. Fires in the park usually begin as long, narrow tongues running in the direction of prevailing winds.

Most fires within Kalbarri National Park are started by lightning. In the summer months, hot, dry northerly winds can result in severe fire weather conditions, with very high temperatures, low humidity and strong winds. These conditions are associated with the formation of low pressure troughs along the west coast, and may be accompanied by dry lightning storms, which can ignite bushfires (McCaw 1998).

## Managing fire to protect life, community and biodiversity assets

Prescribed fire planning aims to reduce the impacts of unplanned fire on life, property and biodiversity by maintaining an effective system of landscape-scale mosaics and fuel-reduced buffers. Together, these decrease the extent and frequency of bushfires and provide a temporal and spatial distribution of functional habitats across the landscape. Effective bushfire threat mitigation requires active and complementary management across all land tenures.

The high degree of predictability in the wind speed and direction experienced in the park assists with achieving safe and effective prescribed burning. The steady southerly winds experienced through much of the year make it possible to undertake north–south aligned open-edged burns<sup>31</sup> relatively safely. East–west open-edged burns are more difficult to implement due to the instability of easterly wind patterns. Open-edged burning requires specific weather conditions following ignition. It is only undertaken when the overnight conditions are sufficiently mild to allow fires to self-extinguish. There is usually only a short period of time during the year when suitable overnight conditions coincide with daytime conditions

<sup>31</sup> Open-edged burns are those that are only contained by a break on one side. Vegetation will continue to burn until conditions become mild enough to extinguish it.

in which fire will spread through the park's discontinuous fuels. The size of this 'burning window' constrains the park's prescribed burning program.

Fuel modification is also used to protect assets from bushfire. This involves pushing over vegetation in areas where fuels are high, allowing it to dry on the ground and then burning. Mulching vegetation, without burning, also occurs. These two methods are used in areas where there are high-value assets (for example, on the boundary with the Kalbarri town site), where the consequences of a prescribed burn escaping would be dire.



A wildfire burning on the park boundary. A rapid response by DPaW staff and members of the Kalbarri Volunteer Bushfire Brigade ensured the fire was contained quickly. Photo – David Pratt

## Life and community assets

There are many community assets in and around Kalbarri National Park that require protection from bushfire. These include the town of Kalbarri, properties surrounding the park and the two access roads to the town site. Assets within the park are: recreation sites and facilities, the radio communication repeater station and tower on Meanara Hill, infrastructure associated with utilities, and sites of cultural and heritage significance.

A vehicle access network within Kalbarri National Park, comprising public access roads and strategic management tracks, will be maintained. Where temporary fire access tracks are constructed during suppression activities, they will be rehabilitated after the fire event.

Bushfires can pose a significant risk to visitors to the department's recreation sites. Through the Kalbarri Local Area Management Committee (of which the department is a member – see *Visitor safety*), an evacuation plan has been developed to ensure the safe evacuation of visitors from the park during a bushfire. Across the State, the department may also close recreation sites on days of very high to catastrophic fire danger rating and this is applied to the park when there is considerable likelihood of a bushfire.

## Fire and biodiversity

Naturally, the park is a very fire-prone environment. Many species have adapted to fire. However, a key threat to the natural values of the park can be inappropriate fire regimes<sup>32</sup>. Specifically, inappropriate fire regimes affect biodiversity, population viability and long-term conservation of many of the species, communities and habitats found within Kalbarri National Park. Therefore, burn prescriptions will reflect

<sup>32</sup> A 'fire regime' is a description of fire in terms of (a) fire frequency (how often it occurs on a site), (b) fire intensity (how much heat energy is released), (c) season (what time of year it occurs), (d) scale (how big it is), and (e) spatial diversity (how patchy it is at both a landscape and local scale). For more information on fire regimes and the environment, refer to the department's website [www.dpaw.wa.gov.au/management/fire](http://www.dpaw.wa.gov.au/management/fire).

ecological, species or habitat requirements. No single fire regime is optimal for all species and an adaptive approach for prescribed fire planning that considers new research is required.

When exposed to fire, species have varied responses. This is true in the case of individual fires, as well as when considering cumulative fire history. In Kalbarri National Park, vegetation in sandplain areas typically responds well to fire but areas that burn less frequently and have sparser vegetation—such as sandstone breakaways, wet refuge areas and particularly the Murchison Gorge—are likely to have fire-sensitive species. Plants that survive fire (which destroys most of the above-ground parts) and recover by resprouting unaffected buds are known as resprouters. Reseeders are plants that are killed by fire and rely on the germination of stored seed to regenerate. The reproductive strategies of reseeders and resprouting species contribute to identifying appropriate fire regimes.

Some fauna species require special consideration during the prescribed fire planning process. During planning for prescribed burning, habitats for tammar wallabies are identified and burning is carried out to protect these where possible. In addition, tammar wallabies prefer a diversity of habitats, so prescribed burning aims for a diversity of fuel ages (and hence greater biodiversity). Consideration should be given to carrying out or increasing fox baiting following large bushfires because expanses of burnt vegetation provide limited cover, leaving native fauna more prone to predation.

## Community awareness

Engaging with the public is vital to ensure a high level of community awareness of fire, fire-mitigation strategies and fire-suppression operations. The department will assist DFES and the Shire of Northampton in communicating important messages about fire management to park visitors and the local community. The department will also make information about its fire-management practices readily available to the public. Park visitors will be made aware of the importance of personal bushfire safety by on-ground staff and signage.

Community involvement in fire suppression is particularly strong in Kalbarri. This involvement occurs due to a strong spirit of cooperation between the department, the Kalbarri Volunteer Bushfire Service, local government volunteer bushfire brigades, DFES, State Emergency Service Volunteers Association, and the Western Australian Police. Collaborative fire management is facilitated by the Local Emergency Management Committee. In addition to responding to bushfires, members of these groups also participate in search and rescue operations in the park.

### Desired outcomes

- Threat of bushfire to life and community assets is reduced.
- Stakeholders are engaged in the prescribed fire planning process.
- Sites of cultural and heritage significance are considered in developing a prescribed fire plan.

### Management actions

1. Maintain an appropriate level of bushfire suppression preparedness by ensuring adequate equipment, access to water, strategic access and communication.
2. Continue to implement a prescribed fire and fuel modification program that incorporates relevant fire management policies, guidelines and available knowledge (including fire history) to:
  - protect the town of Kalbarri, neighbouring properties and other assets (both within and outside the park) from bushfire
  - adapt management and implement appropriate fire management for fire regime-specific biota and habitats
  - establish and maintain a mosaic vegetation structure across the landscape.
3. Work closely with DFES, the Shire of Northampton, Kalbarri Volunteer Bushfire Service and local government volunteer bushfire brigades, neighbouring land managers, the community and other

- authorities to encourage cooperative arrangements and ensure appropriate community protection from fire.
4. Promote public education and awareness of the department's fire planning and management, the effects of fire on the natural environment, the need to prevent bushfires, the safety and survival of people, and protection of property.
  5. Work with Nanda in managing fire, including the application of prescribed fire and protection of sites of cultural and heritage significance.
  6. Establish and maintain post-fire monitoring sites to measure the impact of bushfire and prescribed fire, and to develop an understanding of ecological fire requirements of biota.
  7. Develop and implement recovery plans after bushfires for which the department is responsible.

#### Key performance indicators

Performance measure	Target	Reporting
The impact of bushfire and prescribed fire on human life or community assets	No serious injury to people or damage to community assets attributed to the department's fire management	Annually
Implementation of the prescribed burn program	Prescribe burn program is kept up to date and implemented	Annually
The impact of fire management activities on known threatened flora and priority ecological communities	No adverse impacts on threatened flora and priority ecological communities as a result of fire management activities, without appropriate approval	Annually



# Managing resource use

## 23. Mineral and petroleum operations

Mining in Western Australia is primarily administered by the Department of Mines and Petroleum through the granting of various tenements. The holders of tenements are required to meet certain conditions in order to retain exploration and development rights. These include the requirement that all development projects undergo environmental, heritage and native title assessments. Exploration and development proposals that may cause significant impact on key values must be referred to the Environmental Protection Authority for environmental impact assessment. Furthermore, actions that may have a significant impact on matters of national significance<sup>33</sup> may also require approval under the EPBC Act.

While legislation provides a process for industry to apply for access to undertake mining and petroleum exploration and development in Kalbarri National Park, the department; the Conservation Commission; and the Minister for Environment, will consider application for access and development proposals on a case-by-case basis. Cases where access and/or development would be incompatible with protecting the park's key values will be clearly identified as early as possible in government assessment processes. The department will work with industry and decision making authorities to ensure impacts are avoided or minimised to acceptable levels.

There are no exploration licences or petroleum tenements over Kalbarri National Park, although there are a number of exploration licences over the adjacent lands considered for reservation (see *Consideration of adjacent lands*). The latest information on tenements can be found on the Department of Mines and Petroleum's Tengraph database.<sup>34</sup>

### Basic raw materials

It is the department's preference that basic raw materials are sourced from outside Kalbarri National Park. When this is not feasible, the department will consider access to basic raw materials from within the park on the basis it is for use within the boundary of the park. This may occur for operations such as road building.



Nanda Traditional Owners provide advice about Aboriginal cultural heritage during investigations into sources of basic raw material (gravel) in the park, prior to the commencement of road developments.  
Photo – Rory Chapple (DPaW)

<sup>33</sup> Under the EPBC Act, matters of national significance include nationally listed threatened species and ecological communities.

<sup>34</sup> See [www.dmp.wa.gov.au](http://www.dmp.wa.gov.au).



**Desired outcome**

- Impacts of mineral and petroleum operations and extraction of basic raw materials on key values are minimised.

**Management actions**

1. Work with the Department of Mines and Petroleum and the Environmental Protection Authority to evaluate proposed mineral and petroleum operations that may impact on Kalbarri National Park and seek to avoid or minimise these impacts.
2. Ensure that any areas disturbed by mineral and petroleum operations are rehabilitated in accordance with the conditions of the mining or exploration tenure or approval documentation as well as departmental rehabilitation standards and guidelines.
3. Rehabilitate areas disturbed by basic raw material extraction in accordance with departmental policies and undertake post-rehabilitation monitoring and evaluation to ensure compliance.
4. Ensure that all mineral and petroleum operations and basic raw material extraction adhere to departmental disease hygiene practices.

## 24. Beekeeping

There are no apiary sites within Kalbarri National Park. The department's draft Policy Statement No. 41 *Beekeeping on public land* (CALM 2004) indicates that no new apiary sites will be permitted in Kalbarri National Park because there is no historical use.

**Desired outcome**

- Impacts of beekeeping and introduced honeybees on key values are minimised.

**Management actions**

1. Do not issue any apiary site permits within Kalbarri National Park.

## 25. Water resource use

Water resource use is regulated under the *Rights in Water and Irrigation Act 1914* (RIWI Act) that is administered by the Department of Water, the agency responsible for the protection and management of water resources. Under the RIWI Act, proponents are required to obtain a licence from the Department of Water to extract water within the Gascoyne Groundwater Proclamation Area. The department may, under the CALM Act, issue a water removal permit to proponents seeking to extract water from land vested in the Conservation Commission. Where infrastructure for water abstraction is necessary, a lease may also be required.

Groundwater from the Tumblagooda Sandstone aquifer provides public drinking water for the town of Kalbarri. Water is drawn from six Water Corporation production bores outside the planning area. The bores are located within the gazetted Kalbarri Water Reserve Public Drinking Water Source Area, which covers the town of Kalbarri and parts of Kalbarri National Park to the south and east of the town. There is one monitoring bore in the park, which also provides water to the Park Headquarters. The Water Corporation production bores are surrounded by wellhead protection zones, one of which extends into the park. Wellhead protection zones are for the protection of a drinking water source from contamination in the immediate vicinity of bores (a 500m radius from production bores).

The area of national park within the Kalbarri Water Reserve is a Priority 1 Protection Area (as gazetted under the *Country Areas Water Supply Act 1947*). The *Kalbarri water reserve drinking water source protection plan: Kalbarri and Port Kalbarri town water supply* (DoW 2006) provides guidance for protecting water quality. Management activities must be planned to minimise impacts on the values of this drinking water source.

### Desired outcome

- Impacts of water resource use on key values are minimised.

### Management actions

1. Ensure compliance with the *Kalbarri water reserve drinking water source protection plan: Kalbarri and Port Kalbarri town water supply* (DoW 2006).
2. Follow legislative requirements and departmental policy in assessing and approving water removal permits under the CALM Act.

## 26. Utilities and services

Utilities and services within Kalbarri National Park include:

- high-voltage powerlines
- co-located Parks and Wildlife and Western Australian Police radio communication repeater station and tower on Meanarra Hill
- telephone line
- Telstra fibre optic cable.

There is a need to expand mobile phone coverage within Kalbarri National Park (see *Visitor safety*).

Proposed utilities or services need to be located appropriately to minimise impacts on the area's key values, including visual amenity. To limit these impacts, the department prefers that utility infrastructure that is not servicing Kalbarri National Park itself be located outside the park. When this is unavoidable, the use of already degraded areas, pre-existing corridors or co-location with existing infrastructure is preferred.

If at any stage utilities and services are no longer required, the infrastructure will be removed and the land rehabilitated.

### Desired outcomes

- Impacts of utilities and services on key values are minimised.
- Infrastructure and services in and around Kalbarri National Park facilitate park management.

### Management actions

1. Locate new utilities or services within existing corridors and/or outside Kalbarri National Park, where possible.
2. Liaise with utility providers to ensure that the operation and maintenance of utilities and services are in accordance with departmental conditions.
3. Ensure the responsible management of environmental issues associated with the provision and maintenance of utilities and services, particularly issues of disease hygiene.
4. Ensure the removal of infrastructure and rehabilitation of land when utilities and services are no longer required.



Police and DPaW radio communication repeater station and tower on Meanarra Hill.  
Photo – Mike Paxman (DPaW)

5. Work with utility and service providers to minimise environmental and visual impacts.
6. Seek to maximise mobile phone coverage.

# Research and monitoring

## 27. Research requirements

Management of Kalbarri National Park and the wider planning area should be based on up-to-date and sound knowledge. Ongoing monitoring and evaluation of management practises is important to assess their effectiveness and allow for adaptive management.

Research and monitoring will assist in achieving the key performance indicators listed in this plan. This will include gaining a better understanding of those values identified as being most at risk and the threats most likely to have adverse impacts on key values.

Research and monitoring projects should evaluate the effectiveness of management practices in protecting key values and should give priority to areas where:

- the quality of base data is the poorest
- understanding of the effect of management actions is poorest
- there have been unanticipated changes in factors affecting the park, such as access or adjacent land uses
- the rates of resource or social change are the highest.



Radio tracking tammar wallabies following their translocation into the park. Photo – Mike Paxman (DPaW)

Major research and monitoring projects in Kalbarri National Park that will continue through the life of this plan include:

- research and monitoring associated with *Western Shield* program and the translocation of priority fauna (see *Fauna reconstruction and Introduced and other problem animals*)
- flora monitoring (for example, rare and priority species, weed mapping and goat exclusion plots showing the impact of grazing by goats)
- social research (for example, visitor surveys and Nanda cultural research).

### **Desired outcome**

- Knowledge and understanding of key values and management issues is increased and aids in implementation of this management plan.

### **Management actions**

1. Conduct integrated research and monitoring programs that facilitate management, with a focus on key values and threats identified in this management plan; the establishment of baseline information; meeting key performance indicators; and other departmental research priorities.
2. Encourage and support, wherever possible, external agencies and individuals where their research contributes directly to departmental objectives or the implementation and auditing of this management plan.
3. Ensure relevant information gained through research, monitoring and experience is available to managers and in regional and district office libraries/databases, and is kept up to date.
4. Incorporate research and monitoring findings into performance assessment against the objectives of this management plan and adapt future management, if required.



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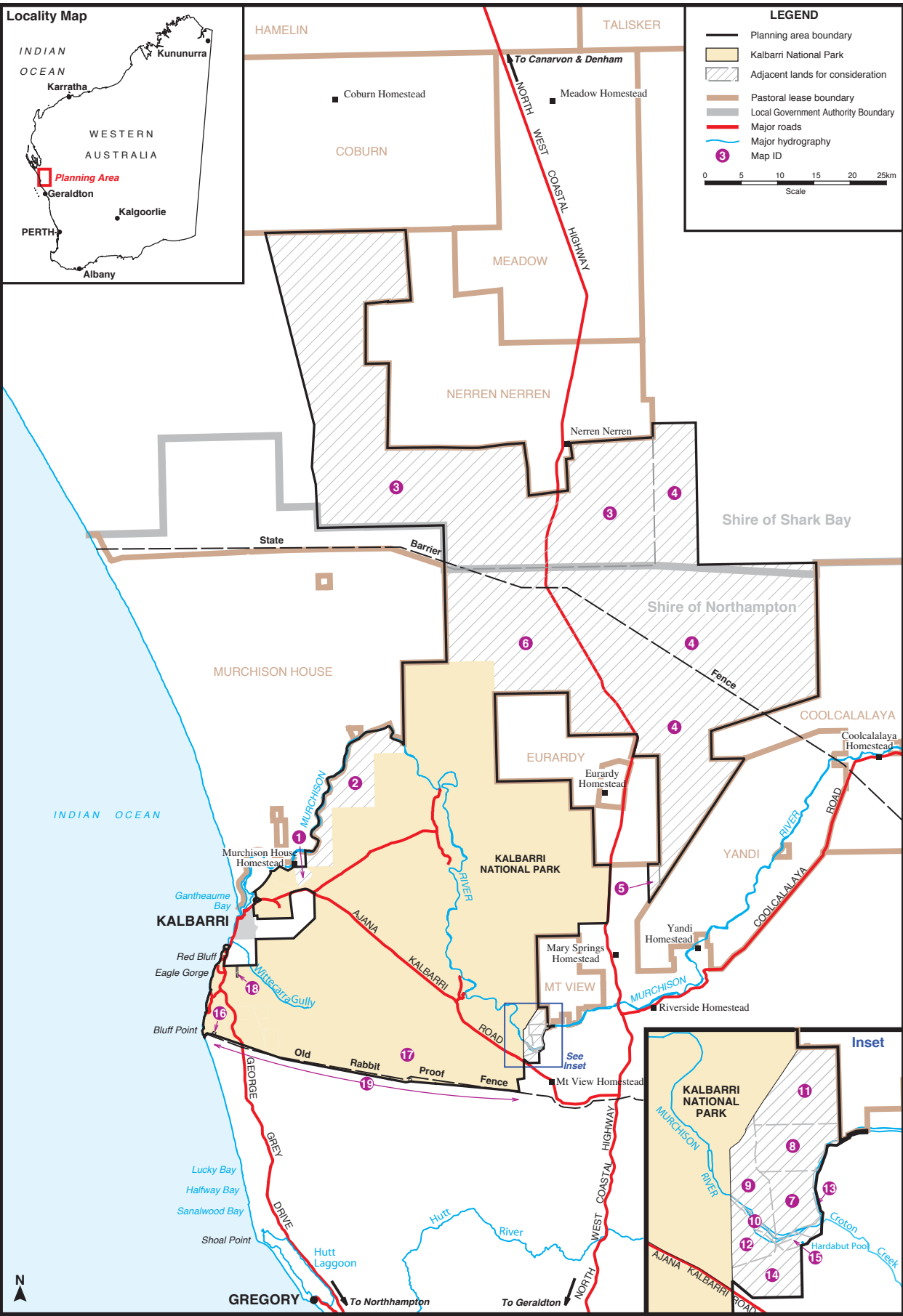
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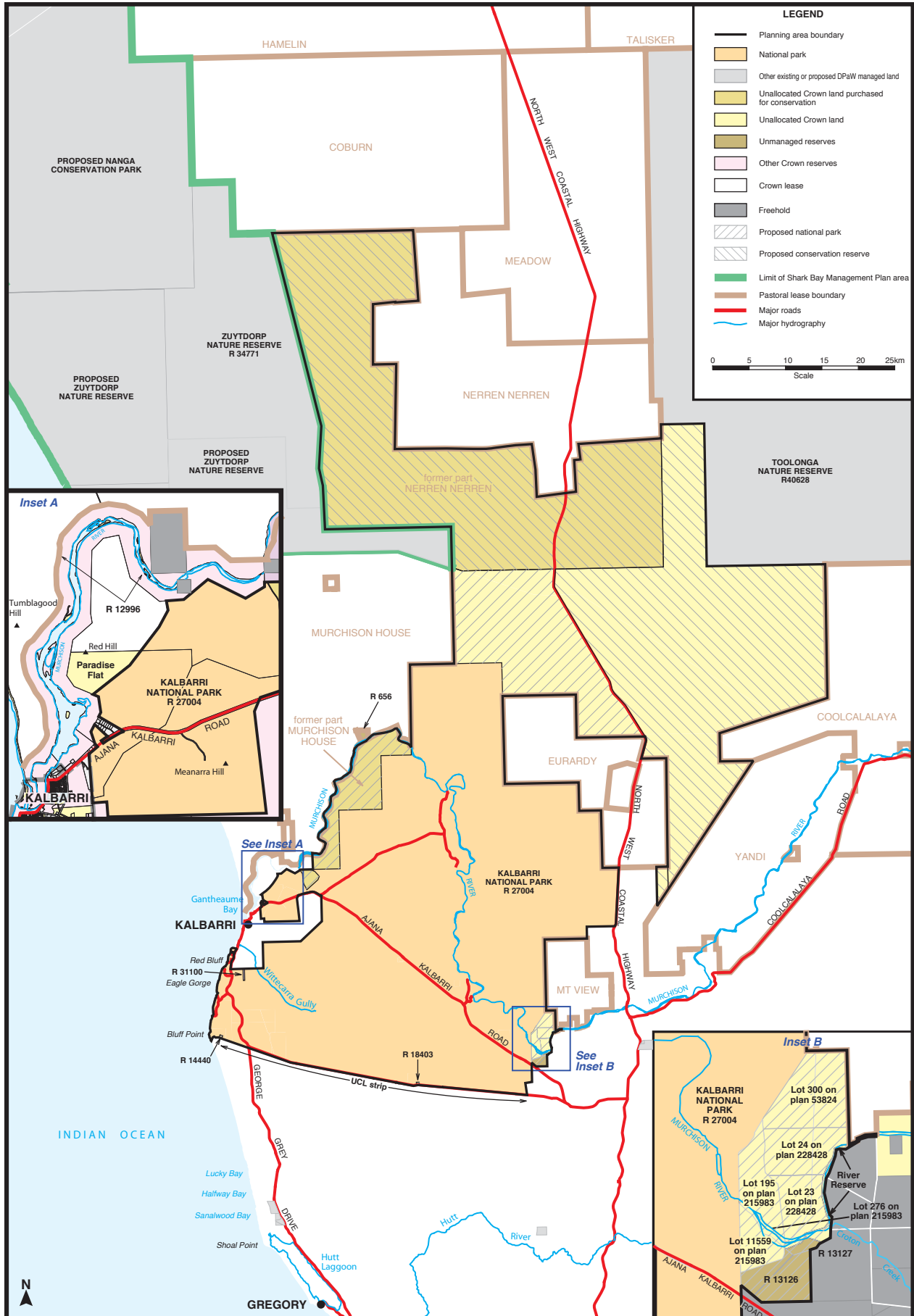
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Map 1. Planning area

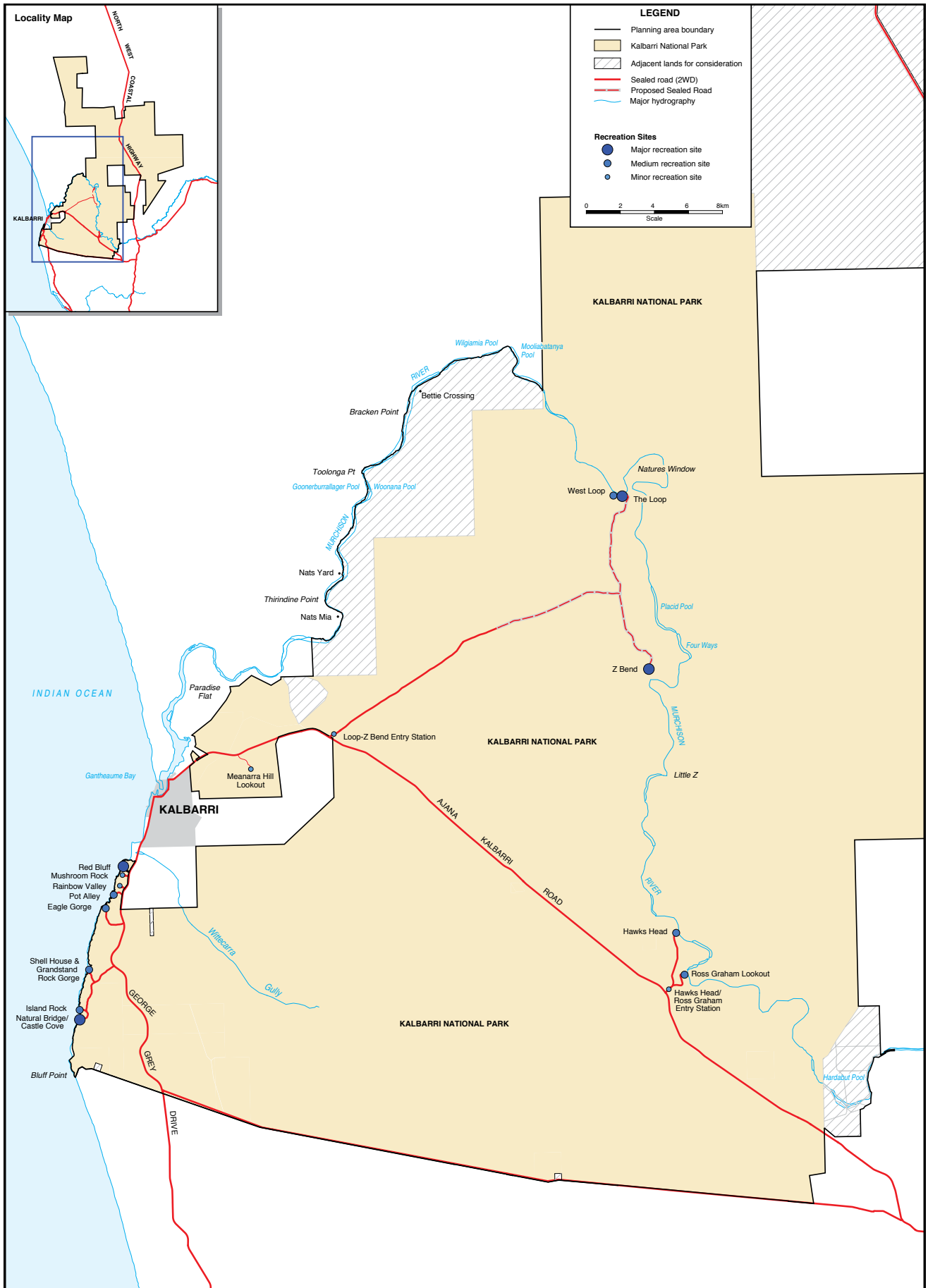




Map 2. Existing and proposed tenure



Map 3. Recreation sites





# Appendices

## Appendix 1. Consideration of adjacent lands – further detail

The Interim Biogeographic Regionalisation for Australia (IBRA) system provides a planning framework for selecting and measuring a CAR system of protected areas. The planning area lies within two IBRA subregions: the Geraldton Hills subregion (part of the Geraldton Sandplains bioregion) and the Edel subregion (part of the Yalgoo bioregion) (see Figure 1).

The adjacent lands considered for inclusion in the conservation reserve system identified in this plan will increase representation of the under-represented Geraldton Hills subregion in the conservation reserve system by about 2.6 per cent and the Edel subregion by about 12.2 per cent.

Land within the planning area but outside Kalbarri National Park falls into three categories. These are:

- lands purchased for conservation
- UCL and unmanaged reserves
- Reserve 31100.

The rationale for considering the inclusion of these conservation and culturally significant lands in the conservation reserve system is given below.

### Land purchased for conservation

There are three areas of former pastoral lease in the planning area purchased by the department for inclusion in the conservation reserve system. The areas are the central portion of Nerren Nerren pastoral lease and two portions of Murchison House on the eastern side of the Murchison River. These areas, shown on Map 1 (Map ID 1–3) are UCL and are described in Table 3. They were identified for reservation because they:

- will provide better protection for the natural, cultural and recreational values of the Murchison Gorge
- have the potential for development of new and/or complementary recreation sites and experiences (including access to these sites) to those already on offer within Kalbarri National Park
- will provide a more practical reserve management boundary.

A recommendation for reservation of portions of former Murchison House Station (Map ID 1) was also included in *Conservation reserves for Western Australia: As recommended by the Environmental Protection Authority 1976: systems 1, 2, 3, 5* (EPA 1976).

UCL purchased for conservation is currently managed under an MoU between the department and the Department of Lands. The MoU provides interim guidance for the acquisition and management of pastoral leases before their inclusion to the conservation reserve system can be completed. It identifies management goals for the department, which include:

- conservation of native plants, animals and habitats
- conservation of physical, cultural and scenic resources
- conservation of groundwater resources
- management of environmental weeds and introduced animals
- rehabilitation of areas degraded by past activities
- provision of sustainable, high-quality nature-based recreation and tourism opportunities, where appropriate

- facilitation of public enjoyment through the provision of access and visitor facilities, where appropriate
- consideration of joint management arrangements with the traditional owners.

Where possible, integrated management in accordance with the CALM Act is proposed for the land identified in Table 3, as well as Kalbarri National Park and other surrounding lands. If reservation is achieved, management guided by the MoU will cease and management under this management plan will commence.

**Table 3. Land purchased for conservation**

Map ID	Proposed addition	Area (ha)	Current tenure	Proposed change
1	Lot 3035 on plan 45068 (former part Murchison House Station)	428.69	UCL (former pastoral lease acquired for conservation)	Add to KNP
2	Lot 3037 on plan 45068 (former part Murchison House Station)	8,100.3	UCL (former pastoral lease acquired for conservation)	Add to KNP
3	Lot 368 on plan 52033 (former part Nerren Nerren Station)	104,211.2	UCL (former pastoral lease acquired for conservation)	Conservation reserve

UCL – unallocated Crown land

KNP – Kalbarri National Park

Conservation reserve – land to which the CALM Act applies

UCL and unmanaged reserves

The plan proposes areas of UCL and unmanaged reserves for inclusion in the conservation reserve system. These areas are shown on Map 1 and described in Table 4. These areas have been identified for reservation because:

#### Map ID 4

- it supports vegetation associations, floristic communities or landscape types that are either not represented or not well represented in the conservation reserve system and have been identified as being of high priority for addition
- it will provide for a more practical reserve management boundary and improve ecological linkages to conservation reserves outside the planning area, providing larger areas with improved potential for conservation
- part of the area is recommended in *Conservation reserves for Western Australia: As recommended by the Environmental Protection Authority 1976: systems 1, 2, 3, 5* (EPA 1976)

#### Map ID 5

- it will provide a more practical reserve management boundary and improve ecological linkages to conservation reserves outside the planning area, providing larger areas with improved potential for conservation

#### Map ID 6

- it is identified in a Cabinet decision in 1992 for addition to the conservation reserve system to compensate or offset previous excisions from Kalbarri National Park
- it will provide a more practical reserve management boundary and improve ecological linkages to conservation reserves outside the planning area, providing larger areas with improved potential for conservation

#### Map ID 7–15

- these areas will provide better protection for the natural, cultural and recreational values of the Murchison Gorge

- these will provide refuges for species impacted by climate change, which will, in turn, improve the resilience of affected species
- these will increase the representation and protection of the important geodiversity in the area
- these will provide potential for the development of new and/or complementary recreation sites and experiences to those already on offer within Kalbarri National Park
- the area is recommended for amalgamation with the park in the *Kalbarri plan* (Department of Planning and Urban Development 1992)

### Map ID 16, 17, 19

- it will provide a more practical reserve management boundary.

These lands are currently managed under an MoU between the department and the Department of Lands. The MoU provides guidance for the administration and/or management of UCL and unmanaged Crown reserves outside the Perth metropolitan area, regional centres and town sites. It identifies a range of management responsibilities for the department, some of which include:

- fire prevention
- control of environmental weeds and introduced animals
- managing the harvesting of flora and forest produce
- liaison with relevant stakeholders, including local government, neighbours and Aboriginal people
- recreation management
- management of special values such as Aboriginal cultural heritage.

Where possible, integrated management in accordance with the CALM Act is proposed for the land identified in Table 4, as well as Kalbarri National Park and other surrounding lands. If reservation is achieved, management guided by the MoU will cease and management under this management plan will commence.

**Table 4. UCL and unmanaged reserves**

Map ID	Proposed addition	Area (ha)	Current tenure	Proposed change
4	UCL PIN 1012123, 11488528, 11488529, (west of Coolcalalaya and Yandi pastoral leases)	9,5851.2	UCL	Conservation reserve
5	Murchison loc 171 (Lot 171 on plan 210528)	657.7	UCL	Conservation reserve
6	UCL PIN 1012103, 1012105 (north of Eurardy pastoral lease)	28,626.1	UCL	Add to KNP
7	Murchison loc 23 (Lot 23 on plan 228428)	244.5	UCL	Add to KNP
8	Murchison loc 24 (Lot 24 on plan 228428)	318.4	UCL	Add to KNP
9	Murchison loc 195 (Lot 195 on plan 215983)	250.7	UCL	Add to KNP
10	Murchison loc 276 (Lot 276 on plan 215983)	30.3	UCL	Add to KNP
11	Lot 300 on plan 53824	463.9	UCL	Add to KNP
12	Victoria loc 11559 (Lot 11559 on plan 215983)	155.8	UCL	Add to KNP
13	River reserve (part PIN 10005474)	68.0	UCL	Add to KNP
14	R 13126 (Purpose: camping. Class C)	251.7	Crown reserve	Add to KNP
15	R 13127 (Purpose: waterway. Class C)	27.5	Crown reserve	Add to KNP



Map ID	Proposed addition	Area (ha)	Current tenure	Proposed change
16	R 14440 (Purpose: Paddock, Rabbit Department. Class C)	15.8	Crown reserve	Add to KNP
17	R 18403 (Purpose: Water and camping, Rabbit Department. Class C)	15.8	Crown reserve	Add to KNP
19	UCL PIN 1005456, 1005466, 1323870, 1185611, 1323869, 1185610, part of 1113766 (adjoining southern boundary of Kalbarri National Park)	27.7	UCL	Add to KNP

UCL – unallocated Crown land

KNP – Kalbarri National Park

Conservation reserve – land to which the CALM Act applies

## Reserve 31100

This management plan furthers the 1992 government decision that Reserve 31100 be considered for inclusion in the conservation reserve system. The area is shown on Map 1 (Map ID 18) and described in Table 5. This reserve originally contained the Kalbarri town site airstrip, which has since been relocated. Reserve 31100 was identified for addition to Kalbarri National Park as compensation for the area excised from the park for the relocation of the airport. The addition of this reserve would also provide a more practical reserve management boundary.

Reserve 31100 is vested in the Shire of Northampton, with the shire responsible for its rehabilitation and management. As the reserve was used as an airstrip, the land currently has degraded natural values and is in need of rehabilitation. Addition of the area to rationalise the park boundary should occur once the area has been successfully rehabilitated.

**Table 5. Reserve 31100**

Map ID	Proposed addition	Area (ha)	Current tenure	Proposed change
18	R 31100 Vested in the Shire of Northampton Purpose: Aerial landing ground Class C	32.4	Crown reserve WPL (21 years) approval of Minister required	Add to KNP

KNP – Kalbarri National Park

## Conservation significance of adjacent lands considered for reservation

The conservation significance, threats and management issues on lands to be considered for reservation are outlined below.

### Geology, landforms and soils

Geology of the adjacent lands considered for reservation to the north-east of the park are part of the Victoria Plateau and comprise a gently undulating sandplain with minor fields of sand dunes.

The Hardabut Fault lies to the south-east of the park, within the area considered for reservation in the Hardabut Pool area. South of the Hardabut Fault is the Northampton Complex, which contains the oldest rocks in the region and is poorly represented in the conservation reserve system. Addition of UCL and reserves 13126 and 13127 (Map ID 7–15) in the Hardabut Pool area would increase the representation and protection of the important geodiversity in the area (granulite and gneiss). The geodiversity may also support flora species and vegetation types not currently well represented in the conservation reserve system.

Former part Murchison House Station<sup>35</sup> includes about 30km of the Murchison River and features of geological significance such as sandstone gorge.

There is potential for damage to geological features, landforms and soils on these lands from introduced animals and associated erosion, particularly on areas of former pastoral lease.

### Native plants and plant communities

Although flora surveys have been conducted on the adjacent lands, further work is required. Four hundred and thirty plant species have been recorded, with five species endemic to these areas. Many were documented as part of the southern Carnarvon Basin survey, conducted in 1994 and 1995, when flora was surveyed on Nerren Nerren Station (Keighery et al. 2000).

The adjacent lands considered for reservation contain a number of species of conservation significance including:

- three species listed as ‘threatened flora’ under the *Wildlife Conservation Act (Wildlife Conservation (Rare Flora) Notice 2012 (2))*—*Hypocalymma longifolium*, Kalbarri leschenaultia and *Stachystemon nematophorus*. This species is also listed as threatened or vulnerable<sup>36</sup> under the EPBC Act
- 45 priority species<sup>37</sup> comprising 10 Priority 1 species, 12 Priority 2 species, 17 Priority 3 species and six Priority 4 species
- 35 recorded range-end species (eight per cent of all recorded species in the adjacent lands). Of these, 94 per cent are at their northern limit (Keighery et al. 2000).

An interim recovery plan has been prepared for one threatened species in the adjacent lands, *H. longifolium*.

The vegetation of the adjacent lands is predominantly shrubland comprising acacia or proteaceous species. These lands contain 13 vegetation associations, six of which are not found in Kalbarri National Park. In addition, eight of these vegetation associations are currently underrepresented in the conservation reserve system (less than 15 per cent). Reservation of these areas would protect four of these underrepresented vegetation associations to greater than 15 per cent in conservation reserves (the IBRA benchmark). Representation of the mallee and acacia thicket on coastal dunes (currently not protected in any conservation reserves) would increase by 97.5 per cent. Similarly, the adjacent lands considered for reservation would increase the protection of shrublands of acacia, casuarina, *Eucalyptus eudesmioides*, *Banksia ashbyi* and thickets of other mixed species by 66.6 per cent and bowgada scrub and scattered eucalypt and cypress pine by 23.1 per cent. Representation of other vegetation associations would also improve.

<sup>35</sup> Former part Murchison House Station refers to the part of Murchison House Station which was once a pastoral lease but has been acquired by the Department for conservation. This term also applies to former part Nerren Nerren Station.

<sup>36</sup> A native species is eligible to be included in the endangered category at a particular time if, at that time, (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria. A native species is eligible to be included in the vulnerable category at a particular time if, at that time, (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria (Department of Sustainability, Environment, Water, Population and Communities 2012).

<sup>37</sup> Priority 1 and 2 flora in particular are still considered to be under threat even though they are not declared as ‘rare’ under the Wildlife Conservation Act.

### Native animals and habitats

As with flora, native animal surveys of the adjacent lands considered for reservation have been limited. Three hundred and seventy-six species have been recorded from these lands, comprising 16 mammals, 97 birds, 50 reptiles and 207 invertebrates. Most of these were documented as part of the southern Carnarvon Basin survey, conducted in 1994 and 1995, when sites on Nerren Nerren and at Hardabut Pool were surveyed for fauna (Burbidge *et al.* 2000).

The adjacent lands considered for reservation contain the following fauna species of conservation significance:

- three threatened species listed under the Wildlife Conservation Act (*Wildlife Conservation (Specially Protected Fauna) Notice 2012 (2)*): malleefowl, eastern curlew (*Numenius madagascariensis*) and shield-backed trapdoor spider and one species listed under the Wildlife Conservation Act as specially protected – the peregrine falcon
- one threatened species listed under EPBC Act: the malleefowl
- four migratory bird species on the national List of Migratory Species under the EPBC Act, that are listed under international agreements: eastern curlew (*Numenius madagascariensis*), ruddy turnstone (*Arenaria interpres*), fork-tailed swift (*Apus pacificus*) and rainbow bee-eater (*Merops ornatus*)
- three Parks and Wildlife priority species: the Priority 3 reptile, *Lerista humphriesi* and the Priority 4 birds, Australian bustard and bush stone-curlew
- eight invertebrate species endemic to the adjacent lands considered for reservation
- one bird species at the northern limit of its range: red wattlebird (*Anthochaera carunculata*)
- one reptile at the southern limit of its range: micro slider (*Lerista micra*).

Surveys by Halse *et al.* (2000) at Hardabut Pool suggest very high invertebrate species richness, which is probably typical of much of the Murchison River within the planning area.

The adjacent lands have not been well surveyed for fauna habitat. The woodlands in the north-eastern part of the park and on the UCL east of the North West Coastal Highway (Map ID 4) are likely to support red-tailed black cockatoos (*Calyptorhynchus banksii*) and malleefowl. Areas of tree heath in the adjacent lands considered for reservation may also be important bird habitat.

### Environmental weeds

Few weeds have been recorded in the adjacent lands considered for reservation, though the area has not been well surveyed. As the majority of these areas are former pastoral lease or UCL that adjoins existing pastoral leases, weeds are likely to exist.

### Introduced and other problem animals

Further surveys for introduced animals are required in the adjacent lands considered for reservation and are likely to indicate significant impacts. As is the case for Kalbarri National Park, goats, pigs, rabbits, foxes and cats are believed to impact the adjacent lands. More detail on these species is provided in *Introduced and other problem animals*.

Other introduced species known from the adjacent lands include:

- camels (*Camelus dromedarius*) known from wetland soaks in Zuytdorp Nature Reserve to the north of the planning area. Camels are also possibly present in northern parts of the adjacent lands considered for reservation such as former part Nerren Nerren (DEC 2012c). Currently, no control measures are used
- deer (*Cervus timorensis*) that may be present in the northern parts of the adjacent lands considered for reservation (DEC 2012c), such as the UCL east of the North West Coastal Highway (Map ID 4). Currently, no control measures are used

- wild dogs that have recently moved from further inland into northern and north-eastern parts of the adjacent lands considered for reservation and are likely to be present on former part Nerren Nerren Station. Currently, no direct control measures are used.

### **Fire**

Under the MOUs with the Department of Lands (which has legislative responsibility for the management of UCL), Parks and Wildlife is responsible for managing fire preparedness on UCL and unmanaged reserves outside the metropolitan area, regional centres and town sites, while local government is responsible for bushfire suppression. This applies to the areas of UCL and unmanaged reserves within the adjacent lands.

### **Aboriginal culture and heritage**

The adjacent lands considered for reservation are known to contain 19 Aboriginal sites recorded on the Department of Aboriginal Affairs *Register of Aboriginal Sites*. Sixteen of these are on former part Murchison House Station and are located near water sources. Ethnographic and archaeological surveys have been conducted over a relatively small portion of the adjacent lands considered for reservation and it is therefore highly unlikely that all Aboriginal sites have been officially recorded.

### **Other cultural heritage**

Part of the State Barrier Fence (known as Fence No. 3), passes through the adjacent lands considered for reservation to the north-east of the park (Department of Agriculture 2001). The State Barrier Fence was originally constructed between 1901 and 1907 and comprises a number of separate fences. Constructed in an arc from north of Kalbarri to east of Ravensthorpe, the State Barrier Fence was designed to keep rabbits, wild dogs, emus (*Dromaius novae-hollandiae*), kangaroos and other pest and problem animals out of the agricultural and pastoral areas. Parts of the fence are still maintained for this reason today.

### **Visitor use**

There is little or no visitor use in the adjacent lands considered for reservation, mainly as a result of the remoteness and lack of access, especially in areas to the north of Kalbarri National Park. Where visitor use does occur, for example in areas of UCL in the Hardabut Pool area (Map ID 7–15), no recreation sites or facilities are provided and use is unmanaged.

There is great potential for the development of recreation opportunities in the adjacent lands considered for reservation and this will be considered in consultation with Nanda.

Sites including former part Murchison House Station downstream of The Loop and in the Hardabut Pool area (see Map 1 IDs 1, 2 and 7–15 respectively) are likely to provide opportunities for visitors to enjoy landscapes and experiences that are not available in Kalbarri National Park. These may include new opportunities for camping, bushwalking, hiking, sightseeing, abseiling and rock climbing, and for accessing the Murchison River for canoeing and kayaking. Should former part Murchison House Station become part of the conservation reserve, a range of sites that complement experiences already available in the park and in the surrounding landscape may be considered.

### **Mineral and petroleum operations**

There are a number of live and pending mineral exploration licences on adjacent lands.

## **Beekeeping**

There are several apiary sites within the adjacent lands considered for reservation. These sites are used about every four years by apiarists to make use of the pollen from York gum. To determine the compatibility of beekeeping with key values of the areas being utilised, an assessment will be conducted at the time of renewal of the apiary site permit. The assessment should be consistent with the department's draft revised Policy Statement No. 41 *Beekeeping on public land* (CALM 2004) (under review) and the *General conditions for using apiary authorities on Crown land in Western Australia* (DPaW 2013). Criteria such as proximity to threatened flora and ecological communities, weeds, disease risk areas and recreation sites, will be considered during the assessment.





