Kennedy Range National Park and Proposed Additions

2008
Management Plan No 59

ACT NOW FOR THE FUTURE

Department of Environment and Conservation
Our environment, our future

Conservation Commission
WESTERN AUSTRALIA

CONTENTS

PART A. INTRODUCTION

1. BRIEF OVERVIEW

Kennedy Range National Park is located approximately 150 km east of Carnarvon and approximately 15 km north of Gascoyne Junction. The park and its proposed additions encompass 319 037 hectares.

The range is a remarkable landscape feature which rises about 100 m above the surrounding plain and comprises an isolated remnant of an older land surface. Apart from its outstanding geology and scenic beauty, the park is valued for a variety of natural values.

The park is located within the Western Australian Planning Commission's (WAPC) Gascoyne Planning Region of Western Australia and within the Shires of Carnarvon and Upper Gascoyne.

The proposed additions of 177 377 ha were purchased with the intention to add the area to the public conservation estate (nominally as national park). The purchases comprise the Mooka pastoral lease and parts of seven other adjoining leases (see Map 1 and Section 6. *Existing and Proposed Tenure*).

Unless otherwise stated, references to 'the planning area' encompass both the existing national park and the proposed additions as stated above. It is intended that these proposed additions will come under the provisions of this management plan once the change in land tenure and purpose occurs and the lands become vested with the Conservation Commission of Western Australia (Conservation Commission).

2. KEY VALUES

Maintaining or enhancing the key values of the planning area will be the focus of this management plan. These values will also form the basis for future audits of the management plan by the Conservation Commission (see Section 7. *Performance Assessment*).

Natural

- representative of a remnant of an older surface, much of which has remained relatively intact due to the geology, relative isolation, difficulty of access and lack of permanent water over much of the area;
- springs and soaks that provide important habitats for invertebrates that do not occur elsewhere in the region or do so only rarely;
- Mooka Spring and its associated creek represent a regionally significant aquatic system and an unusual ecological community;
- a diverse mix of predominantly arid flora of southern affinities and with outliers more common in the south-west;

- diverse geology that is richly fossiliferous, including rare semiprecious gemstone and fossil occurrences, which helps unravel Australia's recent geological evolution; and
- vegetation of top of the range that has been subjected to minimal livestock grazing.

Wilderness

- qualities of remoteness and naturalness not readily available elsewhere in the Carnarvon Bioregion.

Cultural

- 187 Aboriginal sites have been recorded, to date, in and around the planning area;
- an important part in the mythological history of the region; and
- historic features such as the disused Binthalya Homestead and the relics of the old Merlinleigh Homestead provide evidence of the former rich pastoral history in the planning area.

Recreation

- a scenically beautiful, diverse landscape of geological features, landforms and colours; and
- an environment imparting a strong sense of remoteness.

Education and Research

- opportunities for interpretation of natural and cultural values, and education of visitors; and
- a diverse array of natural environments providing numerous research opportunities.

Economic

- icon for the Gascoyne Murchison Region with links to the Gascoyne Murchison Outback Pathways; and
- potential for commercial tourism enterprises.

PART B. MANAGEMENT DIRECTIONS AND PURPOSE

3. VISION

By 2017 the natural values of the planning area will have improved through efforts focused on effective feral animal control, and the provision of carefully considered, sustainable recreational opportunities. The latter will also play a major role in visitors' enjoyment of the area, and contribute economic opportunities to the region. Significant improvements to the management of cultural values, with the involvement of the traditional custodians, will also be in place.

4. LEGISLATIVE FRAMEWORK

National parks are created under the *Land Administration Act 1997*, vested in the Conservation Commission and managed by the Department of Environment and Conservation (the Department) in accordance with the *Conservation and Land Management Act 1984* (CALM Act), the *Wildlife Conservation Act 1950*, and the policies of the Department and the Conservation Commission.

The primary objective in management of national parks, as defined in s.56 of the CALM Act is to:

"*Fulfil so much of the demand for recreation by members of the public as is consistent with the proper maintenance and restoration of the natural environment, the protection of indigenous flora and fauna and the preservation of any feature of archaeological, historic or scientific interest*".

CALM Act section 5(1)(h) reserves are created under the Land Administration Act, vested in the Conservation Commission and managed by the Department for a variety of purposes including recreation and conservation (e.g. recreational fossicking).

The CALM Act does not derogate from the operation of the *Mining Act 1978*, the *Petroleum Act 1967*, the *Petroleum (Submerged Lands) Act 1982*, any other Act relating to minerals or petroleum, or any Government agreement within the meaning of the *Government Agreements Act 1979*.

Departmental policies of particular relevance to this plan include:

- proposed Policy Statement 9 – *Conserving Threatened Species and Ecological Communities* (subject to final consultation);
- Policy Statement 34 – *Visual Resource Management of Land and Waters Managed by CALM* (CALM 1989);
- Policy Statement 53 – *Visitor Risk Management* (CALM 1986);
- proposed Policy Statement – *Environmental Weed Management* (subject to final consultation);

- proposed Policy Statement – *Management of Pest Animals on CALM- Managed Lands* (subject to final consultation); and
- Policy Statement 18 – *Recreation, Tourism and Visitor Services* (DEC 2006).

5. MANAGEMENT ARRANGEMENTS WITH INDIGENOUS PEOPLE

As the Aboriginal history of the planning area is poorly documented, a key issue for management is the involvement of the traditional custodians. There is a strong interest by Aboriginal people to be involved in the management of the conservation estate in Western Australia. By working together with Aboriginal people to care for the land, there will be benefits for the preservation of heritage and conservation of the environment, as well as cross cultural awareness.

The State Government has shown a commitment to explore joint management arrangements with traditional custodians by developing a consultation paper outlining options for ownership, administration and joint management of conservation lands in Western Australia (Government of Western Australia 2003). This paper discusses how these joint management arrangements may work.

Under the *Native Title Act 1993,* the Yamatji Marlpa Barna Babba Majja Aboriginal Corporation is the representative body for the planning area. The role of such bodies is to assist Aboriginal groups or individuals to make applications for native title, help resolve disagreements between groups making applications, and assist groups and individuals by representing them in native title negotiations and proceedings.

There are two registered native title claims under the *Native Title Act 1993* within the planning area, the WAG6161_98 Gnulli claim which includes all of the planning area excluding the WAG6212_98 Thudgari claim which takes in the most northern section of the range.

The Department will work with the Corporation and the native title claimants to progress their involvement in management.

6. EXISTING AND PROPOSED TENURE

Kennedy Range National Park, comprising an area of 141 660 ha, is a class 'A' reserve (No. 42474), gazetted on 8 January 1993. In 2000 and 2001 the Department purchased 177 377 ha of adjoining land with the intention of adding the area to the public conservation estate, nominally as national park. These purchases were made as part of the implementation of the Gascoyne-Murchison Strategy (see Section 9. *Biogeography*) with funding provided by both the Australian and State Governments. Any change in reservation will require consultation with the Department of Industry and Resources (DoIR) with respect to mineral prospectivity and Aboriginal groups with respect of any native title and interests.

The purchases comprise the Mooka pastoral lease and parts of seven other adjoining leases. Six of the eight purchases have been placed under the management of the Department under section 33(2) of the CALM Act whilst two (Mooka and part of Minnie Creek) remain as unallocated Crown land (UCL). All areas will be managed as if they were already national park whilst the process to add them to the public conservation estate proceeds.

Granted mining leases (M09/86 and M09/18) that cover part of the former Mooka pastoral lease will be excluded from the proposed national park additions and established as a separate CALM Act section 5(1)(h) reserve. Subject to an evaluation of the geoheritage significance of mookaite being determined, an area may also be excised from the national park and set aside as a CALM Act section 5(1)(h) reserve for conservation and recreational fossicking. These reserves will comprise part of the planning area for this management plan.

7. PERFORMANCE ASSESSMENT

The Conservation Commission will measure the success of this plan by using performance indicators (see *Management Summary Table* at the end of this document), and other mechanisms as appropriate. Given resource and technical impediments, it is not efficient to measure all aspects of management. Consequently, indicators will target 'key' components of the plan. Kanowski *et al.* (2001) defined 'key' performance indicators (KPIs), when considering the conservation of biodiversity as *"…the minimum set, which if properly monitored, provide rigorous data describing the major trends in, and impacts on, Australian biodiversity"*. This includes evaluation of a measure and target, reporting requirements and a management response to any target shortfall. These components provide a basis for adaptive management, whereby management can be altered, if necessary, to meet a desired outcome.

The Department is responsible for providing information to the Conservation Commission to allow it to assess the success of the Department's management and meeting targets specified in the KPIs. The frequency of these reports will depend upon the requirements of each KPI. Where a report identifies a target shortfall, a response to the Conservation Commission is required. The response may identify factors that have led to the target shortfall, and propose alternative management actions where appropriate. The Conservation Commission will consider the Department's response on the target shortfall and evaluate the need for action in the context of its assessment and audit function under section 19(1)(g)(iii) of the CALM Act. The Conservation Commission will make the results of audits available to the public.

8. NAMING OF SITES AND FEATURES

For the purposes of this plan and to facilitate discussion, informal names have been attributed to many of the sites and features in the planning area. More appropriate names may exist

and stakeholders are encouraged to forward suggestions for names of sites and topographical features. Changes to formal names will require the approval of the State Geographic Names Committee.

PART C. MANAGING THE NATURAL ENVIRONMENT

9. BIOGEOGRAPHY

The National Reserve System Program (NRS) was adopted to preserve Australia's natural biodiversity on a regional scale, and initiate a protected reserve system that meets world's best standards in terms of comprehensiveness, adequacy and representativeness (Thackway and Cresswell 1995). As a framework for developing this system, the NRS initiated the Interim Biogeographic Regionalisation for Australia (IBRA), dividing Australia into 85 bioregions (which may be further divided into sub-regions). This system represents a landscape based approach to classifying the land surface using specialist ecological knowledge, combined with regional and continental scale data on climate, geomorphology, landform, lithology and characteristic flora and fauna.

The planning area is located within the Wooramel sub-region of the Carnarvon bioregion. Prior to 2000/2001 only 3.59% of this sub-region was formally reserved for conservation, still well under the recommended level of reservation for a CAR reserve system (generally acknowledged as 15% (CALM 2003). The acquisition of 364 144 ha through the Gascoyne-Murchison Strategy saw this percentage increase to 9.61% with the 177 377 ha proposed to be added to the national park representing a significant 3% of this total.

Extensive, low gradient, alluvial plains, in which the erosional upland of the Kennedy Range forms a sharp contrast, dominate the region.

10. WILDERNESS

The World Conservation Union defines wilderness as a:

"…large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so to preserve its natural condition".

The Australian Heritage Council (previously Australian Heritage Commission) has compiled and maintains the National Wilderness Inventory (NWI), also known as the Australian Land Disturbance Database, which is designed to identify wilderness quality across Australia. The NWI uses a quality index rating of 0-20, with 20 being the highest quality.

The following four criteria are used to estimate the quality of wilderness:

- remoteness from settlement;
- remoteness from access;
- apparent naturalness; and
- biophysical naturalness.

The Department is seeking to designate wilderness areas across the State and no negative feedback was received in response to the draft plan's intention to declare such an area in the Kennedy Range.

Wilderness areas are created under section 62(1)(a) of the CALM Act. To support the legislation, the Department developed Policy Statement 62 – *Identification and Management of Wilderness and Surrounding Areas*, which incorporates the NWI criteria and specifies that a wilderness area must consist of a NWI wilderness quality index of at least 12 and have a minimum size of 20 000 hectares in arid, semi-arid and tropical areas (CALM 2004).

The main points of relevance of the wilderness policy to the planning area are:

- biodiversity, ecological communities and natural processes will be maintained and, where possible, restored by protecting them from unnatural disturbances and maintaining ecological systems;
- use of mechanised transport is not permitted within wilderness areas, except for emergency or essential management operations, or reasons of cultural importance;
- education and/or recreation expeditions will be permitted within wilderness,
- constructed walk trails, signs, track markers and toilets will not be provided in wilderness areas;
- prescribed burning within wilderness areas may be carried out for the protection and maintenance of biological values and processes as determined through the preparation of management plans; and
- research that contributes to the achievement of management objectives…will be encouraged…(*but*)…research methods must be compatible with the maintenance of the qualities of such areas.

The NWI assessment indicates that the top of the Kennedy Range has significant areas over 20 000 hectares and with an NWI wilderness quality rating over 12, both north and south of the track traversing the range, from which candidate wilderness areas could be chosen. Ideally, any wilderness area would include the two major land systems which vary greatly in character – the elevated sandy plains of the Kennedy system, and the adjoining intensely dissected Moogooloo system with steep footslopes and dendritic drainage, and encompass some part of the eastern

escarpment (refer to Section 12. *Geology, Geomorphology and Land Systems*). Map 2 indicates the area of the park with a NWI rating of 12 from which candidate wilderness area/s can be chosen.

The wilderness qualities of the top of the range are not fully understood. Over the life of the plan, and to enable a wilderness area to be chosen, an analysis of these qualities will need to be undertaken. In the first instance, to gain a better understanding of the area, the focus will be to gain a better understanding of the fire ecology of the Kennedy and Moogooloo Systems. The former is the most fire prone system in the park. Effective fire management is particularly relevant to meeting the criteria for Policy Statement 62 – *Identification and Management of Wilderness and Surrounding Areas* (refer to Section 19. *Fire*).

In addition, as wilderness areas may offer some self-reliant recreational opportunities, the Department will consider what activities may be suitable within a wilderness area. This could include, for example, a 'wilderness' walk across the top of the range between the camping nodes of Temple Gorge and the proposed Yabba campground.

It is important to note that none of the management proposals in this plan are inconsistent with the above points.

11. CLIMATE AND CLIMATE CHANGE

Because of its geographical position, both the winter rainfall of the south-west and the summer rainfall of the north influence the planning area. It has a semi-arid climate, with a mean annual rainfall as low as 200 mm in places. This figure does not reflect fully the pattern and erratic nature of the rainfall and any month of the year may be totally dry.

There is broad scientific consensus that anthropogenic changes to the composition of the atmosphere are already resulting in changes to global climate processes and regional climate conditions (Steffen 2006). Assessments of the potential biodiversity impacts from current and projected climate changes indicate that 15-30% of plants species could become extinct by 2050 (Thomas el al. 2004). Even without mass extinction events, climate changes are likely to have direct and indirect implications for the location of species and the composition, functioning, management and protection of biodiversity and ecosystems because climate has a fundamental influence on the distribution and abundance of species. Hughes (2003) summarised recent research on climate change in Australia. The following points are of particular relevance to the planning area:

- projections for climate change suggest that by 2030, annual average temperatures will be 0.4-2.0o C higher over most of Australia (CSIRO 2001);
- considerable uncertainty remains as to future changes in rainfall, El Nino Southern Oscillation events (CSIRO 2001) and tropical cyclone activities (Walsh and Pittock 1998);

- changes in fire regimes are highly likely in the future, increased fuel loads are expected;
- higher CO2 level resulting in increased plant growth (Howden *et al.* 2003);
- the number of days of very high and extreme fire danger is expected to increase (Williams *et al.* 2001);
- the interactions between elevated CO2 and water supply will be especially critical for grassland and rangelands where approximately 90% of the variance in primary production can be accounted for by annual precipitation (Campbell *et al.* 1997); and
- modelling is consistent in showing most species' distributions will contract and/or become increasingly fragmented.

The "loss of climatic habitat caused by anthropogenic emissions of greenhouse gases" [1](commonly referred to as climate change) has been identified as a key threatening process under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Environment Australia 2001). The National Biodiversity and Climate Change Action Plan 2004-2007 identifies three broad strategies for terrestrial ecosystems: increase biodiversity protection across all land tenures, strengthen the reserve system, and increase protection for vulnerable taxa. The implementation of strategies in this plan aimed at reserve creation, feral animal and weed control, fire management, and potential re-introduction programs, will assist in enhancing the capacity of ecosystems to accommodate changes to climate conditions in situ and in decreasing the impacts of current threatening processes.

12. GEOLOGY, GEOMORPHOLOGY AND LAND SYSTEMS

During the Permian, some 270 million years ago, the Kennedy Range area of the Gascoyne region was a large marine shelf and fringing shoreline, part of the Merlinleigh Sub-Basin of the Southern Carnarvon Basin. Thick layers of sand and silt were deposited in this environment, which were slowly compressed over millions of years to form beds of sandstone and siltstone, known today as the Wooramel Group, the Byro Group and the Kennedy Group. Deposition of sediments probably continued intermittently during the following 100 million years until the break-up of Gondwana caused the Merlinleigh Sub-Basin to be uplifted. Major fault systems and folds were created during this time.

Over the next 30 million years erosion removed the uplifted layers of rock, leaving the Permian rocks exposed at the surface. Deposition of the Winning Group over much of the area followed during the Cretaceous, comprising siltstone, sandstone and radiolite. The Merlinleigh Sandstone was then deposited during

[1] Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases consists of reductions in the bioclimatic range within which a given species or ecological community exists due to emissions induced by human activities of greenhouse gases.

the Eocene, and laterite and silcrete developed probably during the Oligocene and Miocene, creating a regionally extensive land surface.

Uplift during the Miocene, about 20 million years ago, probably initiated the formation of the Kennedy Range, with subsequent erosion stripping off most of the Winning Group and the Merlinleigh Sandstone and dissecting the old land surface. Consequently, the underlying Kennedy Group now forms much of the range, and the Byro and Wooramel Groups outcrop it's eastern side. Remnants of the Winning Group outcrop along its western side. Arid conditions during the Pliocene and Pleistocene led to the creation of extensive dunefields over the Kennedy Range and surrounding areas.

The Kennedy Range, a remnant of an eroded land surface, rises about 100 m above the surrounding plain and forms a large, western-sloping plateau extending over 80 km from north to south and up to 25 km wide. The upper third of the distinctive plateau margin is commonly sandstone cliff, below which is a steep rubble footslope and gently sloping pediment. Contrast between these three forms is sharp, with occasional tumble blocks, to 4 m across, present on the pediment. Freshwater springs outcrop along the western escarpment, providing permanent pools.

Fossilised burrows, or trace fossils, are abundant within parts of the sandstones of the planning area. These conspicuous fossils are worm-like structures created by the burrowing of marine organisms. The planning area also includes other rock sequences (both older and younger) that are fossiliferous. Fossilised *Banksia* cones found in the range are about 50 million years old and represent the earliest known confirmed occurrence of the genus in Australia.

Semi-precious stones found in the planning area are mookaite and petrified wood ('peanut wood'), found in the white hills and several drainage lines on the west side of the range. These areas are the only place in the world where mookaite is found, making them potentially important and significant geological heritage sites. Mookaite is mined intermittently from Mooka Creek (see Section 28. *Mineral and Petroleum Exploration and Development*).

Section 115 of the Mining Act authorises the Director of Geological Survey of Western Australia (GSWA) and his agents to enter upon any land for the purposes of geological research by or for GSWA (GSWA is a Division within DoIR). All additional palaeontological research undertaken in the Park must be authorised by DEC (see Section 35. *Research and Monitoring*). Excluding these specific research activities, damage, disturbance or removal of fossils, without lawful authority, is prohibited under regulation 31 of the *Conservation and Land Management Regulations 2002* (CALM Regulations).

Geoheritage

The Director of the GSWA can designate geological features that are considered unique within Western Australia and/or

have significant geoheritage or geoscientific values as a State Geoheritage Site. Currently, there are no geoheritage sites registered in the Park.

It is proposed that the geoheritage significance of mookaite be evaluated with the intent to register a site/s which best represent the stone. The spatial extent of mookaite would need to be established and within this context, options for an adequately resourced area of land for recreational fossicking considered (refer to Section 28. *Mineral and Petroleum Exploration and Development–Mineral and Petroleum Resources and Prospectivity*). How this geoheritage evaluation could be achieved requires further discussion with DoIR.

Land Systems

Five land systems dominate the planning area. Christian and Stewart (1968) define a land system as 'an area or group of areas throughout which there is a recurring pattern of topography, soils and vegetation'. The Kennedy land system forms the elevated sandy plains on top of the plateau, with large linear to reticulate red sand dunes and wide swales supporting hard spinifex grasslands with numerous shrubs. The dunefield we see today (which overlies an older consolidated dune field) was formed by the reworking of this older field and formed during an arid phase about 25 000 to 16 000 years ago.

The Moogooloo land system completely surrounds the Kennedy system. It includes the spectacular eastern escarpment and intensely dissected parts of the Range, steep footslopes and dendritic drainage, all supporting tall shrublands of mulga (*Acacia aneura*) and other acacias. Marine trace fossils are exposed in some sandstone beds. After rain, waterfalls and pools occur in the eastern gorges and streams flow into the Lyons River valley.

The western slopes of the Range are lower, less steep and more extensively dissected than the east. Adjoining the Moogooloo land system on the western side are the Cahill and Billy land systems, now well represented within the south-western portion of the planning area by the pastoral lease purchases. The Cahill land system is sandy alluvial plains and channelled flow zones with tall shrublands of various acacias. The Billy land system comprises low plateaux, mesas and buttes with stony footslopes and narrow drainage floors, supporting scattered tall shrublands, mulga and other acacias.

Newly represented within the proposed additions to the national park (by the addition of the Mooka pastoral lease) is an extensive area of aeolian sandplain dominated by linear dunes and broad swales. Known as the Yalbalgo land system, the swales support tall acacia shrublands with an under-storey of shrubs or hard spinifex. This dune field is of similar age to those on the Kennedy land system.

Modern vegetation patterns, along with the dune systems and the sea level, stabilised by about 8000 years ago.

The proposed additions to the national park have increased its natural value primarily by capturing the northern extent of the range, creating a wider buffer around the Range by the addition of the footslopes, and by increasing poorly represented land systems within the Western Australian reserve system. Of particular importance to management will be the protection of springs and soaks located along the western slopes of the Range. For example, feral goats cause extensive landscape degradation, particularly around waterholes and breakaway country (see Section 18. *Introduced and Other Problem Animals*).

13. HYDROLOGY AND CATCHMENT PROTECTION

Because of its geographical position, both the winter rainfall of the south-west and the summer rainfall of the north influence the planning area. It has a semi-arid climate, with a mean annual rainfall as low as 200mm in places. This figure does not reflect fully the pattern and erratic nature of the rainfall and any month of the year may be totally dry.

Rainfall Effectiveness

Plant growth in the arid zone is limited primarily by a lack of soil moisture. Even in the wettest years, actual rainfall never approaches the area's evaporation potential. Due to the potential evaporation being much higher in summer, it is usually winter rain that recharges soil moisture sufficient to promote significant periods of plant growth. Cyclonic/irregular rains, however, are also important as they trigger shrub germination that cannot take place in winter.

Hydrology

The planning area lies predominantly within the Merlinleigh Sub-Basin of the Carnarvon Basin. The Carnarvon Basin is generally lacking in permanent surface water, but the utilisation of groundwater has allowed the successful development of a pastoral industry.

Erosion Potential and Protection

The potential for erosion in each of the five land systems within the planning area varies.

The Kennedy system that forms the elevated sandy plains on top of the plateau is quite a stable system when vegetated, but is prone to erosion when the vegetation cover, mostly spinifex, is removed. The primary agent of disturbance in this land system is fire – grazing by feral goats is not of major consequence due to the generally unpalatable vegetation and lack of water. Erosion of the Kennedy system has the potential to impact on downstream aquatic systems such as Mooka Spring, but can be prevented by appropriate fire management (e.g. burn size and distribution).

The Moogooloo land system surrounding the Kennedy land system is a harder surface and includes the spectacular sandstone faces of the eastern escarpment. The harder surface and the steepness of some areas of this system provide some inherent protection from effects of feral grazers.

The Billy land system comprises the low plateaux and mesas and associated footslopes of much of the south-western section of the planning area. These surfaces are erosional, the potential of which is increased by feral goat activity. The breakaway features of this system are potential refugia for uncommon plant species or communities and effective feral goat control is required to protect the soils of this system.

The Cahill land system does not contain the breakaway features of the Billy system and is therefore less susceptible to erosion. However this system does contain channelled flow zones and requires protection from excessive feral grazing animals.

The Yalbalgo land system, which represents the extensive area of aeolian sandplain of the south-western section of the planning area, is not exposed to the same drainage impacts of the Kennedy system. Drainage is mostly absent within the Yalbalgo system. What drainage is present is confined within interdunal plains. This system is the least susceptible to soil-damaging erosional processes.

There are few major drainage systems within the planning area, but those that are present are significant as they provide a source of water for native animals and support species rich aquatic systems, particularly the Mooka Spring system. This system could be severely degraded through a combination of erosional forces caused by fire, grazing and high rainfall events. Control of feral grazing animals and a better understanding of the implications of fire are required to minimise damaging soil erosion events.

14. NATIVE PLANTS AND PLANT COMMUNITIES

The Kennedy Range is located within the Carnarvon Botanical District (Beard 1980). Over 400 native plant species have been recorded in the planning area, of which at least 80 are annual wildflowers. The Range supports a predominately arid flora of southern affinities and the strong desert influence is demonstrated in the composition of the flora, with arid zone taxa dominating in five of the speciose families (Asteraceae [daisies], Goodeniaceae [fanflowers], Malvaceae [hibiscus], Amaranthaceae [mulla mullas] and Poaceae [grasses]). Other well represented families include Caesalpiniaceae (peas), Myrtaceae (gums) and Myporaceae (poverty bushes).

Feral goat control is one of the most important management issues for the planning area as they have a major impact on natural values. The protection of the springs and soaks on the western side of the Range will be a priority for feral goat control. Feral goats cause severe damage to plants through overgrazing and trampling. Grazing pressure also affects recruitment of young plants, which has significant impacts on the viability of plant communities in the long-term. Activity of feral goats in and around springs can also affect the species-rich invertebrate communities of these areas (see Sections 18. *Introduced and*

Other Problem Animals, and 15. *Native Animals and Habitats–Aquatic Systems*). Recreation opportunities around the springs also need careful consideration (see Part E. *Managing Visitor Use*).

The vegetation of the Kennedy Range consists of four main types:

- vegetation of the dunefields on top of the Range;
- open shrubland in the gorges;
- fringing forest around the springs; and
- open shrubland on the alluvial plains surrounding the Range.

On the top of the Range is a dunefield, with long red dunes about 15-20 m high separated by broad swales. The swales are mostly dominated by spinifex (*Triodia basedowii*, *T. pungens*) with shrubs and mallees scattered amongst the spinifex, especially where the rocky sub-soil is exposed. One of the commonest shrubs is *Rulingia kempeana,* others include the kurrajong (*Brachychiton gregorii*) and black mulga (*Acacia citrinoviridis*). Of the several mallees, *Corymbia lenziana* is the most common. The deeper soil and leaf litter around the base of these mallees permit the growth of many smaller plants (saltbushes, mulla mullas and daisies), not found in the harsher conditions on the dunes.

The dune ridges are quite different floristically and the spinifex is replaced by shrubs, occasional grasses and bare sand. Here, many species represent groups more common in the wetter south-west of the State, including Ashby's banksia (*Banksia ashbyi*), dune featherflower (*Verticordia forrestii*), several starflowers (*Calytrix* spp.) and *Calothamnus borealis*. Grevilleas and wattles are also a feature of the ridges with the dune wattle (*Acacia ligulata*), a common sight. The dune ridges will require protection as they are easily damaged by activities (e.g. 4WD vehicles) which remove the plant cover and expose the soil to wind erosion. Frequent fires also destabilise these dunes. The plant assemblages of these dunes have been recognised as an ecosystem at risk (see *Flora and Plant Communities of Conservation Significance*).

The scree slopes of the Range have low open wattle shrublands (*Acacia sclerosperma, A. tetragonophylla, A.*spp.), poverty bushes (*Eremophila* spp.) and hop bushes (*Dodonaea* spp.), often with much bare rock exposed between the plants. Smaller shrubs include the slender horse mulla mulla (*Ptilotus schwartzii*), various *Sida* spp., and lemon-scented grass (*Cymbopogon ambiguus*), which forms large clumps. Sheltered, moister spots support herbs such as wild tobacco (*Nicotiana occidentalis*) and rock fern (*Chielanthes tenuifolia*).

In several places at the base of the western and southern ends of the Range, springs rise to form seeps, pools and some running creeks. Where there is permanent water, forest communities develop under a canopy of tall river gums (*Eucalyptus camaldulensis*) and cadjeputs (*Melaleuca leucadendron*). An

example of this is Mooka Spring and its associated creek. Mooka represents the southern limit of distribution of a few species, which include cadjeputs as an overstorey species, in combination with an intact understorey (often not seen because of grazing pressures). As the spring is wetter and more sheltered than other sites it represents an ususual ecological community. It is also a regionally significant wetland type and has been recognised as an ecosystem at risk (see Section 15. *Native Animals and Habitats–Aquatic Systems*). All the springs have a range of tropical emergent aquatic and dampland plants including droseras, sedges and bullrushes. The wetter soils of the creeklines support shrubs such as coolibah (*Eucalyptus victrix*) and *Acacia citrinoviridus*. Away from water the slopes and valleys are dominated by Acacia shrubland with mulga (*Acacia aneura*) and *A. tetragonophylla* being common.

The outwash alluvial plains carry an open shrubland of mulga and other Acacias over *Hakea*, *Eremophila* and *Senna*. *E. setacea*, although found outside of the existing national park, has its largest populations in the sandy soils at the base of Range. Two characteristic species, even in eroded areas, are bardi bardi (*Acacia victoriae*) and snakewood (*Acacia xiphophylla*). After rain a rich array of annual wildflowers cover the open flats including many small daisies, mulla mullas and saltbushes.

Flora and Plant Communities of Conservation Significance

Recently discovered in the planning area is a disjunct population of *Eremophila phylloda* subsp. *obliqua* ms, found on the top of the Range in rocky soil and three endemic Eremophila's – E. sp. Kennedy Range (M.J. Greeve 42), E. sp. Rocky slopes (T. Mitchell-Smith 56) and E. aff. clarkei.

Threatened or priority flora may also exist within the planning area. Management direction for specially protected flora, fauna, and ecological communities is provided through the Department's proposed Policy Statement 9 – *Conserving Threatened Species and Ecological Communities* (subject to final consultation).

Rare (threatened) flora are gazetted under the Wildlife Conservation Act. To date, no declared rare flora have been recorded from the planning area. Three priority species have been recorded, namely *Gymnanthera cunninghamii* and *Acacia atopa*, (both P3)[2] and *Goodenia neogoodenia* (P4)[3] *Gymnanthera cunninghamii* is a sterile collection of odd habit and its identification is questionable. Further survey work is required to confirm the validity of this record. Similarly, the

[2] Priority 3 species (Poorly Known Taxa) are those which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.

[3] Priority 4 species (Rare Taxa) are those considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently, threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

presence of *Acacia atopa,* which has not been collected from the Range since 1965, needs confirmation. Although priority species are not gazetted under the Wildlife Conservation Act and do not have the same level of legislative protection as rare flora, the priority flora list is maintained as a mechanism to highlight flora of special conservation interest.

Mooka Spring and its associated creek represent both a regionally significant aquatic system and an unusual ecological community (see Section 15. *Native Animals and Habitats–Aquatic Systems*) and are recognised as an ecosystem at risk (see Section 15. *Native Animals and Habitats–Fauna and Animal Communities of Conservation Significance*).

The Biodiversity Audit of Western Australia's Biogeographical Subregions in 2002 (CALM 2002), describes ecosystems at risk in the planning area and has placed the 'Plant assemblages (spinifex dominated) of sand dune mesa topping the Kennedy Range National Park on the Department's Priority 4-a Ecological Communities List.

It is recognised that a more comprehensive knowledge of the planning area's native plants and communities, and the impacts of fire, goats and weeds is required to improve flora management effectiveness (see Section 35. *Research and Monitoring*).

15. NATIVE ANIMALS AND HABITATS

A total of 33 reptile, 103 bird and 20 native mammal species (including 9 bats) are known from the planning area.

Fauna surveys conducted by the Department in the mid 1990s revealed 26 species of reptile, 36 birds and 6 native mammal species at two sites in the dunes and swales on top of the plateau. At two sites on scree slopes, a total of 10 reptiles, 48 birds and 6 native mammal species were recorded. At one site on the mulga-dominated outwash plains 6 reptiles, 42 birds and 3 native mammal species were recorded.

Pending effective feral animal control, the planning area has the potential for the reintroduction of several native mammals that are extant in other parts of the State and whose original distribution encompassed the Range. These include the western pebble-mound mouse, Shark Bay mouse (*Pseudomys fieldi*), western barred bandicoot (*Perameles bougainville bougainville*), greater stick-nest rat (*Leporillus conditor*), bilby (*Macrotis lagotis*), chuditch (*Dasyurus geoffroii*), black-flanked rock-wallaby (*Petrogale lateralis lateralis*) and the banded hare-wallaby (*Lagostrophus fasciatus fasciatus*). These species (except the western pebble-mound mouse) are declared specially protected as threatened species under the Wildlife Conservation Act[4]. These mammals have declined in range and abundance, with the decline attributed to a range of factors including predation and competition by foxes and cats (see Section 18. *Introduced and Other Problem Animals*).

As yet, the Department's Western Shield program, which aims to control foxes and cats, has not been extended to the planning area. The proposed additions to the existing national park will be advantageous for a successful baiting regime if critical weight range mammals are to be reintroduced. The rather narrow eastern plains area of the planning area (approximately 5 km in width) is not ideal for fox and cat control as the potential for reinvasion by foxes and cats from surrounding areas is significant for up to 15 km from a baiting boundary. However, with co-operative management with the surrounding pastoralists, combined with an increased baiting regime, the problem would not be insurmountable. In addition, the location of the area in relation to Department's threatened species captive breeding facility at Shark Bay is advantageous to the reintroduction of certain species.

If baiting was to occur in the Park, the Department uses 1080 poison (sodium fluoroacetete), a naturally occurring poison in native *Gastrolobium* plants, which has enabled animals to develop a natural tolerance to the poison. Research has shown that high levels of 1080-tolerance occur outside the current distribution of *Gastrolobium* and it is unlikely that extant native fauna in the Range would be at risk. Furthermore, species listed as candidates for reintroduction are sourced from populations that are 1080-tolerant.

Other local factors contributing to native species decline may include impacts associated with habitat alteration, grazing, changes in burning patterns and the introduction of feral species, particularly feral goats. Feral goat control is one of the most important management issues for the planning area as they have a major impact on the planning area's natural values (see Section 18. *Introduced and Other Problem Animals*). In relation to potential reintroductions, some species may not survive in the presence of feral goats as the goats compete for similar food and habitat resources and can cause general habitat degradation. Species that may be particularly sensitive to this include rock wallabies and banded hare-wallabies.

Although dingoes (*Canis lupus dingo*) have been declared to be 'unprotected fauna' under the Wildlife Conservation Act, they are thought to have been present in Australia for approximately 4000 years (Fleming *et al.* 2001), and are the highest order predator in Australian ecosystems. Dingoes still maintain a functional part of predator-prey relationships in many cases (Fleming *et al*. 2001). Dingoes are not baited on the public conservation estate unless there is a significant risk to adjacent pastoral enterprises (usually sheep), even though they are a declared animal under the *Agriculture and Related Resources Protection Act 1976*. The *Western Australia Wild Dog Management Strate*gy (2005) recognises that the approaches taken to dingo/wild dog control depends on the risk profile of the relevant industry. Sheep/goat enterprises are viewed as the highest risk (zero tolerance), cattle less so (varying risk, low to high numbers of dingoes/wild dogs), with unstocked country recognised as no risk. In the case of

[4] The Wildlife Conservation Act 1950 provides for species to be declared as 'likely to become extinct or rare, or otherwise in need of special protection', by Ministerial Notice in the Government Gazette."

sheep/goat enterprises, 'buffer' baiting may be required within the protected area.

Dingoes are a significant predator of feral goats – feral goat populations are generally absent, or maintained at low densities if dingoes or wild dogs are present (Parkes *et al.* 1996). In 1992, twenty sterilised dingoes were introduced to Townsend Island, Queensland, to control a population of feral goats estimated at 2000-3000 animals. By 1997, only 4 goats remained and these were shot (Allan *et al.* 1998).

Dingoes/wild dogs may also have a role in limiting the distribution and abundance of foxes and feral cats, although spatial relationships between wild dogs/dingoes and foxes are not well understood (Fleming *et al.* 2001). Foxes and feral cats are known to prey on small native mammals and are more of a threat to these populations than dingoes. The study of most relevance to Kennedy Range is that of Thomson (1992), who examined the behavioural ecology of dingoes in the Fortescue River catchment of Western Australia over a nine year period. Thomson observed that foxes were relatively common on the coastal plains where dingo control was undertaken to protect stock. In an adjacent rugged unstocked area, both dingoes and foxes existed in low numbers. However, when dingo numbers increased, foxes were only ever recorded in the unstocked areas at the edge of sheep paddocks. When dingo numbers again decreased in the unstocked area, foxes re-established themselves from adjacent areas. Dingoes/wild dogs have also been observed excluding foxes from carcasses during drought, hence limiting their access to resources (Corbett 1995).

Approval for dingo/wild dog control operations is required from the Department and clearance must be given by the Midwest Regional Manager prior to operations commencing. Parts of the boundary of the existing national park and parts of the boundaries of the proposed additions are currently baited, in conjunction with neighbours, as part of the program of wild dog control coordinated by the Carnarvon Zone Control Authority (Carnarvon ZCA). The Carnarvon ZCA functions under the Agriculture Protection Board with the purpose of controlling declared plants and animals. In accordance with the Department's draft *Good Neighbour* policy, it is anticipated that this control program will continue on those boundaries, although the long-term potential for dingoes/wild dogs to play a role in controlling feral species in the expanded national park needs further consideration based on a risk assessment to surrounding pastoral enterprises.

Old uncapped mining drill holes exist within the planning area. As these act as traps for native animals, they will be progressively capped.

Aquatic Systems

The western side of the Range contains several small springs and soaks, including the larger Mooka and Chaffcutters Springs. On the flats west of the Range, there are a number of seasonally inundated claypans, including the ephemeral 'Lake Julia',

approximately 8 km east of the disused Binthalya homestead. These claypans support seasonal populations of waterfowl and other bird species while they are flooded.

Mooka Spring and its associated creek represent both a regionally significant aquatic system and an unusual ecological community (see Section 14. *Flora and Plant Communities of Conservation Significance* and *Fauna and Animal Communities of Conservation Significance*).

The smaller springs and soaks contain a discrete invertebrate community that is different from those in larger streams and rivers, and in claypans, of the surrounding areas. They support at least 13 invertebrate species that do not occur elsewhere in the region or do so only rarely.

Little is known about frogs and other species of terrestrial vertebrates in the Range. Mooka Spring could support of number of frog species (including *Pseudophryne douglasi*, a species restricted to widely isolated permanent water holds including Cape Range), even though the Spring is being degraded by goats. It is unlikely that the smaller springs, some of which are severely degraded, could sustain viable frog populations. If these springs can be protected from further degradation, it is likely that frog populations could re-establish themselves once these springs are rejuvenated.

Furthermore, the springs provide an important permanent water source for native mammals and birds, but also feral animals, particularly feral goats. Feral goats are the biggest threat to the natural values of the planning area, and the impact around water sources is palpable. These springs are further threatened where date palms (*Phoenix dactylifera*) have been introduced as the palms vast consumption of water can restrict spring flow and displace native flora (see Section 17. *Environmental Weeds*).

'Lake Julia' has large shrubs growing through it and supports a much richer waterbird community than most claypans in the Region, which tend to be species poor.

Other water sources for fauna are available after rainfall events. Many gorge systems on the eastern side of the Range contain rockpools that hold water for many months after rainfall. After Cyclone Vance in 1999, a lake of approximately 15 ha in size formed on top of the Range. Water persisted in this lake for approximately 6 months.

Fauna and Animal Communities of Conservation Significance

One skink *(Lerista kennedyensis)* is endemic to the planning area. The grey falcon (*Falco hypoleucos*) is listed under the Department's Priority Fauna List as a Priority 4 species[5], and the

[5] Priority 4 (Taxa in need of monitoring) are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.

splendid fairy-wren (*Malurus splendens*) is at its northern limit in the planning area. Several bird species are more common in the planning area than in almost all other parts of the Carnarvon Basin, including rufous-crowned emu-wren (*Stipiturus ruficeps*), slaty-backed thornbill (*Acanthiza robustirostris*) and painted finch (*Emblema pictum*). Old nests, presumed to be those of the extinct lesser stick-nest rat (*Leporillus apicalis),* have been found in the Range in recent years. Old mounds of the western pebble-mound mouse (*Pseudomys chapmani*), a Priority 4 species, have also been recorded on the eastern edge of the planning area. The population of the rock rat *(Zyzomys argurus)* is near its southern limit of distribution. The mulgara (*Dasycercus cristicauda)* is vulnerable and declared specially protected under the Wildlife Conservation Act.

Management direction for specially protected fauna is provided through the Department's proposed Policy Statement 9 – *Conserving Threatened Species and Ecological Communities* (subject to final consultation).

The Biodiversity Audit of Western Australia's Biogeographical Subregions in 2002 (CALM 2002), has described ecosystems at risk in the planning area and has placed the 'Invertebrate assemblages of Mooka Spring on the Department's Priority 4-b Ecological Communities List. It represents the best example of this wetland type in the Carnarvon Basin, based on both plant and invertebrate species and contains a species-rich invertebrate community typical of larger streams and rivers in the Carnarvon Region.

16. THREATENED ECOLOGICAL COMMUNITIES

Threatened Ecological Communities (TEC's) are ecological communities approved by the Minister for the Environment as threatened and listed on the Department's non-statutory database. There are currently no threatened ecological communities listed within the planning area.

It is recognised that a more comprehensive knowledge of the planning area's animals and habitats, and the research into the relationship between fire, buffel grass and grazing is required to improve fauna management effectiveness (see Section 35. *Research and Monitoring*).

17. ENVIRONMENTAL WEEDS

The *Environmental Weed Strategy for Western Australia* (CALM 1999) (EWS) describes environmental weeds as "...plants that establish themselves in natural ecosystems and proceed to modify natural processes, usually adversely, resulting in the decline of communities they invade". The Strategy rates environmental weeds as high, moderate, mild or low based on their potential invasiveness, distribution and environmental impacts. This rating provides the basis for identifying control priorities, with the highest rated species and species that pose a specific threat to natural values within the planning area being a focus for weed management.

Weeds occur in disturbed areas of the planning area, particularly around tracks and recreation sites. Two weeds of particular concern are buffel grass (*Cenchrus ciliaris*) and date palms (*Phoenix dactylifera*), both rated as high in the EWS.

Further guidance for management is provided by the Department's proposed Policy Statement – *Environmental Weed Management* (subject to final consultation). This is used in conjunction with the EWS and local knowledge to guide the approach and priority setting for the control of environmental weeds on the conservation estate.

Buffel Grass

Buffel grass (*Cenchrus ciliaris*) is ubiquitous across the alluvial plains of the planning area. Buffel grass has some environmental benefits in that it is sometimes the only species stabilising severely degraded river systems. Control of buffel grass is complex due to its vigorous response to fire and reproductive capacity (vegetatively through rhizome or stolon production, or sexually by seed), and there is no single control method that may be employed for its successful management at a landscape scale such as within the planning area.

Given that recreation opportunities and access to and across the top of the Range will be provided (see Section 23. *Recreation Opportunities and Visitor Access*), there is an inherent risk that buffel grass could be spread onto the plateau from these activities. As the spinifex of the plateau is free/relatively free of buffel grass, and is listed as a priority ecological community its introduction will need to be monitored and remedial action taken if it is detected. As with all prolific invaders, the key to the successful control of buffel grass is to prevent new infestations or to begin control while the infestation is small and manageable.

Fire and recreation management is complicated by the presence of buffel grass. Issues may include the further encroachment of buffel grass into the fire prone Yalbalgo Land System. Buffel grass is already present in some of the proposed day-use sites at the base of the western side of the Range (see Section 19. *Fire*).

Date Palms

Date palms were planted around springs in the south-western area of the planning area and are now well established. Although date palms have not spread over extensive areas, spring flow is restricted due to their vast consumption of water, which threatens the ecological values of the aquatic systems (see Section 15. *Native Animals and Habitats–Aquatic Systems*). As part of the weed control program for the planning area, an ongoing control program of felling and poisoning all date palms (excluding one palm) has commenced. One male palm will remain at Yenny Spring to reflect the pastoral history within the planning area.

18. INTRODUCED AND OTHER PROBLEM ANIMALS

Feral goats (*Capra hircus*), feral cats (*Felis catus*), feral rabbits (*Oryctolagus cuniculus*), European red foxes (*Vulpes vulpes*) and camels (*Camelus dromedarius*) are present in the planning area. Cattle and sheep are also occasionally present, wandering in from adjoining stations.

Competition and land degradation by feral goats; competition and land degradation by feral rabbits; predation by feral cats; and predation by the European red fox have been identified as key threatening processes under the EPBC Act.

The Department's proposed *Management of Pest Animals on CALM- Managed Lands* policy (subject to final consultation) guides state wide approaches and priority setting for the control of problem animals on the Department's managed lands and waters.

Rabbits and Camels

Rabbits and camels are only in small numbers at a few localities in the planning area, and as such pose minimal threat. No control programs have been undertaken.

Foxes and Cats

The fox is a threat to medium-sized ground dwelling mammals and ground-nesting birds (Burbidge and McKenzie 1989). The feral cat is thought to have been responsible for the extinction of small to medium sized ground dwelling mammals in the arid areas of the State (Burbidge and McKenzie 1989).

Five year threat abatement plans have been prepared for both foxes and cats to provide national coordination, with the emphasis on local control programs to ensure recovery of endangered species. The Department implemented the Western Shield program in 1996 in order to control foxes and feral cats. One objective of the program involves aerial and ground baiting on land managed by the Department using 1080 poison (sodium fluoroacetate) baits to (a) enable native wildlife populations to recover and (b) allow the reintroduction of native animals to former habitats once foxes and cats have been controlled. Foxes and feral cats in arid zones are a component of the program and the subject of ongoing research. As yet, control programs have not been undertaken in the planning area.

Dingoes within the planning area may play a role in suppressing populations of foxes and feral cats (see Section 15. *Native Animals and Habitats*).

Feral Goats

Feral goat control is one of the most important management issues for the planning area and the preparation of the feral goat control strategy is a priority for the plan. This strategy will discuss options for fencing, research and monitoring of the impacts of goats, co-operative and contract mustering, and aerial and ground targeted shooting.

Feral goats have a major impact on natural values as they destroy vegetation and inhibit regeneration, leading to changes in flora composition and destruction of fauna habitats (see Sections 14. *Native Plants and Plant Communities*, and 15. *Native Animals and Habitats*). The impacts of hooves and overgrazing destabilises soils and greatly increases the risk of erosion by rain and wind (see Section 13. *Hydrology and Catchment Protection*). Areas adjacent to water holes and springs within the planning area appear to be the most severely degraded (see Section 15. *Native Animals and Habitats–Aquatic Systems*). Throughout the rangelands, there is anecdotal evidence to suggest that cyclone run-off damage is increasing in severity, due to defoliation and soil erosion caused primarily by goats.

Between July 1991 and June 2000, effective goat control programs (including aerial shooting) were conducted in and around the planning area. These programs were undertaken in conjunction with neighbouring pastoralists and in accordance with the Feral Goat Eradication Program co-ordinated by the Department of Agriculture. This state-wide program ceased in 2002 with the last aerial shooting conducted in the existing national park in 2000. The Department has since carried out one shoot in February 2007. This consisted of a 5 day aerial shoot in which 1690 goats were culled, and with another 238 goats being culled in the follow-up ground shoot.

Over the period 1998-2003, a *de facto* managed goat industry based on sale of unmanaged (feral) goats across Australia has increased by almost 900%. Western Australia has dominated the live export market since 1990, exporting approximately 42% of Australia's live goats (297 249 in 2003) and is a major player in the exportation of goat meat, exporting approximately 20% of Australia's total (226 649 carcasses in 2003) (Forsyth and Parkes 2004). In 2002, in recognition of this significant pastoral industry, goats were reclassified from 'prohibited' stock to 'authorised' stock under the *Land Administration Regulations 1998*. This required that a best practice management framework be developed and confers on the industry a responsibility to demonstrate improved animal and land management practices.

The demise of an effective goat control program, coupled with a growing goat industry, has seen the number of goats within the planning area increase. According to a Department of Agriculture survey in June 2000, the existing national park had a density of 6 goats per 1000 ha, which equates to about 850 goats for that area of the park. Anecdotal evidence would suggest that goat numbers over the past four years are significantly higher than the last Department of Agriculture estimate.

As an indication of this, between January 2001 and January 2005, a total of 13 574 goats have been removed from the former Mooka pastoral lease, where modern goat traps have been installed. Many goats still remain across the planning area with the issue further complicated by areas of existing national park being inaccessible for normal mustering operations.

Some of the recent land acquisitions include springs and pools where goats congregate. These acquisitions greatly increase

the potential to control goats, although effective control needs to be coordinated with the management of goats on adjacent properties. Currently, goats are managed on a cooperative basis with adjoining pastoralists whereby they have permission to muster from Departmental managed lands adjoining their property during their own mustering operations.

Water sources within the planning area will provide a continual attraction to feral goats and other introduced herbivores. Effective fencing of the planning area is prohibitively expensive and would require substantial maintenance. Goats will continue to provide a major income component of neighbouring pastoralists into the foreseeable future and will therefore be an ongoing issue with frequent incursions into the planning area. The rugged terrain and isolated remote water sources within the existing national park make effective control by trapping almost impossible.

In recent years, strategies of occasional/seasonal trapping by neighbours and ex-lessees have proved ineffective in reducing overall goat pressure within the planning area. It is widely accepted that unless 70% or more of a feral goat population is removed from an area, there will be no sustained reduction in population levels. Innovative control strategies, such as targeted shooting in areas where goats can avoid trapping and mustering, must be introduced. Judas goat programs involving radio tracking of goats may assist control efforts.

Some of the current goat harvesting efforts by neighbours are being conducted on land acquired for addition to the national park. Renegotiation of these arrangements and the continued cooperation with pastoral neighbours is vital to ensure goat numbers within the planning area are maintained at levels which do not impact on natural values.

19. FIRE

Fire, both lightning and human caused, is an environmental factor that has shaped many Australian arid zone ecosystems for thousands of years. Traditional use of fire by Aboriginal people was frequent and widespread, especially in flammable hummock grassland (spinifex) communities (*Triodia* spp.), resulting in a fine grain mosaic of different seral stages over much of the landscape. There is growing evidence that the fire regime in much of the arid zone has changed with the relatively recent cessation of traditional Aboriginal burning (Burrows *et al*. 2006). Today, a regime of large and intense wildfires has largely replaced a regime of regular patch-burning. This altered fire regime, together with introduced predators and herbivores, is implicated in the decline of arid zone mammals and some plant communities.

The historical patterns of Aboriginal burning and subsequent ecological effects have not been investigated in the planning area. About 30% of the planning area is spinifex grassland, and studies in other spinifex-dominated communities (Burrows *et al*. 1991, Burbidge 1985, Griffin *et al*. 1983) have shown frequent small fires result in a mosaic of spinifex at differing seral stages,

which is important for providing a range of habitat types and for breaking up the run of large wildfires.

Pastoralism, and the introduction of buffel grass (*Cenchrus ciliaris*) as a dominant pasture species effected a change to the natural fire regimes. It is likely that under pastoralism, alluvial plains now within the western boundary of the planning area were burnt on a regular basis both to encourage the spread of buffel grass and to promote the growth of younger, more palatable native plants.

The advent of pastoralism, together with the departure of Aboriginal people from their homelands and the subsequent changes to fire regimes in arid areas, has probably impacted adversely upon natural values in these areas.

Fire Ecology

Knowledge of species and ecosystem responses to fire, and plant and animal life histories and vital attributes (e.g. juvenile period of obligate seeders, habitat requirements of key fauna species) can be used to help determine ecologically appropriate fire regimes. A fire regime is the history of fire in terms of its:

- periodicity (how often it occurs on a site);
- intensity (how hot it is), season (what time of year it occurs);
- scale (how big it is); and
- its spatial diversity (how patchy it is at both a landscape and local scale).

The spinifex dunefield of the plateau (the Kennedy Land System) is the most fire prone land system in the planning area with fires occurring as a result of lightning strikes. These fires remain on the plateau and pose little threat to surrounding pastoral activity. The low *Acacia* woodland of the Yalbalgo Land System is also prone to fire. The cliff and gorge habitats generally have a lower flammability due to the sparse and discontinuous fuel loads in these areas and as a consequence, species less tolerant to fire are more likely to be found here.

Spinifex will normally only carry a fire after a return period of about 5-7 years although this interval can be shorter under severe fire conditions, or following high vegetation growth after above average rainfall (Burrows *et al.* 1991). Spinifex will burn under most weather conditions but fire behaviour is particularly sensitive to fuel moisture content and to wind speed. Given the cessation of traditional Aboriginal burning, fragmentation and degradation of the landscape through agriculture, and the presence of invasive species, appropriate fire management is needed to maintain species and structural diversity in spinifex-dominated communities. Too much fire or too little fire, or large intense fires, can be detrimental to some communities. For example, mulga and some *Banksia* species are fire-sensitive and should be protected from frequent fire.

Complicating fire management in the planning area is the presence of buffel grass, found across the extensive alluvial plains within the planning area (see Section 17. *Environmental Weeds*). Buffel grass creates the ideal fuel for fire – it burns readily, even when green, rapidly regenerates after fire (Tu 2002), and is capable of encouraging and carrying wildfires through communities that are not adapted to frequent fire. Issues for fire management may include the further encroachment of buffel grass into areas proposed for day-use at the base of the western side of the Range, and into the fire prone low *Acacia* woodland of the Yalbalgo Land System. Once buffel grass has invaded, it has the potential to drastically alter the fire regime, leading to loss of biodiversity.

Lightning-caused summer wildfires are a common occurrence in the spinifex of the Kennedy Land System of the plateau. Satellite mapping recording the fire history of the planning area over the last 17 years indicates large tracts of the plateau have fuel ages between 1-5 years.

Fire Management

The key management objective for the planning area is to protect and conserve biodiversity. Fire management strategies that will be adopted to contribute to the achievement of this objective, and which are consistent with current management capacity (i.e. resources, access and knowledge), include:

- identifying areas that require protection from fire and where feasible, taking measures such as fuel modification, including prescribed burning, to protect these areas;
- implementing an adaptive fire management program to advance fire ecology and management knowledge in these ecosystems (this to include testing assumptions and hypotheses about the biodiversity benefits of a patch mosaic burning regime verses a regime of large scale summer lightning-caused fires);
- conducting research to gain a better understanding of the implications for biodiversity of fire in those communities dominated by buffel grass; and
- allowing wildfires to burn unless there is a threat to life, property or other values.

The Department's fire planning in spinifex grasslands is guided by 16 management principles (Burrows 2004). Of particular relevance to the Kennedy Range are principles 5 and 16. The former states that "Fire management is required primarily to conserve biodiversity. In some circumstances, it may be necessary to manage fire to protect property, infrastructure and cultural values". Principle 16 acknowledges that the approach to fire management must account for disturbed landscapes: "Where spinifex grasslands have been invaded by flammable weed species such as buffel grass, which is capable of adversely altering the frequency and intensity of fire, prescribed fire should be used conservatively and strategically to break up the run of major wildfires".

Fire Management and Candidate Wilderness Areas

The Department is seeking to designate wilderness areas across the State to protect the natural, recreational and scientific values of these areas. The top of the Range has significant areas from which candidate wilderness areas could be chosen and effective fire management is particularly relevant to meeting wilderness criteria (see Section 10. *Wilderness*).

The most appropriate fire mosaic for the spinifex dunefields of the plateau is unknown, and the plateau region presents an ideal opportunity for an adaptive management approach to test assumptions and advance knowledge.

The area of the plateau to the south of the track traversing the Range may be used as a reference area for the rest of the Park where wildfires caused by lightning strikes will be allowed to naturally occur in this area without suppression action. The spatial and temporal patterns of fire will be monitored by remote sensing and key elements of biodiversity will also be monitored.

The area north of the track traversing the Range is suitable for implementing an adaptive fire management program. It has been proposed that a fine-scale mosaic of different seral stages is beneficial to biodiversity conservation at the landscape scale. The rationale being that different seral stages provide different vegetation structures, different habitat opportunities and different assemblages and abundances of flora and fauna, characteristics that comprise biodiversity.

Experimental fire management zones could be established to compare the effects on biodiversity of the natural fire regime driven by lighting strikes (within the reference area south of the track) with those zones that will be prescribed burnt to create a fine grain mosaic of different seral stages. The existing network of old mining access and pastoral management tracks will greatly assist in implementing this adaptive management approach. These tracks could be retained to allow access to conduct prescribed burning, if it was considered that a finer mosaic than is currently occurring may prove beneficial to biodiversity conservation. With an associated program of biodiversity monitoring, it provides an opportunity to improve our understanding of what scale of fire mosaic best promotes biodiversity within spinifex communities.

During the life of the plan, other crucial areas requiring protection from wildfire may be identified, and suppression activities may need to be undertaken at times. The road onto the plateau crosses a narrow saddle of dune and this section of dune is stabilised by spinifex. Burning of the spinifex in this area could destabilise this critical access point. If this area were threatened by wildfire, suppression activities would be considered.

PART D. MANAGING OUR CULTURAL HERITAGE

In Western Australia, the *Aboriginal Heritage Act 1972* protects places and objects used by, or traditional to, the original inhabitants of Australia. All Aboriginal sites are protected, including those sites not yet registered with the Department of Indigenous Affairs (DIA). Currently, on the DIA Register of Aboriginal sites, 171 sites are recorded in the general vicinity of the planning area, and 16 recorded within the existing national park boundary.

The *Heritage of Western Australia Act 1990* provides for registering and protection of sites of historic interest as 'heritage places'. The management of these sites is set out in Department's draft Policy Statement – *Management of non-indigenous cultural heritage on CALM estate*. This policy statement is in accordance with the Burra Charter, which was adopted by Australia in 1979 for the 'conservation and management of places of cultural significance'. The Charter applies to all types of places of cultural significance and has a series of guidelines for managing cultural heritage.

The Australian Heritage Council maintains the Register of the National Estate under the *Australian Heritage Council Act 2003* as a record of important natural, cultural and Indigenous heritage places. The 'Kennedy Range area' and the 'Mooka Spring area' were registered in 1978.

20. INDIGENOUS HERITAGE

The Aboriginal history of the Range is largely unknown, although it appears the Range separated the traditional lands of two Aboriginal tribes – the Maia tribe to the west and the Malgaru tribe to the east (Tindale 1974). The Maia people occupied an area of about 12 000 km^2 from just north of Carnarvon to the western slopes of the Kennedy Range. The freshwater springs on this side of the Range would have been a source of food and water for the Maia people. The Malgaru's tribal lands covered a similarly large area, stretching from the eastern escarpment of the Range, across the Lyons River (known to Aborigines as 'Mithering') and east to the boundary with the Wadjari tribe. To the south of both these tribal areas was country occupied by the Ingarrda.

More recent studies (Melerski 2004) indicate that the Yaggu (Gascoyne) River and permanent springs along the western side of the Range made the area a rich source of game and fish for Aboriginal people. The Inggarda name for the Range is Mandatharra. Artefact scatters found near some of the springs on the western side provide evidence of the long history Aboriginal people have with the area. Other sites include engravings in the vicinity of the Temple Gorge campsite. Orthographic studies have recorded a number of cultural sites in the Range such as a march fly *talu* or increase site – a site where special ceremonies are conducted to control the number of particular species. The

Range, as a very distinct landform, also plays an important part in the mythological history of the region.

Where culturally appropriate, traditional practices, oral history and culture of Aboriginal people should be recorded and where possible, reflected in interpretive information (see Section 5. *Management Arrangements with Aboriginal People*).

There are two registered native title claims under the *Native Title Act 1993* within the planning area, the WAG6161_98 Gnulli claim which includes all of the planning area excluding the WAG6212_98 Thudgari claim which takes in the most northern section of the Range. According to section 24jb(7) of the Native Title Act, native title claimants and their controlling body must be notified of proposed public works to be undertaken.

21. NON-INDIGENOUS HERITAGE

Francis Thomas Gregory explored areas of the Gascoyne and Murchison and named the Kennedy Range in 1858 in honour of the then Governor of Western Australia, Arthur Edward Kennedy. Gregory did not make favourable comment on the pastoral potential of the area. Aside from a relatively small area identified near the mouth of the Gascoyne River, Gregory claimed there was no land worth occupying west of the Lyons River. However, Gregory did comment that "a very important circumstance in connection with this district is the total absence, so far as we were to observe, of any of the varieties of *Gastrolobium* or *Euphorbia*, which constitute the poisonous plants so fatal to cattle and sheep in other parts of the colony".

Perhaps this final point led to pastoral leases being taken up both along the Gascoyne and Lyons Rivers within 20 years. Jimba Jimba was the first station established near the Range in 1878 and as people ventured inland, stations sprang up throughout the area along the Lyons River. Lyons River Station was first taken up in the 1880s and under the Hatch family developed into a prosperous and technologically advanced wool-producing station with the most up-to-date machinery and the first telephone line in the region, installed in 1919.

Over the next 50 years the Carnarvon Basin region continued to expand and grow and at its peak, in 1923/24, carried about 1.065 million sheep. As part of this expansion, sections of what is now part of the planning area were progressively taken up as pastoral lease. Lease boundaries were amended through acquisition of adjoining areas until almost all the existing national park was under pastoral lease.

From the 1930s drought onwards, various factors, such as overstocking, lack of effective vermin control and unpredictable seasons, reduced the viability of some leases. The amalgamation of some leases occurred, resulting in a reduced grazing pressure (particularly on the Range plateau), as stock was concentrated on the lease areas of the surrounding plains. With the dramatic fall in wool prices in 1970/1971, and predation on sheep by wild dogs, some pastoralists changed to the production of beef cattle. It was during this period, in 1974, that a 'Kennedy Range

National Park', to be formed from portions of unviable pastoral leases, was first proposed. The first acquisition was the unviable Binthalya lease, surrendered in 1977. Parts of this lease were allocated to the adjoining Mardathuna and Mooka lease areas. The remaining section was retained as UCL for the creation of the national park. In 1979, a part of Moorgaree lease covering the northern part of the Kennedy Range plateau was also surrendered to form part of the proposed park. The high natural value of this area was intact, due to the virtually waterless plateau being only lightly grazed. Historic features within the planning area now include the disused Binthalya Homestead and the relics of the old Merlinleigh Homestead. Old windmills and associated structures and old fencing also provide evidence of the former pastoral activities.

Current pastoral activities in the vicinity of the planning area focus on cattle and sheep production, commercial harvesting of feral goats and, in some circumstances, tourism.

PART E. MANAGING VISITOR USE

22. REGIONAL TOURISM CONTEXT

In 2004, Tourism Western Australia (Tourism WA) released destination development strategies for the each of the five tourism regions within the State. The Kennedy Range lies on the border between the Coral Coast and Golden Outback regions. The strategy for the former identified the Kennedy Range as a 'focus area' – that is, an area perceived to be iconic, and despite being market-ready for niche segments of the tourism market, requiring product or infrastructure gaps to be addressed before it could be widely marketed. Tourism WA believes that the Kennedy Range has the long-term potential to provide leverage to draw visitors into the region (Tourism WA 2004a). Mt Augustus, 300 km to the north-east of the Kennedy Range, is similarly viewed as a focus area (Tourism WA 2004b).

The destination development strategy for Tourism WA's Golden Outback region (Tourism WA 2004b) recognises several key iconic holiday experiences, two of which are directly applicable to the Kennedy Range: (1) the appeal of the outback, specifically its "vast clear skies and theatrical landscapes, camping under the stars and four wheel driving…" and (2) wildflowers. The tourism potential associated with sealing the road from the North West Coastal Highway at Carnarvon to the Great Northern Highway at Meekatharra via Mt Augustus is identified as a key strategy. Only Stage One of this project, Carnarvon to Gascoyne Junction, has been funded to date. Stages 2 and 3 – Gascoyne Junction to Mt Augustus, and Mt Augustus to Meekatharra respectively – are reliant on further government funding.

Furthermore, the self-drive outback adventure experience is being promoted in the region, particularly through the launch of the Gascoyne Murchison Outback Pathways, which provides three self-drive trails in the region. The Mid West and Gascoyne Development Commissions have managed the implementation of the project. The planning area is a key feature of two of these Pathways. Future staged work for these trails include further interpretive signage and a traveller's guidebook, and it can be expected that these trails and associated interpretive material will lead to increased visitor numbers to the planning area.

The neighbouring stations and town of Gascoyne Junction play an important role in the provision of accommodation, visitor information, essential supplies and management assistance to visitors and Departmental staff. Conversely, the national park and proposed extensions also provide commercial opportunities for regional businesses, and play an increasingly important role in the delivery of social and economic benefits to communities and assisting in reversing the rural exodus. Due to limited Departmental resources, the Department recognises that nature-based tourism products are best delivered through an integrated approach with key stakeholders, and commissioned a study to examine the potential tourism opportunities associated with the recent pastoral acquisitions throughout the Gascoyne–Murchison area. The forthcoming report *Inventory of tourism assets of CALM rangelands properties in the Gascoyne and Murchison Regions of Western Australia* is expected to be published by the end of 2007. Some of the key findings of particular relevance to the planning area are:

- the properties adjacent to the Kennedy Range provide potential for tourism in terms of spectacular and unique landscapes, cultural heritage artifacts and wilderness style experiences;
- development of tourism on key properties will potentially require a management presence specifically established for the purpose;
- tourism may not provide the scale of revenue required to balance management costs but the properties could also be valued in terms of ecological, security and safety factors that may indirectly bring economic benefits to the State; and
- there is an interest from indigenous stakeholders in developing tourism products and experiences.

The Department's Policy Statement 18 – *Recreation, Tourism and Visitor Services* (DEC 2006) outlines the Department's principles, operational guidelines, procedures and administrative controls in relation to facilitating recreation and tourism on the public conservation estate.

Visitor Numbers and Trends

Visitor numbers to the existing national park over the past 10 years is estimated to have been between about 5000 people annually with most recreation occurring in the cooler months between April and October. Major visitation increases are anticipated when the sealing of the road from Carnarvon to Gascoyne Junction (Mullewa Road) is completed in about 2010.

Volunteer campground hosts at Temple Gorge camping area assist in gaining more accurate data on visitors to the Park that will aid planning of the new and improved campground at Temple Gorge (see Section 23. *Recreation Opportunities and Visitor Access–Recreation Opportunities and Access at the Base of the Eastern Escarpment*). These hosts, as well as welcoming campers and providing information to campers, are collecting information including visitor numbers and origin, types of vehicles, types of camping (e.g. tent, camper trailer) and what method of power is used. In 2006, from June-September, approximately 1500 campers stayed on average 1.7 days with July and August being the busiest months for campers. To date, visitors are predominately 4WD but the sealing of the Mullewa Road is likely to encourage more 2WD visitors.

23. RECREATION OPPORTUNITIES AND VISITOR ACCESS

The Range has been preserved for its high natural values and represents a remnant of an older surface, much of which has remained relatively intact due to the geology, relative isolation, difficulty of access and lack of permanent water over much of the area. Management must continue to protect these values whilst enabling public enjoyment of the planning area. A range of recreation opportunities and management options were developed as part of the initial planning process (Hammond 2004), and have been considered to address immediate pressures and responsibilities, and the longer-term potential for recreation and tourism.

Planning for recreation in the planning area is founded on the premise that the remote, rugged, natural characteristics of the Range are its greatest recreation assets. To that end, recreation settings will tend towards the 'remote' end of the spectrum (i.e. settings which are least modified, have the lowest level of facilitation and require the greatest degree of self-reliance).

In the short-term recreation development will occur in areas where the concentration of visitors is already occurring, and works will focus on protecting natural values and increasing visitor safety.

Recreation opportunities in the planning area have been broadly divided into four areas:

- wilderness areas on top of the Range;
- accessible areas at the base of the eastern escarpment;
- the base of the south-western side of the Range; and
- the top of the Range (from Merlinleigh on the eastern footslopes of the Range to the western extent of the plateau).

Wilderness

The National Wilderness Inventory (NWI) assessment of the planning area indicates that the top of the Kennedy Range has significant areas from which wilderness candidate areas

could be chosen. Such areas may offer self-reliant recreational opportunities (e.g. wilderness walks). An analysis of the wilderness qualities is required to be undertaken before the Department can consider what recreation opportunities may be suitable (refer to Section 10. *Wilderness*).

Recreation Opportunities and Access at the Base of the Eastern Escarpment

The existing Temple Gorge campground, walk trails and adjacent day-use sites at Drapers Gorge, Honeycomb Gorge and Sunrise View, represent the only visitor facilities in the planning area (see Map 2). The existing Temple Gorge campground caters for about 10 small families or groups, has a sealed-vault toilet and basic information. Visitors are encouraged to enjoy short walks into the gorges, and several trails have been delineated. Current arrangements provide for a local contractor to undertake general maintenance of these facilities.

In the short term this area will remain the focal point for visitors to the planning area. A new and improved campground (to replace the existing Temple Gorge campground), with walk trails and an entrance station will be developed further east of the escarpment. It is necessary to relocate the existing campground as the area has sustained substantial degradation during the time it has been used due to increasing numbers of visitors, poor layout of camp sites, removal of vegetation for campfires, and erosion due to damage of fragile surface soils. Continued use will exacerbate the already poor condition of the area. The new campground will offer improved views of the eastern escarpment, better opportunities for short walks, and a larger site that is flat and can provide for the design of discrete loops to service various visitor types from tour operators to individual campers. Once the new campground is established, the former site will be redeveloped for day-use purposes only.

In the longer term, there is great potential to develop visitor accommodation on adjacent lands such as Lyons River Station. Other opportunities for small day-use sites also exist both south and north of the current sites (see Map 2).

In relation to access to the planning area, the section of road from the Ullawarra Road to the existing Temple Gorge campground and adjacent day-use sites is the only road recommended for visitor use (see Map 1). The Shire of Upper Gascoyne maintains both this road and the Ullawarra Road to unsealed 2WD vehicle standard.

In the longer term a scenic loop drive could be developed from Temple Gorge back on to the existing park entry road or Ullawarra Road. Factors that need to be considered in developing a loop road include:

- visitor management is most effective when there is only one road access into an area as visitor impacts tend to increase when there are multiple entrances to a park particularly when combined with limited management presence;
- drainage issues associated with ephemeral streams;

- visual impact of any new roads from the top of the escarpment;
- 2 wheel or 4 wheel drive access;
- the possible requirement for access through either the Bidgemia and Lyons River pastoral leases; and
- the potential for new recreation opportunities.

The sealing of the road from Carnarvon to Gascoyne Junction (172 km) is due for completion in about 2010. It is proposed that the road-sealing program continue from Gascoyne Junction to Mt Augustus via Cobra – Dairy Creek Road (288 km), and then to Meekatharra (347 km). From a tourism and economic perspective, there may also be benefit in sealing the road from Gascoyne Junction to the eastern entrance to the planning area off Ullawarra Road (about 57 km), which would stimulate increased visitation and the need for more visitor accommodation and services. As the consequences of this warrant serious consideration, the prescriptions contained within this plan may need to be reviewed and/or modified accordingly.

Recreation Opportunities at the Base of the Western Side

The landscape of the south-western side of the Range is less dramatic than the cliffs and gorges of the eastern escarpment, and is characterised by more vegetation and permanent springs and streams. The presence of river gums and other tree species provides welcome shade for picnicking and as a base for exploring gorges and creeklines. Most sites are best suited to relatively small numbers of visitors as day-use areas.

Although there are currently no designated sites or facilities for either day-use or camping along the western side of the Range, both are occurring, especially around springs, and in particular the very attractive permanent waters of Chaffcutters Spring and Mooka Creek (see Map 2).

There is a number of other existing or potential recreation sites including Yenny Spring, Bullwalya Spring and Pharoah Well (see Map 2).

All of the existing recreation sites can only cater for small numbers of visitors because of site constraints. It is therefore recommended that existing sites be developed for day-use with facilities such as defined vehicle parking, picnic tables, barbeques, toilets, walk trailheads and information. In addition, one large dispersed camping area will be developed with a range of facilities from small, secluded camp sites to large group camping sites for tour groups.

A broad area of land at the base of the western side (Yabba Campground) has the potential to provide a very attractive setting for camping, bushwalking and nature study. Its proximity to the Range and Pharoah Well offers opportunities for short and medium length walks. Furthermore, it is ideally placed to accommodate visitors via the three existing access routes to the western side of the Range – via Mardathuna Station, the Gascoyne River, and over the top of the Range from the eastern

side (see *Recreation Opportunities and Access on to the Top of the Range*).

Until such a time as this campground is developed, current informal and dispersed camping, including campfires, will be allowed to continue at existing sites unless natural values are compromised by such use. The Department will ensure that adequate signage is in place to inform visitors of campfire safety requirements. The exception to current camping arrangements (excluding authorised camping for granted mining leases) is Mooka Creek, which represents part of a regionally significant Mooka Spring aquatic system, is an unusual ecological community, and is recognised as an ecosystem at risk. To protect these natural values, camping at Mooka Creek will be prohibited and vehicle access across an old track crossing the creek will be closed. For management purposes, vehicle access across Mooka Creek will be downstream at the mookaite mining lease. Once the Yabba Campground is established, all current informal and dispersed camping, and informal campfires, will be closed and visitors will be encouraged to make use of the facilities established at the new site. Concentrating camping at one site will minimise environmental impacts, particularly effluent disposal.

Some 10-20 km from the western edge of the Range, but now within the planning area, are the Mooka homestead and the disused Binthalya homestead (see Map 2). Mooka homestead is currently occupied by caretakers but could provide a base for Departmental staff and visitor accommodation in the future. The Binthalya homestead has the potential to be developed to offer commercial accommodation and visitor services.

Recreation Opportunities on and Access to the Top of the Range

Some visitors traverse the planning area on the rough 4WD track over the top of Range, but numbers appear to be very small. In the short to medium term, the track will not be promoted due to significant hazards, alignment, erosion, wildfire risks, and the lack of visitor infrastructure and management capability. Furthermore, access to this track from the Ullawarra Road is through Minnie Creek Station via a station track. Mt Sandiman homestead is well located on this track and could potentially assist in managing visitor access and provide visitor accommodation and services accessing the planning area via this route (see Maps 1 and 2). Dispersed, unregulated camping and exploration of gorges, dunes and other features occurs along this 4WD route. Visitor risks are high (see Section 27. *Visitor Safety*).

This plan allows 4WD access to continue across the top of the Range. In doing so, however, the Department and the Conservation Commission recognise that the development of appropriate visitor facilities and control of visitor numbers is required to prevent impacts and to retain the remote experience (see *Introduction and Administration of a Permit System for Crossing the Range*). To date, there are no designated sites or facilities on top of the Range. Over the life of the plan, two

camping areas and several day-use sites may be considered for development (refer to discussions below).

Merlinleigh is an abandoned homestead on the eastern footslopes of the Range. Remnants of the homestead are limited to a concrete verandah, a small shed, water tank and fencing but provide a poignant reminder of the pastoral history of the area. In the longer term, this site may be developed for camping, as it offers an ideal base for exploring the top of the eastern escarpment, and the varied landscapes around the homestead area. Facilities provided could include a bush camp with parking, separate camping bays, 'safari'-type tent camping, toilets, information/ interpretation, shade shelters and walking tracks. The area has good potential for group camping and possibly commercial tour operations.

On the top of the eastern escarpment, the spectacular views allow an appreciation of the sheer size and scale of the landscape, and the geological formations, colours and rock complexes are truly inspiring. In the longer term, it is recommended that camping areas be established near the Great Gorge which will allow visitors to explore the largest gorge in the vicinity. Facilities here could be provided and managed as a commercial tour operation.

As the 4WD track runs along the top of the eastern escarpment for some 30 km, it is also suggested a number of small day-use sites could be established, allowing short walks to view the escarpment and gorges (e.g. White Stacks, The Neck – see Map 2).

From the vicinity of the Great Gorge the track meanders westward across a very different landscape of sandy dunes. Crossing this dune system offers opportunities for the development of small-scale day-use recreation sites as a base for nature appreciation and short walks. However, due to the highly erodable soils of the sandy dunes of the plateau, this area has a very limited capacity to sustain a significant increase in visitor numbers without major road upgrading and increased visitor infrastructure and management effort. As a consequence any development needs careful consideration. In the longer term, it is recommended that day-use sites be considered at The Dunes, Mesa Knob and The Basin (see Map 2). Other opportunities for day-use sites on the top of the Range may exist and may be investigated for development during the life of the plan.

Introduction and Administration of a Permit System for Crossing the Range

In preparing this plan, the Conservation Commission requested that the Department seek the views of major stakeholders on whether public vehicle access across the Range should continue and if so, what level of public use would be considered appropriate, and how use would be managed to maintain natural values and a remote recreation experience.

Key considerations in determining the most appropriate level of public access and use include:

- environmental impacts of use;
- establishment costs (including costs to improve the track and provision of visitor facilities and services);
- limited resources for management and cost recovery options;
- the role of potential commercial tour operations to assist with management;
- visitor risk management; and
- restricting visitor numbers to retain the 'remote' values of the Range.

Stakeholders were advised that the Department recommended the retention of the existing track across the Range to 4WD standard. It is considered that the track has a generally stable sandy surface (given current use levels) and satisfactory alignment. A few minor realignments may be required to reduce erosion impacts, allow rehabilitation of some eroded sections and avoid particularly rough or dangerous sections closest to the eastern edge of the escarpment. Preliminary stakeholder feedback agreed that access should remain open, that the introduction of a permit system to access the top of the Range was considered acceptable, and that access across the top of the Range remain as 4WD only.

In addition to vehicle access on to the plateau, risks associated with extended walking tours of the plateau also need to be considered.

The route taken to cross the top of the Range is not a public road. The route commences from the east at Mt Sandiman homestead on Minnie Creek Station, and terminates at the intersection with Mardathuna Road on the northern section of the former Mooka pastoral lease.

The CALM Regulations allow the Department to specify that in some Department-managed areas, access is by 'lawful authority' only. This can be done by way of registration and/or permit, and visitors wishing to access such areas by vehicle need to inform the Department.

To assist the Department in understanding visitor use within this area, and to achieve long-term sustainable use of the area, certain conditions of entry need to be met. They include:

- all visitors on to the top of the Range must obtain a permit;
- until a review is conducted by the Department and the Conservation Commission (within two years of commencement of this plan), vehicle numbers will be restricted to a maximum of 20 vehicles at any one time. Similarly, vehicle permits will not be issued to groups of more than 10 vehicles to help preserve the remote quality of the area;
- single vehicles will only be permitted to cross the Range if they are suitably equipped for an emergency situation;

- vehicles with catalytic converters must carry a working fire extinguisher at all times as the spinifex of the park is highly flammable; and
- no campfires will be allowed on top of the Range due to fire prone vegetation and lack of firewood. This will be reviewed when future recreation site development in the area is undertaken.

Some of the issues that need to be considered in order to implement the permit system include:

- where and how permits would be made available (e.g. Gascoyne Junction, Mt Augustus Tourist Resort, Cobra/ Bangemall Inn, the Departmental office in Carnarvon, via phone/fax or on-line booking system)[6];
- what if any fee should be attached to the permit (with all monies directed back into the management of the planning area);
- whether the permit system should differentiate between day visitors and campers and the level of access for each;
- the possibility for seasonal (e.g. during hot summer months) or temporary closures (e.g. during flooding, goat mustering); and
- whether a combined access/camping fees could be charged.

Visitor risk is also an important consideration if the Department is to allow access across the Range. As well as incorporating key safety requirements as part of any permit conditions, the Department may need to consider permanent signage at one or more strategic points on either side of the Range in such a way that anyone attempting to cross the Range has to encounter at least one sign. These signs would recommend the minimum safety requirements for travellers including equipment, communication means and hazards.

Access through Minnie Creek Station pastoral lease currently relies on the continued agreement of the owners of the Station. To maintain access, this area could be considered for creation as a dedicated public road (see *Other Visitor Access*).

Day Visits and Camping on Top of the Range

Access on to the top of the Range is an opportunity that should be allowed for both day-use visitors and overnight campers. How to best cater for both experiences requires careful consideration. The Department and the Conservation Commission are considering two options to manage the mix of day visits and camping – an access permit for all visitors to the top of the Range, irrespective as to whether they camp overnight or not, or a two-part permit system that caters specifically for day visitors or campers, viz:

[6] The Department is in the process of developing an on-line booking system for camping, and it may be possible to apply the same technology to permits for access.

1. an access permit for day visitors accessing the top of the Range but who are not intending to camp; and
2. a combined access/camping permit.

Fees may be introduced as part of the permit system to aid cost recovery and to assist with the ongoing management of the planning area (see *Introduction and Administration of a Permit System for Crossing the Range*).

In either case, a maximum number of 20 vehicles at a time and 10 vehicles per party will remain in place until reviewed by the Department and the Conservation Commission.

Monitoring Visitor Impacts on Top of the Range

Prior to implementing the permit system, an audit of the current track condition and level of visitor impact should be undertaken to obtain a benchmark of the current condition. Track attributes to be recorded should include number of side-track/deviations present, depth of erosion channels at specified locations and evidence of degradation (e.g. campfires, firewood collecting and other degradation).

The condition of the track will be reviewed by the Department and the Conservation Commission after two years of commencement of this plan to determine if any significant damage has occurred, with the number of permits issued adjusted accordingly.

Other Visitor Access

Gorges and footslopes in the south-west portion of the planning area are accessible by 4WD via the Mardathuna Road from the south (dedicated public road 9485, Map 1), or via Mardathuna Homestead from the west. The Shire of Carnarvon maintains the section from the North West Coastal Highway to Binthayla Homestead, whereas the section from Binthalya Homestead to the Gascoyne Junction Road is not maintained at present. Access via the latter is often restricted due to flooding or high water. Informal day-use and camping may increase here as visitors wait for a safer crossing.

Access to the south-western portion of the Park is also possible from the west of road 9485 via Mooka Homestead. This route is an option for additional access but will not replace road 9485 which allows a relatively direct, durable, maintainable, safe access for visitors, pastoralists and mookaite miners to the western base of the Range.

The Shire of Upper Gascoyne maintains roads in the eastern portion of the planning area.

With the Park being promoted for tourism and with the sealing of the road from Carnarvon to Gascoyne Junction, visitation to the Park is expected to increase significantly. In relation to long-term management arrangements, public access issues will need to be resolved in consultation with the relevant Shires and pastoralists. The issue that some public access is via undedicated roads on the Mardathuna and Minnie Creek pastoral leases may

need to be addressed through the creation of dedicated roads under the Land Administrative Act 1997.

Management Access

There are a number of management tracks that are necessary for the ongoing management of the planning area (e.g. goat control). These tracks are often on erodable soils and in poor condition and as a consequence, public access on these tracks will be restricted. All public access tracks will be clearly signposted.

24. VISUAL LANDSCAPE

Visual landscape management is based on the premise that the visual quality of any landscape is a resource in its own right and can be assessed and managed in much the same way as other resource values such as fauna, flora and recreation. It involves maintaining, restoring or enhancing natural and cultural landscape values, as well as planning land use activities and developments to provide diverse views and minimise negative impacts.

The interesting geology and scenic landscapes are among the planning area's most attractive features. For many, visual appearance is the most direct way visitors will experience an area and therefore, is often the criterion by which land management is judged.

The Department's Policy Statement 34 – *Visual Resource Management of Lands and Waters Managed by CALM* (CALM 1989) provides guidance for landscape management. This policy will be applied prior to any developments within the planning area.

25. RECREATION ACTIVITIES

The planning area imparts a strong sense of remoteness and enables access to many features including spectacular and diverse landscapes, geological features, beautiful springs, wildflowers, and numerous other key natural values.

As part of the forthcoming report *Inventory of tourism assets of CALM rangelands properties in the Gascoyne and Murchison regions of Western Australia* a *Tour Operator Survey of the Hinterland of the Gascoyne-Murchison Region* (which encompasses the Kennedy Range) was conducted. Activities which ranked the most important to clients on these tours included camping, 4WD, sightseeing, flora appreciation and relaxing. The most valued aspects for these clients included remoteness, ecotourism experience, 4WD experience, scenery, camping, bushwalking and rocks for abseiling/climbing.

The Department's Policy Statement 18 – *Recreation, Tourism and Visitor Services* outlines the Department's principles, operational guidelines, procedures and administrative controls in relation to facilitating recreation and tourism on the public conservation estate.

Abseiling and Rock Climbing

There are many areas managed by the Department where rock climbing and abseiling occur, often on a commercial basis. However, in the planning area, these activities may not be suitable. The friable and incompetent nature of the cretaceous sandstone (see Section 12. *Geology, Geomorphology and Land Systems*) is considered unsafe for these activities to be authorised (in terms of abseiling) or recommended (in terms of rock climbing). In addition, the steep rubble footslopes (particularly on the eastern side of the Range) are made of lots of loose rocks and climbing is not advised (Lane 2004). As part of the management planning process, further advice will be sought and weighed against safety and environmental factors.

Management of Organised Non-commercial Education and Leisure Activities

These activities (such as orienteering, car rallies and special events) are acceptable use of lands managed by the Department, providing they are sensitively located and properly planned and managed. Such events must be authorised under either Regulation 50 or 53 of the CALM Regulations.

Amateur Rock Collecting

The geology of the Park is richly fossiliferous, including rare semi-precious gemstone and fossil occurrences which are of interest to both scientists and visitors. Amateur rock collecting has occurred in the planning area (see Section 28. *Mineral and Petroleum Exploration and Development – Mineral and Petroleum Resources and Prospectivity*).

Camping, Campfires and Firewood Collection

Camping is a popular activity within the planning area, allowing visitors to relax and develop an awareness, appreciation and understanding of the natural environment. Camping is catered for at the Temple Gorge campground on the east side of the Range, and some informal camping occurs along the western base and top of the Range. In the short term the Temple Gorge area will remain the focal point for visitors camping in the Park.

Campfires are prohibited in the Park with the exception of the western side the Range and potential communal campfires at managed camping areas. Until such time as formalised camping is developed on the western side, informal camping, including campfires, will be allowed to continue at the existing sites unless natural values are compromised by such use (refer to Section 23. *Recreation Opportunities and Visitor Access – Recreation Opportunities at the Base of the Western Side*).

To protect the natural values of the Park, firewood collection within the Park is prohibited. The Department will monitor degradation caused by illegal campfires and illegal firewood collecting, and will provide information and signage to inform visitors of requirements for campfires.

The Department, with the assistance of camp ground host volunteers, has been trialling a communal campfire at the existing Temple Gorge campground, which can cater for both cooking and a place for visitors to congregate. Firewood has been provided by the Department for this trial. If this trial proves successful, and issues of safety and wood availability can be addressed, communal campfires may be developed at the new Temple Gorge campground and other formalised camping areas as proposed in the plan (refer to Section 23. *Recreation Opportunities and Visitor Access–Recreation Opportunities and Access at the Base of the Eastern Escarpment* and *Recreation Opportunities and Access on the Top of the Range*).

In the longer term, and if practicable, it may be possible to offer communal gas barbeques.

Camping Fees

Although camping fees are currently not collected at the existing Temple Gorge camp site, it is intended that fees will be introduced during the life of this plan. Fee collection issues associated with the area's remoteness will need to be resolved.

Generators

Generators are permitted within the park at present, but their use can lead to complaints from some visitors with regard to noise pollution. To reduce conflicts between visitors is may be necessary to consider:

- restricting the use of generators to designated sites;
- limited the size of generators;
- placing a curfew on the hours of generator use; and
- encouraging the use of solar power.

Visitor Information

Visitor information shelter exists at Temple Gorge and others have been established on the south bank of the Gascoyne River crossing on Jimba Jimba, and at the intersection approximately 9 km east of the disused Binthalya homestead (see Map 2). The shelters will provide information to interpret the natural and cultural values of the planning area, promote visitor safety and also to orientate visitors to the area. Directional signs will be required on the top of the Range, and a brochure and other visitor information will be developed to promote the safety of visitors that travel over the top.

26. TOURISM AND COMMERCIAL OPERATIONS

A commercial concession is a right granted by way of lease or licence for occupation or access and use (respectively) of an area of land or water managed by the Department. Commercial concessions can increase the Range of recreation opportunities and facilities within national parks and make a financial contribution towards meeting the costs of natural resource

management, but must be consistent with the purpose of the reserve, the protection of its values, and with the objectives of this plan. The Department may enter into commercial arrangements to help meet the rising demand for high quality recreation and tourism services. All commercial concessions are subject to approval by the Minister for the Environment after consultation with the Conservation Commission.

Leases which allow a lessee to occupy a particular area of land are granted under Section 100 of the CALM Act. A lease provides security to protect significant investments and may be for a term not exceeding 21 years and may involve an option to renew that lease for a further term. The length of a lease is usually related to the level of investment and the return on the investment. For example, infrastructure such as permanent accommodation is usually subject to a lease arrangement. At present, there are no leases issued in the national park, although it is possible that future accommodation facilities will be developed through a lease arrangement (e.g. Binthalya homestead).

Licenses allow operators to access and use lands and waters managed by the Department. All private tour operators conducting commercial tourist activities on conservation reserves are required to obtain a licence in accordance with the CALM Act. The Department issues two types of commercial tour operator licences – 'T' Class (open to many operators) and 'E' Class (limited number of licences issued due to environmental or management issues).

The *Tour Operator Survey of the Hinterland of the Gascoyne-Murchison Region* (as referred to earlier) shows that of the 112 tour operators holding T class licenses to conduct tours in the park, less than 25% are known to visit the park. Other points in this survey of particular relevance to the planning area are:

- the length of visit to the park was commonly for half a day or less but up to 7 days;
- the most common type of tours were four-wheel drive followed by coach tours;
- 19% of operators stayed at the Temple Gorge campsite;
- the main issues for further development of the park related to access, roads and the need for more camping areas;
- passenger numbers are not commonly collected but estimated to be between 4-20 per group; and
- the values of remoteness and ecotourism rate highly for the Region.

As major visitation increases are anticipated, it is a priority for management to gather further information on current and projected recreational use of the planning area. Commercial operators can be asked to assist in the collection of these data as part of their licence conditions.

To access the top of the Range (as discussed previously), commercial tour operators will be required to adhere to the proposed permit system. Issues of specific relevance to

commercial operations requiring input from stakeholders include:

- the ratio of private vehicle to commercial vehicles;
- specific licence conditions for commercial operations; and
- how to deliver equitable opportunities for all interested commercial operators (through an EOI process with specific weighting to criteria including but not limited to local knowledge, regional preference, experience, ability etc).

In planning for future recreation, particularly the design of new campgrounds at Temple Gorge, Yabba and Great Gorge, consideration will be given to opportunities for commercial services and the potential for commercial involvement in the development and management of visitor facilities.

Two neighbouring pastoralists offer station-stay visitor accommodation, one of which also conducts tours in the existing park (see Section 22. *Regional Tourism Context*).

In the past, the Mt Sandiman Homestead has provided station-stay accommodation, with operators conducting day visits onto the plateau. The area accessed on the plateau by these tours is not within the existing national park, and consequently operators did not require a Commercial Tour Operator licence. In future, all operators in the expanded conservation reserve will require a licence. Commercial tourism activities are not currently being conducted from the homestead but the potential exists for the tourism business to be developed in the future.

The development of commercial visitor services, such as a safari camp at Merlinleigh, could contribute to management of the planning area in various ways (e.g. through monitoring and directing public access, interpreting the values of the planning area and promoting visitor safety). Whether such an operation is managed by way of a lease or a licence is dependent on the level of infrastructure – commercial concessions for safari style accommodation elsewhere in the State are offered as five year licences due to their semi-permanent nature, rather than as long-term leases.

Off-park accommodation (e.g. Lyons River Homestead) has the potential to cater for increasing visitation and offer accommodation types not available in the park.

27. VISITOR SAFETY

Visitor safety is a key management issue in the planning area. In addition to a genuine concern for visitor welfare, the Department has a moral and legal responsibility to consider personal safety. The Department manages the risks presented to visitors by their activities and by the natural, cultural, and developed environments through a visitor risk management program. This is guided by the Department's Policy Statement 53 – *Visitor Risk Management* (CALM 1986b).

In the event of an incident, the coordination of search, rescue or recovery operations is the responsibility of the Western Australian Police Service, with the Department providing support as requested. However, in an area as remote as the Kennedy Range, it could be anticipated that the Department, or the surrounding neighbours, may need to organise the initial response. To date, no search and rescue operations have been conducted in the planning area.

The risks to visitors include potential injury while walking due to unstable cliffs and uneven terrain. The cliffs pose a risk through the collapse of cliff faces, people falling off the edges and people being hit by falling rock. There is also potential for visitors to become lost or stranded on disused mining exploration tracks or due to vehicle failure. Sun exposure and dehydration are inherent risks for much of the year. Wildfires may also present a risk. As visitor safety is a key issue in the planning area, the provision of safety information and the preparation of a Visitor Risk Management Plan are priorities for this plan (refer to the *Management Summary Table* at the end of this document).

PART F. MANAGING RESOURCE USE

28. MINERAL AND PETROLEUM EXPLORATION AND DEVELOPMENT

The planning area has petroleum potential, is actively mined for the semi-precious gemstone mookaite, and may contain a major heavy mineral deposit(s) on the western side of the Range.

Legislation and Government Policy

Mining[7] on land managed by the Department is subject to the Mining Act, the Petroleum Act, *Petroleum Pipelines Act 1969* and Petroleum (Submerged lands) Act, the *Environmental Protection Act 1986*, Wildlife Conservation Act and various State Agreement acts. The Environmental Protection Act takes precedence over most other Acts.

Mining projects that potentially may cause significant environmental impacts can be referred to the Environmental Protection Authority (EPA) under section 38 of the Environmental Protection Act by the proponent, DoIR, the Conservation Commission, the Department and individuals.

As of 8 July 2004, the Environmental Protection Act provides for the protection of native vegetation and control of clearing and all mineral and petroleum activities require a permit for clearing, except where granted an exemption.

DoIR administers the Mining Act and the exploration for and subsequent development of minerals in Western Australia is undertaken through the various tenements including prospecting licences, exploration licences, general purpose leases and mining leases. DoIR also administers the exploration

[7] Mining includes exploration, fossicking, prospecting and mining operations.

for and subsequent extraction of petroleum resources through the granting of exploration permits and production licences. The holders of such tenements, permits and licenses are required to meet conditions to retain the right to explore and develop. The consent of the Minister responsible for the Mining Act is required for issuing various tenements.

Under the Mining Act the specific processes for approval of mining proposals on land managed under the CALM Act are dependent on the classification of the reserves under the Land Administration Act. The granting of a mining tenement or petroleum permit or licence is:

1. subject to the concurrence of the Minister for the Environment and approval of both Houses of Parliament for:
   - national parks across the state;
2. subject to the Minister for the Environment being consulted for:
   - class A reserves [conservation parks or section 5(1)(g) and 5(1)(h)] outside the South-west Land Division;
   - non class A land [conservation parks or section 5(1)(h) and 5(1)(h) reserves] across the State.

The Department and the Conservation Commission provide advice to the Minister for the Environment with regard to all mining tenement applications for all reserves.

Current Government policy is to prohibit mineral and petroleum exploration and development in national parks and class A nature reserves. However, applications that were lodged before February 2001 for access to national parks and nature reserves for mineral and petroleum exploration and development are considered but there is no assumption for approval and, if approved, they may be subject to the principle of 'environmental offsets'[8].

In 2006 the EPA released Position Statement No. 9 – *Environmental Offsets*. Should mining or petroleum tenements be approved in proposed conservation estate, these should be subject to the principle of environmental offsets. In addition, the Department's position is that the costs of rehabilitating mining and petroleum activities should be borne by the organisation(s) responsible for the activity.

The document, *Guidelines for Mineral Exploration and Mining within Conservation Reserves and other Environmentally Sensitive Areas* (DME 1998), outlines the procedures and conditions to be applied to applications for mining tenements.

Mineral and Petroleum Resources and Prospectivity

The current status of exploration and mining in the existing national park is as follows:

[8] Environmental offsets aim to ensure that significant and unavoidable environmental impacts are counterbalanced by a positive environmental gain, with a goal of achieving a 'net environmental benefit' (EPA 2004)

- one petroleum exploration permit (EP405);
- four pending exploration licences (E09/1388; E09/1389; E09/1343; E09/1344); and
- two granted mining leases (M09/86, M09/18) and two pending (M09/92, M09/109).

The mining leases are for the colourful agate mookaite, operating within the former Mooka pastoral lease and adjacent to the Mooka Creek recreation site. Current mining practices involve removing on average between 500 – 1500 tonnes of mookaite annually from the river bed.

Granted mining leases M09/86 and M09/18, which cover advanced resource development projects on the former Mooka pastoral lease, will be excluded from the proposed national park additions and established as a separate CALM Act section 5(1)(h) reserve (see Section 6. *Existing and Proposed Tenure*).

Amateur Rock Collecting

In relation to amateur rock collecting, under the CALM Regulations, a person must not, without lawful authority, damage, disturb or remove naturally occurring features (which includes mineral specimens and fossils) on CALM Act land.

Under the Mining Act, fossicking for rocks and gemstones is permitted on Crown land that is not the subject of a mining tenement provided a Miner's Right has been obtained. Under the Mining Act, reserves for or dedicated to any public purpose, with some exceptions including land reserved for mining or commons, are not considered to be Crown land and hence a Miner's Right is not applicable.

As the long term intention is to incorporate the proposed additions into the existing national park, it will not be possible for amateur rock collecting of mookaite and other gemstones to continue, once these additions are reserved. However, over the life of the plan, consideration of a separate CALM Act reserve for conservation and recreational fossicking is required to allow for this activity to be undertaken by hobbyists and tourists. This is an option that will be explored with DoIR. Issues for such an option include land tenure, size of reserve, vesting and management arrangements. Any such reserve is conditional on the geoheritage significance of mookaite being evaluated (see Section 12. *Geology, Geomorphology and Land Systems*).

Fossicking for rocks and gemstones is permitted on mining tenements provided permission in writing is obtained from the tenement holder. Two granted mining leases for mookaite are operating within the proposed extensions to the Park.

29. BEEKEEPING

There are no registered apiary sites within the planning area and to date no interest has been shown in having sites in the area. Within the planning area over 35 species of native bees and 'pollen' wasps have been recorded.

Amongst these is one of Australia's largest bees. Known as Dawson's burrowing bee (*Amegilla dawsoni*), an active nesting colony may contain up to 10 000 burrows and can provide one of the most exciting entomological experiences to witness. These bees are confined to W.A. and forage on poverty bushes (*Eremophila spp*.) and rough bluebell (*Trichodesma zeylanicum*).

As the planning area contains a large suite of native insects including bees, wasps, beetles, flies, moths and butterflies, all of which may be put at risk by competition for floral resources, beekeeping will not be permitted. This is consistent with the Department's draft Policy Statement 41 – *Beekeeping on Public Land*, which allows, through the management planning process, for areas of the conservation estate to be kept free of apiary sites.

30. UTILITIES AND SERVICES

Occasionally utility service providers will seek access to and/or acquisition of areas in the conservation reserve system to facilitate provision of their services (e.g. electricity, gas, public transport infrastructure, water and telecommunication.

The provision of new services and infrastructure has the potential to impact on the natural and cultural values of the planning area and depending on their location and type can result in a number of significant management problems. Such impacts may include the clearing of vegetation, introduction of weeds and disease, increase susceptibility to fire, visual impacts and the destruction of important habitats.

To limit management problems such as these, it is preferable that all utility infrastructure not servicing the park itself, is accommodated outside of it. In instances where accommodating utility service developments within or adjacent to the park is acceptable, or undesirable but nonetheless unavoidable, the Department will provide direction as necessary to minimise adverse impacts on key natural and cultural values.

An underground gas pipeline is located to the east and south of the planning area, and tall towers are located at substations along the pipeline. One tower is prominent from most viewing points along the eastern escarpment on top of the Range. It detracts from the vast uninterrupted views to the east, and is a reminder of how utilities located outside the planning area can impact on visual quality and visitor experiences.

31. PASTORAL INFRASTRUCTURE

Remnants of the pastoral operations in the planning area persist through the presence of fences, windmills, stock troughs and station homesteads, all in various states of disrepair. Depending on the condition and maintenance requirements of the fencing, some may be worth retaining for stock control purposes. Redundant fencing will eventually be removed.

The acquisition of Mooka pastoral lease includes the station homestead (where the previous lessees continue to reside as caretakers), as well as the disused Binthalya homestead. Relics of the old Merlinleigh homestead exist in the north east of the planning area.

Some windmills and associated infrastructure may be required to provide water for feral animal control and fire-fighting purposes.

The boundary of the planning area is not fenced in its entirety, and as a consequence it is possible for stock to wander from adjoining pastoral lands. In some situations, however, boundary fencing will not be required due to the unimproved condition of the adjoining land and hence the reduced likelihood of wandering stock. Conversely, boundary fencing may be required in areas where adjacent pastoralists are utilising country on the planning area boundary.

PART G. INVOLVING THE COMMUNITY

32. INFORMATION, INTERPRETATION AND EDUCATION

An effective information, interpretation and education program is vital to achieve the objectives for management of the planning area. Information, interpretation and education inform the public of the attractions and opportunities available, and assist the community in appreciating and understanding the natural and cultural environments. Such programs should engage the community and foster a sense of ownership, and encourage appropriate visitor behaviour that minimises adverse impacts on the environment while enhancing visitor experiences.

Education and interpretation programs will concentrate on raising awareness about the planning area's natural values, potential human impacts, visitor risks, cultural heritage, and the positive actions visitors can take to support management.

33. WORKING WITH THE COMMUNITY

A key function of the Department and the Conservation Commission is to promote and facilitate community involvement in both the planning and management of the public conservation estate.

The community has been involved in the preparation of this management plan. Initially, as part of the preparation of Interim Management Guidelines (IMG) previously prepared for the planning area, comments were sought from key stakeholders and the immediate community and provided perspective on several management issues, in particular management with a focus on access across the top of the Range. Following on from the IMG the draft management plan was prepared and released for public comment. All submissions have been examined and changes have been made to the plan where appropriate. Further information was also sought from key stakeholders in relation

to a number of management issues including long-term road access, mining and fossicking, fire ecology, beekeeping and tourism.

It is recognised that ongoing community support and assistance with management is essential for the successful implementation of the management plan. The involvement of the traditional custodians, adjacent pastoralists, visitors, tour operators, other government agencies, volunteers and interest groups is important to the conservation of the values of the planning area. Key areas of community involvement identified in this plan include:

- the sharing of cultural heritage information (see Part D. *Managing Our Cultural Heritage*);
- the evaluation of the geoheritage significance of mookaite with DoIR (see Section 12. *Geology, Geomorphology and Land Systems–Geoheritage*);
- the management and mustering of feral goats by neighbouring pastoralists (see Section 18. *Introduced and Other Problem Animals*);
- assistance to visitors and the collection of visitor data by campground hosts (see Section 22. *Regional Tourism Context–Visitor Numbers and Trends*);
- the use of local contractors to undertake general maintenance of the Temple Gorge campground facilities (see Section 23. *Recreation Opportunities and Visitor Access–Recreational Opportunities and Access at the Base of the Eastern Escarpment*);
- tours conducted by neighbouring pastoralists (see Section 26. *Tourism and Commercial Operations*);
- provision of station-stay accommodation by neighbours (see Section 26. *Tourism and Commercial Operations*);
- numerous future opportunities for low impact accommodation facilities within the planning area (e.g. semi permanent safari camps – see Section 23. *Recreation Opportunities and Visitor Access*);
- the involvement of the local community in search, rescue and recovery operations in the planning area (see Section 27. *Visitor Safety*); and
- exploring the option of a CALM Act reserve for the purposes of fossicking with DoIR (see Section 28. *Mineral and Petroleum Exploration and Development–Amateur Rock Collecting*).

PART H. IMPLEMENTING THE PLAN

34. ADMINISTRATION

For administrative purposes, the Department is structured into nine geographic regions that are further sub-divided into districts. The day to day implementation of the plan will be the responsibility of the District Manager, Geraldton District (Midwest Region), and the Carnarvon Work Centre who coordinates the operational management of the park.

Over the life of the plan the Department will consider the requirement for permanent/seasonal staff presence in the Park.

35. RESEARCH AND MONITORING

Research and monitoring are important components of management. The Department's research gives priority to:

- describing and documenting Western Australia's biological diversity;
- providing knowledge on how best to conserve the State's biodiversity; and
- increasing knowledge of visitor use patterns and profiles (e.g. demographics, level of use of recreation sites, visitor expectations and perceptions).

Many opportunities exist for research and monitoring within the planning area. Gaps in data needed for the identification of natural values and management responses have been identified for the Wooramel subregion (see Section 9. *Biogeography*), which encompasses the planning area (CALM 2002). The data gaps, all of which are of relevance to the planning area, are as follows:

- vegetation and regional ecosystem mapping;
- systematic fauna survey;
- floristic data; and
- ecological and life history data.

Research and monitoring projects identified throughout the plan include:

- monitoring and remedial action of environmental weeds, in particular buffel grass, is required, particularly in relation to fire prone systems and its encroachment into recreation sites (see Sections 17. *Environmental Weeds* and 19. *Fire*);
- investigation of the fire ecology and management in the planning area, in particular prescribed burning of the dune fields of the Kennedy Land System (see Section 19. *Fire*);
- monitoring of Priority 4 ecological communities, namely the invertebrate assemblages of Mooka Spring; and the spinifex-dominated plant assemblages of the plateau (see Section 14. *Flora and Plant Communities of Conservation Significance*

and Section 15. *Fauna and Animal Communities of Conservation Significance*); and

- investigation into the most appropriate level of public access and use, including environmental impacts of use, the role of commercial tour operators, the introduction of a permit system to access the top of the Range, and determination of optimum numbers and mix of day-use and overnight campers to maintain environmental and social conditions (see Section 23. *Recreation Opportunities and Visitor Access*).

Scientific research activity involving disturbance of flora and fauna (including palaeontological research) can only occur if it is in accordance with a licence issued under the Wildlife Conservation Act, except when undertaken by or for the Geological Survey of Western Australia (see Section 12. *Geology, Geomorphology and Land Systems*).

Ideally, it would be appropriate for research and monitoring programs to involve a wide range of people and groups. The involvement of volunteers, educational and other scientific institutions, and individual researchers can reduce the cost of such programs, assist in providing information to both management and the broader community, and assist in fostering a sense of ownership in the planning area.

36. TERM OF THE PLAN

This management plan will guide management of the park for a period of 10 years from the date the final management plan is gazetted. During this time, amendments to the plan are allowed under section 61 of the CALM Act. If an amendment is necessary, 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. The new management planning process requires full public consultation and approval from the Minister for the Environment. If the plan is not reviewed and replaced by the end of the 10 years period, this plan will remain in force unless revoked by the Minister for the Environment.

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MANAGEMENT SUMMARY TABLE

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		Performance Measure	Target	Reporting Requirements
PART B. MANAGEMENT DIRECTIONS AND PURPOSE				
6. EXISTING AND PROPOSED TENURE • Kennedy Range National Park was created on 8 January 1993 as a class A reserve. • One entire pastoral lease and parts of seven other adjoining leases have been purchased to add to the existing park (refer to Map 1 – Locality and Land Tenure). • As the long-term intention is to incorporate the proposed additions into the existing national park, it will not be possible for amateur rock collecting to continue. The option of establishing a CALM Act reserve that allows for recreational fossicking is to be explored with DoIR. • Current State Government policy is to prohibit mining in national parks (see Mineral and Petroleum Exploration and Development). Consequently, a separate CALM Act section 5(1)(h) reserve is required to permit granted mining leases covering the former Mooka pastoral lease.	OBJECTIVE To protect the planning area with the maximum security of tenure and purpose. THIS WILL BE ACHIEVED BY: 1. the Department initiating all actions for which it is responsible to reserve the proposed additions as class A reserve for the purpose of national park under the Land Administration Act; 2. excluding granted mining leases M09/86 and M09/18 from the proposed national park additions and establishing these areas as a separate CALM Act section 5(1)(h) reserve; and 3. subject to an evaluation of the geoheritage significance of mookaite, considering the excision of an area from the national park and the establishment of a separate CALM Act section 5(1)(h) reserve for conservation and recreational fossicking.	Changes in land tenure and purpose.	To formally change the proposed additions to national park (class A) within two years of commencement of the plan.	After two years or once changes in land tenure and purpose occur (whichever is the sooner).
8. NAMING OF SITES AND FEATURES • Informal names have been attributed to many sites and features in the Park.	OBJECTIVE To formalise appropriate names for sites and features in the Park. THIS WILL BE ACHIEVED BY: 1. encouraging proposed new names to be processed via the State Geographic Names Committee.			
PART C. MANAGING THE NATURAL ENVIRONMENT				
10. WILDERNESS • The National Wilderness Inventory indicates that the top of the Range has significant areas from which candidate wilderness areas could be chosen.	OBJECTIVE To provide statutory protection to any proposed wilderness area. THIS WILL BE ACHIEVED BY:			

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		Performance Measure	Target	Reporting Requirements
	OBJECTIVE (continued) 1. undertaking an analysis of the wilderness qualities on top of the Range, including gaining a better understanding of the fire ecology of the Kennedy and Moogooloo Land Systems; and 2. subject to the analysis of wilderness qualities, and on approval of the Conservation Commission and Minister for the Environment, gazetting an area of wilderness under section 62 of the CALM Act.			
11. CLIMATE AND CLIMATE CHANGE • The planning area has a semi-arid climate with a mean annual rainfall as low as 200 mm in places. • Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases has been identified as a key threatening process under the EPBC Act.	OBJECTIVE To increase knowledge of the impacts of climate change on the planning area. THIS WILL BE ACHIEVED BY: 1. investigating the potential vulnerability of the planning area's species and communities to climate change (in particular species and communities of conservation significance); 2. adapting climate change management approaches as necessary in response to new knowledge (e.g. improved understanding of the park's biological systems) and changes in state-wide climate-biodiversity strategies; and 3. implementing strategies in this plan aimed at reserve creation, feral animal and weed control, fire management, and re-introduction programs.			
12. GEOLOGY, GEOMORPHOLOGY AND LAND SYSTEMS • The Range has a diverse geology that is richly fossiliferous, including rare semiprecious gemstone and fossil occurrences. • Mookaite is understood to be confined to the planning area. • Recent acquisitions have seen greater representation of the Billy and Cahill Land Systems within the south-western portion of the planning area, and the Yalbalgo Land System newly represented. • Dune systems of the Kennedy Land System on top of the Range are easily destabilised by ground disturbance, such as vehicles.	OBJECTIVES 1. To maintain the geological and geomorphological diversity and processes in the planning area. 2. To protect the geological features and fossils of the planning area.3. THIS WILL BE ACHIEVED BY: 1. providing visitor information to interpret the planning area's geology and landscape values; 2. protecting geomorphological features vulnerable to damage; and 3. investigating the geoheritage significance of mookaite with DoIR.	Geoheritage significance of mookaite.	The geoheritage significance of mookaite is evaluated and registered.	Every five years.

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		Performance Measure	Target	Reporting Requirements
12. GEOLOGY, GEOMORPHOLOGY AND LAND SYSTEMS (continued) • Excluding geological research authorised by DoIR and the Department, a person must not, without lawful authority, damage, disturb or remove naturally occurring features (which includes mineral specimens and fossils) from a national park.				
13. HYDROLOGY AND CATCHMENT PROTECTION • Both the winter rainfall of the south-west and summer rainfall of the north influence the planning area, although it is usually winter rains that give the long lasting recharges of soil moisture. • There are few major drainage systems within the planning area, but those that are present are significant as they provide a source of water for native animals and support species rich aquatic systems, particularly the Mooka Spring system. • The soils of the Kennedy Land System on the plateau are susceptible to erosion, primarily after fire. • The impacts of hooves and overgrazing by feral goats is destabilising much of the breakaway areas within the planning area. Springs and waterholes are also very susceptible to degradation and contamination by feral goats. • The regionally significant Mooka Spring system requires protection from goats and inappropriate visitor use.	OBJECTIVE To minimise erosion potential of each land system and protect the water quality and quantity in the planning area. THIS WILL BE ACHIEVED BY: 1. implementing strategies for feral goat control (see Section 18. Introduced and Other Problem Animals); 2. gaining a better understanding of the implications of fire to minimise damaging soil erosion events (e.g. implementing strategies for fire management of the spinifex dunefields of the Kennedy Land System (see Section 19. Fire); 3. preparing and implementing recreation plans and rehabilitation plans for areas degraded by human use; and 4. prohibiting camping at Mooka Creek and controlling vehicle access across the creek.			

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		Performance Measure	Target	Reporting Requirements
14. NATIVE PLANTS AND PLANT COMMUNITIES • The planning area is situated in the Carnarvon Botanical District which coincides broadly with the geological Carnarvon Basin. • There is a diverse mix of predominately arid flora of southern affinities with outliers more common to the south-west. • A more comprehensive knowledge of the planning area's native plants and plant communities, and the impacts of fire and weeds is required to improve flora management effectiveness. • The plant assemblages of the dunes on top of the Range are listed as a priority ecological community. • Feral goats pose a major threat to the flora. • The Mooka Spring system is an important and unusual ecological community, and represents the best of its type in the Carnarvon Basin. It requires protection from goats and inappropriate visitor use. • Three priority species (*Gymnanthera cunninghamii*, *Acacia atopa* and *Goodenia neogoodenia*) occur in the planning area. • Three endemic *Eremophila* spp. have recently been discovered in the planning area.	OBJECTIVE To conserve the diversity of native plants, plant communities and vegetation structures, particularly threatened or other priority species in the planning area. THIS WILL BE ACHIEVED BY: 1. identifying and protecting native plants and plant communities that may require special protection from inappropriate fire regimes (see Section 19. Fire), environmental weeds (see Section 17. Environmental Weeds), unsustainable feral animal grazing (see Section 18. Introduced and Other Problem Animals) or visitor use (see Part E. Managing Visitor Use). In particular, protect the springs for the birdlife, herbaceous flora and invertebrates they support, from disturbance by goats; 2. liaising with neighbouring landholders to co-ordinate conservation efforts to protect native plants and plant communities; 3. encouraging floristic research and monitoring efforts in the planning area, with a focus on significant species and communities, and 4. prohibiting unauthorised camping at Mooka Creek and controlling vehicle access across the creek.	Population numbers and range of specially protected flora, fauna and significant ecological communities.	Remain stable or increase over the life of the plan subject to natural variations.	Every five years.
15 NATIVE ANIMALS AND HABITATS • A more comprehensive knowledge of the planning area's native animals and habitats, and the impacts of fire, feral animals and weeds, is required to improve fauna management effectiveness. • The skink (*Lerista kennedyensis*) is endemic to the planning area.	OBJECTIVE To conserve the diversity of native fauna and their habitats, particularly threatened or other priority species in the planning area. THIS WILL BE ACHIEVED BY: 1. implementing strategies for feral goat control (see Section 18. Introduced and Other Problem Animals) and visitor use (see Part E. Managing Visitor Use), with a priority to protect aquatic and other habitats of high natural value;			

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		Performance Measure	Target	Reporting Requirements
15. NATIVE ANIMALS AND HABITATS (continued) • The rufous-crowned emu wren (Stipiturus ruficeps), found is the spinifex dunes on the top of the Range, is the only recording in the Gascoyne region. • Springs and soaks on the western side of the Range provide important habitat for many animals including at least 13 invertebrates that do not occur elsewhere in the region or do so only rarely. • The invertebrate assemblages of the Mooka Spring system are listed as a priority ecological community and represent part of a regionally significant wetland type. The spring requires protection from feral goats and inappropriate visitor use. • Goats pose a major threat to fauna as they cause habitat degradation and compete for similar foods and habitat resources. • Combined with effective feral animal control, the planning area has the potential for the reintroduction of several mammals whose original distribution encompassed the Range. • Dingoes/wild dogs are the highest order predator in Australian ecosystems. Dingoes still maintain a functional part of predator-prey relationships in many cases, and may help to control feral goats and foxes.	OBJECTIVE (continued) 2. continuing to liaise with park neighbours and the Carnarvon Zone Control Authority in relation to dingoes/wild dogs, with the long term objective of supporting a self-sustaining population if impacts on surrounding pastoral enterprises can be adequately addressed; 3. encouraging systematic fauna research and monitoring in the planning area with a focus on significant species and habitats; 4. locating and capping old drill holes that act as traps for fauna; and 5. considering the translocation of species now extinct in the area as part of the Western Shield program.			
17. ENVIRONMENTAL WEEDS • Environmental weeds take advantage of disturbance, particularly around tracks and recreation sites, and displace indigenous plants by competing with them for light, nutrients and water. • Buffel grass is ubiquitous across the alluvial plains of the planning area, and is a weed of specific concern.	OBJECTIVE To minimise the impacts of environmental weeds on the planning area's values. THIS WILL BE ACHIEVED BY: 1. implementing the Department's commitments to the Environmental Weed Strategy for WA and the Department's proposed Environmental Weed Management Policy (subject to final consultation) where weed invasion threatens the planning area's natural values;	Changes in the area covered by species rated as High in the Environmental Weed Strategy for WA or in the weed control plan.	No increase in the area covered by buffel grass in the spinifex dunefields of the plateau.	Every five years.

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		Performance Measure	Target	Reporting Requirements
17. ENVIRONMENTAL WEEDS (continued) • Fire and recreation management is complicated by the presence of buffel grass. Its further encroachment into the fire prone Yalbalgo Land System, the relatively buffel grass-free and fire prone Kennedy Land System, and some proposed recreation sites may be of concern. • Date palms restrict spring flow due to their vast consumption of water, impacting on many of the natural values of the springs.	OBJECTIVE (continued) 2. removing female date palms (and, if necessary, male date palms); 3. monitoring buffel grass on the plateau and taking remedial action if new populations are detected; and 4. controlling any access which spreads weeds and adopt hygiene measures during operations within the planning area, in particular access which might increase the spread of buffel grass on the plateau spinifex dunefields.	Presence of date palms.	All date palms (excluding one male) to be eradicated by 2011.	Every five years.
18. INTRODUCED AND OTHER PROBLEM ANIMALS • Competition and land degradation by feral goats, predation by cats, and predation by the European red fox are all identified as key threatening processes under the EPBC Act.	OBJECTIVE To minimise and where necessary, ameliorate the impact of problem animals on the planning area's values. THIS WILL BE ACHIEVED BY:			
• Feral goat control is one of the most important management issues for the planning area. • The proposed additions to the planning area, particularly of the former Mooka pastoral lease which includes springs and pools where feral goats congregate, will greatly increase the potential to control feral goats. • The industry of commercial harvesting of unmanaged (feral) goats by surrounding pastoralists has increased over the last decade. • The demise of an effective goat control program, coupled with a growing goat industry has seen the number of goats within the planning area increase. • Dingoes/wild dogs can assist with effective goat control. • Cooperation with pastoral neighbours is vital to ensure effective pest animal control within the planning area.	1. preparing, within one year of commencing this plan, and implementing a feral goat control strategy for the planning area; 2. using the existing water points on former Mooka pastoral lease for feral goat trapping purposes; 3. liaising with neighbouring pastoralists to facilitate the removal of feral goats, sheep and cattle from the planning area, and encourage control of these animals on their properties; and 4. implementing strategies related to wild dogs/dingoes (see Section 15. Native Animals and Habitats) to assist in the possible long-term control of feral goats.	Changes in the area and intensity of vegetation and land systems adversely impacted by feral goats.	Decrease over the life of the plan.	Every three years.

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		Performance Measure	Target	Reporting Requirements
19. FIRE • Active wildfire suppression is not feasible in most of the planning area due to inaccessibility and remoteness from fire suppression resources. • The spinifex dunefield of the plateau (Kennedy Land System) is the most fire prone in the planning area, and the low Acacia woodland of the Yalbalgo Land System is also prone to fire. • The cliff and gorge habitats generally have a lower flammability due to the sparse and discontinuous fuel loads in these areas and as a consequence, species less tolerant to fire are more likely to be found here. • The protection and conservation of biodiversity is the main focus for fire management.	OBJECTIVES 1. Maintain fire diversity and hence biodiversity, and protect ecologically sensitive areas from inappropriate fire frequency or large and intense wildfires. 2. Protect, where feasible, life, property, community values and assets of the planning area from wildfire.3. THIS WILL BE ACHIEVED BY: 1. documenting the fire history of the planning area and conducting a wildfire threat analysis to determine management priority actions; 2. protecting, where possible, fire sensitive species found in the damper and relatively fire-free cliff and gorge areas from the impacts of wildfire; 3. implementing an adaptive fire management program on the plateau to improve understanding of what scale of fire mosaic best promotes biodiversity within spinifex communities;	Change in the diversity of vegetation age classes in the spinifex dunefields of the plateau.	Increase in diversity of vegetation age classes over the life of the plan.	Every five years.
• Fire management is complicated by the presence of buffel grass. Its further encroachment into the fire prone Kennedy and Yalbalgo Land Systems, and into some proposed recreation sites may be of concern. • The top of the Range has significant areas from which candidate wilderness areas could be chosen and effective fire management is particularly relevant to meeting wilderness criteria.	4. encouraging research into the determination of fire and biodiversity interactions; 5. liaising with Fire and Emergency Services Authority, the Upper Gascoyne and Carnarvon shires and neighbouring landowners to determine the requirements (if any) for a co-ordinated fire response; 6. determining which of the existing water points on the former Mooka pastoral lease should be retained for fire fighting purposes; and 7. restricting spread of fire-responsive buffel grass on to the plateau by allowing vehicles only on those tracks identified on Map 2 – Recreation Opportunities.			
PART D. MANAGING OUR CULTURAL HERITAGE				
20. INDIGENOUS HERITAGE AND 21. NON-INDIGENOUS HERITAGE • The Range was named in 1858 after the then governor of WA, Arthur Edward Kennedy. • The involvement of Aboriginal people with a connection to the planning area is a key focus for management. • Two native title claims cover the planning area – WAG6161_98 and WAG6212_98.	OBJECTIVE To protect the cultural heritage values of the planning area. THIS WILL BE ACHIEVED BY: 1. ensuring that Aboriginal people with a connection to the planning area have a primary and active role in managing their heritage;			

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		Performance Measure	Target	Reporting Requirements
20. INDIGENOUS HERITAGE AND 21. NON-INDIGENOUS HERITAGE (continued) • Artefacts scatters near the springs on the western side provide evidence of a long Aboriginal history in the area. • Traditional pastoral activity focused on sheep and wool production. • Factors including drought, land degradation, falling wool prices, saw pastoral activity move to cattle after the 1970s. Current pastoral activities now include the commercial harvesting of feral goats. • Historic features within the planning area include the disused Binthalya Homestead and relics of the old Merlinleigh Homestead.	OBJECTIVE (continued) 2. continuing to work with the appropriate Aboriginal representative group in a manner consistent with Government policy; 3. referring proposals to undertake public works to the relevant Native Title claimants and authorities; 4. in accordance with the Burra Charter, developing a process to protect existing and potential heritage sites; 5. providing visitor information to promote the appreciation of the area's cultural history and protection of heritage values; and 6. ensuring visitor and management activities do not adversely impact upon significant cultural and historical sites.			
PART E. MANAGING VISITOR USE				
22. REGIONAL TOURISM CONTEXT • Tourism WA has identified Kennedy Range and Mt Augustus as 'focus areas' for tourism in the area. • The planning area is a key feature of two of the Gascoyne Murchison Outback Pathways self-drive trails. • Major visitation increases are anticipated with the sealing of the road from Carnarvon to Gascoyne Junction expected to be completed in 2010. 23. RECREATION OPPORTUNITIES AND VISITOR ACCESS • The remoteness of the planning area imparts a strong sense of wilderness and the top of the Range has significant areas from which candidate wilderness areas could be chosen. • The Temple Gorge recreation area is currently the only area offering visitor facilities in the planning area.	OBJECTIVE Provide and enhance opportunities for recreation that are consistent with the values of the planning area, minimise conflict between visitors, and consider visitor safety. THIS WILL BE ACHIEVED BY: 1. undertaking an analysis of the wilderness qualities on top of the Range with the long-term aim of creating wilderness area/sand wilderness recreation opportunities (see Section 10. Wilderness); 2. introducing a permit system for crossing the Range; 3. considering the issue that some public access is via undedicated roads on the Mardathuna and Minnie Creek pastoral leases. This may need to be addressed through the creation of dedicated roads under the Land Administrative Act 1997; 4. developing a new campground, entry station and walk trails to replace the existing, degraded Temple Gorge recreation area;	Condition of the track across the top of the Range. The satisfaction that visitors express with their visit (including visitors crossing the Range).	No degradation over the life of the plan. Maintain or increase over the life of the plan.	Every two years Every five years

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		Performance Measure	Target	Reporting Requirements
23. RECREATION OPPORTUNITIES AND VISITOR ACCESS (continued) • Visitation to the western side and the top of the Range needs to be controlled to protect the remote experience and promote visitor safety. • Access management across the top of the Range, linked to the introduction of a permit system for crossing the Range, is a focus for this plan. • Eastern access to the top of the Range is through Minnie Creek pastoral lease.	OBJECTIVE (continued) 5. developing a campground (Yabba) and day-use areas on the western side of the Range; 6. developing facilities for overnight use at Great Gorge and Merlinleigh; 7. in consultation with private enterprise, considering proposals for commercial accommodation (and other) opportunities for the Binthalya and Mooka homesteads, and Merlinleigh; 8. prohibiting unauthorised camping at Mooka Creek and controlling access across the creek;			
• The geology, geomorphology and aesthetic qualities of the planning area are attractive features for visitors, yet some geomorphological features present significant risks to visitors and/or are susceptible to visitor impacts. 25. RECREATION ACTIVITIES • Important activities for visitors include camping, 4WD, sightseeing, flora appreciation, abseiling/climbing and rock collecting. 26. TOURISM AND COMMERCIAL OPERATIONS • The planning area and surrounding properties provide numerous potential opportunities for commercial tourism operations.	9. prohibiting informal campfires, except the western side of Range until formalised camping arrangement are in place. Until such time, ensure that all campers on the western side of the Range are informed of the minimum requirements for campfire safety; 10. continue to gather information from tourism operators about their use of the planning area for consideration in the review of access management, potential commercial services and the design of visitor facilities; 11. preparing a visitor risk management plan for the planning area; 12. applying DEC Policy Statement 18 – Recreation, Tourism and Visitor Services and CALM Policy Statement 34 – Visual Resource Management on Lands and Waters managed by CALM prior to any development or management activity that may impact on the aesthetic values of the planning area; 13. considering the requirement for permanent/seasonal staff presence in the Park; and 14. continue to gather information on recreation activities, with particular reference to abseiling/climbing and rock collecting (see Section 28. Mineral and Petroleum Exploration and Development).			

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		Performance Measure	Target	Reporting Requirements
PART F. MANAGING RESOURCE USE				
28. MINERAL AND PETROLEUM EXPLORATION AND DEVELOPMENT • The planning area has petroleum potential, is actively mined for the semi-precious gemstone mookaite, and may contain a major heavy mineral deposit(s) on the western side of the Range. • Two granted mining leases (M09/86 and M09/18) and two pending leases occur in the planning area. There is also one petroleum exploration permit and four pending exploration licences. • Current State Government policy is to prohibit mineral and petroleum exploration and development in national parks and class A nature reserves. As a result, granted mining leases on the former Mooka pastoral lease must be excluded from the proposed national park additions and established as a separate CALM Act section 5(1)(h) reserve. • The option of excising an area of national park and establishing a separate CALM Act reserve for conservation and recreational fossicking is also to be explored with DoIR (see Section 6. Existing and Proposed Tenure).	OBJECTIVE To protect the planning area from the impact of mineral and petroleum exploration and development whilst being consistent with Government Legislation and policy. THIS WILL BE ACHIEVED BY: 1. referring proposals that may adversely impact on the planning area to the EPA for their consideration of assessment under the Environmental Protection Act; 2. excluding granted mining leases M09/86 and M09/18 from the proposed national park additions and establishing these areas as a separate CALM Act section 5(1)(h) reserve; 3. liaising with DoIR to ensure that environmental conditions are met where approvals to explore and mine are granted; and 4. investigating management options to allow recreational fossicking to continue in an appropriate reserve.			
PART G. INVOLVING THE COMMUNITY				
• An effective information, interpretation and education program is vital to achieve the objectives for management of the planning area. • Community support and assistance with management is essential for the successful implementation of the plan.	OBJECTIVE To facilitate an effective communication program and effective community involvement in the ongoing management of the planning area. THIS WILL BE ACHIEVED BY:			

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		Performance Measure	Target	Reporting Requirements
• The community includes traditional custodians, adjacent pastoralists, visitors, tour operators, other government agencies, volunteers and interest groups.	OBJECTIVE (continued) 1. providing information to visitors on natural and cultural values and issues within the park such as visitor safety, and appropriate activities and behaviour; 2. supporting activities that involve the community in planning for and on-going management of the planning area; 3. liaising with the adjoining pastoralists to gain an appreciation of their knowledge of the planning area, and in management activities such as fire, weed and goat control; and 4. progressing the involvement of Native Title claimants in management and interpretation of the planning area (see Part D. Managing Our Cultural Heritage).			
PART H. IMPLEMENTING THE PLAN				
• Scientific data gaps of relevance to the planning area include: • vegetation and regional ecosystem mapping; • systematic fauna survey; • floristic data; and • ecological and life history data. • The knowledge of visitor use patterns and profiles for the region is poor.	OBJECTIVES 1. To increase knowledge and understanding of natural values and visitor use to provide for better management of the planning area. 2. To enable the impacts of management strategies to be assessed.3. THIS WILL BE ACHIEVED BY: 1. identifying and initiating integrated research and monitoring programs that facilitate management of the planning area, as resources permit and according to priority.	The number of survey and data collection projects undertaken within the planning area. Achievement of KPIs.	Increased over the life of the plan. Target requirements for KPIs satisfactorily met.	Every five years Every five years

*Note: the response to target shortfall for each of the key performance indicators is for the Department to investigate the cause and report to the Conservation Commission for action.

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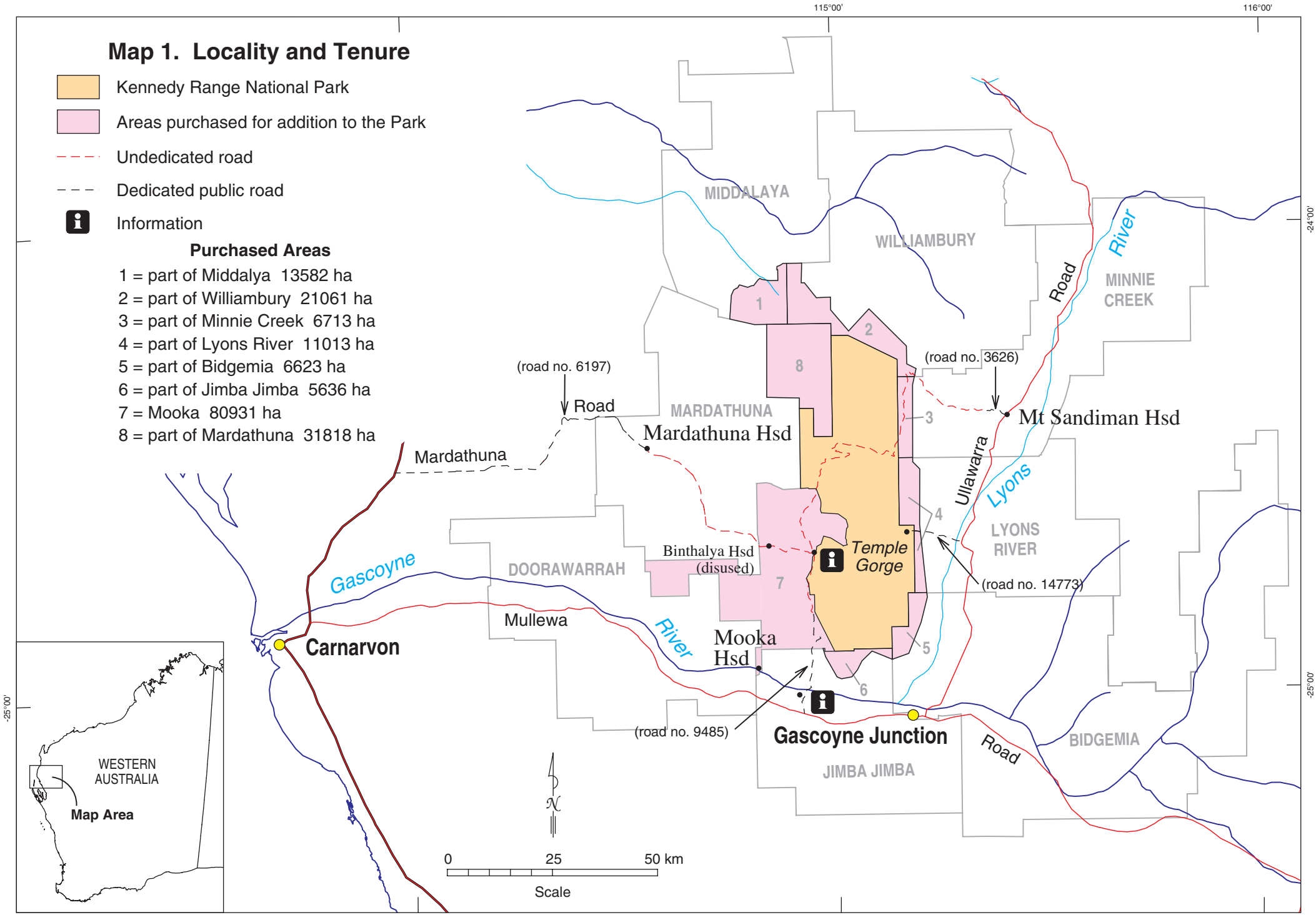
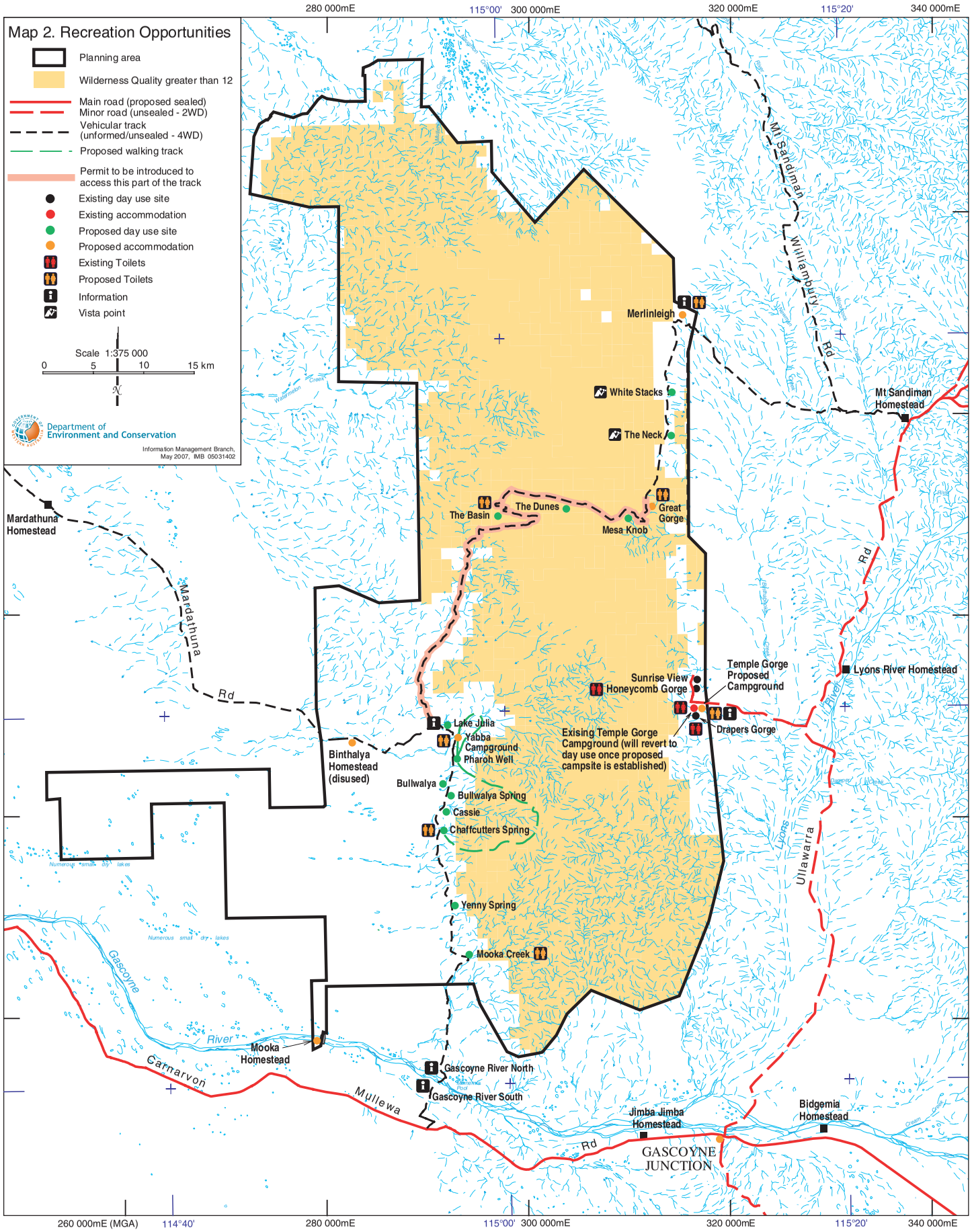

Map 1. Locality and Tenure
Kennedy Range National Park
Areas purchased for addition to the Park
Undedicated road
Dedicated public road
Information
Purchased Areas
1 = part of Middalya 13582 ha
2 = part of Williambury 21061 ha
3 = part of Minnie Creek 6713 ha
4 = part of Lyons River 11013 ha
5 = part of Bidgemia 6623 ha
6 = part of Jimba Jimba 5636 ha
7 = Mooka 80931 ha
8 = part of Mardathuna 31818 ha
115°00'
116°00'
-24°00'
-25°00'
MIDDALAYA
WILLIAMBURY
MINNIE CREEK
MARDATHUNA
DOORAWARRAH
LYONS RIVER
BIDGEMIA
JIMBA JIMBA
(road no. 6197)
Road
Mardathuna
Mardathuna Hsd
(road no. 3626)
Mt Sandiman Hsd
Ullawarra Road
Lyons River
Binthalya Hsd
(disused)
Temple Gorge
(road no. 14773)
Gascoyne River
Mullewa
Carnarvon
Mooka Hsd
(road no. 9485)
Gascoyne Junction
Road
1
2
3
4
5
6
7
8
WESTERN AUSTRALIA
Map Area
N
0
25
50 km
Scale
114°00'
115°00'
116°00'


Map 2. Recreation Opportunities
Planning area
Wilderness Quality greater than 12
Main road (proposed sealed)
Minor road (unsealed - 2WD)
Vehicular track (unformed/unsealed - 4WD)
Proposed walking track
Permit to be introduced to access this part of the track
Existing day use site
Existing accommodation
Proposed day use site
Proposed accommodation
Existing Toilets
Proposed Toilets
Information
Vista point
Scale 1:375 000
0 5 10 15 km
N
Department of Environment and Conservation
Information Management Branch, May 2007, IMB 05031402
280 000mE
115°00'
300 000mE
320 000mE
115°20'
340 000mE
7 300 000mN
7 280 000mN
7 260 000mN
7 240 000mN (MGA)
24°20'
24°40'
25°00'
260 000mE (MGA)
114°40'
Merlinleigh
White Stacks
The Neck
Mt Sandiman Homestead
Mt Sandiman Williambury Rd
Mardathuna Homestead
The Basin
The Dunes
Mesa Knob
Great Gorge
Mardathuna Rd
Sunrise View
Honeycomb Gorge
Temple Gorge Proposed Campground
Drapers Gorge
Lyons River Homestead
Exising Temple Gorge Campground (will revert to day use once proposed campsite is established)
Lake Julia
Yabba Campground
Pharoh Well
Binthalya Homestead (disused)
Bullwalya
Bullwalya Spring
Cassie
Chaffcutters Spring
Yenny Spring
Mooka Creek
Ullawarra
Lyons River
Gascoyne River
Carnarvon Mullewa Rd
Mooka Homestead
Gascoyne River North
Gascoyne River South
Jimba Jimba Homestead
Bidgemia Homestead
GASCOYNE JUNCTION