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Southern Brigalow Belt Biogeographic Region

Carnarvon National Park — Management plan

June 2005

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Summary

This management plan provides the framework and guidelines on how Carnarvon National Park will be managed. It sets out the considerations, outcomes and strategies that are proposed to form the basis on which day-to-day management decisions are made.

Acknowledgements

Queensland Parks and Wildlife Service staff prepared this management plan. Although the principal author is Claire Grant, the preparation of this management plan has been made possible only by the contributions of a great number of people.

The involvement and support of organisations and the public who contributed to the plan, the respective Aboriginal people and Land Councils, and adjoining landholders who contributed information and general assistance is acknowledged and appreciated.

Cover photographs: Aerial view of Carnarvon Gorge. Photo: EPA/Queensland Parks and Wildlife Service.

Disclaimer

This plan does not intend to affect, diminish or extinguish Native Title and associated rights.

Note that implementation of some management strategies might need to be phased in according to availability of resources.

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Contents

Introduction

Set in the Central Highlands Sandstone Belt, Carnarvon National Park is an area of outstanding natural beauty. Erosion of the sandstone has left behind many interesting geological features including sandstone gorges, cliff faces and other wind and water sculpted formations. The higher parts of the park are at elevations of more than 1200 metres and provide spectacular views over the surrounding country.

Over many thousands of years, Aboriginal people have developed a powerful spiritual connection to the Carnarvon landscape. They believe that a great number of mythological and spiritual beings resided in certain areas or were metamorphosed as particular features of the landscape (National Centre for Studies in Travel and Tourism and Department of Tourism, James Cook University, 1991), and that they are responsible for the protection and management of these places and features. Aboriginal people used the sandstone cliffs and caves as a canvas for ceremonial art. These sites, some more than 19,000 years old, have endured centuries of weathering, and their full significance can only be appreciated through knowledge of the legends and rituals with which they were created.

The park contains a rich mosaic of plant communities. Cool, shaded side gorges offer some respite from the drier, warmer environments of the park and contain patches of remnant rainforest and ferns. These areas have high aesthetic value and contribute significantly to the popularity of the sections of the park in which they occur, notably the Carnarvon Gorge section.

The natural beauty and cultural mystique associated with Carnarvon National Park have made it a popular recreational and educational venue for local, interstate and international visitors. The park continues to be managed by the Queensland Parks and Wildlife Service (QPWS), an entity of the Environmental Protection Agency (EPA). QPWS considers Carnarvon National Park to be an 'icon' national park. The park has one of the highest visitation rates in the state and current trends in visitation indicate that visitor numbers will continue to increase.

Management directions and purpose

Directions

Carnarvon National Park will be managed to preserve and present its rich and diverse array of undeveloped landscapes and naturally occurring species. Management programs will be developed to maintain natural ecological processes and actively identify and control threats to the long-term viability of the park's natural systems.

Places in the park of spiritual value and cultural importance to the traditional owners will be protected. Carnarvon National Park will be managed in a way that respects the rights, interests, skills and knowledge of Aboriginal peoples.

Carnarvon National Park's role as one of Queensland's icon parks will be maintained. Visitors to the park will be able to partake of a wide range of nature-based recreation opportunities in various settings, from picnicking in well-developed day-use areas to camping in remote and rugged terrain with high 'wilderness' values. Park management will aim to ensure that visitors enjoy these activities in a way that maintains the park's natural and cultural values.

Interpretive materials will be further developed to enhance visitor experiences and foster a greater appreciation of the park's outstanding geological history, diversity of vegetation communities and native animals, and its role in a broader conservation context. Education and interpretation programs will also highlight the significance of the area in terms of Aboriginal occupation. Involvement of traditional owners in these programs will be supported.

Carnarvon National Park will be managed in accordance with the park's zoning scheme. The zoning scheme proposes to continue concentrating recreational activity in the Carnarvon Gorge section of the park, and in the remainder of the park encourages activities that will have a minimal effect on the environment.

An adaptive management approach will continue to be used at Carnarvon National Park. Mechanisms will be put in place to ensure that staff actively improve their knowledge of management issues, modify management practices based on their improved knowledge, and pass such knowledge on to new staff.

Purposes

The major purposes of management for Carnarvon National Park will be to ensure that:

Conservation

- the park's significance as a representative example of regional ecosystems in the Southern Brigalow Belt is recognised and retained;
- the diversity and distribution of native plants and animals, particularly rare, threatened and biogeographically significant species and communities, are conserved;
- sites and places of cultural significance are protected and managed co-operatively with traditional owners;
- the integrity of the major catchment systems is protected;

- the quality, integrity and aesthetic beauty of natural landscapes are maintained; and
- a system of management zones is used to satisfy the management principles of the national park.

Presentation

- a range of recreational opportunities on the park complement opportunities offered in the surrounding area; and
- the park's natural and cultural values are presented to the public and jointly interpreted with traditional owners.

Community involvement

- co-operative partnerships are developed which allow traditional owners to have direct participation in the management of the park;
- opportunities are provided for the community to become involved in the planning and management of the park; and
- the conservation of nature is encouraged by the education and co-operative involvement of the community.

Basis for management

Carnarvon National Park is designated under the *Nature Conservation Act 1992* and must be managed in accordance with section 17 of the Act, which sets out the following principles for management:

- to provide for the permanent preservation of the area's natural condition to the greatest possible extent;
- to protect and present the area's cultural and natural resources and their values; and
- to ensure that the only use of the area is nature-based and ecologically sustainable.

Management is also required to observe other relevant legislation, Queensland Government policies, Ministerial directions from time to time, and policies approved by the Environmental Protection Agency/Queensland Parks and Wildlife Service.

There has been a long history of Aboriginal occupation in the Central Highlands Sandstone Belt, and many traditional owners have a strong affiliation with sites and places within Carnarvon National Park. Native title claims over the park are awaiting determination. The involvement of traditional owner groups therefore forms an important component of all management and interpretive activities.

Planning area

Location and planning area

Carnarvon National Park lies within Queensland's Central Highlands Sandstone Belt, which is part of the Great Dividing Range.

The park is surrounded by but quite remote from the rural service centres of Augathella, Tambo, Springsure, Rolleston, Injune and Mitchell (see Map 1). The park is approximately 600km north-west of Brisbane.

Carnarvon Gorge was the first section of the Carnarvon National Park complex to be gazetted, on 28 April 1932. The original gazettal area was approximately 26,304 hectares. Other sections have been progressively added, with the area of the park now totaling 298,000 hectares.

Due to its long and irregular shape, Carnarvon National Park is managed as three QPWS management units, with rangers stationed at four bases — Mount Moffatt, Carnarvon Gorge, Salvator Rosa and Springsure. For management, presentation and planning purposes, seven sections of the park each with different biophysical characteristics are recognised. These are (from east to west): Moolayember, Carnarvon Gorge, Mount Moffatt, Buckland Tableland, Ka Ka Mundi, Salvator Rosa and Goodliffe. Map 2 shows the location of these sections.

Regional context

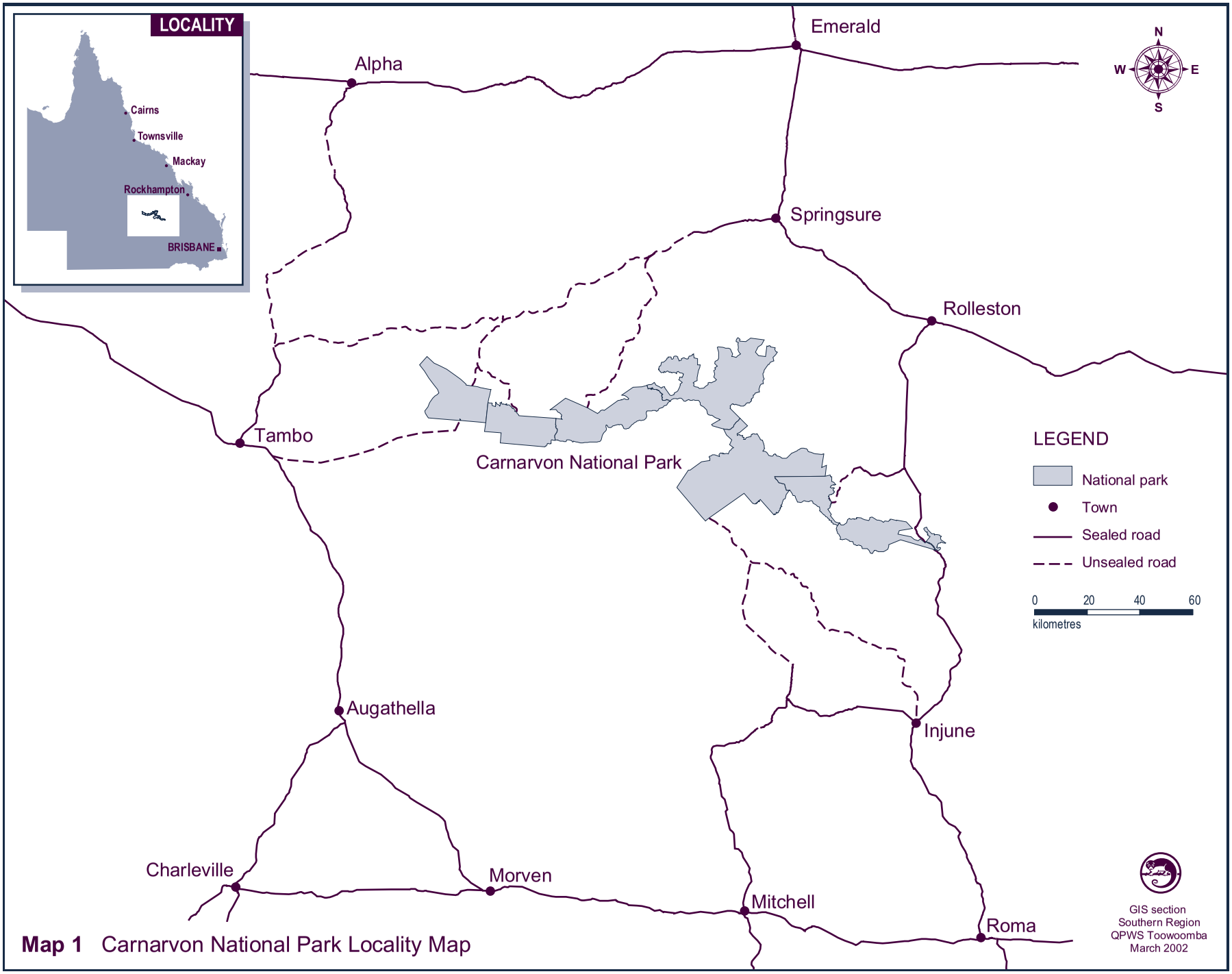
Carnarvon National Park stretches approximately 300km from north-west to south-east, has 700km of boundary, and spans three Shires. Most of the park (77 percent) falls into the Bauhinia Shire, with 22 percent in the Booringa Shire, and the final 1% in the Murweh Shire. These shires have a relatively low population (approximately 10,200 residents) and are dominated by rural enterprises and rural service centres.

The entire park occurs in the Brigalow Belt South biogeographic region. This bioregion is a major agricultural and pastoral area, and much of it has been extensively cleared. Approximately 2·2 percent of the bioregion is reserved in protected areas (Sattler and Williams, 1999), and half of this area (50·89 percent) is contained in Carnarvon National Park.

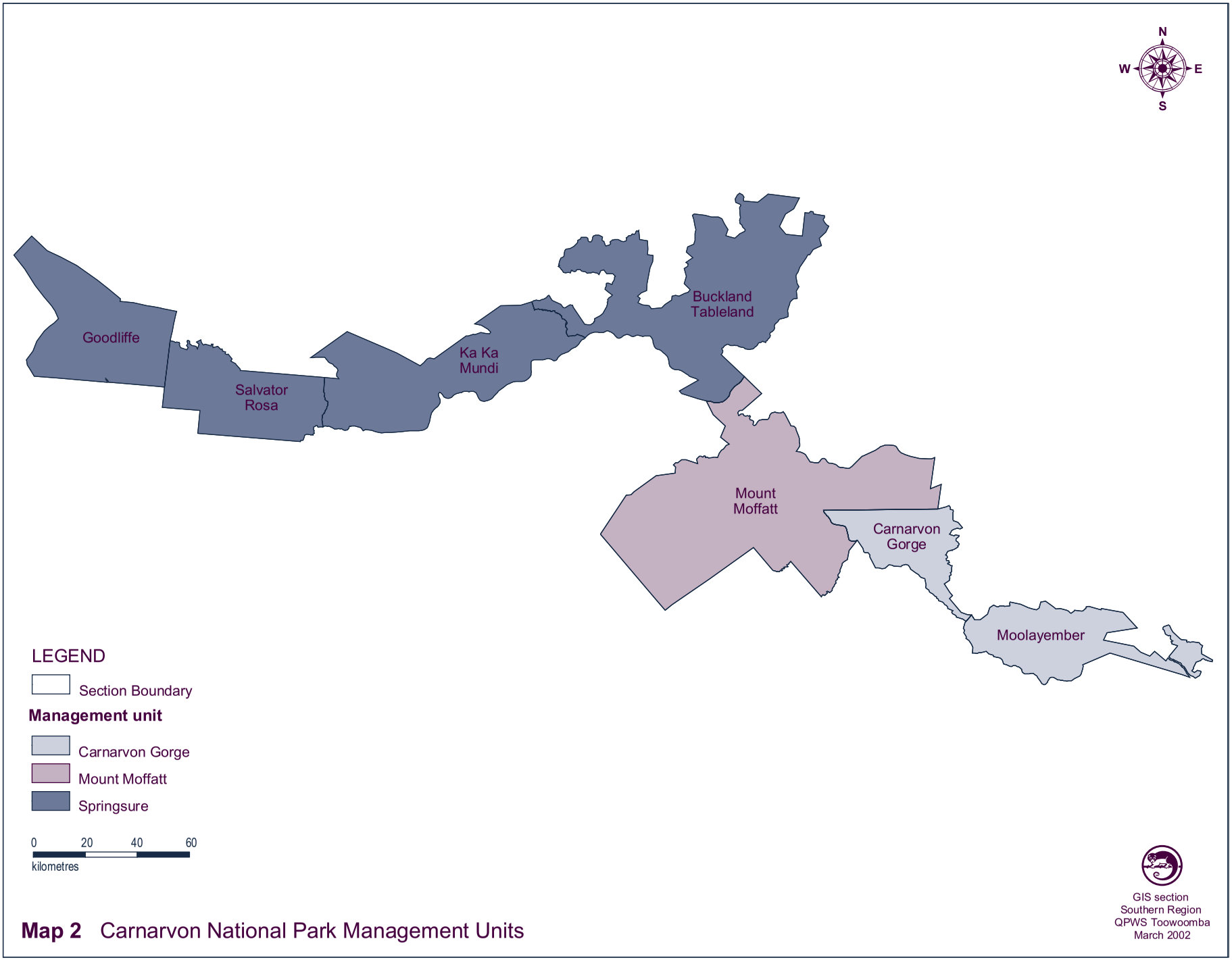
Tourism began in the region in the 1930s with the gazettal of the Carnarvon Gorge section of the park (National Centre for Studies in Travel and Tourism and Department of Tourism, James Cook University of North Queensland, 1991). This section of the park is one of the major tourist attractions within the region.

Plan review

This management plan was prepared in January 2005 and will provide a consistency of direction for park management over the next 10 years. The plan may be reviewed in accordance with the *Nature Conservation Act 1992* at any time within the 10-year period, to take into consideration changes or new initiatives.



Map 1 Carnarvon National Park Locality Map



Map 2 Carnarvon National Park Management Units

Values of Carnarvon National Park

Register of the National Estate

The Register of the National Estate provides Commonwealth recognition of natural and cultural heritage places that are worth keeping for the future. In 1980 the Carnarvon Gorge, Ka Ka Mundi and Salvator Rosa sections were placed on the Register of the National Estate, and in 1986 part of the Moolayember section was added. The entire Central Highlands region, including Carnarvon National Park, is currently listed as an indicative place (i.e. is being assessed for possible inclusion on the register).

Geology and landscape

Carnarvon National Park is a representative example of the Central Highlands Sandstone Belt and forms part of the Great Dividing Range. Sedimentary deposits have eroded over time to form a mosaic of winding gorges, impressive sandstone cliffs and widely spaced basalt-capped tablelands. The area is very scenic, with panoramic views, springs, fresh clear-flowing streams and spectacular sandstone monoliths. Some of the western sections are of lower relief, unfolding into low undulating hills with rocky outcrops.

The permeable sandstones in the park allow rainfall to infiltrate into the underground water supplies of the Great Artesian Basin. Underlying approximately one-fifth of Australia, the Great Artesian Basin is the largest artesian groundwater basin in the world. Numerous perennial springs are located in the park and are the source of several streams including the Carnarvon, Consuelo and Louisa Creeks.

Titled by the traditional owners as *The Home of the Rivers*, Carnarvon National Park is an important catchment protection zone. The park is located at the headwaters of five major river catchments — the Nogoa, Comet, Dawson, Warrego and Maranoa (refer Map 3). The latter two rivers are on the northern boundary of the Murray-Darling Basin, which is the largest river basin in Australia.

Flora

Addicott (1997) has prepared a comprehensive report that documents the park's key vegetation communities. A vegetation map at a scale of 1:100,000 supports this report. Broad vegetation types (shown in Map 4) are:

- brigalow and softwood scrubs;
- shrubland with eucalypt emergents on alluvial plains;
- cypress pine woodland on alluvial plains;
- eucalypt dominated open woodland and open forests on basaltic elevated areas;
- eucalypt and angophora dominated woodland to open woodland;
- freshwater habitats (springs, swamps, flowing creeks);
- mixed eucalypt, acacia, white cypress pine or turpentine woodlands and/or open forests on sandstone slopes, scarps, ridges and residuals;
- Queensland blue grass grasslands on alluvial basalt plains;
- cleared and/or regrowth areas; and
- angophora dominated open woodland to open forest on deep sandy soils.

At least 40 regional ecosystems[1] are represented in the park. There is significant representation of some communities (e.g. brigalow and dry rainforest communities) that have otherwise been extensively cleared in the Brigalow Belt bioregion.

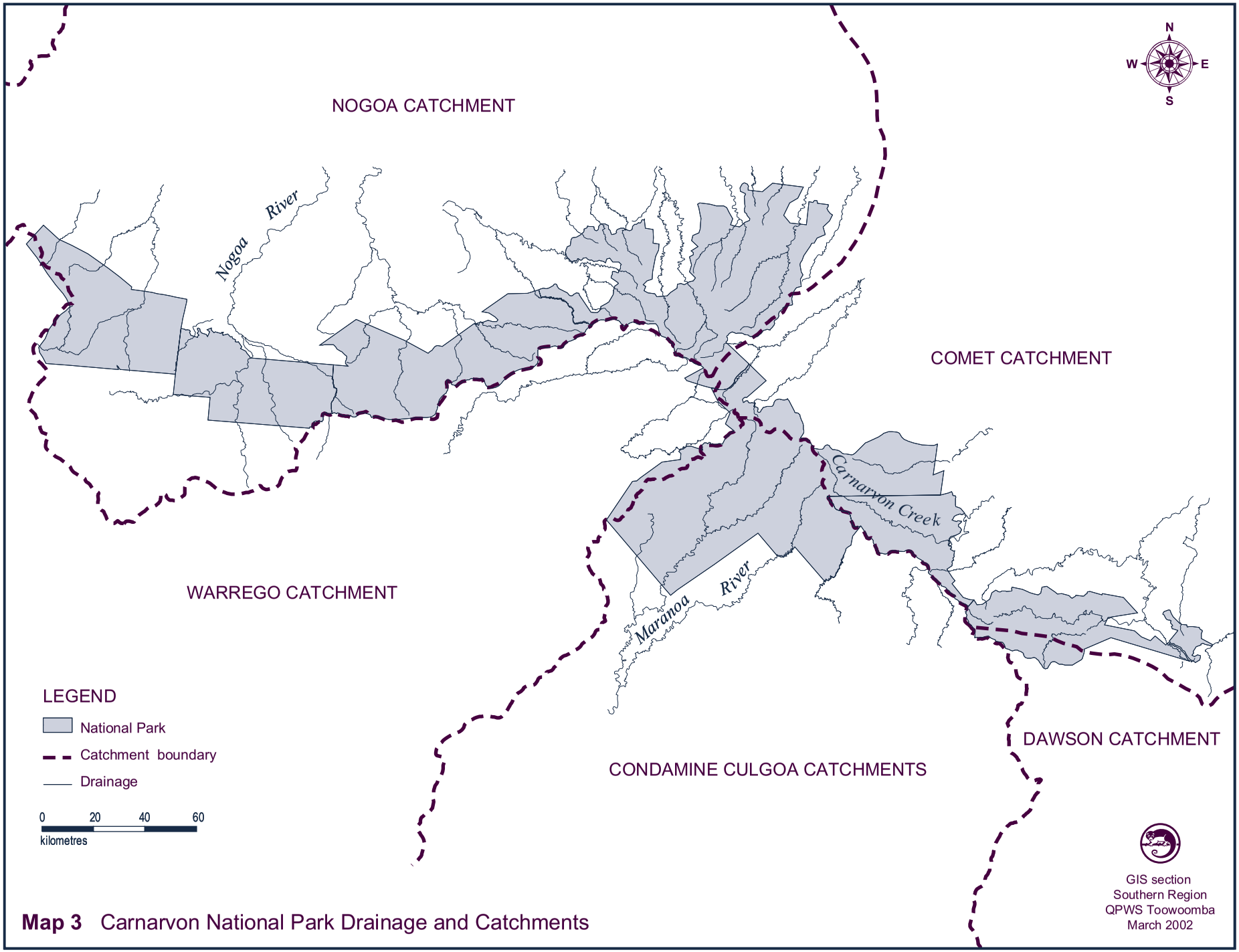
At least nine regional ecosystems on the park are listed as endangered according to Sattler and Williams (1999):

- RE 11.3.1 brigalow and/or belah open forest with a low understorey of wilga and false sandalwood;
- RE 11.3.17 poplar box woodland with brigalow and/or belah;
- RE 11.3.21 bluegrass, Mitchell grass grassland on alluvial plains;
- RE 11.4.9 brigalow shrubby open forest to woodland usually with yellowwood and false sandalwood;
- RE 11.9.1 Dawson gum or mountain yapunyah and brigalow shrubby open forest with a false sandalwood understorey;
- RE 11.9.4 semi-evergreen vine thicket with brigalow, poplar box, belah, ooline and bottle trees emerging;
- RE 11.9.5 brigalow with or without belah open forest with a wilga and false sandalwood understorey;
- RE 11.9.8 bonewood thicket on lowlands; and
- RE 11.9.10 brigalow, poplar box open forest.

A further 11 regional ecosystems on the park are listed as of concern (Sattler and Williams, 1999):

- RE 11.3.2 poplar box open woodland with a grassy understorey on alluvial plains;
- RE 11.3.4 Queensland blue gum woodland on alluvial plains;

[1] Sattler and Williams (1999) define a regional ecosystem as a vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil.



Map 3 Carnarvon National Park Drainage and Catchments

- RE 11.3.6 silver-leaved ironbark woodland on alluvial plains;
- RE 11.3.25 Queensland blue gum, river she-oak fringing woodland on alluvial plains;
- RE 11.3.27 freshwater wetlands;
- RE 11.8.3 semi-evergreen vine thicket on steep basalt hillsides;
- RE 11.8.6 bonewood thicket on igneous rocks;
- RE 11.8.11 bluegrass grassland with emergent trees;
- RE 11.9.7 poplar box, false sandalwood shrubby woodland;
- RE 11.9.13 gum-topped box open forest; and
- RE 11.10.2 tall open forest in sheltered gorges and moist habitats.

Rare and threatened plant species and other species of conservation significance

Twenty-three rare and threatened species are known to occur within the Carnarvon National Park (see Table 1). The distribution, habitat preferences, population sizes and management requirements for most of these species are poorly known.

The most obvious of these species are the Carnarvon fan palm *Livistona nitida* within Carnarvon Gorge section, ooline *Cadellia pentastylis* which occurs in association with brigalow and dry rainforest communities within the Moolayember section, and austral cornflower *Stemmacantha australis*, a large population of which occurs on Marlong Plain in the Mount Moffatt section.

Numerous plant species have their distributional limits in Carnarvon National Park and others have disjunct populations there. Some examples include fuzzy box *E. conica*, silvertop stringybark *E. laevopinea*, yellow box *E. melliodora*, Sydney blue gum *E. saligna*, and king fern *Angiopteris evecta*.

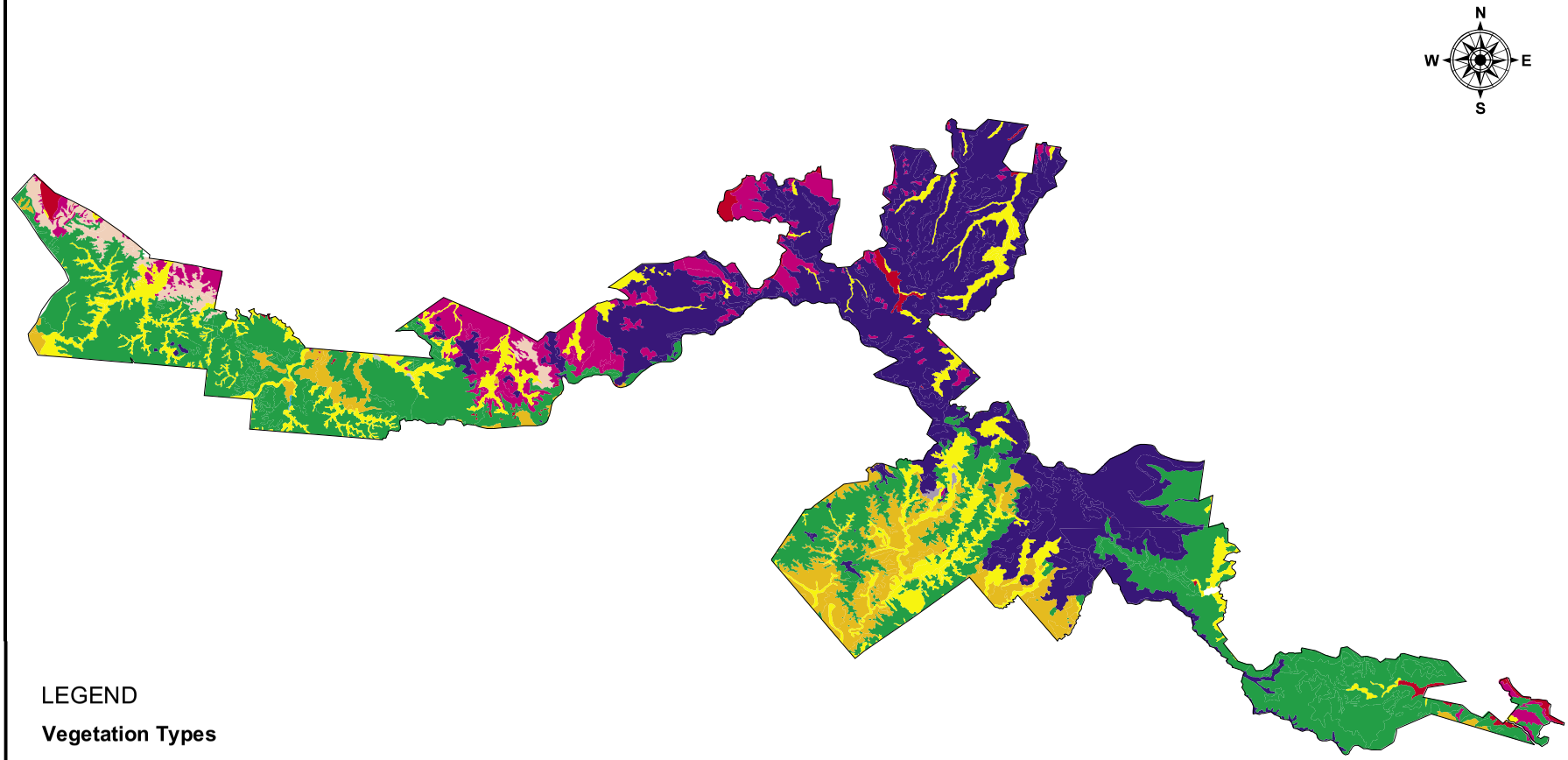
The complex of springs centred around the Nogoa River and Louisa Creek contains one of the most species-rich artesian spring floras in Queensland, and is the only known locality for an undescribed species of *Dimeria* grass (R. Fensham pers. comm.).

The isolated population of king fern *Angiopteris evecta* (approximately 13 plant clumps) within Wards Canyon in the Carnarvon Gorge section is a popular tourist attraction and the only known occurrence of this species in the Brigalow Belt.

Table 1: Plant species with Queensland legislation rare and threatened status known to occur on Carnarvon National Park

Species name	Status NCA	Species name	Status NCA
Acacia islana	R	*Hibbertia monticola*	R
Acacia pubicosta	R	*Homoranthus zeteticorum*	R
Arthraxon hispidus	V	*Leucopogon grandiflorus*	R
Beyeria sp. (Bull Creek Gorge B.O'Keefe 573)	R	*Livistona nitida*	R
Boronia eriantha	R	*Logania cordifolia*	R
Cadellia pentastylis	V	*Lomandra teres*	R
Callistemon chisholmii	R	*Macarthuria ephedroides*	R
Dianella fruticans	R	*Melaleuca groveana*	R
Dichanthium setosum	R	*Pterostylis woollsii*	R
Diuris parvipetala	R	*Stemmacantha australis*	V
Gossypium sturtianum	R	*Tephrosia baueri*	R
Grevillea cyranostigma	R	*Thesium australe*	V
Haleoragis exalata ssp. velutina	V	*Wahlenbergia islensis*	R

Conservation status categories (NCA): V = Vulnerable
R = Rare



This map has been adapted by
K. Sparshott, QPWS Toowoomba
from the 1:100,000 vegetation map
produced by E. Addicott and R. Moye, 1997.

Map 4 Carnarvon National Park Broad Vegetation Types

Fauna

Background information

The diversity of habitats and relatively high elevation and rainfall compared with surrounding areas have promoted the development of an extremely rich and distinct fauna within Carnarvon National Park. Many animal species are worthy of note because of their rarity, localised distribution or disjunct occurrence. Few of these species have been the subject of intensive study, thus their habitat and management requirements are not fully understood. The park is home to at least 15 rare and threatened species.

Birds

The park is a popular venue for birdwatchers with more than 210 bird species recorded. Many species reach their western distributional limits in Queensland at or near the park, including:

Emerald dove	*Chalcophaps indica*
Wonga pigeon	*Leucosarcia melanoleuca*
Little lorikeet	*Glossopsitta pusilla*
Australian king-parrot	*Alisterus scapularis*
Oriental cuckoo	*Cuculus saturatus*
Powerful owl	*Ninox strenua*
Forest kingfisher	*Todiramphus macleayii*
White-throated treecreeper	*Cormobates leucophaeus*
White-browed scrubwren	*Sericornis frontalis*
Striated thornbill	*Acanthiza lineata*
Yellow-tufted honeyeater	*Lichenostomus melanops*
Fuscous honeyeater	*Lichenostomus fuscus*
Lewin's honeyeater	*Meliphaga lewinii*
White-throated honeyeater	*Melithreptus albogularis*
White-naped honeyeater	*Melithreptus lunatus*
Eastern spinebill	*Acanthorhynchus tenuirostris*
Scarlet honeyeater	*Myzomela sanguinolenta*
Rose robin	*Petroica rosea*
Spotted quail-thrush	*Cinclosoma punctatum*
Golden whistler	*Pachycephala pectoralis*
Rufous fantail	*Rhipidura rufifrons*
Satin flycatcher	*Myiagra cyanoleuca*
Varied triller	*Lalage leucomela*
Red-browed finch	*Neochmia temporalis*

The park also contains considerable habitat for woodland-dependent species such as the bush stone-curlew *Burhinus grallarius*, barking owl *Ninox connivens*, speckled warbler *Chthonicola sagittata* and grey-crowned babbler *Pomatostomus temporalis*, currently listed as common under Queensland legislation but recognised by Garnett and Crowley (2000) as being near-threatened in the subtropical woodlands of southern Queensland and northern New South Wales.

Mammals

Approximately 60 species of mammal have been recorded from the park, six of which are introduced. Bats comprise about one-third of the mammal fauna, and notable species include the little pied bat *Chalinolobus picatus* and large-eared pied bat *C. dwyeri*, both listed as rare; and the vulnerable greater long-eared bat *Nyctophilus timoriensis*. The greater broad-nosed bat *Scoteanax rueppellii* has been recently recorded at Consuelo Tableland, representing a significant inland range extension for the species in Queensland.

Other mammals of particular conservation significance include the platypus *Ornithorhynchus anatinus* (tourist attraction, isolated population at western limit of distribution in Queensland), northern quoll *Dasyurus hallucatus* (one of six major population strongholds for the species in Australia), common ringtail possum *Pseudocheirus peregrinus* (disjunct population) and northern brown bandicoot *Isoodon macrourus* (uncommon in parts of Brigalow Belt South). Significant recent discoveries include the eastern pebble-mound mouse *Pseudomys patrius* (uncommon and patchily distributed within Queensland), common rock-rat *Zyzomys argurus* (southern range limit) and long-nosed bandicoot *Perameles nasuta* (rare in western parts of Brigalow Belt).

Carnarvon National Park represents the western limits of distribution of many mammals in the park including:

Common planigale	*Planigale maculata*
Yellow-bellied glider	*Petaurus australis australis*
Squirrel glider	*Petaurus norfolcensis*
Greater glider	*Petauroides volans*
Feathertail glider	*Acrobates pygmaeus*
Eastern horseshoe-bat	*Rhinolophus megaphyllus*
Common bentwing-bat	*Miniopterus schreibersii*
Eastern chestnut mouse	*Pseudomys gracilicaudatus*
Fawn-footed melomys	*Melomys cervinipes*

The park is particularly rich in macropods (nine species), arboreal mammals (eight species), native rodents (eight species) and bats (at least 20 species).

Reptiles

More than 90 species of reptile have been recorded, and the park is particularly rich in skinks (34 species) and geckoes (13 species). More than 35 species have their distributional limits within the park. Several species have disjunct populations including the common tiger snake *Notechis scutatus*, Cunningham's skink *Egernia cunninghamii* and the skinks *Calyptotis scutirostrum* and *Ctenotus arcanus*.

These species are confined to the Consuelo Tableland and are of high biogeographic value as relictual species. These populations and that of the skinks *Lampropholis adonis*, *L. delicata* and major skink *Egernia frerei* are isolated from all other Queensland populations.

Rare and threatened species recorded include the golden-tailed gecko *Strophurus taenicauda*, short-necked worm-skink *Anomalopus brevicollis*, common death adder *Acanthophis antarcticus* and brigalow scaly-foot *Paradelma orientalis*. Extensive habitat exists for other species that are of conservation concern in the Brigalow Belt South bioregion (Drury, 2001) including the frilled lizard *Chlamydosaurus kingii* and two-clawed worm-skink *Anomalopus leuckartii*.

Amphibians

Twenty-two species of frog are known to occur within Carnarvon National Park. The introduced cane toad *Bufo marinus* is also present. The populations of eastern sedgefrog *Litoria fallax* and tusked frog *Adelotus brevis* are at their western distributional limits and are isolated from other Queensland populations. Other species at their western range limits within Carnarvon National Park include the striped marshfrog *Limnodynastes peronii*, scarlet-sided pobblebonk *L. terraereginae* and eastern gungan *Uperoleia laevigata*.

Fish

Fish have been poorly studied within Carnarvon National Park and surveyed only on an *ad hoc* basis. At least 10 species are known to occur. However, further surveys are required to compile a comprehensive inventory.

Invertebrates

The invertebrate fauna of Carnarvon National Park is extremely diverse and some groups such as certain insect orders, scorpions and molluscs have been well surveyed. Species endemic to the Carnarvon Range that have their entire or majority of their known distributions within Carnarvon National Park include the dragonflies *Eusynthemis denisae* and *Austroaeschna muelleri*, the dobson fly *Archichauliodes riekei*, the stoneflies *Dinotoperla carnarvonensis* and *Illiesoperla carnarvonensis* and at least four species of land snail.

Other notable species include the butterflies *Trapezites phigalia philus* and *Neolucia agricola agricola* which have isolated populations in Carnarvon National Park (Monteith & Yeates 1988) and the occurrence of the imperial hairstreak *Jalmenus evagorus eubulus* which is listed as vulnerable in Queensland.

The Consuelo Tableland is of particular significance for insects that have relictual populations including a stag beetle *Sphaenognathus munchowae*, other ground-dwelling beetles, the lace bug *Ceratocader monteithi*, several other bugs and a cockroach (G. Monteith pers. comm.). Consuelo Tableland is also the only known location within the park for the giant black trapdoor spider *Xamiatus ilara*, which only occurs elsewhere at Blackdown Tableland National Park. A number of other hilltops and mountain peaks in Carnarvon National Park have been shown by entomologists to be insect diversity 'hot spots', particularly for butterflies and flies.

The aquatic invertebrate fauna is known to be diverse, but is largely unstudied outside of Carnarvon Gorge. Significant recent discoveries include a population of *Parastreptocephalus* sp., a recently rediscovered genus of Australian fairy shrimps.

Velvet worms (peripatus) have been recorded from the Consuelo Tableland. Peripatus are commonly described as the 'missing link' and are of great evolutionary significance. This is the most inland occurrence of the phylum in Queensland, and it is likely that the species is undescribed.

Aboriginal culture

Aboriginal culture is centred around the natural elements — land, water, flora and fauna. These elements help Aboriginal people to retain their identity and shape their culture.

Carnarvon is a sacred landscape of intense spiritual significance to Aboriginal people of Central Queensland. The Bidjara and Garingbal/Kara Kara people continue to claim their own connection to various parts of Carnarvon.

To the traditional owners, Carnarvon National Park provides links to their past and evidence of their long and unbroken connection to the area. With its diverse range of landscapes and abundant wildlife, the park is known as *The Home of the Rivers*, and represents a cradle of life through the spawning of five river systems. It is also a burial place for people passed.

The park contains extensive physical evidence of Australia's original culture in the form of art sites, burial places and occupation sites. These are tangible connections between today's traditional owners and their ancestors. Art sites were used to record their 'story' (or history) and, through art, the traditional owners have been able to keep Aboriginal culture alive — by showing future generations how they lived, the types of instruments they used and how they were made.

Kenniff Cave, the first stratified site to be dated to the Pleistocene in Australia, is one such example of Aboriginal heritage. It dates back 19,500 years. The Art Gallery and Cathedral Cave also provide public examples of stencil and engraving techniques used in the region, and are recognised around the world as some of the finest examples of such artistic expression.

Traditional owners have the opportunity to enhance appreciation and conservation of their continuing and timeless culture in Carnarvon National Park. By being involved in the management of the cultural resources on the park, they can maintain their connections with special sites. They can also ensure the story of how their culture evolved, and the 'protocols' that must still be met, are remembered and remain accurate.

Non-Indigenous culture

In his early (1840s) expeditions, Sir Thomas Mitchell passed through the area and named many key landscape features particularly in the Salvator Rosa area. He claimed that the hills of Salvator Rosa:

> "... surpassed any that [he had] ever seen in picturesque outline. Some resemble Gothic Cathedrals in ruins, others forts ... It was a discovery worthy of the toils of a pilgrimage ..." (Mitchell, 1848).

Major Mitchell Spring on the Salvator Rosa section of the park is named after this famous explorer, who camped nearby for several months during his second expedition through the area.

European history in the Carnarvon Ranges has been "colourful", particularly from the 1870s to the 1930s, when an array of explorers, cattlemen, cattle duffers and murderers passed through and/or resided in the area.

Kenniff Cave, on the Mount Moffatt section, is named after the Kenniff Brothers who roamed the nearby ranges and were charged with the murders of a local pastoralist and policeman. Wards Canyon (locally known as 'the freezing chamber') was used by the Ward Brothers, who hunted possums in the area and used the canyon to store their skins.

Many residents in the local area once lived or worked on the properties that now constitute Carnarvon National Park, or have relatives who once did. They value the materials which signify their part of the pastoral heritage of this national park. Although much of the tangible evidence of European heritage has been lost or destroyed by fire, some remnants remain and are worthy of preservation.

A section of stone paving and timber corduroy remains within the Goodliffe section to mark the original location of the Springsure–Tambo road. This road was used in the late 1860s to transport wool to the markets. Main Range Hotel, a stopover point on this road, is today signposted at Telephone Gorge, also in the Goodliffe section. (Cameron, 1999)

The CWA hut adjacent to the Carnarvon Gorge section was the first accommodation available, in 1947, for visitors to Carnarvon Gorge (Warner, 1987).

Recreation and tourism

Carnarvon National Park is hundreds of kilometres from the nearest city and several hours' drive from the nearest major town. However, it has become a popular tourist destination for both campers and day visitors. Each section of the park has its own unique value and offers different types of recreational opportunities to park visitors, from hiking and four-wheel-driving to walking on graded tracks and camping in campgrounds.

Many people describe the Carnarvon Gorge section as an oasis set amidst the highlands of Central Queensland with flowing, crystal clear creeks and secluded side gorges. Visitors to this section are provided with a range of simple facilities and enjoy walking and picnicking in the tranquil surroundings of this immense gorge and learning about the fascinating legacy held in the Aboriginal rock engravings and paintings.

Other sections of the park are visited by fewer people and offer the opportunity to escape the urban environment and relax in a natural setting. The tangle of escarpments and rangelands in these sections provide spectacular views and showcase a diverse and unique array of wildlife species. Ample opportunity also exists for those wanting to experience isolation and adventure by hiking into remote areas and bush camping.

It is this unique combination of values and features that has made Carnarvon National Park attractive to such a wide range of people. It is now considered one of Queensland's highest profile parks.

Management strategies

Working towards a better parks system

Protecting the Queensland parks system into the future

Background information

Carnarvon National Park has been gazetted to protect its diverse landscapes including spectacular gorges, its outstanding Aboriginal sites and a wide variety of plants and wildlife, many of which have special conservation significance. The park also provides substantial nature-based tourism and recreation opportunities, and plays an integral role in the protection of ecosystem services in the region, such as watershed protection (EPA, 2001). QPWS aims to conserve these values into the future.

While parks are regarded as the cornerstones of conservation, they are complemented and linked by conservation efforts and sustainable land-use practices on properties in the surrounding area (EPA, 2001).

Conservation agreements and covenants over private and leasehold lands allow landholders to formally ensure the protection of significant natural and cultural landscape and wildlife values on their property. These agreements are entered into on a voluntary basis and, through negotiation, tailored to suit the management needs of the property while still providing long-term protection of the area's nature conservation values.

The Australian Bush Heritage Fund has recently purchased an adjoining property, Carnarvon Station, and is negotiating with QPWS to include the property in the nature refuge scheme. This will ensure that its high conservation values are managed for perpetuity.

Desired outcomes

- Carnarvon National Park is conserved as a representative example of the Central Highlands Sandstone Belt communities and landscapes.
- Boundaries of the park continue to adequately conserve the diversity of biological and landscape values originally reserved in the park.
- The park is managed as part of the broader environment, with a range of conservation strategies practised in the surrounding country.

Proposed guidelines and actions

- Investigate opportunities to add to areas of conservation value.
- Promote the protection of areas of high conservation value on adjacent properties while recognising the needs and interests of landholders, and further explore the option of developing conservation agreements on a voluntary basis with landholders.

Achieving conservation and visitation

Background information

Carnarvon National Park is an increasingly popular tourist destination in Central Queensland. While the Service needs to accommodate growing recreation demands, careful planning is needed to ensure the park's intrinsic values are maintained and that use is sustainable in the long-term.

A range of recreation settings[2] has been established for the park. They will guide the opportunities available to park visitors in different areas. Future developments must ensure that the recreational settings offered are compatible with the expectations of the visitor and support conservation objectives.

To help address the above issues, a zoning scheme has been adopted at Carnarvon National Park (see Map 5) with zones established based on environmental qualities, resource impacts, recreational opportunities and existing and anticipated patterns of use. The zones reflect the broad management objectives of protection and conservation of natural and cultural values, and the presentation of these values to park visitors. They also serve to regulate activities and guide future development in specific areas.

Risk management aims to improve the safety of park users. The park zoning scheme can be used to indicate to park visitors the major purposes of management, and the style and level of development that can be expected in particular areas. This, in turn, guides the type and suitability of recreational opportunities in these areas.

The five zones chosen for use on Carnarvon National Park — Developed, Recreation, Natural-Recreation, Natural and Remote-Natural — are shown on Map 5 and briefly outlined below. Appendix 1 provides a summary of zone criteria. The Visitor Management Strategy provides a more detailed explanation of why certain areas have been classified into a particular zone.

[2] The term 'setting' describes the character of a place, taking into account its physical, social and managerial features. Settings on parks range from high-density visitor areas with signs, toilets and car parks, to wild, remote locations.

Developed Zone

The Developed Zone provides for relatively high levels of recreation and social interaction in a natural setting. The environment may be modified to allow intensive visitor use, with hardened surfaces and a range of facilities provided. The needs, interests and abilities of less experienced and less active visitors are catered for.

There are two Developed Zones in Carnarvon National Park. One is located at the Carnarvon Gorge Visitor Area, at the outer edge of Carnarvon Gorge, where facilities include a day-use area, camping area, information centre, formalised car parking area, public amenities, staff quarters and workshops. New facilities will be designed to cater for the requirements of special needs groups and will, as far as possible, blend into the natural surroundings.

The other Developed Zone incorporates the Mount Moffatt homestead and includes staff accommodation and workshop facilities. Strategies for the development and management of these sites are to be developed as a matter of priority.

Recreation Zone

The Recreation Zone maintains a recreational setting where visitors can experience nature-based activities in an environment dominated by natural elements, but modified to accommodate the visitor.

Visitors can generally expect a medium level of recreation and social interaction in a natural setting, opportunities for education and interpretation of the area's values and promotion of responsible use of the protected area. The interests and abilities of movement-impaired people may be catered for in some of these areas. Some sites may also need to be hardened to ensure the continued protection of the park's natural and cultural values. Visitor facilities include access routes, picnic areas, camping areas and car parks.

This zone allows most visitors to experience spectacular and popular sites in the Carnarvon Gorge section of Carnarvon National Park with a minimum of impact on the environment.

Natural-Recreation Zone

The Natural-Recreation Zone encourages and provides for the protection, appropriate use, appreciation, education and enjoyment of the park's natural and cultural values.

This zone encompasses areas of relative naturalness, with low to moderate evidence of human activity. Some basic recreation facilities are provided. Access in this zone is principally by vehicle and foot. Walkers must observe the bushwalking code of practice.

The aim of this zone is to disperse recreational use by providing a variety of well-marked walking tracks and access roads. The major activities are walking and nature viewing together with scenic driving and limited overnight camping. There may be a perception of self-reliance for novice users.

There are a limited number of Natural-Recreation Zones in the Carnarvon Gorge section. The campgrounds and walking tracks in the Mount Moffatt and Salvator Rosa sections of the park also fall into this zone.

Natural Zone

There is only minor evidence of human activity in the Natural Zone. Access is principally pedestrian oriented, although some public vehicle access and basic facilities may be provided. The principal purpose of this zone is the conservation of natural and cultural values and the provision of low level of nature-based recreation and eco-tourism opportunities.

Natural Zones occur most commonly in the Ka Ka Mundi, Mount Moffatt and Salvator Rosa sections of the park, although some of the extended walks within the Carnarvon Gorge section also fall into this zone.

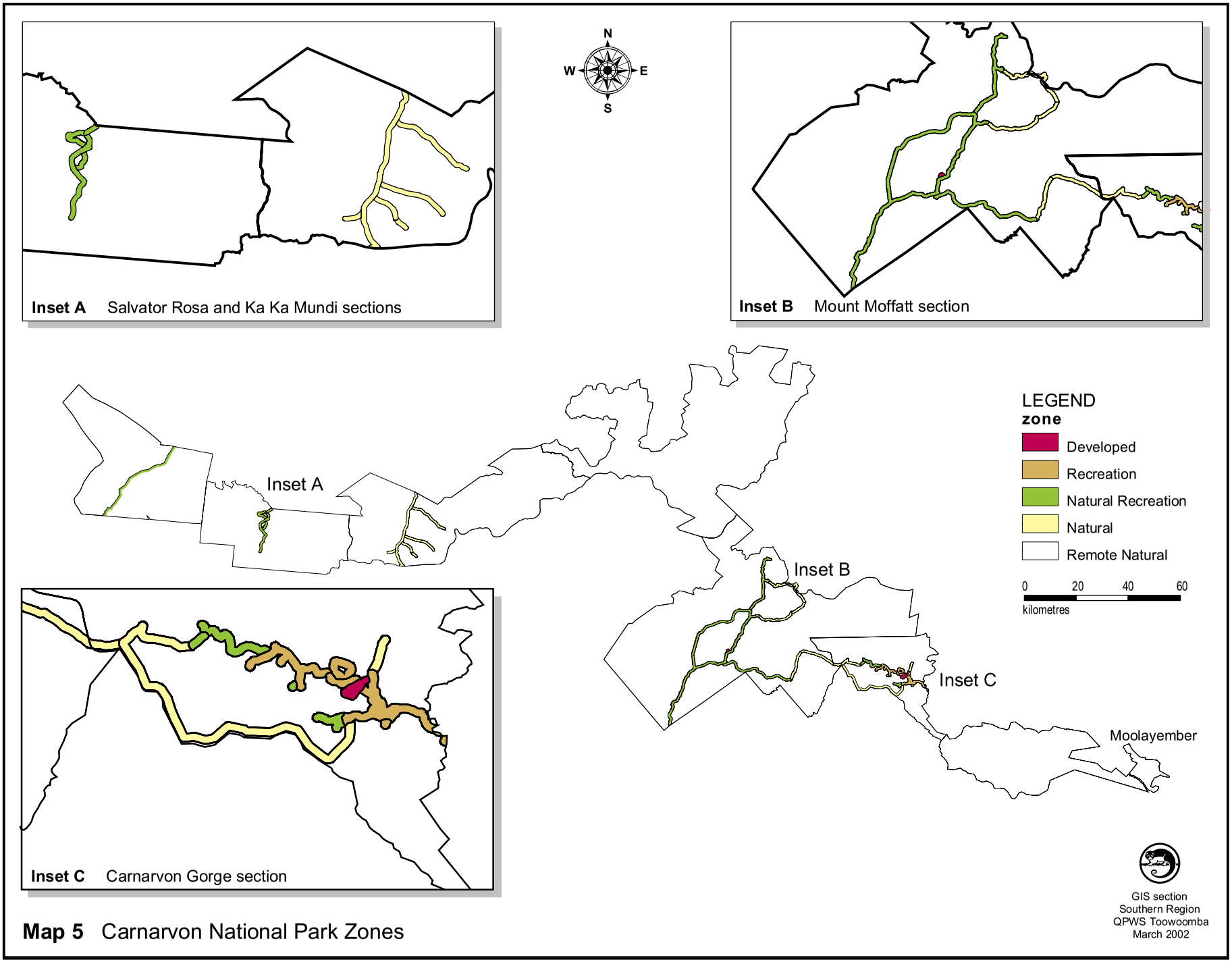
Remote-Natural Zone

This zone covers most of Carnarvon National Park and has the dual purpose of providing an experience of remoteness for visitors and protecting the park's natural and cultural resources. To achieve this balance, public access is by foot. Access by vehicles is limited to management staff and other authorised personnel (e.g. emergency services), and then only where no other option is feasible.

All visitors wishing to use the Remote-Natural Zone are required to register their intentions with park staff, as a safety measure. The number of persons and length of stay may also be regulated in particular areas.

Overnight camping by those who wish to backpack will normally be allowed in this zone, provided camping permits are obtained, fire regulations are observed, and minimal impact bushwalking techniques are followed. Particular sites might be specified in camping permits to ensure that use remains within sustainable limits and that visitor experiences are maintained.

No visitor facilities are provided in this zone. Trail markers may be used to aid visitor safety and environmental protection.



Map 5 Carnarvon National Park Zones

Desired outcomes

- Management actions and recreational activities comply with zoning criteria.
- Recreational settings maintain their character.

Proposed guidelines and actions

- Use the zoning scheme for the park as a tool to guide the style and level of development and recreation within particular areas.
- Manage most of Carnarvon National Park as a remote 'wilderness' area, with minimal or no visitor facilities.
- Monitor the effectiveness of the zoning scheme over the life of this management plan.

Conserving natural heritage

Protection of landscapes, landforms, soil and catchment values

Background information

The Great Dividing Range separates the drainage systems that flow north and east into the Fitzroy River system from those that flow south into the Darling River system. The main streams that run north and east from the park are the Nogoa, Comet and Dawson Rivers. To the south of the park are the upper reaches of Warrego and Maranoa Rivers. Land management practices within the park and on surrounding areas can affect the water quality of these river systems so an integrated approach to land management is required.

The major land uses in the region are cropping and grazing. Continued degradation and increasing demand on land and water resources threaten much of the catchments outside the park area (Sattler and Williams 1999) and result in problems such as soil erosion, salinity and siltation. Grazing impacts in some catchment areas have contributed to park management concerns. The effects of pastoral land clearing in the district on ground water supplies and stream flow within the park are unknown.

Soils at highly visited sites in the Carnarvon Gorge section such as the Moss Garden, Amphitheatre and Wards Canyon are compacted. This increases the rate of water run-off and is likely to increase the rate of soil erosion. Soil erosion occurs in association with roads and firebreaks throughout the park. These roads require some realignment and other work to reduce this problem.

The Peat Bog found in Louisa Creek in the Salvator Rosa section is the only known example of this type of natural feature in the Central Highlands Sandstone Belt. It may provide a valuable scientific resource that can give information on floristic types through pollen records and the possible fire history of this section of the park. The Peat Bog eroded approximately 50 metres between 1990 and 1995.

The sandstone environment of Carnarvon National Park is of immense natural beauty. Potential threats to visual amenity include the clearing and construction required for the placement of radio transmission towers and other public infrastructure such as powerlines, and the 'pushing' of seismic lines.

The park's sandstones are fragile. In many areas movement in fault lines that developed during geological formation is causing the sandstone structure to fracture. Any major geological disturbances in the region may exacerbate this process, decreasing the stability of the sandstone and thereby increasing the risk of collapse. On a smaller scale, sandstone surfaces are constantly flaking – which poses a long-term risk to rock art.

Desired outcomes

- Scenic values are retained and considered in the assessment, design and construction of park developments.
- Recreational use is managed to ensure that the natural scenic qualities of the park's environment are not compromised.
- High use areas are protected as far as possible from erosion, and degraded areas are rehabilitated.
- Visitors are encouraged to appreciate the different landforms and landscape types in Carnarvon National Park.
- Park operations have minimal impact on the quality of ground and surface water in the national park catchment area and/or in catchments on adjacent properties.

Proposed guidelines and actions

Planning

- Ensure that any proposed works that may disturb geomorphological processes and/or landscape values undergo an impact assessment before approval. Impact assessments must conform to established government procedures.
- Assess existing and proposed structures to ensure the visual character of the sandstone and basalt environments is not compromised. Existing structures that are visually obtrusive will be removed, screened by vegetation or repainted in landscape-sympathetic colours.

Strategic Approach

- Manage Carnarvon National Park in the regional context by developing a working partnership with relevant catchment management organisations, Landcare groups and traditional owner groups.

Development and Maintenance

- Ensure that future location and design of all park infrastructure including the siting of roads and walking tracks takes account of soil characteristics and local surface hydrology.

- Exercise extreme care in operational activities particularly in environmentally sensitive or erodible land systems.
- Maintain and, where necessary, construct boardwalks and fencing to minimise damage to sensitive and/or highly visited sites (e.g. rock art sites) by park visitors.
- Ensure maintenance work conducted on access roads and public utilities minimises disturbance to surrounding vegetation. This may involve developing Deeds of Agreement with service providers for the conduct of works on Carnarvon National Park.

Research and Monitoring

- Monitor high use areas to determine if patterns of visitor behaviour and visitor use rates are sustainable. Where appropriate, these areas will be temporarily closed and rehabilitated. Revegetation will be undertaken using local species.
- Develop and implement an appropriate monitoring program for the assessment of water quality in Carnarvon National Park.
- Prepare a site management plan for the Peat Bog. This may involve undertaking studies to determine whether it is appropriate and feasible to take remedial action to reduce the rate of erosion occurring in the Peat Bog in the Salvator Rosa section.

Education and Interpretation

- Use interpretive materials and activities to inform park visitors about the inherent values of fragile side gorges and other sensitive areas, and the potential impacts of undesirable practices at these sites.
- Counter any form of degradation of the park's watercourses attributable to human causes with increased patrols, regulatory signs and educational programs and other actions considered necessary.

Protection and presentation of the park's wildlife

Background information

Carnarvon National Park has a high diversity of plant and animal species (wildlife). At least 1,180 plant species and more than 400 vertebrate species have been recorded. As most land in the biogeographic region is significantly modified from its natural condition, the park is not only a representative sample of the Sandstone Belt communities in their 'natural' state but also a haven for many wildlife species.

Flora and fauna inventories have been prepared for the most sections of the park. The Goodliffe, Buckland Tableland and Moolayember sections remain the least-studied sections. Continued resource surveys and monitoring will continue to add to species inventories. Further research into the functioning of natural systems will enhance management of biodiversity in the future.

Studies are required to determine the life history and survival needs of many species and/or communities on Carnarvon National Park.

The most immediate challenge is to identify goals with regard to biodiversity management. The development of a natural integrity statement for Carnarvon National Park will aid this process. Natural integrity statements document the park's natural values and define the desired conditions; provide five-yearly evaluations of the natural integrity; report on emerging issues and actions to maintain or restore integrity; and set out strategies, objectives and actions to work towards in the next five years.

Flora

Addicott (1997) provides the baseline data for future monitoring and/or research on plant communities and flora within Carnarvon National Park. Though this report is comprehensive, further ground-truthing and survey work is required.

Numerous unique and vulnerable ecosystems and/or species within Carnarvon National Park require special protection. Some of these are briefly outlined below.

Softwood scrub communities

Carnarvon National Park is one of the few reserved areas in the Brigalow Belt that have significant representation of softwood scrub. These communities are extensive in the Goodliffe, Ka Ka Mundi, Buckland Tableland, and Moolayember sections, with smaller pockets in the Mount Moffatt section. Generally these scrubs occur on steeper slopes and are found on the boundaries of the park adjacent to cleared pasture lands. This allows for the encroachment of exotic grasses such as buffel grass *Cenchrus ciliaris* and green panic *Panicum maximum* thereby dramatically increasing the risk of destruction to these fire sensitive communities.

A wetter environment exists in the sheltered side gorges which are characteristic of the Carnarvon Gorge and Moolayember sections. These areas provide suitable habitat for relic rainforest species including the king fern *Angiopteris evecta*, and frequently have a lush growth of mosses, ferns and liverworts. Any threat to the stability of these sensitive species, such as the impact of pedestrians, needs to be controlled and managed appropriately.

Pedestrian impacts include:

- increased erosion potential to the base of the side gorges;
- trampling and compaction of soil;
- trampling of sensitive vegetation, such as delicate ferns and mosses, some of which are endemic to the area;

- vandalism of walls and vegetation during busy times and school holidays; and
- introduction of environmental weeds via clothing and/or from depositing citrus fruit seeds etc.

Side gorges are one of the major visitor attractions of the Carnarvon Gorge section. In areas such as the Moss Garden, Wards Canyon and the Amphitheatre, visitor impacts are the largest threat to these communities and need to be controlled with constructed paths/ boardwalks, barriers and interpretation.

Wetland systems

Numerous wetlands and associated ecosystems occur within Carnarvon National Park including the Peat Bog, rivers, creeks, streams, waterholes and artesian springs. These ecosystems support an abundance of plant and animal species, and provide important habitat for many other native species. Some of these features are also of cultural interest and/or significance (e.g. Major Mitchell Spring and Bunbuncundoo Spring).

Currently, the most significant threats to the wetland systems within the park are:

- contamination and/or disturbance (e.g. trampling and uprooting) by introduced animals or stray stock, especially feral pigs, horses and/or cattle;
- introduced plant species that may outcompete native species and clog water systems (e.g. mistflower);
- pollution of ground water sources;
- stream or streambank erosion;
- fire; and
- impacts caused by the activities of park visitors, including the trampling of riparian vegetation, streambank compaction and the inappropriate siting or inadequate provision of visitor infrastructure.

Rare and threatened species

Rare and threatened plants are those most likely to become extinct in the relatively short-term. Significant research and monitoring effort will be required to obtain a comprehensive knowledge of their life histories and survival needs. A monitoring program for *Homoranthus zeteticorum* at Salvator Rosa has been in progress for several years, and a similar program was commenced at Mount Moffatt for *Stemmacantha australis*.

Staff conduct formalised vegetation monitoring programs while tour guides and park visitors report observations from along the tracks, trails and at destination sites. Each observation contributes to the knowledge of park staff, and helps to improve approaches to the management of the park's rich and diverse plant species.

Fauna

The varied landscapes and rich diversity of plant communities found at Carnarvon National Park support more than 400 species of vertebrate animals, with an undetermined number of invertebrate species. While priority is often placed on ensuring the long-term survival of rare and threatened populations, park staff also aim to maintain the natural abundance, diversity and distribution of common species. Few of these species have been the subject of intensive study, so their habitat requirements are not fully understood. Many species, both common and rare or threatened species, can be used as indicators of ecosystem health including woodland birds, some invertebrate groups and tree-dwelling lizards.

A comprehensive fauna survey program is in progress at Mount Moffatt. Similar programs are proposed for other sections of the park but will take many years to complete.

Some habitats such as softwood scrub, artesian spring habitats, side gorges and the Consuelo Tableland have a high diversity of fauna containing habitat-specific and endemic species, which may require specific management to ensure the survival of these species.

Dingoes *Canis lupus dingo* occur on the park and are not considered feral. Neighbouring landholders are concerned that the dingoes that occur on the park will migrate onto their properties and threaten their stock. While baiting of dingoes should focus on the perimeter of the park, it is recognised that dingo populations help control pig numbers. The distribution of northern quoll *Dasyurus hallucatus* populations and possible effects of baiting on these also need to be further investigated.

In the past, park visitors often hand-fed animals, in spite of signs asking them not to do so. Species involved were eastern grey kangaroo *Macropus giganteus*, common brushtail possum *Trichosurus vulpecula*, pied currawong *Strepera graculina*, kookaburra *Dacelo novaeguineae* and lace monitor *Varanus varius*. The practice of feeding animals presents problems and is detrimental to the health of the wildlife. Animals that 'expect' to be fed often become aggressive and, on occasions, have attacked visitors. Hand feeding leads to unnaturally high densities of these animals, encouraging animals into campgrounds and picnic areas, and increases the chances of disease transmission.

Desired outcomes

- A natural integrity statement is developed for Carnarvon National Park and associated action plans are being implemented.
- The diversity and composition of plant and animal populations are protected and maintained.
- The location, distribution and survival needs of significant wildlife species are appropriately documented.
- Management decisions are based on an expanding knowledge of natural ecosystems and individual species.
- The presence and distribution of potentially sensitive species such as the northern quoll, platypus, squatter pigeon, glossy black-cockatoo and powerful owl are monitored.

Proposed guidelines and actions

Monitoring

- Review existing monitoring programs and ensure results are incorporated into management.
- Ensure vegetation monitoring programs provide an insight into the movement of plant community boundaries over time, changes in community composition and structure, and the impacts of fire on plant communities and/or individual species.
- When developing monitoring programs, recognise the importance of gathering information on indicator species.
- Identify and monitor threats to ecosystems and communities and, where practicable, implement appropriate responses.

Inventories and records management

- Contribute data collected on the park's wildlife species to the Department's WildNet database.
- Record data collected from monitoring programs on a geographic information system (GIS).
- Map the locations of noteworthy species and keep photographic records of them at the park and in district office/s.
- Continue current fauna and flora inventory programs at Mount Moffatt and expand to other sections.

Research

- Encourage researchers and staff from universities, museums and herbaria to undertake research into understanding the ecological requirements and vulnerability of recognised endemic, rare, threatened and introduced species recorded from the park.
- Monitor habitat utilisation and/or the ecological requirements, sensitivities and preferences of noteworthy species and formulate management strategies (e.g. suitable fire regimes) that will promote populations and habitats.
- Establish a research project to study the reproductive ecology, population dynamics and fire regimes for noteworthy and indicator species.
- Set up monitoring sites along selected sections of the walking tracks to determine the extent of trampling caused by visitor use.
- Encourage traditional owners to collect and collate information on the park's wildlife species, particularly in relation to the traditional management and utilisation of wildlife (i.e. plants and animals).

Recreation management and infrastructure

- Carefully manage access to areas that support noteworthy species. Management options that may be adopted to control visitor impacts include site hardening, discouraging visitation, fencing areas off and/or the erection of interpretive or regulatory signs.
- Establish baseline data on the presence, health and abundance of plant species in heavily used sites (e.g. the Moss Garden) to assist in managing recreational activities.
- Before commencing any new development, survey the site and its surrounds to identify any potential threats to noteworthy species.
- Limit infrastructure in areas containing noteworthy species to what is necessary for protection and interpretation purposes.

Fire management

- Where possible, regulate the frequency and intensity of fire to maintain plant species composition and structure, and the ecological dynamics of all vegetation communities. The fire management plan for the park should also take into account the ecological requirements of noteworthy and indicator species.

Population management

- Investigate available control options for pest species and, where appropriate, implement the most suitable option.
- Assess the suitability of Carnarvon National Park for the reintroduction of endangered species that used to occur in the area. Managers will need to carefully consider both the ecological and management implications of undertaking this type of project.
- Identify and regularly inspect sites supporting populations or species of commercial or horticultural interest to ensure poaching is not occurring.
- When necessary, carry out baiting for pest species. Where possible, this should be undertaken on a co-operative basis with all park neighbours, and with assistance from local Land Protection Officers.
- Alter the type of bait and its method of delivery, dependent upon the presence and sensitivity of non-target species.

Education and interpretation

- Ensure support systems are in place for park staff to be able to identify and record flora and fauna species, particularly those that are rare or threatened.
- Continue discouraging the feeding of native animals, through signs, interpretive material, enforcement and public education.

Management of pest plants

Background information

Environmental weeds occur throughout Carnarvon National Park, particularly in disturbed areas next to roads, walking tracks and trails, along creeklines and in campgrounds. These weeds are introduced to the park by wind, water, feral and native animals, on firewood brought into campgrounds, on road maintenance equipment and other vehicles, on clothing/footwear and through inappropriate disposal of food waste.

Commonly seen weeds on Carnarvon National Park include cobblers pegs *Bidens pilosa*, crownbeard *Verbesina enciliodes*, khaki weed *Alternanthera pungens*, corky passion vine *Passiflora suberosa*, Mossman River grass *Cenchrus echinatus* and stinking roger *Tagetes minuta*. Declared plants[3] include mistflower *Eupatorium riparium*, noogoora burr *Xanthium occidentale* and prickly pear *Opuntia stricta* and *O. tomentosa*.

Corky passion vine is a very invasive weed and is smothering many riparian species in the Carnarvon Gorge section. Its rate of spread along Carnarvon Creek has been rapid, so control of this species should be seen as a priority.

Crownbeard is a particular issue on the Salvator Rosa, Goodliffe and Ka Ka Mundi sections of the park. It leans out over park access roads, enabling cars to pick it up and bring it further into the park, concentrating it around campgrounds and other visitation areas. It is prolific along the section of the Nogoa River adjacent to the campground in the Salvator Rosa section, and floods aid its distribution. In heavily infested and easily accessible areas, spraying is an effective control measure. Other areas are best managed through the use of cool burns after rain, to reduce seed germination.

Various fruit trees, especially citrus trees (*Citrus* spp.), have been found growing in the Carnarvon Gorge section of the park. It appears that people are spitting out seeds when they stop for a rest in the side gorges, and the cool, moist conditions offered in these areas favour the growth of such species. Park staff remove these species by hand whenever noticed.

Introduced grass species used for improved pastures (e.g. buffel grass *Cenchrus ciliaris* and green panic *Panicum maximum*) also cause environmental damage to the national park. These species outcompete many of the native grass species, often to the extent that they form very dense monocultures. This reduces the species diversity of the park's flora, changes the habitat value of those grassed areas to native animals, and puts fire sensitive communities such as softwood scrubs at risk. Where low levels of these species occur, park staff remove individual plants by hand. In areas adjacent to grazing pastures, such as along park boundaries and along firebreaks where soils have been disturbed, buffel grass is very hard to control.

Individual plants and small infestations of parthenium *Parthenium hysterophorus* have been found in campground areas and isolated locations over recent years. These plants are removed by hand or chemically treated, and the area monitored to ensure no further plants germinate. The potential for parthenium to be introduced into Carnarvon National Park and colonise is ever present. Staff discourage park visitors from washing down their vehicles while in the park and recommend the use of the wash-down facilities in the nearby townships of Injune and Rolleston.

Carnarvon National Park is situated in the headwaters of several river catchments. Weeds occurring on the park have the potential to impact on environments further down the catchment, and vice versa. The park must therefore be managed as part of the whole landscape, not in isolation. Species such as rubber vine *Cryptostegia grandiflora* and giant rats tail grass *Sporobolus pyramidalis* occur within the river catchments of the area and are therefore a potential threat. The artesian springs within the park should also be regularly monitored for any occurrence of para grass *Brachiaria mutica* and hymenachne *Hymenachne* spp.

Many visitors to the park are not aware of what some of these weeds look like, or the potential threat that they pose to the park environment, and introduce them innocently. Weed awareness is promoted during slide shows at Carnarvon Gorge and on the visitor information sheet for the Salvator Rosa and Carnarvon Gorge sections.

Weed action plans have been developed for some sections of Carnarvon National Park. It is envisaged that weed surveys will be incorporated into the natural resource management monitoring programs conducted on the park.

[3] Declared plants are species that have, or could have, serious economic, environmental or social impact. Declaration imposes legal responsibilities for control. (The State of Queensland, Department of Natural Resources and Mines, 2001).

Desired outcomes

- The impact and distribution of weed species on the natural ecosystems of the park are reduced.
- No new weed species are established in Carnarvon National Park.
- Introduced and environmental weed control programs are developed in the regional context.

Proposed guidelines and actions

Planning

- Develop weed management strategies for all sections of the park, and revise and/or update them as appropriate (e.g. as new control techniques are developed). These strategies should be implemented as part of the annual works program.

Strategic approach

- Work co-operatively with neighbouring land users, relevant community groups and government bodies to control declared plants and weeds in catchments and prevent the introduction of new species to the park.

Research and monitoring

- Map weed species on the park, and monitor the effectiveness of control efforts.
- Actively monitor the Nogoa River, Louisa Creek and Carnarvon Creek for waterweeds and, if found, take appropriate action.
- Monitor the occurrence of existing and new weed species along access roads to the park and firebreaks, and control as necessary.
- Establish and encourage research programs to investigate the environmental effects of weeds on park ecosystems.

Prevention and treatment

- Give priority to the control of weed species in habitats of high conservation value, at disturbed sites, around watering points, along park boundaries and in popular visitor areas.
- Ensure areas invaded by parthenium are treated immediately and follow-up action is undertaken in these areas for up to ten years after treatment.
- Encourage natural regeneration and adopt other rehabilitation methods that will impede weed growth (e.g. use fire or replant lower stratum species).
- Where fire sensitive species have been invaded by pasture species, make every effort to minimise fire invasion into these areas (e.g. by burning from the edge of softwood scrubs)
- Keep fences stock-proof and continue feral animal and stock control activities to minimise the potential for spreading weed infestations into the park.

Training

- Ensure that park staff are trained to correctly identify and control weed species occurring on the park, and that they have a comprehensive knowledge of species that are likely to invade the park from adjacent areas.
- Develop a weed identification kit for each section of the park.

Education

- Continue to encourage park users to clean boots and camping equipment and wash down their vehicles before entering the park if they have previously been in weed-infested areas.
- Include information on the impacts of weeds on the environment in park interpretive materials and programs, and at visitor information centres.
- Develop and implement a community education program to raise the awareness of the negative effects that pasture grasses such as buffel grass can have on natural ecosystems.

Management of feral and introduced animals

Background information

Feral and introduced animals occurring on Carnarvon National Park include animals introduced to Australia:

- as domestic stock (e.g. pigs, horses and cattle) which have become feral, are stray or are grazed under a stock grazing permit;
- for recreational purposes (e.g. foxes, rabbits and hares);
- as 'companions' which have become feral—most notably the cat; and
- as a biological control agent, namely the cane toad.

Feral pigs occur on all sections of the park. Their numbers fluctuate depending on the season and water availability, so the damage they inflict on the park is both seasonal and irregular. They dig for roots and tubers of plants in soft soil and mud and can cause extensive damage. This is particularly evident around the artesian springs and on the walking tracks in Carnarvon Gorge. Damage to these tracks and adjacent areas fouls water supplies, springs and creeks and damages animal habitat, and also increases maintenance works and costs.

Feral horses are found on sections of the park. They create most damage in the areas surrounding the fragile spring environments, where they foul waters and trample delicate vegetation. They wear tracks into the ground in the areas leading to these watering points, and cause erosion where soils are friable.

Several stock grazing leases that existed over Carnarvon National Park before the introduction of the *Nature Conservation Act 1992* still remain over sections of the park. Upon expiry, these leases will not be renewed. On occasions, cattle also stray onto the park from adjacent properties. Section 59 of the *Nature Conservation Regulation 1994* prohibits a person allowing stock to stray onto a protected area, and penalties apply. The removal of cattle from the park is usually undertaken with assistance from their owners.

Predatory animals (e.g. wild dogs, foxes and cats) kill native animals and also compete with them for food and shelter. Although not yet in large numbers, these animals pose a potential threat for small to medium-sized prey, including mammals, birds and reptiles. Rabbits occur on the park in small numbers and are not seen as a major threat.

The ruggedness of the terrain and the large number of water sources make control efforts difficult. Feral animal action plans have been developed for some sections of the park. Control methods include the trapping, shooting and/or baiting of animals, depending on the situation. Baiting is undertaken in accordance with the *Good Neighbour Policy* and, where possible, is only being undertaken as part of a strategic and co-ordinated program with surrounding properties.

Park staff generally trap and bait feral pigs in Carnarvon Gorge. Due to the associated safety risks, shooting activities require closure of the Gorge. As the Carnarvon Gorge section is a popular tourist destination, closure should only be for short periods and at times likely to cause least impact to visitor activities.

Fencing and trapping around water supplies may improve control efforts. This is impractical in most sections of the park due to the many small springs and creeks. However, it may be feasible to use this approach during dry periods.

Desired outcomes

- Negative effects caused to the natural and cultural values of the park by introduced animal species are decreased.
- No new populations of feral animals have established in Carnarvon National Park.

Proposed guidelines and actions

Strategic approach

- Work co-operatively with park neighbours, government agencies and other relevant organisations to develop a strategic approach for the control of introduced species in the local area/district.
- Undertake pest management activities at times and places that give the greatest conservation outcomes with the resources available, and use methods of control that pose minimal risk to visitors, personnel, wildlife or natural ecosystems.

Planning and management

- Develop a Feral Animal Management Strategy for the park and implement recommendations as part of the annual works program.
- Liaise with neighbouring landholders to determine appropriate fencing arrangements, and construct boundary fencing as funding permits.
- Reduce the impact of feral pigs and horses on artesian spring environments.
- Only close the park (or relevant section of the park) for feral animal control purposes if public safety is at risk.
- Encourage traditional owner involvement in feral animal control programs.

Monitoring

- Regularly monitor the occurrence of introduced animals to determine the success or otherwise of control measures. The degree of disturbance around waterways, especially artesian springs, may also be used as one indicator of control needs.

Education and interpretation

- Incorporate an animal pest management component for established and potential pests into interpretive programs aimed at park visitors, user groups and the local community.

Using and managing fire in protected areas

Background information

Fire is an integral part of ecosystem management in Carnarvon National Park, with many native species requiring fire for their continued survival. On protected areas, fire management is undertaken to protect life and property and to conserve the park's natural and cultural resources.

Vegetation community structure and composition is strongly influenced by fire. Inappropriate fire regimes may threaten the survival of certain species, while carefully planned and conducted fire management helps to maintain or maximise biological diversity. Fire management practices should therefore aim to create a mosaic of plant communities in all stages of growth, while protecting ecosystems that are considered fire-sensitive (e.g. softwood communities and Peat Bog).

Mosaic burning can also benefit wildlife and impede progress of wildfires. Wildfires endanger the lives of park visitors, staff and neighbours and threaten plant communities, infrastructure and cultural sites on the park and in adjacent areas.

Fuel reduction (or prescribed) burning is strategically undertaken at Carnarvon National Park to reduce fuel levels and protect human life and property.

Weeds and fire can change the structure and composition of plant communities and/or habitats. While weeds are a particular issue along waterways and in disturbed areas, fire has the potential to impact on all communities and on cultural places. The development of an appropriate fire regime will be essential to the maintenance and/or management of specific vegetation communities and species in Carnarvon National Park (e.g. white cypress *Callitris glaucophylla*, blady grass *Imperata cylindrica* and the vulnerable *Stemmacantha australis*).

Though much is already known about the vegetation communities in Carnarvon National Park, the fire requirements of many plant and animal species that occur in the park are not fully understood. Further research into the fire responses of species and communities will help in the future development of appropriate fire regimes. It is important that any such research is clearly communicated to on-ground staff.

The Queensland Parks and Wildlife Service has adopted a statewide fire management system. It provides direction and guidelines for fire planning and management. Fire plans detail the fire strategy, planned burn program and wildfire response procedures at the individual park level. Park staff are currently working in conjunction with traditional owners and other relevant personnel to prepare fire plans for their management units.

The walking tracks and firebreaks that dissect the park play an important part in preventing the movement of fires into, out of, and within the park. They also provide a means of access for park staff to fight fires and allow them to access the different sections of the park during their day-to-day operations. Firebreaks occur within the more commonly visited sections of Carnarvon National Park (i.e. Carnarvon Gorge, Salvator Rosa, Mount Moffatt and Ka Ka Mundi). However, due to the rugged terrain and high erosion potential of soil types found in the park, firebreaks are not intended for use as a major fire management tool. Where possible park staff try to undertake burning operations in conjunction with neighbouring properties, using natural boundaries such as cliff lines and creeks to manage fire.

There are several dams, bores and water tanks within Carnarvon National Park. Some of these artificial water supplies have been strategically positioned for fire management purposes.

Any water supplies that have value for fire fighting purposes will not be removed or decommissioned.

Fighting fires on Carnarvon National Park is the primary responsibility of the Queensland Parks and Wildlife Service. On private land the responsibility lies with Queensland Fire Service and landholders, and on State Forest with the Queensland Parks and Wildlife Service and the Department of Primary Industries, Queensland Forest Service division. These groups work in close association with one another and, where necessary, may all be involved in the suppression of a wildfire at the same time. The State Emergency Service can also be called in to provide logistic support to fire fighters. Wildfire response procedures have been prepared for each of the management units within Carnarvon National Park.

A zoning scheme has been developed for the park. Wood fires are permitted at a limited number of sites, as outlined in the Visitor Management Strategy. Gas fires are allowed in all zones. It is likely that fire ban regulations may need to be imposed during periods of high fire danger. Firewood cannot be collected from the park. However, there is the risk of introducing pest plants such as parthenium and buffel grass on firewood brought into the park.

Desired outcomes

- Human life, property and culturally significant sites are protected from fire and the effects of wildfire are mitigated.
- The natural biological diversity and integrity of native plant and animal communities are promoted and protected through the responsible management of fire.
- A fire plan is developed and implemented for Carnarvon National Park.

Proposed guidelines and actions

Planning

- Develop a fire plan for Carnarvon National Park as part of the statewide QPWS Fire Management System. This is likely to involve the compilation of fire management strategies for each management unit.
- Consider the attitudes, expectations and requirements of park neighbours when developing (and conducting) planned burn programs.
- Update wildfire response procedures annually, and conduct wildfire responses in accordance with incident control systems. Fire management activities will be co-ordinated with landholders, residents, traditional owners, local authorities and relevant fire fighting agencies.

Research and monitoring

- Document the fire history of the park including date, source of fire, extent, intensity and recovery, and record the information on a geographic information system (e.g. Parkinfo).
- Undertake research and monitoring to determine the most suitable fire regimes with relation to the frequency, intensity and timing of burns for natural communities and populations within the park.

Management

- Adopt precautionary fire management measures including well-placed and well-maintained fire control lines, clearing around buildings and other facilities, education of visitors and discussions with neighbours on their fire responsibilities, and general staff preparedness for fire emergencies.
- Encourage traditional owner participation in the formulation of fire plans.
- Where possible, ensure fire management activities do not damage culturally significant materials and places. Location maps may need to be developed to delineate general areas that require protection from fire, noting that confidentiality will need to be respected.
- Where possible, ensure fire is excluded from fire sensitive communities such as the Peat Bog, softwood scrubs and rainforest. Develop monitoring programs to measure any edge effects from fire.

Training and safety

- Ensure fire management and fire suppression activities are adequately resourced, and that staff involved in fire management and containment have appropriate fire training and personal protective equipment.
- Display official fire signs during periods of extreme fire danger and, where required, provide for the co-ordination of a fire ban policy with the local fire warden. Where necessary, visitors will be excluded from areas of high fire danger.

Education and interpretation

- As part of the park education program, develop and conduct a public education program to raise public awareness and understanding of the role of fire in natural ecosystem and cultural heritage management.

Conserving cultural heritage

Protection and presentation of Aboriginal cultural heritage

See also Section: Recognising the responsibilities, interests and aspirations of Aboriginal peoples

Background information

Traditional owners have a detailed knowledge of the wildlife, habitats, seasons, places and history of the area. Aboriginal people want to ensure the knowledge and understanding associated with the past, and the collective memory within the culture today, is continued into the future. Conservation of oral history and tradition is therefore vital to the wellbeing of Aboriginal culture and the continuing management of the park. Unfortunately, little of this knowledge has been recorded.

Archaeological materials found in Carnarvon National Park, such as rock art, help to reconstruct the history of Aboriginal occupation in the Carnarvon area. This history of occupation is an important part of the cultural significance of the park. It is therefore important that significant and sacred sites and materials within Carnarvon National Park are protected from unauthorised and inappropriate use or access. This will assist in protecting the values of continuing cultural practices and the archaeological significance of these sites as recognised in the listing of sites on the Register of the National Estate.

Some sites were used for particular rituals and/or ceremonial activities and, as such, access to these areas and information about them is also restricted. However, not all sites that are of particular significance in Carnarvon National Park are restricted, and park visitors have the opportunity to visit and learn about them.

The Queensland Parks and Wildlife Service has constructed boardwalks with guard-rails to keep visitors from touching art and/or creating dust that could be damaging to the artwork. Interpretive materials have been developed and placed at selected cultural places that are presented to the public, to help explain their significance. Regulatory signs have been installed where visitors have been disregarding guard-rails and vandalising cultural sites, and video surveillance has recently commenced at the Art Gallery. These and other planned security measures aim to protect the cultural resources of the park, while still allowing visitors to continue enjoying these areas within the context of culturally appropriate behaviour.

The protection of some sites of cultural significance has not been as effective as desired. Some boardwalks are in need of repair or replacement and should be subject to a regular maintenance program. There is also ample evidence of visitors disregarding guard-rails and vandalising art sites. Consequently, some of the cultural heritage material is physically deteriorating and conservation measures need to be reassessed.

Many archaeological materials have been removed from Carnarvon National Park in the past. Aboriginal people are concerned about unauthorised entry to closed sites and the removal of artefacts and sacred materials by visitors. Conservation, protection and interpretive measures need to be upgraded to counter vandalism, theft and other impacts. Traditional owners would like to see these materials returned to the park and preserved in a dedicated keeping place.

It is hoped that Aboriginal peoples of the area will work co-operatively with the Queensland Parks and Wildlife Service to develop strategies and guidelines for the conservation and management of Aboriginal cultural heritage. Intellectual and cultural property rights of traditional owners need to be recognised and respected at all times.

Central to the concept of park visitors behaving in a culturally appropriate manner is the need to explain and teach the public about Aboriginal culture and Aboriginal laws. Interpretive displays, brochures and signs can help share this knowledge with visitors. Traditional owners believe, however, that the most effective way to do this is through face-to-face contact with an Aboriginal ranger.

Aboriginal ecological knowledge has direct application to a great variety of park management practices including wildlife management and fire management. Western scientific research and survey methods can also be used to improve knowledge about Indigenous conservation measures and practices (e.g. when developing archaeological inventories). By working co-operatively to ensure conservation practices are complementary, the ecological and cultural values and resources of the park are likely to be better managed.

In Queensland, Aboriginal sites are protected under the *Aboriginal Cultural Heritage Act 2003*, the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (Cwlth) and the *Nature Conservation Act 1992*. The level of protection offered to sites listed on the Register of the National Estate under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) is, at this stage, unclear.

Desired outcomes

- Cultural resources in Carnarvon National Park are cared for and presented in a manner that recognises and respects the links between past and present, and the land and its peoples.
- Management and presentation of Indigenous cultural resources on Carnarvon National Park are undertaken in conjunction with the traditional owners of the area.
- Rock art and other cultural materials on the park are protected from visitor impacts, vandalism, climatic conditions and weathering.
- The cultural and intellectual property rights of Aboriginal people are respected.

Proposed guidelines and actions

Inventory and assessment

- Continue compiling an inventory of all known materials and places of Aboriginal cultural heritage significance on Carnarvon National Park, using appropriate safeguards to ensure privacy of information where needed.
- Assess the significance of materials and places of cultural significance and make recommendations on the level and type of management they require. Management options may range from allowing places to age naturally with no intervention, to developing a conservation plan with resources committed to the preservation of the material and place in perpetuity.

Co-operative management

- Using a culturally sensitive approach, work with traditional owners to conserve their cultural heritage.
- Manage cultural sites in a way that protects and maintains the widest possible range of significant values. This will involve working with and/or assisting Aboriginal people and other relevant experts to develop best-practice standards and guidelines for the conservation and management of Aboriginal cultural resources on the park.
- Consult and negotiate with traditional owners in relation to any proposed park management action that may affect their cultural heritage.
- Where requested by the traditional owners, consider restricting visitor access to sites. Sites closed to public visitation will be patrolled and monitored for unauthorised entry and the removal of artefacts and sacred materials.
- Prior to taking appropriate action, advise traditional owners of any known threats to art sites (e.g. possible mass movement and water staining) and determine their wishes and suggested management approaches.
- Encourage research into traditional ecological knowledge for use in park management.

Site development and management

- Work co-operatively with Aboriginal people to ensure that archaeological/cultural impact assessments are incorporated into development proposals for the park.
- Take measures to physically protect and conserve rock art and other cultural material from visitor impacts and vandalism.
- Ensure that visitor use does not interfere with the spiritual privacy of the traditional owners.
- Manage developed sites to reduce visitor impact through measures such as interpretation, site hardening and other suitable methods of visitation control (e.g. having traditional owner rangers on-site).
- Continue to review and improve infrastructure near significant sites and, where necessary, re-route or relocate tracks and upgrade signs.
- Where necessary, control vegetation growth next to Aboriginal art sites to minimise fire damage.

Interpretation and information

- Review and/or update interpretation materials relating to the conservation of rock art and other cultural resources in the park and, where possible, give Aboriginal people opportunities to interpret their culture to park visitors and/or the broader community.
- Establish a seasonal Aboriginal ranger program for interpretive activities during peak visitation periods and monitor its success.
- Ensure film crews and photographers do not publish images that contravene the wishes of Aboriginal peoples.
- Ensure the intellectual and cultural property rights of Aboriginal people are protected in relation to the collection and possible dissemination of traditional ecological and cultural knowledge.
- Work with commercial tour operators and traditional owners to develop standard, high quality interpretive information for use during commercial tours.

Research and monitoring

- Encourage research into the significance of the Aboriginal cultural sites in the park.
- Conduct systematic surveys to develop a comprehensive understanding of the archaeological resources of the park. An agreement for the planning and conduct of archaeological survey work will be developed with the traditional owners.
- Establish and maintain a consistent monitoring program to assess the condition of cultural heritage places, particularly those that are open to public visitation.
- Encourage recording of traditional oral histories related to the park.

Preserving materials

- Encourage the return of previously removed cultural resources from the park.

Protection and preservation of non-Indigenous cultural heritage

Background information

Sir Thomas Mitchell travelled through and camped in the Carnarvon area in the 1840s. Today, many of the site names still pay tribute to his endeavours.

The Chinese people who resided in the area around the turn of the 20th century operated gold mines in the high country. The location of at least one mineshaft is known today. Its location is not publicised due to the serious safety risks associated with its presentation.

Tourism began in the region in the 1930s, after the Royal Geographical Society of Australasia (RGSA) visited Carnarvon Gorge and subsequently promoted the region's beauty and the idea of a national park. Following the gazettal of the Carnarvon Gorge section as a national park, the RGSA continued its promotion of the area by leading expeditions into the park. A wide range of people including politicians, naturalists, mineralogists and anthropologists participated in these trekking adventures (National Centre for Studies in Travel and Tourism and Department of Tourism, James Cook University, 1991)

The history of settlement in the Carnarvon area has been documented by Cameron (1999) and provides the basis for interpretation of non-Indigenous heritage in the park. Carnarvon National Park has been gazetted primarily from pastoral holdings. Throughout the park, evidence of the previous pastoral industry remains — particularly in the Mount Moffatt, Salvator Rosa, Ka Ka Mundi and Goodliffe sections — in the form of homesteads, huts, water points, stock yards, fences and fence lines. The integrity of some European sites, such as the Mount Moffatt yards and some fence lines, may have been compromised through inappropriate additions, modifications and treatments.

The *Nature Conservation Act 1992* provides for the protection of cultural resources in protected areas. The *Queensland Heritage Act 1992* provides protection for historical places nominated and assessed as of State significance. The Burra Charter sets a standard of practice for those conserving and managing places of cultural significance in Australia.

Many sites and materials of European cultural significance on the park have been identified and recorded by the Environmental Protection Agency. The majority of these relics have considerable interpretive value. Some have been removed or destroyed due to misinformation or lack of understanding of their significance. To prevent further degradation, they should be recorded and assessed to ensure appropriate management, protection and maintenance.

Desired outcomes

- Sites and materials of cultural significance are protected, and where appropriate presented, consistent with the principles established in the Burra Charter.
- Places of potential State significance are identified, assessed and nominated to the Queensland Heritage Register.

Proposed guidelines and actions

Information management

- Encourage staff to collect, manage and maintain information relating to the cultural heritage of Carnarvon National Park, especially in relation to past land management practices. This may involve recording sites, searching through archives, collecting oral histories, researching written literature, and storing the information in hardcopy, electronic and photographic form/s.

Inventory and assessment

- Continue compiling a comprehensive inventory of all known materials and places of historical significance on Carnarvon National Park.
- Assess the significance of historical materials and places. Where materials and/or places are of potential State significance, they should be assessed against criteria in the *Queensland Heritage Act 1992* and nominated to the Queensland Heritage Register. For materials and/or places that are of local or regional significance, management options may range from allowing sites to age naturally with no intervention, to developing a conservation plan with resources committed to the preservation of the material and place in perpetuity.
- Identify, assess and nominate places of potential State significance to the Queensland Heritage Register.

Strategic approach

- Assess materials and places of historical significance within a statewide, regional or local context. Although there may be other examples of building styles or fences represented and maintained elsewhere, these may not be afforded protection.

Community participation

- Where possible, involve local historical societies and/or historians in the development of protection measures for protecting places and materials of historical significance.

Site management

- Manage places entered in the Queensland Heritage Register under the provisions of the *Queensland Heritage Act 1992*. Manage other places under the provisions of the *Nature Conservation Act 1992* and according to the principles of the Burra Charter.
- Wherever possible, employ adaptive re-use options for historical structures in order to retain the significance of the structure and visitor safety is ensured.
- Manage and interpret historical materials and structures if deemed compatible with their conservation. Some fragile and/or dangerous sites may be presented to the public using off-site interpretive materials.
- Ensure any new structures built in close proximity to historical places are designed and located to avoid adversely affecting the historical values of the place.

Working with community partners

Recognising the responsibilities, interests and aspirations of Aboriginal peoples

See also Section: Protection and presentation of Aboriginal cultural heritage

Background information

The *Nature Conservation Act 1992* provides for the recognition of the rights and interests of Aboriginal people in protected areas, native wildlife and nature conservation. The *Native Title (Queensland) Act 1993* provides for the recognition, protection and determination of Native Title, and establishes ways of working with and taking into account the rights and interests of Aboriginal peoples.

The interests of Aboriginal people in Carnarvon National Park evolve largely from their relationship to the land, as defined under their Indigenous laws. Central to Aboriginal culture is the concept that Aboriginal people are responsible for looking after 'country'. This responsibility entails obligations to past, current and future generations. These obligations are shared with QPWS.

While Carnarvon National Park has been established to conserve its natural and cultural values, and to provide for appropriate visitor use, recognition is given to the aspirations of its traditional owners. It is important therefore that park managers and the wider Australian community appreciate and respect the laws, customs, knowledge responsibilities and interests of Aboriginal peoples. This means increasing the capacity of the traditional owners to resume or continue custodianship of 'country' and to fulfil their cultural obligations, and ensuring that government policies and procedures facilitate Aboriginal involvement.

Throughout the management planning process, several meetings were held with Aboriginal peoples with an interest in the management of Carnarvon National Park. From these meetings, it was determined that Aboriginal people expect their interests to be reflected in park management through the formation of a group comprising representatives from each of the interested Aboriginal groups. This group exists and is known as the Carnarvon National Park Traditional Owners Management Group.

It is anticipated that this group will participate in the development of strategies for conserving Indigenous heritage for the park and continue to be informed about management processes.

The overwhelming issue that arose from the consultative meetings was the desire for Aboriginal peoples to have a continuing physical presence on the park. By increasing opportunities for Aboriginal employment on the park, provision is made for Aboriginal peoples to have direct input into the different facets of park management including infrastructure development, interpretation, and natural and cultural resource management. Another way for Aboriginal peoples to 'Care For Country' is to integrate traditional management practices with current knowledge about park management.

A history of traditional hunting and gathering by Aboriginal people associated with Carnarvon National Park is recognised.

Desired outcomes

- The rights and interests of Aboriginal peoples are recognised and reflected through their involvement in the park's management.

Proposed guidelines and actions

Co-operative management

- Involve traditional owners in the management of natural and cultural heritage resources within the park.
- Establish formal links with Aboriginal people associated with Carnarvon National Park with a view to co-operatively developing an Aboriginal Cultural Heritage Management Plan for the park.
- Further explore the option of developing partnership agreement/s with traditional owners in relation to the management of Carnarvon National Park.
- Establish a capacity for conflict resolution between management and traditional owners.

Employment and training

- Encourage Aboriginal people to apply for job vacancies on the park, and facilitate their employment through the establishment of Indigenous identified positions.
- Where possible, continue to provide a local Aboriginal representative on the selection panel for ranger positions at Carnarvon National Park.
- Examine the possibility of employing or contracting Aboriginal person/s during peak visitation periods for the purpose of interpreting Aboriginal cultural places and co-ordinating a cultural education program.
- Where possible, employ or contract Aboriginal people as consultants, advisers, co-researchers and educators on cultural resource identification and management.
- Explore opportunities for traditional owners as volunteers.
- Continue to provide training opportunities and develop the skills of Aboriginal rangers employed through the public sector, particularly in relation to cultural resource management and interpretation.

The park, the surrounding landscape and neighbourhood issues

Background Information

More than 40 properties share a common boundary with Carnarvon National Park. As the natural elements (flora, fauna, fire, water and air) do not recognise park boundaries, co-operation with these landholders is vital for the effective and efficient management of the park.

Management issues shared with neighbours to Carnarvon National Park include fire management, the control of pest plants and animals, water quality, boundary maintenance, management of domestic livestock and the provision of visitor facilities. As evidenced in the *Good Neighbour Policy*, the development and maintenance of co-operative relationships with local people is considered fundamental to park management operations.

Carnarvon National Park covers the headwaters of five river catchments. Many issues faced on-park (e.g. weeds) have the ability to affect whole catchments. Therefore, these issues are more effectively managed when planned and managed regionally.

National parks occur within a surrounding landscape comprised of a diversity of landholders, local governments, industries and community groups. Working together, these groups have the capacity to manage and protect their landscape. Catchment management organisations provide important links between these groups and provide advice on suitable ways of achieving targets within catchment/s. The Queensland Parks and Wildlife Service supports Landcare and integrated catchment management initiatives. QPWS staff are encouraged to take part in forums and activities and to make decisions at a local level.

Two UHF radio repeaters are located in Carnarvon National Park. Local landholders and other emergency services use these repeaters during day-to-day operations and emergency situations.

Carnarvon National Park falls within three local government jurisdictions. Benefits that flow from the park to the region include catchment protection, biodiversity conservation and increased tourism to local communities. It is acknowledged that the many thousands of visitors attracted to the park every year increase the need for road maintenance and put a greater burden on rubbish disposal facilities in local townships.

Where possible, QPWS staff work with local authorities to reach clear agreements in relation to these management issues, and to develop and maintain good working relationships.

Grazing

Grazing is prohibited in national parks under the provisions of the *Nature Conservation Act 1992*. However, provisions do exist under the *Nature Conservation Act 1992* to honour arrangements made under the *National Parks and Wildlife Act 1975* for stock grazing leases over the park, and for grazing to continue on new acquisitions for a period. Special leases still remaining over sections of the park will not be renewed upon expiry.

Boundary fencing is generally undertaken progressively, subject to the availability of capital works funding. Where there is an immediate and substantial threat to park values, emergent funding may be sourced.

Some boundary locations are not well defined and/or impractical to fence, posing implications for both park management and adjacent landowners. Agreement on the alignment of a maintainable fence line is made locally with relevant landholders. While the fence line may not follow the gazetted boundary, the tenure remains constant and maintenance costs are reduced.

The Moolayember section of Carnarvon National Park is in a relatively pristine condition. Unfortunately the upper boundary is not fenced, allowing cattle into the area and potentially increasing the rate at which weeds are spread into the park. Management problems associated with the lower boundary relate to its location, its close proximity to the Carnarvon Development Road and the risk of spreading weeds such as parthenium. These fence lines should be rationalised and secured as a matter of priority.

Maintaining and replacing boundary fencing is generally undertaken on a shared basis with park neighbours. A cattle management strategy will be developed for each management unit within Carnarvon National Park and will detail fencing requirements and the procedures to be followed when stock stray onto the national park.

Carnarvon National Park acts as a natural cattle tick buffer between shires with tick-free status (e.g. Murweh, Booringa and Tambo) and shires without tick-free status (e.g. Bauhinia Shire). Several properties adjacent to the park have also acquired tick-free status. Stock may be travelled along the stock routes that traverse the park. The Department of Primary Industries is responsible for ensuring that stock are clean of cattle tick and that all necessary permits and waybills have been obtained prior to their movement.

QPWS must be advised at least 48 hours before the movement of stock along the stock routes that traverse Carnarvon National Park.

Desired outcomes

- Issues and problems faced by park neighbours are considered in the management of the park and where possible co-operative arrangements with adjacent landholders are established.
- Park staff work with the community to promote and contribute to relevant Landcare and integrated catchment management initiatives.
- Park boundaries prevent access by stock.

Proposed guidelines and actions

Strategic approach

- Strengthen the links between park staff and catchment management organisations by participating in the development, implementation and evaluation of catchment strategies and action plans.
- Consider park management activities in the regional context.

Grazing

- Manage special leases on Carnarvon National Park in accordance with provisions outlined in the *Nature Conservation Act 1992*.
- As a matter of priority, develop written agreements with adjoining landholders to enable the placement and construction of a 'give and take' boundary fence. This will be an interim strategy until a manageable fence line can be surveyed and re-gazetted.
- Liaise with neighbouring landholders to determine appropriate fencing arrangements, and construct boundary fences as funding permits.
- Investigate other practical solutions to park boundary issues (e.g. the development of nature refuge agreements).
- Remove stray stock from the park in accordance with the conditions set out in the pending Cattle Management Strategy/s, the *Good Neighbour Policy* and the *Nature Conservation Regulation 1994*.
- Ensure all stock being travelled across Carnarvon National Park are confined to stock routes, and the provisions of the Queensland *Stock Act 1915*, and/or conditions outlined by the Department of Primary Industries stock inspectors, are adhered to. Where possible, park staff will be present when stock are being walked across the park.

Partnerships with tourism industries

Background information

Carnarvon Gorge is a major drawcard for the Central Highlands region. Tourist developments including caravan and camping grounds and motel or cabin style accommodation occur in (and are proposed for) the region. This has considerable implications for the development and management of access and facilities within the park.

To ensure Carnarvon National Park complements other recreational opportunities offered in the region, a strategic approach to marketing needs to be taken. If Carnarvon National Park is marketed as a tourism attraction in the region, the infrastructure and services provided must be appropriate and adequate to ensure both the protection of the natural and cultural resources of the park and the long-term viability of the tourism industry. It is crucial therefore that Service staff maintain continued involvement with community interest groups and the recreation and tourism industries, and have the ability to influence tourism and recreation management in the Carnarvon region.

The nearby townships of Mitchell, Roma, Rolleston, Springsure, Injune, Emerald and Tambo provide fuel, accommodation, camping and food supplies, mechanical repairs and tourist information services for visitors to Carnarvon National Park. By working together, government, industry and local communities can provide a diversity of tourism opportunities across the region, which complement one another and thereby encourage tourists to stay in the local area for longer periods.

It has been suggested that staff from visitor information centres in the region and/or local areas should undertake yearly familiarisation trips to the different sections of Carnarvon National Park. Such trips would provide a good understanding of the park and allow for the dissemination of accurate information about camping facilities, park attractions, access roads etc.

Desired outcomes

- Partnerships are established with other agencies having a strong interest in regional tourism.
- Diverse tourism and economic opportunities are offered within the region.
- Recreational use of Carnarvon National Park is consistent with the protection and promotion of park values.

Proposed guidelines and actions

- Develop guidelines for sustainable tourism on Carnarvon National Park in partnership with local governments, Tourism Queensland, conservation groups, Aboriginal groups and the general community.
- Encourage co-operative regional promotion of a wider range of available recreational opportunities.
- Promote the Carnarvon Gorge section of Carnarvon National Park as a high profile tourist attraction in the Central Highlands.
- Ensure QPWS staff have continued involvement with any organisations influencing and co-ordinating tourism in the region.
- Ensure that all proposals to create new visitor destinations within the park are in accordance with the park zoning scheme and the *Visitor Management Strategy for Carnarvon National Park*.
- Carefully consider the implications of developing other national parks in the region and/or other sections of Carnarvon National Park as a means of reducing visitor pressure on Carnarvon Gorge.
- Encourage staff from local and regional tourism offices to organise and undertake familiarisation tours of Carnarvon National Park.

Sustaining recreational and tourism opportunities

Queensland's Parks system will be managed to support a range of styles of nature-based visitation, and management planning will ensure that a variety of different settings cater for different types of visitors. Planning at statewide and regional levels generally considers four categories of parks[4].

- *high profile* — key parks strongly promoted domestically, interstate and overseas, with defined, highly developed sites receiving high levels of use especially by large groups;
- *popular* — parks with defined, developed sites receiving moderate to high levels of use and with a range of facilities and opportunities;
- *explorer* — low-key developments, low to moderate levels of use; and
- *self-reliant* — few or no developments, low and irregular levels of use.

Within each park, there is a range of opportunities and settings. For example, a high profile park may contain a small 'developed' setting or zone with high visitation and facility levels, while 95 percent of the park remains undeveloped and has very few visitors.

[4] Each park will be allocated to one of these four classes based on the highest level of development available at certain sites within each park. However, this does not imply that the whole of 'high profile' or 'popular' parks will be developed for visitors. In most cases only a very small part of these parks will be managed for moderate to high visitation, and the undeveloped nature of other parts of the park will be maintained. Management planning will define and limit areas for present and future recreation facilities.

Table 2: Recreational settings for Carnarvon National Park

Section	Classification	Attributes
Carnarvon Gorge	High Profile *Developed to Remote-Natural Zones*	The Carnarvon Gorge section has highly developed sites concentrated primarily in Carnarvon Gorge itself, and receives high levels of use, attracting over 90% of visitors to Carnarvon National Park. Carnarvon Gorge is strongly promoted and receives many local, interstate and overseas visitors. The majority of tourists visiting this section enjoy walking on graded tracks and using the park as a day-use venue.
Mount Moffatt, Salvator Rosa and Goodliffe	Explorer *Natural-Recreation to Remote-Natural Zones*	The Mount Moffatt, Salvator Rosa and Goodliffe sections offer recreational experiences in a more remote setting than Carnarvon Gorge. A higher level of commitment and self-reliance is required from the visitor, and developments are low-key. Recreational opportunities in these sections are primarily vehicle-based and most require the use of a four-wheel-drive vehicle. Hiking opportunities also exist and walking tracks may be increased in the future. Visitor use levels are low to moderate, and steadily increasing.
Ka Ka Mundi and the remainder of the park	Self-reliant *Natural to Remote-Natural Zones*	The Ka Ka Mundi section provides for low and irregular levels of visitation in a remote setting. A four-wheel-drive vehicle is required to access this section. Although access to this section is primarily vehicle-based, visitors must be self-sufficient. The remaining sections of the park are not managed for visitor use and, as such, no visitor facilities are provided. Visitors enjoy a hiking experience and use these areas following minimum impact bushwalking practices.

Due to the size and complexity of Carnarvon National Park, this management plan treats each section individually, and regards each as having its own attributes and characteristics, as shown in Table 2.

The *Visitor Management Strategy for Carnarvon National Park* provides a more detailed explanation of the visitor settings and park zoning scheme.

Providing opportunities for people to connect with nature

See also Appendix 1: Detailed zone descriptions for Carnarvon National Park

Background information

Providing access for people with a disability

Equity of access to recreation opportunities and the natural values of the park is required, in accord with the Queensland Government's social equity policies. However, disabled access opportunities on Carnarvon National Park are limited due to its rugged terrain.

Facilities on the park that are accessible to wheelchairs are confined to the day-use area in the Carnarvon Gorge section of the park and include the toilets and visitor information centre. People with disabilities use many of the walking tracks. However, some sections (e.g. creek crossings) prevent these people from being able to do so safely and comfortably.

Walking tracks that meet wheelchair specifications could be constructed in the Carnarvon Gorge section, primarily about the day-use area and adjacent areas. The walking track to Baloon Cave Aboriginal rock art site is being hardened to facilitate access for less able visitors.

Recreational driving

There are opportunities for recreational driving in the Mount Moffatt, Salvator Rosa and Ka Ka Mundi sections. Four-wheel-drive vehicles or motorbikes are needed to gain access to many places of interest within these sections. Unless otherwise specified, roads and tracks signed for QPWS vehicles only are not available for recreational driving, and vehicles are restricted to access roads open to the public. Vehicles must not be used off-road.

Presently there is not a high demand for four-wheel-driving within the park. From time to time four-wheel-drive magazines feature sections of the park in articles depicting the desirability of the park for this type of activity. For many, however, the challenge and recreational driving experience are in making the trip to the park.

Potential impacts from recreational driving include modification of natural drainage patterns, intrusion of visual amenity, spread of weeds, erosion and conflict with other users of the area.

Camping

A variety of camping opportunities is provided at Carnarvon National Park, ranging from camping areas with toilet facilities to remote camp areas with no facilities, isolated from other visitors. Camping provides an opportunity to experience tranquillity, natural beauty and other elements of the natural environment in a way that is not possible through a day visit. It is also a low-cost form of accommodation.

Before year-round camping in the Gorge's main campground was abolished in 2002, the Carnarvon Gorge Visitor Area on Kooramindangie Plain catered for over 91percent of the visitors to the Carnarvon National Park. This high visitor use presented significant management challenges to QPWS including septic and grey water disposal, soil compaction, visitor safety, and water supply, especially during peak visitation periods. Private operators located near the Gorge entrance are now also providing camping facilities for visitors to the Carnarvon Gorge section of the park. The Carnarvon Gorge Visitor Area is designed to operate primarily as a day-use area, although camping is permitted in this area during Queensland school holiday periods except for the Christmas holiday period.

Camping areas are available in the Mount Moffatt and Salvator Rosa sections of the park. On Mount Moffatt all campgrounds have a pit toilet and some potable water is available at some sites. At Salvator Rosa, the Nogoa River campground has a pit toilet.

Big Bend campground in Carnarvon Gorge provides a walk-in camping opportunity. A composting toilet is provided. Group size and time limits apply.

A basic camping area is provided in the Ka Ka Mundi section of the park near Bunbuncundoo Springs. There are currently no facilities or services available at this site.

Remote camping is allowed in other areas of Carnarvon National Park. However, camping may be restricted or prohibited in areas where significant features are threatened. Unless otherwise specified, groups planning to camp remotely are generally restricted to six people[5]. Camping for long periods at one particular site in the Natural and Remote-Natural Zones has the potential to reduce the enjoyment of other users, as impacts of camping will be noticeable. There will also be impacts on the environment in these areas that are not consistent with the purposes of the zoning.

Camping permits are required for all areas of the park.

Day-use facilities

Day-use and picnicking facilities are provided in Carnarvon Gorge, Mount Moffatt and Salvator Rosa sections of the park.

Previously many day visitors to Carnarvon Gorge tended to visit en route to another destination within the region, or they resided in the local area. With the development of a day-use facility at the Carnarvon Gorge Visitor Area, and the establishment of private campgrounds external to the park, the number of day visitors accessing Carnarvon Gorge has increased substantially. The amount of vehicle traffic travelling between the private campgrounds and the day-use area on a daily basis has also increased significantly.

The day-use area at Carnarvon Gorge has formalised car parks, toilet and shower blocks, reticulated water, grassed areas, picnic tables, gas barbecues and a coach zone. Management challenges faced by park staff in the management of this day-use area include human waste and grey water management, soil compaction and/or erosion, trampling and loss of understorey plants, littering, and the supply of water for drinking and sprinkling. Future development proposals for this area are outlined in the Visitor Management Strategy for the park.

It has been suggested that a shuttle bus service be provided to transport people from the nearby campgrounds into the day-use area to reduce the amount of traffic travelling into and out of the park and the number of vehicles using the car park. This concept is supported by the Queensland Parks and Wildlife Service, as is the promotion of pedestrian access from external campgrounds.

Localised impacts in day-use areas can be eliminated or minimised through careful site selection and the appropriate design and placement of facilities.

Walking

Carnarvon National Park offers a range of walking opportunities, from routes and unmarked trails to graded walking tracks.

The Carnarvon Gorge section of the park has an extensive network of graded walking tracks, with most attractions accessible only by foot. Much-loved features of the walking tracks in Carnarvon Gorge are the many stepping-stone crossings over Carnarvon Creek. However, there are many management challenges associated with the maintenance of these crossings. Flood events can physically remove the stones from the crossing and machinery is required to lift new stones into place. They are not easily negotiable by the many elderly and/or infirm visitors to the park.

Hiking tracks and trails which lead to the high country within the Carnarvon Gorge section provide more of a challenge to park users. Hiking activities in this section centre around Battleship Spur, The Ranch and The Devils Signpost.

[5] Group size is generally restricted to six people in remote areas. However, six groups are permitted to camp remotely in most sections of the park at any one time. Larger groups wishing to undertake a remote or off-track bushwalk may apply for a Group Activity Permit. Group size must not exceed double the original maximum group size.

Walking tracks to park attractions within the Mount Moffatt and Salvator Rosa sections are primarily accessed from the road, and are relatively short. The Ka Ka Mundi section of the park has no formed walking tracks, and park exploration is generally vehicle-based.

Opportunities for long distance and remote bushwalking are available in all sections of the park, in the Remote-Natural Zone. Where trails and routes are established these need to be managed to ensure that contact with other users is minimal, and impacts from walkers do not diminish the experience of those who come later.

The impact of bushwalking on the physical environment, while generally low, can be variable depending on soil conditions, landform, vegetation type and intensity of use. Where use levels are high, bushwalking can lead to the loss of vegetation and localised loss of soil cover leading to loose sand or soil compaction and erosion problems. Other impacts may also occur, including the introduction and spread of weeds and plant diseases or the possible escape of fires.

Recreational fishing

No fishing is permitted in Carnarvon National Park.

Recreational flying

The Civil Aviation Safety Authority (CASA) controls aircraft operations in Australia. Air Services Australia (ASA) manages airspace. Section 82 of the *Nature Conservation Regulation 1994* also makes provision to control aircraft activities over national parks.

Several operators of fixed wing aircraft and helicopters have shown an interest in conducting charter and joy flights over the park. In the past, some flights over the Carnarvon Gorge section and other parts of the park have been conducted at low altitudes, and some operators have even flown down through the gorge itself.

Low flying aircraft may disturb fragile geological structures and rock surfaces, wildlife and park residents, and detract from the experience of on-ground visitors who are generally in search of peace and quiet and enjoyment of the sites and sounds of nature. The option of developing 'Fly Neighbourly' agreements with ASA in areas of high visitation such as Carnarvon Gorge, and remote areas where hikers are seeking a 'wilderness' experience, are currently being investigated.

The only airstrip on Carnarvon National Park is on the Mount Moffatt section near the homestead. There is potential for visitors and tour operators to be issued an authority to use this strip as part of a tour package or on a private basis.

However, this airstrip is not licensed under CASA regulations and, as such, the airstrip may not meet CASA standards and/or be regularly inspected to ensure that it meets those standards. Consequently, there are liability implications for the Queensland Parks and Wildlife Service if its use is permitted.

Abseiling and rock climbing

The nature of the sandstones in the park makes them generally unsafe for rock climbing and abseiling as the rock structure can be easily fractured and broken. For this reason, recreational abseiling or rock climbing should not be undertaken in most parts of Carnarvon National Park.

Local State Emergency Service groups conduct abseiling activities in the park during cliff rescue training operations. Access to abseiling sites by these groups needs to be managed to prevent erosion and ensure the area is safe to conduct training activities. However, off-park areas are used for training purposes where appropriate.

Water activities

Swimming occurs in all sections of the park, unless restricted or prohibited in areas where significant values are threatened or where water quality may threaten public health. To limit creek bank erosion and wildlife disturbance, visitors in the Carnarvon Gorge section are discouraged from swimming anywhere other than at the Rock Pool.

Water levels and rocky cascades limit canoeing and kayaking activities in the park. These activities are permitted in Carnarvon National Park, except during flooding, but are not a popular recreational pursuit due to the general lack of suitable watercourses. Group sizes are limited and, where significant values are threatened, canoeing and kayaking may be restricted or prohibited.

The use of motorised watercraft is not permitted in Carnarvon National Park.

Cycling

Bicycling is restricted to vehicle access roads open to the public. Management roads and tracks are not available for cycling unless specified.

Nature-based recreation

The tranquil atmosphere of Carnarvon National Park appeals to many visitors. The park's geological formations, scenic features and interesting wildlife provide many opportunities for visitors to partake in nature-based activities such as drawing and painting, nature observation and photography.

Competitive and organised events

Competitive events are generally not permitted in national parks. Organised events may be permitted if appropriate, though it may be necessary to restrict or prohibit competitive or organised events in certain areas and zones where significant values are threatened. Approval for such events will take into account environmental effects, impacts on other visitors, the safety of participants and spectators, and the availability of alternative venues outside the park.

Desired outcomes

- A range of nature-based recreation opportunities is provided at Carnarvon National Park to encourage visitor enjoyment, to highlight the park's special character and to complement other local and regional opportunities.
- Visitor services and facilities are appropriate for the desired recreational setting.
- Recreation activities are managed so the ecological and cultural integrity of the park is sustained, and the quality of visitor experience is maintained.

Proposed guidelines and actions

Visitor management strategy

- Encourage visitors to experience, enjoy and learn about the natural and cultural environment of Carnarvon National Park.
- Manage recreational activities at Carnarvon National Park in accordance with the visitor management strategy for the park.

Recreation activities

- Permit bush camping in most remote areas, and encourage campers to adopt environmentally friendly camping practices. Bush camping in some areas will be restricted to particular sites or areas and limits may be placed on numbers and length of stay.
- Adopt the following general guidelines for walking within Carnarvon National Park:
  - Access to particular areas may be restricted or prohibited in areas where significant park values are threatened.
  - Group sizes and the number of groups may be limited to protect visitor experience, minimise visitor impact and for safety reasons.
  - People intending to undertake a remote or off-track bushwalk are recommended to call park staff at least one week prior to leaving and explain details of the planned walk. This is both a courtesy call and a chance for QPWS to pass on information of any dangers, restrictions or regulations placed on the area.
  - Visitors are encouraged to use designated walking tracks.
  - For visitor safety, Carnarvon Gorge and other gorge systems will be closed to walkers during flooding and all walking areas will be closed in extreme fire danger.
- Review the future of camping in the Carnarvon Gorge Visitor Area during the life of the plan.
- When considering applications for competitive and organised events, check that proposed activities meet the objectives and strategies outlined in this plan and do not infer any potential legal liability upon QPWS.
- Promote a minimal impact code for recreational driving and cycling, and for competitive and organised events. Only permit vehicle and bicycle use on public access roads, unless otherwise specified.
- Develop co-ordinated management of airspace over Carnarvon Gorge and Moolayember Gorge so aircraft are restricted to a minimum flying height of 1500 feet AGL[6]. Methods of achieving this include adding Carnarvon Gorge and Moolayember Gorge to Schedule 5 of the *Nature Conservation Regulation 1994*, ensuring that all future commercial operation permits exclude flights below 1500 feet AGL, and incorporating proposed Fly Neighbourly agreements into ASA publications. The use, and subsequent restriction, of aircraft being used for authorised management practices will be assessed on a case-by-case basis.

Infrastructure management

- Where appropriate in the Carnarvon Gorge section, install infrastructure to protect existing sites and better support increases in visitation without causing degradation.
- Undertake site hardening and management actions, as appropriate to the desired setting, in areas where physical deterioration is likely, in order to decrease erosion, lower maintenance requirements, maintain the natural amenity and improve access for the general public including people with disabilities.
- Restrict designated camping areas to specific areas of the park, as under the park zoning scheme.
- Provide day use areas in the Carnarvon Gorge, Mount Moffatt and Salvator Rosa sections of Carnarvon National Park, and in other areas allowed for in the park zoning scheme.
- Maintain the Mount Moffatt airstrip to RFDS standards and/or the CASA guidelines. Use of the airstrip will be limited to that required for management purposes and by recreational aircraft in emergencies only, or with the Chief Executive's written approval.

[6] AGL means Above Ground Level. This is defined by drawing a vertical line from the aircraft to the ground surface. All landscape features within a 600m radius of that point must be 1500 feet below the aircraft.

Off-park camping

- Encourage private campground operators to provide a shuttle bus, or some other alternative group transportation, to Carnarvon Gorge section.
- Upgrade the walking track from the park boundary between Carnarvon Gorge Wilderness Lodge and the Carnarvon Gorge visitor area.

Recreation monitoring

- Monitor recreational opportunities and experiences periodically by surveying visitor numbers, reasons for visiting, location, use of recreational facilities and visitor attitudes. Surveys will be conducted in accordance with the planned visitor survey protocol.

Interpreting and presenting the park

Background information

Interpretation facilities, materials and programs are provided at Carnarvon National Park to enrich the experience of visitors, to increase their appreciation and understanding of the park, and to encourage behaviour which is safe and causes minimal impact on the environment. A recent visitor survey supported these objectives by identifying that one of the main reasons people visit Carnarvon Gorge is to learn about the park and its cultural history.

As a key visitor park, Carnarvon National Park has a specialist interpretive ranger and high quality interpretive facilities. The Carnarvon Gorge section of the park, being the most heavily visited, has a higher level of public contact facilities, materials and staffing than other sections of the park.

An information centre is located at Kooramindangie Plain in the Carnarvon Gorge Visitor Area and a small, unstaffed interpretive centre is near the Mount Moffatt homestead complex. Three-quarters of park users visit the information centre in the Carnarvon Gorge section to look at the displays.

Visitor Information Sheets (VIS) are available for the Mount Moffatt, Carnarvon Gorge, Salvator Rosa and Ka Ka Mundi sections of the park. They provide basic pre-visit information and some detail of what recreation opportunities are available. At Carnarvon Gorge a walking track guide supplements the VIS. Visitation to the remaining sections of the park is currently very low and no interpretive materials are provided. However, visitors are required to have direct contact with park staff before hiking into these sections.

Interpretive signs have been placed at various sites in the Carnarvon Gorge and Mount Moffatt sections of the park. Signage on the park is relatively simple, focusing on natural and Aboriginal cultural history. With higher standards of education and an increased level of environmental concern, visitors are now better informed and more discriminating than in the past. The nature of interpretive materials provided, the level of detail and the quality of information provided on the park will need to be improved to reflect this.

At Carnarvon Gorge, staff time constraints have restricted the level of interpretation offered at peak times. The use of volunteers and/or seasonal rangers to undertake general duties during these periods will release permanent staff with experience and knowledge of the park to deliver interpretive programs.

The value of the park as an 'outdoor classroom' is indicated by the popularity of the area with all educational organisations. Education-related users vary from school groups on their annual school camp to visiting overseas experts in archaeological research. Many university groups use the area on a regular basis for studies ranging from management to biological research. However, problems occur when teachers do not contact park staff before their visit.

With the establishment of campgrounds adjacent to the Carnarvon Gorge section, it is likely that fewer visitors will attend night time and early morning interpretive programs and activities. Staff will therefore need to be flexible and creative when developing and delivering interpretive activities, displays and programs.

Desired outcomes

- Park visitors are inspired to care for the park's natural environment and cultural heritage.
- Interpretive materials and activities at Carnarvon National Park enrich visitor experiences and promote safe and responsible behaviour.
- Where appropriate, traditional owners are involved in the development and delivery of information about the park's cultural resources.
- Interpretive programs stimulate community members to conserve nature and protect cultural heritage in their everyday lives.

Proposed guidelines and actions

Planning and management

- Produce a public contact plan for the park, outlining:
  - target audiences (on and off-park)
  - key messages and interpretive themes based on the park's unique and significant natural and cultural values
  - public contact issues and appropriate communication strategies.
- Further assess the need for a volunteer network and identify areas where volunteers can effectively support QPWS projects.

Information

- Use the most effective and efficient means of providing pre-visit and on-park information to visitors so they are aware of the park's values and have appropriate nature-based recreational expectations and knowledge to plan their trip.
- Continue to convey information to support management such as *Minimum Impact Guidelines*.
- Update visitor information to include details of availability of access to the park for disabled people.
- Ensure tour operators are providing clients with appropriate information on the values and recreational opportunities offered at Carnarvon National Park.
- Provide adequate warnings for potentially hazardous locations and risk-associated activities.

Activities

- Encourage rangers to have face-to-face contact with park users.
- Under the guidance of traditional owners, develop and implement an interpretive program on the Aboriginal culture.
- Provide curriculum-based education opportunities that meet the needs of school groups, support QPWS objectives and provide students with a positive national park experience, as resources become available.
- Examine the option of developing and delivering some interpretive activities, displays and signage off-park, in response to the changed visitation patterns.
- Investigate options for charging for some ranger-led activities.

Signs

- Improve interpretive materials, especially for high use areas, as resources permit.
- Encourage and enforce appropriate visitor behaviour and actions through the use of regulatory signs.

Managing commercial use of the park

Background information

Carnarvon National Park offers many opportunities for commercial operators to conduct activities for financial gain. Commercial tour operators have an important part to play in helping visitors appropriately use, appreciate and enjoy the park and its special features. Well-trained, properly informed tour operators have the potential to promote a conservation ethic and provide high quality visitor experiences.

Anyone wishing to conduct a tour or activity on the park for commercial gain must obtain a commercial activity permit before beginning such an activity. Permits are not issued for activities likely to substantially degrade the natural and cultural values of the park. Conditions may be imposed on any permit issued and, if an operator does not meet the conditions imposed, permission to conduct such an activity may be withdrawn. The commercial activity permit system ensures that safety standards are adhered to and park values are protected.

No limits are currently set on the number of operators using the park. Twenty-four operators currently hold commercial activity permits for Carnarvon National Park. Commercial coach tour operators provide a range of experiences from organised tours with accommodation provided at the Carnarvon Gorge Wilderness Lodge or in the Takarakka Bush Resort campground to education tours or charters with varying levels of logistic support.

Commercial aircraft are required to abide by Air Services Australia regulations and any conditions set out on their commercial activity permit. Concern has been expressed that such activities will detract from the 'wilderness' experience being sought by remote walkers. The option of developing 'Fly Neighbourly' agreements over areas of concern is currently being investigated. Commercial aircraft are not permitted to land in any area of the park except in emergency situations.

Carnarvon Gorge is intensively marketed through promotional materials such as posters, postcards, clothing and many other pieces of memorabilia. Care needs to be taken to ensure that traditional owners view these materials, the quality of the information given to clients and the types of interpretive activities undertaken by QPWS as being culturally appropriate.

Desired outcomes

- Commercial operators use good management practices, enhance visitor experiences, and operate in accordance with park purposes.
- Commercial operators providing scenic flights adhere to the air space guidelines in the proposed 'Fly Neighbourly' agreement.
- Commercial operations do not detract from the experiences of independent park users.

Proposed guidelines and actions

Approvals

- Only permit commercial activities that are compatible with the long-term use of the park's facilities and maintenance of the park's natural and cultural values.
- Only permit low frequency commercial use in high conservation areas, and ensure that group sizes are small and appropriately managed.

- Issue commercial activity permits only for specific sections of the park, not the entire park; and ensure permit conditions are in accordance with the Visitor Management Strategy.

Management

- Work co-operatively with Air Services Australia to develop and enforce height restrictions for all aircraft flying over the Carnarvon Gorge and Moolayember sections of the park, via a 'Fly Neighbourly' agreement.
- Determine group size restrictions on a site-by-site basis by considering both the need to minimise impacts on the park and the needs and safety of visitors. Generally, group sizes will be limited to a maximum of six people in Remote-Natural Zones, and a maximum of 15 people on walking tracks and at sites within Carnarvon Gorge.
- Encourage tour operators to undertake training courses and encourage Tourism Queensland to host tour operator workshops and assist with the dissemination of relevant and accurate information. Where appropriate, Aboriginal peoples should be encouraged to contribute to the provision of such training.
- Encourage Aboriginal peoples to develop commercial ventures.

Compliance

- Monitor compliance with permit conditions with relation to park zoning, conservation and recreation objectives.
- Conduct regular enforcement patrols to ensure that commercial operators hold current permits and are observing permit conditions; and revoke permits if conditions have been breached.

Marketing

- Materials produced and marketed by QPWS will meet high standards, be culturally appropriate and where possible promote environmental sustainability and energy efficiency. Other organisations producing and/or retailing materials relating to Carnarvon National Park will be encouraged to ensure they are culturally appropriate.

Equity of Use

- Consider the balance between commercial and independent use and consider the need to set proactive limits.
- Encourage large groups to follow guidelines similar to those of commercial operators.

Ensuring visitor safety

Background information

QPWS and commercial operators have a duty to care for visitors and staff. Commercial tour operators are required to take responsibility for the safety of their clients and to be fully familiar with safety precautions and procedures applicable to the park. In different parts of the park, visitors will be provided with information on environmental conditions and the type of facilities provided, to help reduce dangers.

Safety issues

Visitor safety issues on Carnarvon National Park include:

- floods — during the dry season creeks flow very slowly or not at all, but during the wet season can become raging torrents, preventing all access (including that of aircraft) to and from the park for periods of up to several weeks. During flooding, Carnarvon Creek can isolate walkers on the main Carnarvon Gorge walking track system or at the Big Bend campground;
- fire — severe wildfire can occur, especially during the warmer months, over all sections of the park;
- falling limbs and trees;
- visitors being ill-prepared for and/or under-estimating the length of day walks;
- the limited availability of drinkable water to visitors undertaking extended walks;
- the potential for visitors to become disorientated in the rugged sandstone terrain and vegetation, especially if they have limited navigation skills;
- diving in creek-based areas such as the Rock Pool;
- the potential for habituated animals to attack visitors in campgrounds and day-use areas;
- the temptation for visitors to get close to cliff edges to obtain spectacular photographs and views;
- road conditions — areas can become isolated and extremely slippery and boggy following rainfall events. The general nature of the landscape also requires the skilled use of 4WD vehicles in places.

Facilities provided at Carnarvon National Park are located, designed, constructed and maintained to meet appropriate safety standards. Information disseminated to visitors promotes awareness of the hazards present within the park. However, some elderly visitors have suggested that it does not adequately inform them of the levels of skill and competence required to cope with the distances they may have to walk within Carnarvon Gorge. Care will be taken to ensure this issue is addressed within the life of the management plan.

Communication is an important aspect of any risk management strategy. Risk communication conveys information about risks to the public to allow realistic perceptions of risks and to increase awareness of appropriate behaviours or strategies to avoid them. Risk management strategies include:

- placement of safety signs;
- distribution of literature;
- direct communication with individuals and/or user groups;
- liaison with user groups to establish acceptable practices;

- promotion of industry self-regulation; and
- the requirement for certain users (e.g. commercial operators) to take responsibility for the risk by indemnifying the Environmental Protection Agency.

The Moolayember section may be dangerous due to the risk of flash floods and the difficulty of determining weather conditions once in the gorge system. Management of public use of this remote area requires that all persons who wish to use the area inform park staff of their actions. The use of pre-visit and bushwalker safety forms is essential.

Emergency responses

From time to time accidents, lost visitors and other medical emergencies occur on the park. The Queensland Police Service, State Emergency Service, Queensland Ambulance Service, Royal Flying Doctor Service and QPWS are involved in search and rescue operations. Police have overall responsibility for search and rescue although QPWS is often the initial point of contact. Emergency operations are conducted in accordance with the guidelines set out in the Local Disaster Management Group counter-disaster plans.

The Moolayember, Buckland Tableland, Ka Ka Mundi and Goodliffe sections do not have a full-time staffing presence. A VHF radio network has recently been installed to improve radio coverage throughout the western sections of the park. The installation of two UHF radio repeater stations — one at Carnarvon Gorge and one at Mount Moffatt — have improved communications for search and rescue and wildfire response operations. However, these repeaters are not linked and there are 'dark spots' to all types of radio communications in some sections of the park, namely in the Moolayember, Ka Ka Mundi, Salvator Rosa and Goodliffe sections. Although satellite communications equipment (e.g. satellite telephones and personal locator beacons) are viewed as being the most reliable means of communication at all times of the day, they also do not work in some of the park's narrow gorge systems. A telephone service is available at each of the park bases. Mobile telephones do not work within the park.

The response to medical emergencies can be delayed for several reasons including the remoteness of the park and/or section of the park, difficult terrain, weather conditions, lack of aircraft access and availability of a response unit (i.e. land-based vehicle or suitable aircraft).

During emergency situations it is often desirable to allow access for aircraft due to the general remoteness of the park and the time delay in getting injured or sick visitors to hospital.

It is envisaged that helicopter landing areas will be constructed within Carnarvon Gorge for emergency and management operations only, and that the Mount Moffatt airstrip will be maintained to meet RFDS standards. Commercial and recreational aircraft are not permitted to land on the park except in emergency situations. While use of the airstrip and helicopter landing areas is at the discretion of the pilot, QPWS also has a duty of care to ensure these landing areas are maintained in a serviceable condition.

Training in first-aid is continual, and staff are encouraged to become familiar with their management unit so they can provide an efficient rescue service when needed. Staff liaise with rescue personnel on a regular basis and, where possible, participate in organised, on-park State Emergency Service search and rescue training exercises. This enables QPWS staff to competently assist Police in the event of a search and rescue operation, and helps limit the risks for the rescue personnel.

Desired outcomes

- Patterns of visitor use that minimise risk and the incidence of safety problems are promoted.
- Park staff are fully trained to assist in search and rescue operations.
- Park staff continually liaise with search and rescue groups, and maintain appropriate standards of emergency response.
- Park zones reflect the level of risk management which will be undertaken by QPWS, and indicate the level of responsibility visitors need to take to ensure their own safety.

Proposed guidelines and actions

Planning

- Update emergency response procedures for each management unit of the park on an annual basis
- Continue to participate in local disaster management group counter-disaster planning meetings, and take an active role in the review of such plans.
- Use the zoning system to inform staff and visitors of which activities are appropriate in different parts of the park.

Precautionary action

- Ensure park staff are appropriately trained in the administration of first-aid and the safe conduct of search and rescue operations.
- Regularly inspect all recreational use areas and visitor facilities as part of the regional risk management programs, and ensure the park's risk management response is updated on a regular basis.

- Take appropriate action to restrict access to dangerous sites and areas in accordance with the area's setting. Temporarily close dangerous sites and tracks until appropriate remedial measures (e.g. signs or fencing) can be undertaken.
- Continue to maintain a record of people using the Remote-Natural Zones. This will assist in managing and monitoring visitor use and the conduct of search and rescue operations in these areas.
- Take appropriate action consistent with the Agency's hazardous trees policy to reduce injury relating to tree fall. The level of action taken to address tree fall issues will correlate with park zones and settings.

Education

- Provide park users with safety advice via pre-visit information, displays, park brochures, on signs at park access points and other appropriate locations, and face-to-face contact with park staff.
- Ensure commercial operators are aware of their responsibilities in relation to safety management.
- Inform visitors of the limited availability of health and medical facilities and services in the park and local area, and encourage visitors to ensure their personal safety.
- Make visitors aware of the types of risks likely to be encountered in the different settings.

Infrastructure management

- Design, construct and maintain visitor facilities to defined safety standards.
- Strategically locate helicopter landing areas within Carnarvon Gorge for emergency and management operations only, and maintain the Mount Moffatt airstrip to meet Royal Flying Doctor Service standards.
- Maintain and enhance an effective and operational communication network.

Search and rescue activities

- Participate in search and rescue training, in conjunction with the Queensland Police Service, State Emergency Service and Queensland Ambulance Service.
- Maintain comprehensive records of staff and visitor injuries and search and rescue events, observing the emergency response procedures for the park.

Enhancing management capabilities

Collecting and compiling resource information

Background information

Carnarvon National Park provides abundant opportunities for scientific research and monitoring programs.

Some research has been undertaken in the fields of ecology, geology, archaeology and hydrology. Department staff and individuals or groups from various institutions have also conducted recreation, zoological and botanical surveys. Scientific knowledge takes a long time to acquire, so priority needs to be given to projects that will improve management of the area.

Research and monitoring programs in national parks conducted by outside agencies require a scientific purposes permit. Any activity that involves the taking, use or keeping of protected wildlife for scientific or educational purposes must also demonstrate ecological sustainability. Manipulative research has the potential to have a significant impact and must therefore be limited.

Recreation-oriented surveys are conducted at Carnarvon Gorge to help staff understand and appreciate the characteristics, behaviour and preferences of people using the area. While this information identifies current and future recreation demands and the social aspects of visitor use, the impacts of visitor activities need to be closely monitored to ensure conservation values are not adversely affected.

On-going monitoring activities conducted by QPWS staff include fire monitoring programs, king fern monitoring and the monitoring of various other significant wildlife populations. A permanent network of pitfall traps has been installed in the Mount Moffatt section to provide information on some of the park's vertebrate and invertebrate species. An immediate monitoring requirement relates to water quality testing within Carnarvon Creek in the Carnarvon Gorge section.

The results and findings from research projects and monitoring programs not only have the capacity to benefit park management and the educational community, they often have application at the local, state and national level. It is important therefore that these findings are extended to the local community and included in park interpretation programs.

Desired outcomes

- Monitoring activities and research projects continue to improve the ability of park staff to effectively protect the ecological and cultural integrity of the park.
- Management decisions are based on high-quality, fact-based information that supports long-term ecosystem and cultural heritage management.
- Results from research and monitoring projects that have application in off-park areas are appropriately communicated.

Proposed guidelines and actions

Inventories

- Compile a list of past and existing research and monitoring sites and programs, including an assessment of their values for continued scientific use. New sites will be investigated and set up, and others removed, depending on how they meet requirements of management needs.

Project suitability

- Give support to projects that increase knowledge of the park resources and their management requirements, provide guidelines for limiting impacts, and are not disruptive to park use.
- Encourage research by other agencies and tertiary institutions, provided it conforms to management objectives and cannot be performed satisfactorily off the national park. Such studies will be directed and supported as much as possible.
- Ensure research activities are appropriate to the particular management setting in which they take place.

Project conditions

- Confine manipulative research to less significant areas, preferably outside the protected area estate.
- Ensure areas subjected to environmental disturbance, either for or as a result of research activities, will be rehabilitated on completion of the research.
- Establish control sites at or near approved research sites. These sites should be photographed and measured at regular intervals to detect any environmental change.
- Ensure research proposals consider the appropriateness of an area's zone classification.

Monitoring and researching nature

- Carry out research into the habitat requirements and life needs of threatened or significant species and populations.
- Continue monitoring and research projects, including:
  - fire monitoring in Mount Moffatt, Salvator Rosa and Carnarvon Gorge sections;
  - king fern monitoring at Carnarvon Gorge; and
  - Homoranthus zeteticorum monitoring at Salvator Rosa.
- Use a range of monitoring techniques to monitor terrestrial fauna including, where appropriate, permanently established pitfall trap lines.
- Re-establish Stemmacantha australis monitoring at Mount Moffatt.
- Conduct regular water quality testing in Carnarvon Creek. Water quality monitoring will be undertaken to measure environmental and health-related factors.

Monitoring and researching culture

- Ensure cultural places are included in the list of new places to be investigated and set up for monitoring.

Monitoring and researching visitors

- Conduct appropriate visitor surveys to determine patterns of use, attitudes and expectations. A standardised system should be used when collecting and processing this information.
- Continue existing photo monitoring projects at the Moss Garden, Amphitheatre, Aljon Falls and Art Gallery.
- Establish monitoring programs to quantitatively determine visitor impacts on the natural and cultural environment and to ensure adverse impacts do not occur.

Recording and reporting

- Continue compiling and maintain a systematic records system for past, current and future research materials – including the use of photographic records to monitor change over time.
- Ensure the results of any research project are made available to QPWS in a usable format and timescale.
- Maintain and contribute to geographic information systems (e.g. ParkInfo) as the basis for recording and storing data relating to the monitoring of fire and pest management activities.
- Ensure field data is recorded and stored on the WildNet database so the findings can be communicated to other staff members.
- Co-ordinate and guide the activities of volunteer groups (e.g. Birds Australia, Royal Geographical Society of Queensland) to ensure integration with QPWS monitoring programs.
- Communicate research outcomes to the local community and other user groups, through extension and interpretation activities and programs.

Future research and monitoring

- Recommended topics for research and/or monitoring are:
  - fire behaviour and species responses to fire;
  - control of introduced grasses within and adjacent to softwood scrub communities;
  - feral animal management;
  - detailed surveys of fauna species;

  - detailed surveys of vegetation communities and known species of conservation significance;
  - monitoring of cultural heritage places and visitor monitoring at cultural heritage places.
- Monitor the implementation of the guidelines and actions outlined in this plan, and amend relevant guidelines and actions where improved knowledge leads to opportunities to improve park management.

Maintaining an effective and efficient workforce

Background information

Regional integration

Carnarvon National Park falls into two QPWS Regions — Central and Southern. To implement the park-wide priorities and actions outlined in this document, a holistic approach will be taken to park management. Similar issues should be managed consistently across the entire park, and this document should be closely linked with the business planning cycle. Effective communication is a fundamental component of this process.

Staffing

The District Office for the Carnarvon Gorge, Mount Moffatt and Moolayember sections is located in Roma. A District Manager and Senior Ranger based in this office assist and supervise park staff in these sections. Staff managing the Buckland Tableland, Ka Ka Mundi, Salvator Rosa and Goodliffe sections of the park report to a Senior Ranger in the Emerald Office and the District Manager (Capricorn) in the Rockhampton Regional Office. Specialist positions also provide specific advice and expertise to park staff when required.

Some park management tasks (e.g. road and firebreak maintenance, boundary fence erection and infrastructure development projects) are contracted to private enterprise as this is a more cost effective and efficient way to handle these tasks.

Accommodation

Staff are currently accommodated on some sections of Carnarvon National Park due to the distances from nearby towns and for park security purposes.

Training

Most staff on Carnarvon National Park require a broad range of skills and competencies including a basic understanding of ecosystem values and functions, visitor needs and aspirations, infrastructure maintenance standards and requirements, community issues and cross-cultural awareness.

The Carnarvon Gorge section plays an important role as a training ground for many rangers. It presents an ideal environment for new staff to acquire the skills and/or knowledge required to carry out the diverse range of duties expected of rangers, including an ability to work in conjunction with Aboriginal peoples.

Where possible, staff are encouraged to take part in on-the-job training opportunities and learn from other staff who are competent in particular aspects of park management. Managers are responsible for ensuring that park staff participate in training programs, develop the appropriate skills required to perform park management activities and also enhance future career opportunities for members of their workforce.

Desired outcomes

- A well-trained workforce operates effectively and efficiently to deliver good park management outcomes.
- Diverse opportunities are provided for Aboriginal employment.
- Good morale, communication and co-operation are maintained in the workforce across administrative boundaries.

Proposed guidelines and actions

Regional integration

- Ensure staff from both regions meet on an annual basis to monitor implementation of this management plan. These meetings will also serve to guide budget processes and annual works programming.

Staffing

- Encourage a traditional owner to participate as a member of the selection panel for advertised ranger positions at Carnarvon National Park.
- Develop a seasonal ranger program for the Carnarvon Gorge section of the park, to provide additional staffing resources during peak visitation periods (i.e. from April to October), as appropriate.
- Investigate opportunities for alternative employment arrangements for specific maintenance activities (including part-time, casual and contract work) so rangers can focus on conservation and public contact roles.

Accommodation

- Where feasible, provide permanent, park-based staff with accommodation.
- Improve accommodation provided for staff employed at Carnarvon National Park to meet industrial standards.
- As funding permits, progressively upgrade staff accommodation to meet industrial awards. Yearly works programs will provide for continuing maintenance and upgrading of residential buildings.

Training

- Ensure staff have up-to-date skills and competencies.
- Provide training opportunities to enhance staff abilities and career advancement.

Provision of suitable services and facilities

All new developments on Carnarvon National Park require Native Title approval and an environmental and cultural assessment before commencement.

Park infrastructure

The Environmental Protection Agency is committed to continually improving the sustainability of its operations. In 2002, an audit of sustainable management practices occurred at the Carnarvon Gorge section to determine energy efficiency, water quality and use and management of effluent and refuse. Recommended management strategies have been documented and are being gradually implemented.

Equipment and infrastructure essential for operation on Carnarvon National Park include offices, workshops, staff accommodation, vehicles, tools, visitor information centres, public toilets, campgrounds, day-use areas, signs, boardwalks, walking tracks and associated safety structures. Unless maintained on a regular basis, these assets can be costly to replace. Consequently, their development and maintenance is a priority and comprises a large proportion of work programs. Care needs to be taken to ensure that park staff still devote sufficient time and resources to managing the natural and cultural resources within the park.

Visitor amenities and other infrastructure at Carnarvon National Park will be based upon the chosen setting of the park section. For example, the Carnarvon Gorge section of the park is managed as 'high profile' and it has more permanent structures than other sections. However, the need for and placement of such structures is assessed on a case-by-case basis and in accordance with the park zoning scheme.

Roads

The existing road network to and within Carnarvon National Park was originally established to meet requirements of the rural industry. Within the park, this network has been adapted to meet visitor and QPWS management needs. Some of these roads also double as stock routes.

Most management sections of the park can be reached in conventional vehicles when road conditions are dry, although road conditions can be very rough. Wet weather can make access impossible in all types of vehicles. With the exception of the Carnarvon Gorge section and part of Mount Moffatt, a four-wheel-drive vehicle is needed to move about the park as most roads and tracks are not suitable for access by two-wheel-drive vehicles.

Gazetted roads pass through the park in several locations. Some of these roads are not maintained and are impassable. As a general rule, local authorities will not support closure of these roads due to the possibility of future access. There is concern that future construction and use of these roads will fragment the park, increase the risk of weed infestation and contribute to existing erosion problems. The spread of parthenium weed is of particular concern.

The Carnarvon Development Road is now fully sealed. This has greatly increased the amount of traffic through the region as it is the most direct route to Queensland's north from the southern states. This road passes through the only ooline community found on the park. Ooline and its associated softwood species are particularly susceptible to fire. Grass growth along the road edge has increased the risk of fire intrusion into this community. There is also a greater potential for the area to become infested by weeds. Care is required in the management of this area to prevent additional damage to the scrub.

The last three kilometres of the access road into Carnarvon Gorge park headquarters and day-use area is a QPWS road and is not gazetted. This access was developed in 1964 to meet use levels at that time, and has been upgraded from time to time to improve the road surface and drainage issues. The road has hidden curves, few run-off areas and also has several steep sections with high erosion potential.

The Tambo Wilderness Way which passes through the Goodliffe section of the park is strongly promoted by the Tambo Shire Council for use by tourists travelling through the area. This has substantially increased visitation to the western sections of the park.

In addition to the roads and tracks provided for public access, a number of firebreaks and service roads pass through the park. These roads are essential for the management of this large area. Public access along these tracks is not permitted unless otherwise specified.

Communication equipment

An effective communication system is central to providing efficient and effective health and medical, law enforcement, fire fighting, search and rescue and emergency services, and day-to-day management activities.

Telephone communications are provided to staff at the Carnarvon Gorge, Mount Moffatt and Salvator Rosa sections of the park. Public telephones are located in the Carnarvon Gorge day-use area, the Carnarvon Gorge Wilderness Lodge and Takarakka Bush Resort. There is currently no mobile telephone coverage within Carnarvon National Park. QPWS operational bases have recently gained access to the Internet, thereby increasing the rate of data exchange and improving workforce capability.

Carnarvon National Park uses VHF, HF and UHF radio communications. Royal Flying Doctor Service frequencies are programmed into HF radios, and the park is able to utilise the HF radio-telephone landline interconnect systems used by QPWS and other Government agencies across Queensland. QPWS does not share any common channel with the Police, Ambulance and State Emergency Service, making long distance communication difficult during emergencies. Radio communication is not possible in some sections of the park due to the ruggedness of the terrain.

QPWS has adopted an electronic booking system for camping on some sections of Carnarvon National Park. Clients can obtain information and perform electronic/credit card payments when reserving a campsite. Camping permit transactions can be made in person at a service centre, over the Internet, or via telephone, mail, e-mail and fax.

Energy supply

A regular and reliable power supply is required to provide basic living conditions and office functions, to pump water and run workshop appliances. Electricity is supplied to the Carnarvon Gorge and Mount Moffatt sections with a single wire earth return (SWER) system.

As an alternative to electric power, gas is used for the hot showers and barbecues in the Carnarvon Gorge day-use area. Solar power is used to operate the composting toilet systems within the park.

Water supply

On Carnarvon National Park, water is used for a variety of reasons, ranging from human consumption to sewage treatment, household requirements for staff, fire fighting, cleaning visitor amenities and swimming.

Carnarvon Creek in the Carnarvon Gorge section provides a reliable water supply throughout the year. The water from Carnarvon Creek is treated to remove harmful bacteria. However, during flooding the water becomes turbid, making the water impossible to pump and therefore unsuitable for consumption. Feral animal activity upstream, and to a much lesser extent visitor activities, also contaminate the creek from time to time. Carnarvon Creek's water is regularly tested.

Water for human use is obtained from underground bores and rainwater tanks on the Mount Moffatt section and, for staff, from rainwater tanks in the Salvator Rosa section. By their nature, underground water supplies are more reliable in drought periods providing they are not overused, and they can provide a source of clean potable water.

Several unused bores throughout the park could be re-established if required for fire management purposes. Several springs also provide water that may be used for fire fighting supplies and/or feral animal control activities. Feral animal activity in these areas can make this water unsuitable for human consumption.

Solid waste disposal

Park visitors and staff are required to remove their rubbish from the park. Staff are also encouraged to recycle glass and aluminium.

The Bauhinia and Bungil Shires have assisted QPWS with waste management by allowing park visitors to use rubbish bins located in strategic locations in nearby townships. Park staff use rubbish dumps at Injune and Rolleston.

Sewage and grey water

Effective sewage treatment protects public health by preventing the spread of infectious disease that can be carried in human waste, prevents nuisance from unpleasant odours and flies, protects the environment from pollution, and protects aquatic life.

Three main systems are presently in use on Carnarvon National Park to treat sewage. These are:

- septic waste systems, using absorption trenching as the final treatment;
- pit toilets of various constructions; and
- composting toilets.

In some sections, grey water disposal methods in staff accommodation complexes need to be addressed. Staff observations and monitoring activities will identify whether there is a need for more facilities in the future.

Desired outcomes

- Site development is approached in a holistic, integrated fashion, with appropriate environmental and cultural evaluation. Developments do not reduce the natural or cultural integrity of the park.
- Communications systems are provided to assist in efficient management of the park and contribute to the safety of park visitors and neighbours by facilitating rapid emergency response and co-ordination.
- Where necessary, essential services are provided within Carnarvon National Park to required standards and with minimal impacts on the park's natural and cultural resources.

Proposed guidelines and actions

Infrastructure management

- Ensure capital works programs identify and address infrastructure management issues on Carnarvon National Park, including requirements for additional space and facilities for administrative and management functions.
- Conduct environmental and cultural assessments before the commencement of any upgrading and/or development works. Materials and designs that are compatible with existing buildings and the surrounding environment will be used.
- Ensure that all park infrastructure is appropriate to the chosen setting of the park section, and is in accordance with the park zoning scheme.
- Apply appropriate environmentally sustainable design principles to all infrastructure, within reasonable financial and practical constraints.
- Encourage the different park bases to co-ordinate work programs and use of equipment.
- Investigate options for expanding office/ interpretive facilities in the Carnarvon Gorge section.

Roads

- Upgrade and progressively seal sections of the access road within the Carnarvon Gorge section. Signs regulating traffic (e.g. imposing a speed limit) will be erected where appropriate.
- Prepare operational guidelines for the construction and maintenance of roads and tracks within the park. Internal access roads will be maintained to classified standards as outlined in the park zoning scheme.
- To minimise weed spread across the park, actively control weed infestations along internal road edges.
- Liaise with park neighbours, local authorities and Queensland Transport regarding access to and the promotion and use of Carnarvon National Park as a regional drawcard.
- Apply to have unused roads de-gazetted and included within Carnarvon National Park, particularly where there is a risk of weed and/ or disease spread.
- Ensure QPWS and contracted vehicles and machinery that have been in parthenium-infested areas are appropriately washed down before being used in parthenium-free areas of the park.

Communications

- Gradually upgrade existing communications systems to use new technologies, ensure cost effectiveness and allow co-ordinated emergency response. This may involve negotiating a common communication mechanism between all local emergency services and/or authorities.
- Train all park staff to ensure effective use of the communications systems used in the park.
- Do not permit the construction of any communication facility on Carnarvon National Park without taking into account environmental effects, cultural impacts, Native Title implications, benefits to park management and the availability of alternative sites outside the park.
- Investigate the option of installing an additional UHF repeater on the Salvator Rosa section, and relocate the repeater at Saddler's Springs for interfacing with the Salvator and Mount Moffatt repeaters. This will allow co-ordinated operations across the park.
- Where appropriate, advise park visitors of the availability of UHF radio communications for emergency purposes. QPWS staff will monitor visitor use of UHF repeaters to ensure it does not hinder park operations.
- Commercial organisations will be permitted to use existing communication facilities on Carnarvon National Park but will not be permitted to construct new towers or sites

Energy supply

- Where SWER lines are to be extended into Carnarvon National Park, negotiate with the supplier to identify an alternative location for the infrastructure external to the park estate. Where this cannot be achieved, ensure that clearing activities do not jeopardise any environmental or cultural values and that formal agreement is attained in relation to the width of clearing and maintenance of the line.
- Retain generator sets in the Carnarvon Gorge and Mount Moffatt sections of the park for emergency situations such as floods and long-term mains power failure.
- Investigate alternative power supplies and enhancement of energy efficiency for use on the park.
- Where feasible, use energy-efficient building design and renewable energy sources for any additional camper facilities (e.g. barbecues, hot water showers and toilets).

Water supply

- Maximise efficient use of water in services and facilities on the park.
- Monitor all QPWS management base water supplies at Carnarvon National Park on a quarterly basis. Samples will be tested for contamination by bacteria and other pathogens and subjected to chemical analysis. The effectiveness of the water disinfection process used at Carnarvon Gorge will be assessed on a regular basis to ensure the system is working adequately.
- Provide staff with training in methods of monitoring water supplies. Carnarvon Gorge staff will also require training in the operation of a water treatment facility.
- Conduct water quality testing of campground water supplies (i.e. Carnarvon Creek and Mount Moffatt water tanks) leading up to and during the high season. Other water points frequently used by visitors for drinking water (e.g. creeks and springs) may also be sampled.
- Ensure reticulated water systems meet human consumption requirements under the Australian Water Quality guidelines, the Queensland Water Quality guidelines and the *Environment Protection Act 1994*. Park visitors will be advised to boil all drinking water from creeks and springs.
- Undertake regular and ongoing water quality monitoring in Carnarvon Creek and the Nogoa River to ensure environmental standards are being met. Where needed, remedial action will be taken.

Solid waste disposal

- Continue the 'carry in – carry out' principle of rubbish management across all sections of Carnarvon National Park.
- Ensure building contractors remove all waste building materials from the park on completion of their contracts.

Sewage and grey water

- Design, locate, construct, operate, maintain and inspect all toilets at Carnarvon National Park in accordance with the QPWS Site Planning Manual, IEMS and the park zoning scheme.
- Continue to use existing toilet and shower facilities where there are no adverse impacts on the environment. Pit toilets will be gradually replaced with environmentally appropriate systems, on a priority basis and subject to available funding.
- Install additional composting toilets along the main walking track at Carnarvon Gorge as the need arises and funding permits.
- Temporarily or permanently close toilets under circumstances that have the potential to cause serious environmental damage.
- Assess the sustainability of grey water disposal methods used in accommodation complexes across the park.

Undertaking compliance activities

Background information

Conservation officers have the power and delegation to enforce the *Nature Conservation Act 1992*. QPWS and some other department officers are trained in law enforcement procedures and carry out law enforcement activities as a routine operation.

Police stations are located in the nearby townships of Rolleston, Injune, Tambo and Springsure. The response times from these locations vary depending on staffing and numerous other factors. At best the response time is about one hour from first call to several hours at worst.

Traditional owners are concerned that cultural resources are being removed from the park. Compliance activities need to address this.

Desired outcomes

- The *Nature Conservation Act 1992* and Regulations are enforced as necessary and as appropriate to the situation.
- Park users are informed about appropriate conduct and regulations.

Proposed guidelines and actions

- Disseminate information to park users to ensure understanding and appreciation of relevant parts of the *Nature Conservation Act 1992* and Regulations. Such information may be presented as educational material, during interpretive activities, through signs or in placing physical barriers.
- Ensure that park staff and other designated Conservation Officers continue to enforce the *Nature Conservation Act 1992* and Regulations.
- Continue to train park staff to ensure compliance is an integral component of routine day-to-day operations and that law enforcement activities are effectively administered. Staff should also periodically undertake refresher courses in law enforcement.

Plan Implementation

This plan seeks to provide a framework within which the values of Carnarvon National Park may be protected in perpetuity.

The directions, policies and actions outlined in this plan are to be implemented by QPWS from the date of publication and until such time as the plan is reviewed. Amendments may be made as a result of public submissions, changing circumstances or better information resulting from research and monitoring activities. However, all amendments must be made in accordance with s.124 of the *Nature Conservation Act 1992*.

Management actions in relation to Carnarvon National Park will be clearly communicated between the Southern and Central QPWS regions. The regions will meet annually to evaluate progress towards management plan implementation. These meetings will also act as a forum for discussing major works proposed in this document, and thereby help to guide budget processes and annual works programming.

In accordance with s.125 of the *Nature Conservation Act 1992*, this plan will be formally reviewed no later than the year 2015.

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Appendix 1: Detailed zone descriptions for Carnarvon National Park

Zone Characteristics	Remote-Natural	Natural	Natural-Recreation	Recreation	Developed
Settings Class**	**1**	**2, 3**	**3, 4**	**4, 5**	**6, 7**
Off-site interpretation	Yes	Yes	Yes	Yes	Yes
Natural & cultural resource management (eg. ecological burning, weed/feral animal control, erosion control etc.)	Yes	Yes	Yes	Yes	Yes
Fuel stoves	Yes	Yes	Yes	Yes	Yes
Pedestrian access	Yes	Yes	Yes	Yes	Yes
Camping	C5	C4	C3	C2	C1
Landscape	Natural	Natural	Natural appearing	Modified with natural elements	Modified
Level of on-site management	Low to moderate	Moderate	Moderate to high	High	Very high
Development of structures for Departmental purposes	Yes	Yes	Yes	Yes	Yes
Fire trails	If essential	If essential	Yes	Yes	Yes
Land-based vehicle access	Authorised personnel	Restricted or seasonal access for 4WDs	Some restrictions on unsealed roads (e.g. wet weather)	Some restrictions on unsealed roads (e.g. wet weather)	All weather access usually provided
Helipad or airstrip	For management and emergency purposes	For management and emergency purposes	For management and emergency purposes	For management, emergency and commercial purposes	For management, emergency and commercial purposes
Vehicular roads and tracks	R6	R6, R5, R4	R6, R5, R4, R3	R6, R4, R3, R2	R6, R3, R2, R1
Nature-based recreational opportunities	Yes	Yes	Yes	Yes	Yes
Directional, safety and regulatory signage	If essential	Yes	Yes	Yes	Yes
Safety signs, barriers and fencing	If essential	If essential	Yes	Yes	Yes
Walking tracks	T6,T5	T5, T4	T4, T3, T2	T3, T2	T1
Commercial operator groups	By permit	By permit	By permit	By permit	By permit
Degree of self reliance	Very high	High	Moderate	Low to moderate	Low
Level of visitor management	Very low	Low	Low to moderate	Moderate	High
Level of recreational use	Very low	Low	Moderate	High	Intensive
Social interaction	Little or none	Brief	Occasional	Regular	Unavoidable
Defined carparks		Optional	Yes	Yes	Yes
Interpretive publications		Optional	Optional	Yes	Yes
Boardwalks and lookouts		Optional for environmental & safety reasons	Optional	Yes	Yes
Defined campsites		Optional	Optional	Yes	Yes
On-site interpretation		Where necessary	Where necessary	Yes	Yes
Composting toilets		Optional at sensitive & regularly used sites	Optional	Optional	Optional
Number of campsites (maximum)		5	25	50	150
Hardened or modified sites		Optional	Optional	Likely	Yes
Picnic areas		P3	P2	P2, P1	P1
Site modification		If essential	Low	Moderate in specific areas	High
Sharing of sites		Occasional	Likely	Highly likely	Inevitable
Pit toilets		Optional	Optional	Optional	No
Barbecues		Gas & electric optional in picnic areas only	Optional	Optional	Gas & electric (wood optional)
Open wood fires		Optional at designated sites	Optional at designated sites	Optional at designated sites	Optional at designated sites
Information shelters			Optional	Yes	Yes
Sewer/septic toilets			Optional in picnic areas only	Optional	Yes
Disabled access				Optional	Where possible
Visitor centres				Optional	Optional

NOTE: Seasonal closures may apply to all zones.
Restricted access areas may be imposed within any of the zones.
Traditional use, emergency situations and management strategies may override zone criteria and will be assessed on a case-by-case basis.

** Settings class refers to the standard classification system for characterising the biophysical, social and management attributes of sites and areas within QPWS managed areas, from a visitor management perspective.

Camping Facilities

Facilities	Developed Campground C1	Campground C2	Camping Area C3	Basic Camping Area C4	Remote Camp Area C5
Zone permitted	**Developed**	**Recreation**	**Natural-Recreation**	**Natural**	**Remote-Natural**
Water	Yes	Yes	Optional	Optional	
Defined campsites	Yes	Yes	Optional	Optional	
Toilets — composting	Optional	Optional	Optional	If essential	
Toilets - pit	No	Optional	Optional	If essential	
Sites (maximum)*	150	50	25	5	
Barbecues provided	Yes	Yes	Optional		
Tables	Yes	Yes	Optional		
Information shelter	Yes	Yes	Optional		
Showers — cold water	Yes	Yes	Optional		
Vehicle access to site	Yes	Optional	Optional		
Covered area	Optional	Optional	Optional		
Resident manager	Yes	Optional			
Toilets - septic/sewer	Yes	Optional			
Showers - hot water	Yes	Optional			
Kiosk	Optional	Optional			
Garbage collection	Optional	Optional			
Powered sites	Optional				
Visitor centre	Optional				
Built accommodation	Optional				

Picnic Facilities

Facilities	High Facilities P1	Low Facilities P2	Basic Facilities P3
Zone permitted	**Developed and Recreation**	**Recreation and Natural-Recreation**	**Natural**
Tables	Yes	Yes	Yes
Site limit (maximum no. tables)	20	10	5
Car parking	Yes	Yes	Optional
Water supplied	Yes	Optional	Optional
Barbecues — gas or electric	Yes	Optional	Optional
Covered area	Yes	Optional	Optional above table
Toilets — composting	Optional	Optional	Optional
Toilets — pit	No	Optional	Optional
Information shelter	Yes	Optional	
Toilets — septic/treatment plant	Yes	Optional	
Barbecues — wood	Optional	Optional (gas or electric preferred)	
Visitor centre	Optional		
Garbage collection	Optional		

LEGEND: (for camping and picnic areas)

Yes	Facility or service should be provided.
No	Facility or service will not be provided.
Optional	Facility or service may be provided but is not essential.
*	Maximum number of camping sites permitted to preserve the recreational setting. A maximum of 6 people per site is assumed.

Roads

Use or Standard	Major Sealed Road R1	Minor Sealed Road R2	Major Unsealed Road R3	Minor Unsealed Road R4	4WD Track R5	Management Road R6
Zone Permitted	**Developed**	**Developed and Recreation**	**Developed, Recreation and Natural-Recreation**	**Recreation, Natural-Recreation and Natural**	**Natural-Recreation and Natural**	**All Zones available for public use**
4WD access	Yes	Yes	Yes	Yes	Yes	Optional
Bicycle access	Yes	Yes	Yes	Yes	Optional	Optional
Passenger car access (2WD)	Yes	Yes	Yes	If feasible		
Bus and coach access	Yes	Yes	Yes	4WD option		
All weather access	Yes	Yes	Optional			
Caravan access	Yes	If feasible	If feasible			

LEGEND: (for roads)

Yes	Access is suitable for the type of vehicle specified
If feasible	Access is suitable for the type of vehicle specified depending on the road conditions (I.e. width, grade and surface).
Optional	Vehicle access may be provided but it is not essential or necessarily desirable.
4WD option	Access by 4WD buses and coaches may be provided but it is not essential or necessarily desirable.

Walking Tracks

Refer to the Australian walking track classification standards for detailed descriptions of the criteria and classifications used.

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