



Ngura Nganampa Kunpu Kanyinma
Keep on Looking After Our Country Strongly

**Katiti-Petermann Indigenous Protected Area
Plan of Management**

2015

Cover Artwork:

**'Walytjapiti Tjunguringkula Ngura Atunymankunytja –
Families are coming together to look after the land'**

Produced for the CLC by Kaṯiṯi-Petermann IPA Steering Committee
members Malpiya Davey, Rene Kulitja, Nyinku Kulitja, Judy Trigger, 2014

The artists painted the IPA lands including aspects of *Tjukurpa* with the Kaṯiṯi-Petermann IPA represented as a concentric circle in the centre of the painting. Traditional owners are supporting and collaborating in cross-border management in all directions (north, east, south and west). The smaller circles show Uluru-Kata Tjuṯa National Park, the different homelands, communities and outstations where everybody is working together looking after the country. The different coloured patches represent the land and the work done together, namely:

- deep red – patch burning / controlled burning
- reds, pinks, purples – teaching the young kids about bush food
- blues – looking after *kapi*, cleaning waterholes, rock holes protecting the water resources from pest animals
- yellows and greens – the plants and grasses through the seasons



Ngura Nganampa Kunpu Kanyinma
Keep on Looking After Our Country Strongly

**Katiti-Petermann Indigenous Protected Area
Plan of Management**

2015



This initiative is funded by
the Australian Government

National Library of Australia Cataloguing-in-Publication entry

Central Land Council (Australia)

Ngura nganampa kurrpu kanyinma = Keep on looking after our country strongly :
Kaṯiti-Petermann Indigenous Protected Area Plan of Management 2015 /
Central Land Council.

ISBN 978 1 87694 809 2 (paperback)

1. Aboriginal Australians--Land tenure--Northern Territory. 2. Protected areas--Northern Territory--Management.
3. Natural resources conservation areas--Northern Territory--Management. 4. Petermann Ranges (N.T.)

333.720994291

Acknowledgements

The following people are acknowledged for their contributions to the development of this plan:

Members of IPA Planning and Steering Committees, in particular:

Ronnie Allen, Peggy Gallagher, Tjukapati James, Yvonne James, Nyinku Kulitja, Rene Kulitja, Pantjiti McKenzie, Janie Miama, Jim Nyukiti, Martha Protty, Daphne Puntjina, Malya Teamay, Gordon Tiger, Johnny Tjingo, Barbara Tjikatu, Judy Trigger, Reggie Uluru, Daisy Walkabout, Sandy Willie and Roy Yaltjunki

The Kaṯukatjara Rangers past and present

CLC Staff:

Pete Allsop, Richie Brittingham, Kate Crossing, Lynn Day, Andrew Drenen, Tracey Guest, Patrick Hookey, Alison Hunt, Marieke Kijne, Janie Miama, Colleen O'Malley, Sam Rando and James Young

Pirarpa experts

Dave Albrecht, Jayne Brim-Box, Peter Latz, Rachel Paltridge, Kathy Tozer

IPA committee members and rangers who have passed away during the development of this plan:

**Kunmanara Andrews
Kunmanara James
Kunmanara Kulitja
Kunmanara Smith
Kunmanara Tjingo**

CONTENTS

i. Statements from Traditional Owners	6
ii. How to Use this Plan	8
iii. Summary of the Plan	9

Part A Background

1 Introduction	
1.1 Location and Regional Setting	13
1.2 <i>Ngura</i> – Country	16
1.3 <i>Aṅangu</i> – People	16
1.4 Land Management Programs	18
1.5 Indigenous Protected Area Program	20
1.6 Linked Protected Areas	20
2 Significance	
2.1 <i>Aṅangu</i> Significance	23
2.2 <i>Pirṅapa</i> Significance	24
3 <i>Yaaltjinggaṅi</i> – Management Framework	
3.1 Purpose and Scope of the Plan of Management	25
3.2 Cultural Foundation	26
3.3 Planning Process	27
3.4 Governance	28
3.5 Management Partners	32
4 Overarching Management	
4.1 Protected Area Category	33
4.2 Guiding Principles	34
4.3 Two-Way Land Management	34
4.4 Cross-Border Collaboration	35
4.5 Management Themes	37

Part B Management Strategies

5 <i>Tjukurpa-ku aṭunymananyi</i> – Looking after Culture	
5.1 Introduction	41
5.2 Cultural Beliefs and Knowledge	41
5.2.1 Background	41
5.2.2 Issues and Opportunities	43
5.2.3 Management Strategies	45
5.3 Customary Practices	49
5.3.1 Background	49
5.3.2 Issues and Opportunities	51
5.3.3 Management Strategies	54
6 <i>Mantaku aṭunymananyi</i> – Looking after Country	
6.1 Introduction	57
6.2 <i>Manta</i> – Rocks, Landforms and Soils	66
6.2.1 Background	66
6.2.2 Issues and Opportunities	67
6.2.3 Management Strategies	68
6.3 <i>Kapi</i> – Water	69
6.3.1 Background	69
6.3.2 Issues and Opportunities	73
6.3.3 Management Strategies	79
6.4 <i>Puṅu</i> – Plants	80
6.4.1 Background	80
6.4.2 Issues and Opportunities	87
6.4.3 Management Strategies	90
6.5 <i>Kuka</i> – Animals	94
6.5.1 Background	94
6.5.2 Issues and Opportunities	102
6.5.3 Management Strategies	107

6.6	Waru – Fire	110
6.6.1	Background	110
6.6.2	Issues and Opportunities	112
6.6.3	Management Strategies	115
7	Ngapartji-ngapartji nintiringanyi – Two-Way Education and Training	
7.1	Introduction	119
7.2	Education and Training	119
7.2.1	Background	119
7.2.2	Issues and Opportunities	122
7.2.3	Management Strategies	124
8	Waaka kutjupa tjuṯa maniku palyalkatintjaku – Jobs and Economic Development	
8.1	Introduction	127
8.2	Land Management	128
8.2.1	Background	128
8.2.2	Issues and Opportunities	129
8.2.3	Management Strategies	130
8.3	Tourism	132
8.3.1	Background	132
8.3.2	Issues and Opportunities	133
8.3.3	Management Strategies	135
8.4	Other Opportunities	137
8.4.1	Background	137
8.4.2	Issues and Opportunities	138
8.4.3	Management Strategies	139
9	Monitoring, Evaluation and Review	
9.1	Monitoring	143
9.2	Evaluation and Review	144
9.3	Management Strategies	145
10	Plan Implementation	147

Part C Appendices

Appendix 1.	Abbreviated forms	150
Appendix 2.	Pitjantjatjara/ Yankunytjatjara Glossary	151
Appendix 3.	Plants of Conservation Significance in the IPA	154
Appendix 4.	Weeds of the IPA	156
Appendix 5.	IPA Fauna Species List	157
Appendix 6.	IPA Weed Hygiene Procedures	161
Appendix 7.	IPA Road and Track Construction and Rehabilitation Guidelines	163
Appendix 8.	Environmental Conditions of CLC Grazing Licences	164
Appendix 9.	Annual IPA and Regional Fire Planning Cycles	165

Selected Relevant References	167
-------------------------------------	------------

Figures

Figure 1.	Location of the Kaṯiṯi-Petermann IPA	13
Figure 2.	Kaṯiṯi-Petermann IPA	14
Figure 3.	Linked Protected Areas	21
Figure 4.	IPA Management Structure	29
Figure 5.	<i>Anangu</i> Land Types	62
Figure 6.	Biological Significance	64
Figure 7.	Mapped Cultural Places of the IPA	73
Figure 8.	Botanical Sampling Densities, Threatened and Significant Plants	84
Figure 9.	Fauna Sampling Density and Threatened Animals	100
Figure 10.	Extent of Wildfire in the Kaṯiṯi-Petermann IPA 2012-13	112

Tables

Table 1.	Sites of Botanical Significance	86
Table 2.	Reptiles of Conservation Significance	95
Table 3.	Birds of Conservation Significance	97
Table 4.	Mammals of Conservation Significance	99
Table 5.	Feral Animals Present in the IPA	103
Table 6.	CLC Ranger Training Units	121
Table 7.	Customary Land Management Training	121

Boxes

Box 1.	Rediscovering Katiti	74
Box 2.	Camels at Wala Rockhole	77
Box 3.	<i>Tjakura</i> – Great Desert Skink	95
Box 4.	Australian Feral Camel Management Project	105



i. Statements from Traditional Owners

Nganana Tjukurpa wanungku tjukarurungku kunpungku Tjukurpa kanyira kunpu ngarama waakangka.

Waaka nganana tjukarurungku kunpungku palyantjaku ... ka malatja tjutangu kunpungku waaka tjukarurungku palyantjaku.

Ngayulu IPA-ku mukuringanyi ngura nganampa kunpungku kanyintjaku. Munu nyara palulawanu Tjukurpa paluru mukuringkula kunpungku government-alawanu wangkantjaku ngura nganampaku paluru kunpu witu-witu wangkantjaku.

By working straight and strong according to the Tjukurpa we will keep the Tjukurpa strong through the work.

We have to do the IPA work properly and strongly ... and the future generations have to work properly and strongly.

I want an IPA so we can keep looking after our country strongly. And through it, if someone wants to speak strongly to the government about our country, they will speak with proper strength and authority.

Sandy Willie

Ngayulu mukuringanyi IPA palyantjikitjangku panya waaka tjitjiku munu young one tjutaku. Panya kuranyukutungku future nyakukatintjikitjangku, nganampa tjitji, grandchildren, palunya tjananya.

Walka tjura nganana wantikatinyi palumpa tjanampa waaka panya ngarantjaku. Panya pakara tjitjingku nyakuntjaku munta kamilu tjana nyangatja wirunya walka tjura wantikatingu.

Munu kuwari nyanga ngayulu worry-rinyi IPA nyangaku, nganana witulya kanyintjikitjangku walytjangku waaka runamilantjikitjangku munu young people tjuta ma-untuntjikitjangku waaka nyangatja.

I want to form the IPA to make work for our young people. I'm looking to the future for our children and grandchildren.

We need to leave behind a plan so there's work for them. So when they grow up they can see the good things recorded and left by their grandparents. I'm thinking hard about the IPA so we can keep things strong, managing and working ourselves, and I want to push the young into this work.

Judy Trigger

Kuwari ngayulu pukularinyi panya IPA Anangu winkingu ngura kunpungku atunmankunytjaku tjitji malatja malatjaku.

Nganana kuwari panya ngura nganampaku mukuringanyi ankula ngura nyakuntjitkitja, tjtji tjuta nintintjikitja ngura munu Tjukurpa tjamulu kamiku iriti ngarantja. Kala IPA nyara palumpa pulkara mukuringanyi Anangu winki, Anangu maru tjuta nganana tjungu waakarintjaku munu atunymankuku.

I'm really happy about the IPA because all the people will be able to look after the country properly for future generations.

We want to be able to go out on country to see it and teach the children about the land, the Tjukurpa and how our grandparents used to live. So we really want the IPA so all Anangu can work together and protect things.

Rene Kulitja

Yaaltji yaaltjingkula palya witu-witu kanyilku? Nyuntu tjinguru tjukarurungku palyanma nyuntu ngarama IPA panya palula ka nyangangu wangkangu palya tjukaruru ngarantjaku titutjara witu-witu.

How will we keep things strong? If you keep working properly and stick with the IPA it will guide you because it's told you to always stay true and strong.

Ronnie Allen

Panya tjitji tjutaku nganana mukuringanyi tjananya nintintjikitja, tjitji tjutangu tjana pulkaringkula panya kanyintjaku tjana. Nganana panya tjinguru wiyaringkuku, tjingurula pampa mulararira tjinguru Tjukurpa kutju tjakultjunama ka tjana para nyangama ngura kulu kulu munu atunymanama.

Uwa, nganampa atunypa wiru palyantjaku nganana tjanala tjakultjunanyi.

Munula kuwari nyanga uwankara tjarpatjura, wiyaringkula nganana uwankara nintini tjitji uwankara nganampa tjuta.

We want to teach the children so when they are grown they can look after things. Perhaps when we are gone, or are really elderly and can only tell our stories then they can go out to watch over and keep protecting the country.

We're explaining everything so we can create the best protection for us.

We want to include everything in the plan so when we're finished we can teach everything to all our children.

Daphne Puntjina



ii. How to Use this Plan

Part A Background

(Chapters 1–4)

CHAPTER 1 Introduction

Contains introductory information that provides a regional context with regards to ecology, Aboriginal culture, demography and infrastructure.

CHAPTER 2 Significance

Documents the significance of country in the IPA through both *Anangu* and *Pirrapa* perspectives.

CHAPTER 3 *Yaaltjingani* – Management Framework

Details the purpose, scope, cultural foundation, planning processes, governance and management partners of *Ngura Nganampa Kunpu Kanyinma*.

CHAPTER 4 Overarching Management

Provides detailed information with regards to the IPA management structure and decision-making processes, together with key management principles, concepts and themes.

Part B Management Strategies

(Chapters 5–9)

CHAPTER 5 *Tjukurpa-ku atunymananyi* – Looking after Culture

Provides detailed background information, and describes related issues, opportunities and corresponding management objectives and strategies regarding *Anangu* cultural beliefs, knowledge and customary practices.

CHAPTER 6 *Mantaku atunymananyi* – Looking after Country

Contains detailed background information, together with key issues and opportunities and associated management objectives and strategies pertaining to soils, water places, plants, animals and fire management in the IPA.

CHAPTER 7 *Ngapartji-ngapartji nintiringanyi* – Two-Way Education and Training

Comprises background information, and descriptions of key issues and opportunities, management objectives and strategies regarding *Anangu* and *Pirrapa* education and training in relation to the IPA.

CHAPTER 8 *Waaka kutjupa tjuṯa maniku palyalkatintjaku* – Jobs and Economic Development

Contains background information, and discussions on related issues and opportunities and associated management objectives and strategies concerning the creation of sustainable livelihoods for *Anangu*.

CHAPTER 9 Monitoring, Evaluation and Review

Describes management requirements for monitoring, evaluation and reporting against the four key management themes of *Ngura Nganampa Kunpu Kanyinma*.

CHAPTER 10 Plan Implementation

Establishes a prioritisation hierarchy which will be applied to all management strategies contained in this plan.

Part C Appendices

Contains appendices that provide detailed information related to certain matters addressed in Parts A and B of the plan.

iii. Summary of the Plan

This document, '*Ngura Nganampa Kunpu Kanyinma – Keep on Looking After Our Country Strongly*', is the Plan of Management for the Kaṭiṭi-Petermann Indigenous Protected Area (IPA).

The IPA program, an initiative of the Australian Government, is directed at supporting Aboriginal people to manage their country for the enhancement of biodiversity and cultural values. Implicit in the protection of these values is recognition of social benefits for participating Aboriginal people and communities, including improvements in health and education outcomes.

IPA declarations are based on traditional owners entering into voluntary agreements to add their lands to the National Reserve System (NRS) (Australia's system of protected areas). IPAs are classified according to International Union for Conservation (IUCN) protected area categories.

Traditional owners of the Kaṭiṭi-Petermann IPA have decided to manage their country as an IUCN Category VI protected area, which is defined as:

[An] area containing predominantly unmodified natural systems, managed to ensure long-term protection and maintenance of biological diversity, while at the same time providing a sustainable flow of natural products and services to meet community needs.

This plan outlines a suite of strategies directed at achieving a management regime consistent with this IUCN definition. Each of these strategies is based on an appreciation of the central role of *Anangu* customary knowledge and practices in maintaining a healthy environment. They are also informed by the need to combine traditional ways of managing country with new approaches to address new threats.

The management objectives and strategies for *Ngura Nganampa Kunpu Kanyinma* are grouped into four themes, which reflect the primary goals of traditional owners in managing their country. These include discussions of values, issues and

opportunities and the associated management objectives and strategies related to:

- ***Tjukurpa-ku aṭunymananyi – Looking after Culture***

This theme includes strategies that sustain and strengthen customary management practices and traditional knowledge, which are central to maintaining the natural and cultural resources of the region and the social and spiritual wellbeing of the region's landowners.

- ***Mantaku aṭunymananyi – Looking after Country***

This theme includes strategies that marry *Anangu* and *Pirranpa* management knowledge and skills to enhance the condition of cultural and biodiversity values in the region and mitigate key threatening processes.

- ***Ngapartji-ngapartji nintiringanyi – Two-Way Education and Training***

This theme covers educational provisions to strengthen and improve *Anangu* and *Pirranpa* education and training outcomes, raise community awareness about threats to country and educate land managers in both traditional and Western approaches to caring for country.

- ***Waaka kutjupa tjuṭa maniku palyalkatintjaku – Jobs and Economic Development***

This theme includes strategies to help build sustainable *Anangu* livelihoods that deliver employment and economic development outcomes in the IPA.

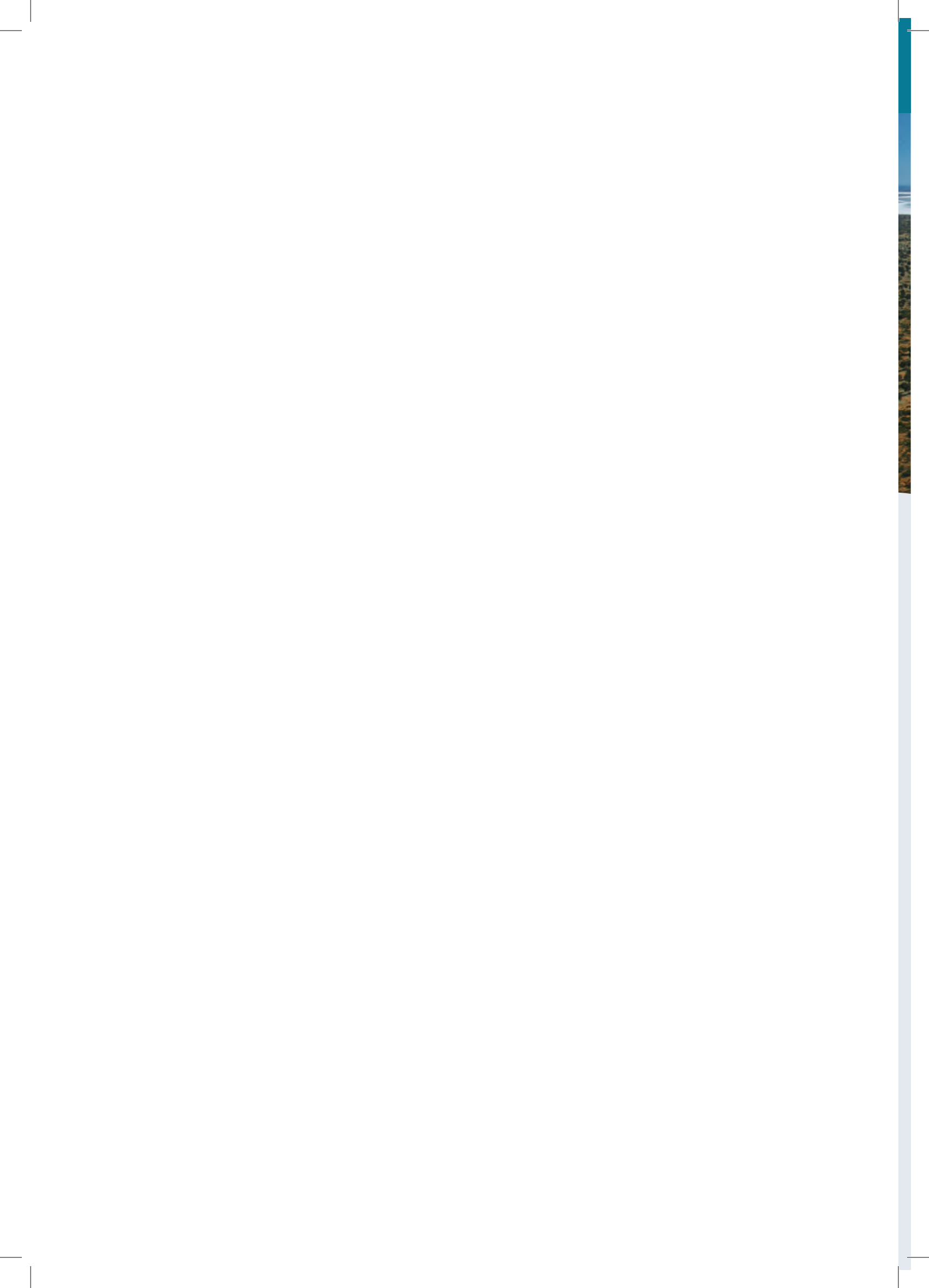
The IPA is managed in accordance with traditional governance arrangements through an IPA Management Committee comprising representatives from the four major regions of the IPA. An IPA Advisory Committee of scientific specialists and government agency representatives provides technical advice to the Management Committee. The management strategies contained in this plan are primarily implemented by members of the Kaṭukajara Ranger group.





Part A

BACKGROUND





Lake Amadeus from the air

1.1 Location and Regional Setting

The Kaṯiṯi-Petermann Indigenous Protected Area (IPA) is located in the far south-west corner of the Northern Territory between latitudes 26° 00' and 24° 08' South and longitudes 129° 00' and 131° 40' East. Roughly rectangular in shape, it extends 206 km north to south and approximately 270 km east to west (refer Figure 1).

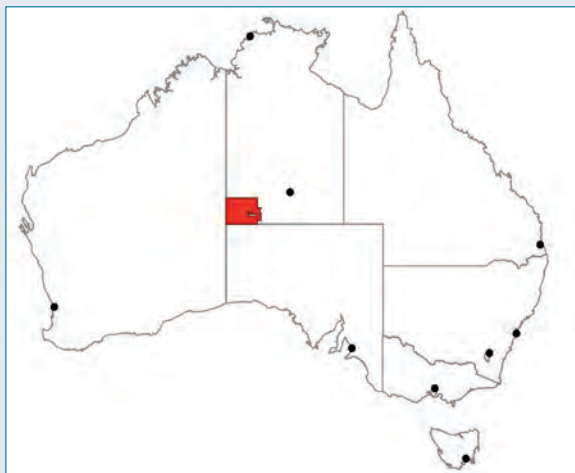


Figure 1 Location of the Kaṯiṯi-Petermann IPA

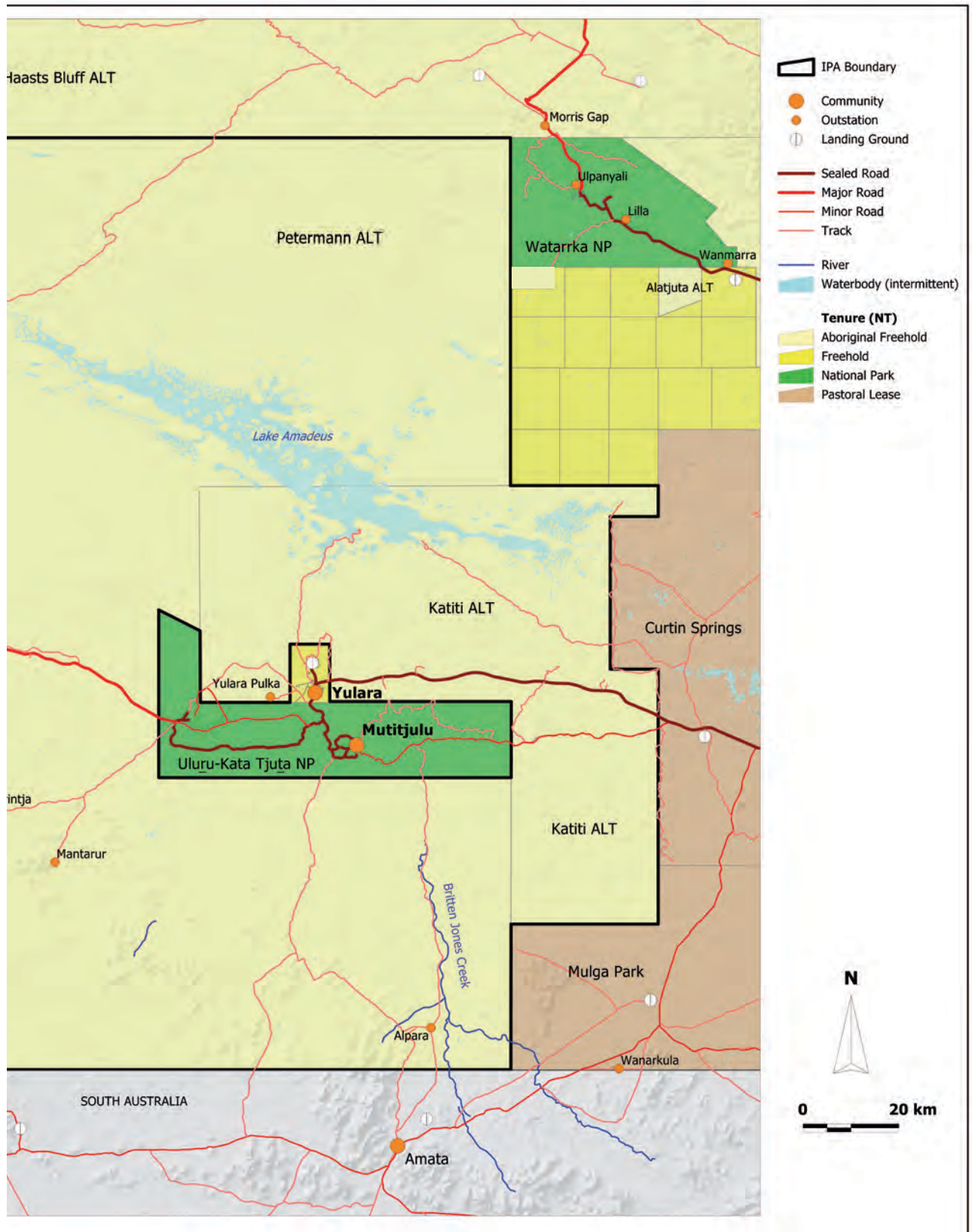
Declared in 2015, the IPA incorporates 50,432 km² (5,043,187 ha) of Aboriginal freehold land, being the entire Petermann Aboriginal Land Trust (ALT) (44,993 km²) and Kaṯiṯi ALT (5,431 km²) and the road reserves therein (refer Figure 2).

The Aboriginal community of Kalṯukatjara (Docker River), which is located only 8 km from the Northern Territory / Western Australia (NT/WA) border, is the only permanent settlement in the IPA. It has approximately 350 residents. The community of Muṯitjulu, which is situated just outside the IPA in Uluru – Kata Tjuṯa National Park (UKTNP), has some 300 residents. Thirty-four outstations have been established in the IPA, though few of these are permanently occupied at present.

There are only two major roads in the IPA. The sealed Lasseter Highway cuts across the eastern portion of the IPA for a distance of 100 km to the tourist resort of Yulara. The unsealed Tjukaruru Road, which links the Lasseter Highway in the east with the Great Central Road to the west, extends for 200 km in an east-west direction from the western boundary of UKTNP to the WA border. Both roads form sections of the Outback Way, which consists of a series of roads linking the towns of Winton in Queensland and Laverton in WA. Elsewhere in the IPA, the road network comprises graded vehicular tracks, which provide access to outstations or neighbouring communities, and rough tracks created by repeated travel to popular hunting, bush food harvesting and wood-gathering sites.



Figure 2 Katiġi-Petermann IPA



With its south-west corner sometimes referred to as Surveyor General's Corner, the IPA is bounded in the west by the NT/WA border, where it adjoins the Ngaanyatjarra IPA, and to the south by the Northern Territory / South Australia (NT/SA) border, where it abuts the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands. Sections of the southern boundary adjoin declared IPAs, namely the Kalka-Pipalyatjara IPA and the Apara-Makiri-Punti IPA, which are contiguous with the Watarru, Walalkara and Antara-Sandy Bore IPAs. To the north, the IPA adjoins the Haasts Bluff ALT, while to the east it shares a border with Watarrka National Park, Watarrka ALT, Northern Territory freehold land held by the Land Settlement Aboriginal Corporation, and Curtin Springs and Mulga Park pastoral leases. The IPA completely surrounds UKTNP and the contiguous parcel of freehold land associated with the Yulara tourist resort.

1.2 Ngura – Country

The Kaṭiṭi-Petermann region has an arid climate characterised by extreme summer temperatures which may exceed 40°C for days or weeks on end. Rainfall is low and erratic, with mean annual precipitation of less than 300 mm disguising a pattern of prolonged dry periods punctuated by high rainfall events. While rain can occur at any time of year, it predominantly falls during summer months in association with the remnants of tropical depressions which intermittently move across Central Australia from the Kimberly region.

Anangu recognise three main seasons:

- *Kuli* hot time
- *Nyinninga* cold time
- *Piriyakutu* when the west wind blows (August–September).

Other seasonal or weather event classifications include:

- *Inuntji* time when acacias flower profusely and there is plenty of green growth (January–March)
- *Ailuru* drought or dry times, when food is scarce.

Extensive sandplains (*pila*) and sandhills (*tali*) dominate the IPA. This low relief landscape is bounded in the south by an east–west chain of mountains

(*puli*) comprising the Musgrave and Mann ranges, which in places exceed 1,000 m in elevation. The similarly aligned Petermann and Bloods ranges characterise the central portion of the IPA, while elsewhere the plains and dunes are broken by isolated mountains, low ridges and occasional hills. A chain of salt lakes (*pantu*) stretches diagonally across the entire length of the northern section of the IPA. The largest of these are Lake Amadeus and Lake Neale.

Surface water, that rarest of desert resources, may be found at isolated soakages, claypans, springs and rockholes, or along river channels. Virtually all of these water places are ephemeral, with some holding water for only a few days after rain and others retaining water for many months or even years.

The vegetation of the IPA is dominated by highly flammable hummock grasslands of spinifex (*Triodia* species), which typically contain a sparse shrub layer of *Grevillea*, *Hakea* and *Acacia* species. Fire-sensitive mulga woodlands are also relatively common, as are desert oak stands. In the hill and range country, gullies, gorges and escarpments provide refugia for various fire-sensitive plants while the usually dry riverbeds extending out from the ranges are fringed by river red gums. The margins of salt lakes are commonly occupied by low open chenopod shrublands and tea-tree thickets.

1.3 Anangu – People

Anangu are the Yankunytjatjara- and Pitjantjatjara-speaking traditional owners of the Kaṭiṭi-Petermann IPA. While archaeological evidence suggests they have inhabited this region for at least 10,000 years, Anangu believe they have occupied their country since the *Tjukurpa*, the time when great ancestral beings journeyed about creating landscape features, plants and animals – and Anangu themselves.

Embedded within the stories, songs and ceremonies associated with the travels and adventures of these heroic ancestral beings are laws and responsibilities that form the basis of Anangu values and govern how Anangu conduct their lives and look after their country. The *Tjukurpa*, in all of its facets, contains a wealth of knowledge about seasonal influences and rhythms, the ecology of particular plants and animals, the use of fire, the locations of



View of Mt Currie looking south-east towards Kata-Tjuta

waters and the sustainable use of resources. Based on thousands of years of observation and practice, this storehouse of information enabled *Anangu* to survive in an otherwise hostile environment.

Traditional *Anangu* life revolved around small family groups, the movement of which was governed by the availability of resources, with the most important of these being water. During prolonged dry periods, families retreated to the most reliable water places on their country, surviving on locally available bush foods and wildlife. Wet conditions allowed people to spread out across the greater landscape, utilising temporary waters and the rain-induced flush of plant and animal life. It also permitted gatherings of hundreds of people to conduct ceremonies and maintain political, trade and social links. Traditional *Anangu* life reflected the boom and bust cycles that apply to most life in the desert.

Early European incursions into the region by explorers such as Ernest Giles (1872 and 1873) and William Gosse (1873), and the various surveyors, adventurers and prospectors who followed them, had only fleeting and localised impacts on *Anangu* life. Although the Petermann region was declared an Aboriginal Reserve by the Australian Government in 1920, the region continued to be visited by small numbers of Europeans, including missionaries, patrol officers, police, prospectors, doggers and

the occasional tourist. Within a few decades, the movement of *Anangu* from their traditional estates to missions and ration depots established at places such as Ernabella, Warburton, Hermannsburg and Areyonga, or to pastoral stations fringing their lands, had gained momentum. This depopulation of country, which was triggered by a combination of drought, the lure of reliable and desirable food, and government assimilationist policies was never entirely complete. *Anangu* maintained their strong connection to country and culture, and continued to return to their country to fulfil cultural obligations. Some also engaged in the dogging industry in which a government bounty was paid for dingo scalps.

In response to pressure from the fledgling tourism industry, in 1958 an area was excised from the Petermann Aboriginal Reserve to create the Ayers Rock - Mount Olga National Park. At this time, small numbers of *Anangu* were living at Uluru, in close proximity to fledgling tourism services and infrastructure. *Anangu* returned to their country in far greater numbers once the community of Docker River (now known as Kalutukatjara) was established by the government in 1968 in order to relieve pressure on the existing settlements of Areyonga and Warburton.

The land rights campaign of the 1970s was accompanied by the 'homelands movement'

across northern and Central Australia. This saw the Australian Government provide funding for the construction of outstations so as to allow Aboriginal people to re-establish semi-traditional lifestyles on their home country away from major communities. Thirty-four such outstations were established on the Petermann and Katiti lands.

Anangu control of their country was significantly enhanced with the passage of the Australian Government's *Aboriginal Land Rights (Northern Territory) Act 1976*, which resulted in the Petermann Aboriginal Reserve being converted to Aboriginal freehold land in 1978. The adjoining Katiti lands were subsequently gazetted as Aboriginal freehold land in 1980, following a successful land claim by traditional owners over this country.

The movement of *Anangu* back to Uluru accelerated with the announcement of the intended handback of the UKTNP (formerly Ayers Rock – Mt Olga National Park) to traditional owners in October 1985. With the opening of the Yulara tourist resort in 1984, the site of the former tourist campground in the park was set aside for *Anangu* and named Mutitjulu.

Today, the majority of the traditional owners of the IPA reside in the communities of Mutitjulu, Kaltukatjara, Utju (Areyonga), Imanpa and Ntaria (Hermannsburg) or in one of the various communities located on the APY Lands in SA or the Ngaanyatjarra Lands in WA. Other traditional owners live as far afield as Alice Springs and Adelaide.

1.4 Land Management Programs

Anangu have undertaken 'land management' activities across the region now included in the IPA for thousands of years. These activities revolved around sustaining food and resource production and were essential to people's survival. They ranged from burning of the country and cleaning out of waterholes to conducting animal and plant increase ceremonies. All such activities were governed by *Tjukurpa*.

The movement of *Anangu* off country during the first half of the twentieth century greatly reduced the extent and regularity with which traditional land management practices were applied. Activities such as burning, which were once systematic

and intensively undertaken across the landscape, became localised and sporadic, being associated with the forays made by *Anangu* back to country, usually for cultural purposes.

The strengthening of *Anangu* presence on country from the 1950s onwards has been accompanied by a limited revitalisation of traditional land management activities. Most of this is carried out by people as they traverse the lands at ceremonial times; as they travel for work, recreation or funerals; or during periods of time spent camping at outstations and other bush camps. In addition to Kaltukatjara and Mutitjulu residents, *Anangu* from various neighbouring communities in SA and WA opportunistically undertake customary land management activities in the southern and western portions of the IPA respectively. Similarly, land management activities are also undertaken in the northern part of the IPA, if and when possible, by people residing in Utju, Ulpanyali, Lilla, Wanmarra, Ukaka and Imanpa.

In recent years, *Pirampa* (non-Aboriginal people) have actively supported *Anangu* participation in traditional and contemporary land management activities. Although this work was initially focused on UKTNP and the residents of Mutitjulu community, within the last decade various land management programs have also been initiated at Kaltukatjara through organisations such as the former Kaltukatjara Community Council, the Central Land Council (CLC), NPY Women's Council, Ngaanyatjarra Aboriginal Corporation and at the adjoining Watarrka National Park through the Northern Territory Government's Flexible Employment Program.

An indigenous ranger group was initially established at Kaltukatjara in 2006. The group, which currently includes six rangers and a coordinator, is administered by the CLC and funded through the Australian Government's Working on Country initiative.

The Kaltukatjara Rangers have undertaken a variety of land management activities since their inception. These include fencing and cleaning out waterholes, flora and fauna surveys, weed management, feral animal control and fuel reduction burning. Opportunities for rangers to learn traditional skills from elders are facilitated regularly, and intensive training is provided in contemporary land management techniques.



Kaltukatjara Ranger Selwyn Burke and family working on country, 2010

The Kaṯiṯi-Petermann IPA development project, which commenced in 2009, built upon the work of the Kaltukatjara Rangers and further increased the scope of land management work undertaken in the region while also providing new opportunities for *Anangu* participation. IPA development activities included:

- country visits for cultural maintenance purposes
- flora and fauna surveys
- Indigenous Ecological Knowledge (IEK) projects
- aerial-assisted and ground-based burning programs
- water quality monitoring projects.

Field trips which enabled traditional owners to visit country, often for the first time in many years, were a key component of the IPA development program. These trips, which typically included CLC staff and a variety of specialist *Pirampa* personnel, provided opportunities for *Anangu* to see first-hand the changes in the condition of their country, discuss

management threats and strategies and undertake remedial actions. They also created valuable opportunities for elders to pass on traditional knowledge to younger people and record this knowledge on-site for safekeeping.

In recent years, burning work in the region has been guided by a fire management strategy commissioned by the CLC and based on traditional owner burning priorities. Since 2011, the amount of fire work undertaken by the rangers, IPA staff and traditional owners has substantially increased through the securing of fire management-related grant monies (refer Section 6.6).

The Kaṯiṯi-Petermann region has the highest density of feral camels in Australia. Since 2009, the CLC has devoted considerable resources to raising the awareness of *Anangu* about impacts associated with camels and gaining traditional owner consent for various camel management methods. Funding provided by the Australian Government through the Australian Feral Camel Management Project (AFCMP), of which the CLC was a partner organisation, allowed this work to be continued and expanded through until December 2013. Importantly, it enabled *Anangu* to be involved in camel impact monitoring and survey projects and work towards gaining the necessary skills to be able to manage feral camel numbers at a local level on a long-term basis (refer Section 6.5, Box 4).

There are strong cultural connections between the UKTNP and the surrounding IPA through shared traditional ownership. The Joint Management Futures project initiated by the Director of National Parks in October 2014 to revitalise joint management on UKTNP and other jointly-managed Commonwealth national parks (Kakadu, Booderee) has generated renewed joint management planning at UKTNP refocussed on the fundamental traditional owner expectations of joint management from the outset. What is now envisaged is more collaborative planning and resourcing of land management work which maximises *Anangu* employment benefits across the boundaries of these two protected areas. The establishment of a second Australian Government-funded *Anangu* ranger group at Muṯiṯjulu has been proposed as the key ingredient to facilitate this aspiration. Discussions are progressing between the CLC, Parks Australia and other relevant agencies toward establishing a development pathway for such a group (refer Section 8.1).

1.5 Indigenous Protected Area Program

The IPA program, an initiative of the Australian Government, has been established to support Aboriginal people in managing their country for the enhancement of biodiversity and cultural values. Implicit in the protection of these values is recognition of the need to achieve social benefits for participating Aboriginal people, including improvements in employment, health and educational outcomes.

The program has no legislative foundation. Instead, it is based on traditional owners entering into voluntary agreements to add their lands to the National Reserve System (NRS) – Australia’s system of protected areas. As with all reserves recognised as part of the NRS, IPAs are classified according to the International Union for the Conservation of Nature (IUCN) protected area categories. The management of individual IPAs is directed at achieving the overarching objectives defined for the protected area category chosen by traditional owners for their country (refer Section 4.1).

The Australian Government assesses the merits of IPA proposals received from traditional owners according to:

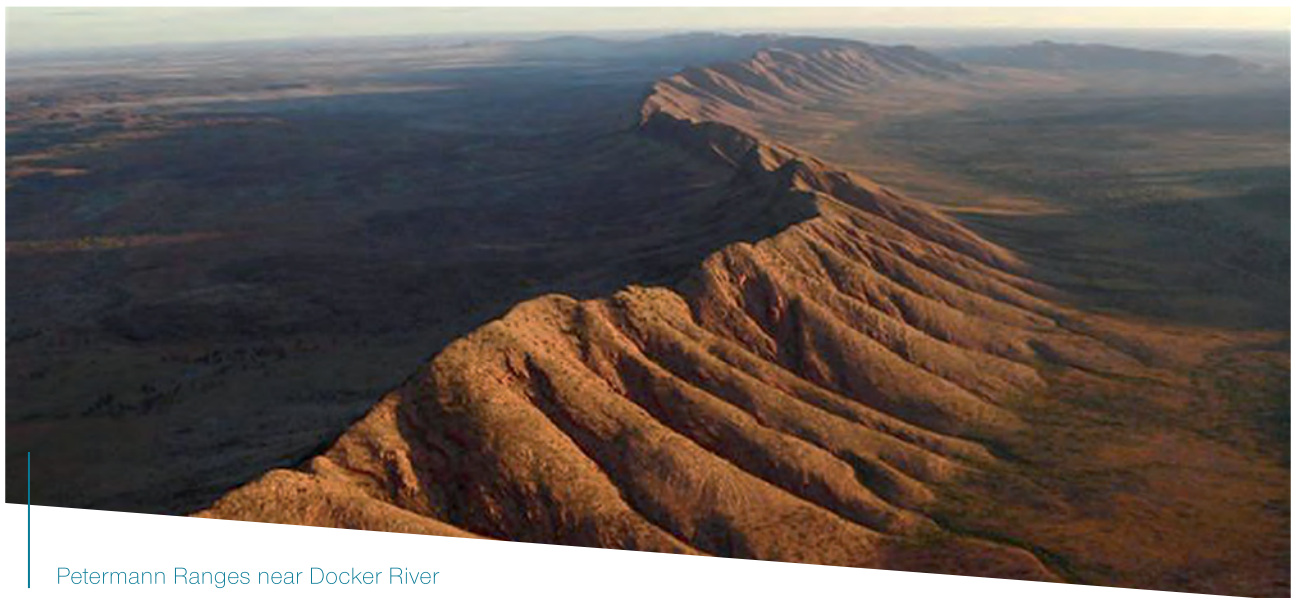
- the proportion of the Australian Interim Biogeographic Region within which the proposed IPA is located which is already included in the NRS
- the level of interest among traditional owners of the proposed IPA for managing their land for conservation purposes

- the capacity of traditional owners to manage the proposed IPA and to administer funds according to Australian Government funding requirements
- the level of demonstrated support from the relevant State/Territory nature conservation agency for declaration of the proposed IPA.

Successful applications are funded for a development phase lasting several years, during which time traditional owners support or oppose declaration of all or part(s) of their country as an IPA. IPA declaration is dependent on completion of a satisfactory draft Plan of Management for the area and the outcome of funding negotiations. Funding for the ongoing management of IPAs is primarily sourced from the Australian Government through the Department of the Environment.

1.6 Linked Protected Areas

The *Katiti*-Petermann IPA is part of a cluster of nine contiguous protected areas that straddle the Northern Territory, Western Australia and South Australia borders (refer Figure 3). Together, these reserves protect almost 200,000 km² of desert country in the centre of the Australian continent, representing a conservation initiative of international significance.



Petermann Ranges near Docker River

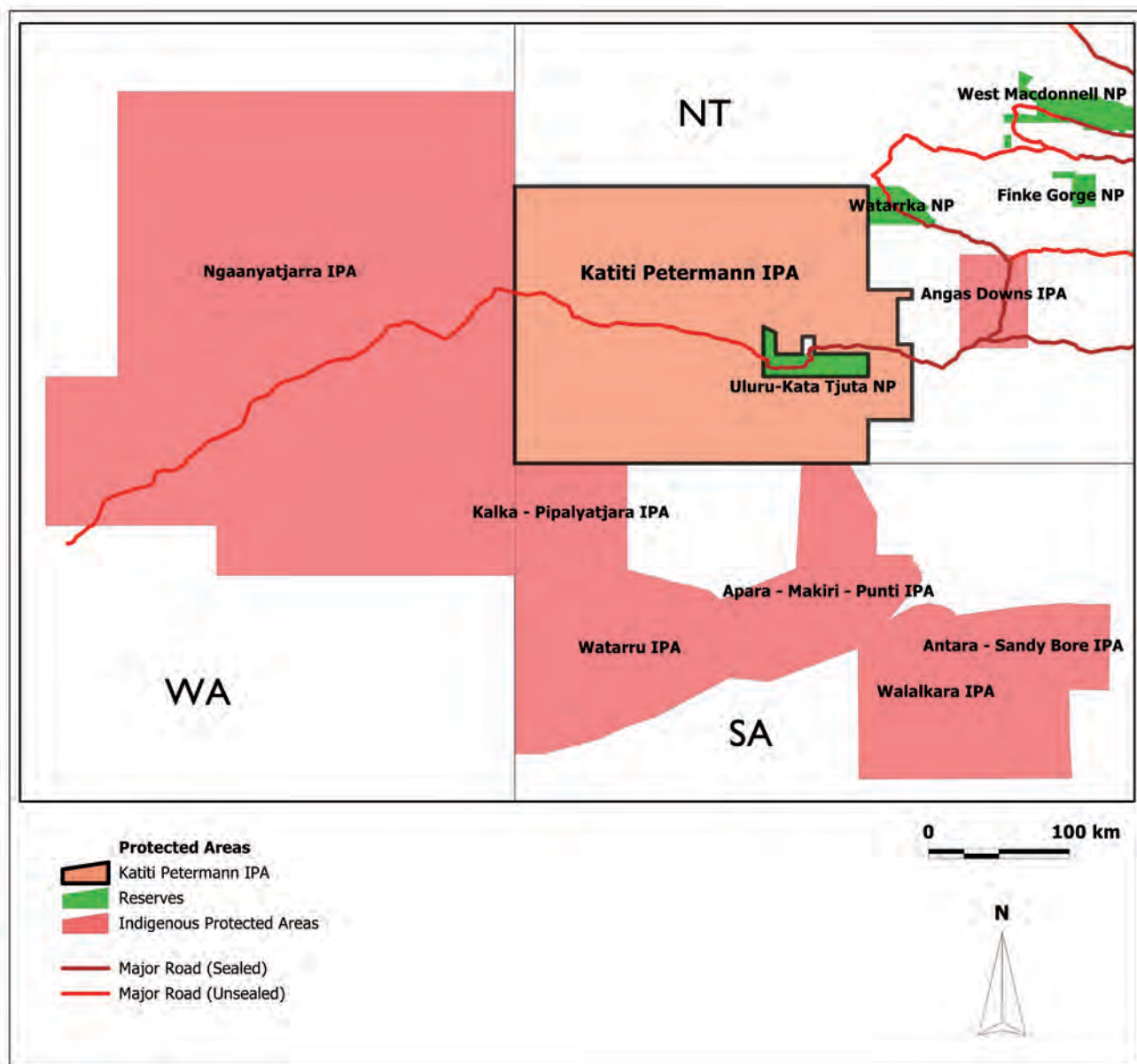


Figure 3 Linked Protected Areas

The 206 km western boundary of the Katiti-Petermann IPA adjoins the Ngaanyatjarra IPA in WA, which encompasses 98,000 km². This is administered by the Ngaanyatjarra Council, with on-ground works undertaken by indigenous ranger groups based at the communities of Warburton and Warakurna and other traditional owners.

The southern boundary of the Katiti-Petermann IPA joins the APY Lands of SA. This 122,000 km² block of Aboriginal freehold land, which occupies the entire north-west corner of SA, contains a collection of five adjoining IPAs, all of which are linked with the Katiti-Petermann IPA. These are:

- Kalka-Pipalyatjara IPA (5800 km²)
- Watarru IPA (12,000 km²)

- Apara-Makiri-Puntji IPA (11,090 km²)
- Walalkara IPA (7000 km²)
- Antara-Sandy Bore IPA (8460 km²).

These five IPAs are administered by the APY Council in conjunction with family and community-based indigenous ranger groups.

All of the seven adjoining IPAs in this tri-state corner are managed as IUCN Category VI reserves, with the dual aims of protecting natural ecosystems and using natural resources sustainably (refer Section 4.1).

The Kaṭiṭi-Petermann IPA completely surrounds UKTNP (1326 km²), named for the iconic landforms of Uluru and Kata Tjuta. The title to the park was handed back to traditional owners in 1985, and it was subsequently leased to the (Australian Government) Director of National Parks for the purpose of a national park. The park is jointly managed by *Anangu* traditional owners and staff of the Australian Government agency Parks Australia.

The 1052 km² Watarrka National Park joins the far north-east corner of the Kaṭiṭi-Petermann IPA. Whereas UKTNP is a federally administered reserve, Watarrka is gazetted under Northern Territory legislation. The park was returned to traditional owners in 2012 and then immediately leased back to the Northern Territory Government. It is jointly managed by traditional owners and the Northern Territory Parks and Wildlife Commission.

Both of the above-mentioned national parks are designated as IUCN Category II reserves, in which management is primarily focused on ecosystem conservation and recreation.

All of the nine protected areas lie within, or adjacent to, the broad sweep of country included in the former Trans-Australia Eco-Link Project. This initiative of the Northern Territory and South Australian governments aimed to establish a continental-scale conservation corridor of linked protected areas stretching 3500 km from Arnhem Land to Port Augusta. With a change of Northern Territory Government in 2012, the Eco-Link Project is no longer being pursued.



Johnny Tjingo, Butler Dome, 2010

2.1 *Anangu* Significance

The land, and all it contains, is what makes *Anangu* who they are.

To *Anangu*, their country is the physical result of *Tjukurpa*, the creative period when ancestral beings rose up from the earth or travelled from distant places, forming or modifying geographical features and placing different plants and animals in the landscape. Eventually, most of these beings were transformed into certain plants or animals themselves, or celestial bodies or elemental forces such as wind, rain or fire. Where they changed into particular entities, such as rocks or trees or watercourses, their powers became localised at these places. These sacred sites are scattered across the IPA often along one of the many ‘dreaming’ tracks or storylines which crisscross the region.

As well as places which embody certain *Tjukurpa* beings, storylines also contain localities where these beings danced, ate, slept, fought and so on. These places are also regarded as sacred sites in that they, too, are believed to be repositories of the essence and consciousness of these ancestral beings. This power, which is still considered to be active, is deemed to be necessary for the maintenance of the life forms related to each being.

Anangu are required to perform particular ceremonies, songs and other rituals to ensure the ongoing wellbeing of species and the continuing viability of individual *Tjukurpa* stories and associated places. Specific individuals or families are responsible for certain storylines and sites as determined by a variety of factors, including a person’s descent, place of birth, spiritual affiliation, ceremonial knowledge and place of residence.

In addition to the myriad of *Tjukurpa* associations marking the country, other evidence of people’s recent and distant ancestors also dot the IPA, including rock art and stone arrangements, knapping sites and innumerable campsites. For contemporary *Anangu*, these tangible signs provide people with a direct connection across thousands of years to their forebears. They are highly regarded and a source of pride.

The significance of the IPA to *Anangu* is also linked with their ongoing maintenance of traditional activities such as gathering bush resources, burning and hunting. Perpetuating these practices also provides people with a bridge across hundreds of generations while strengthening the bonds between people and country.

2.2 *Piranpa* Significance

For *Piranpa*, the Kaṭiṭi-Petermann IPA epitomises the ‘outback’, that vast tract of country that characterises the interior of Australia. The region now included in the IPA was an important setting for the expeditions of nineteenth century explorers such as Giles and Gosse. They were followed by a procession of surveyors, doggers, police officers, missionaries and prospectors, including the hapless Harold Lasseter seeking his illusory reef of gold. All of them contributed to creating the legends of the outback frontier and the iconic Australian ‘bushman’. These romanticised myths have endured and remain integral to Australian identity.

The prominence of this region in the national imagination today is largely due to the presence of the World Heritage-listed national park containing Uluru and Kata Tjuṭa, which is surrounded by the IPA. These two neighbouring features, which attract hundreds of thousands of visitors annually from around the country and the world, have become internationally recognisable symbols of Australia. As such, it is not surprising that the national park and a portion of the IPA are included in the Red Centre National Landscape, one of 16 National Landscapes recognised as the finest visitor destinations in the country.

For many visitors, the landscapes of the IPA have a raw aesthetic and inspirational appeal. This is partially due to the vastness and apparent emptiness of the sandplain, sand dune and salt lake systems that characterise the IPA, and the stark beauty of its desert mountain ranges. But for many people, it is the colours of the place, in particular the many hues of red, that are most memorable. They have inspired innumerable artists and are also central to the widespread appeal of the indigenous paintings that represent stories of this land.

The natural history of the region has interested *Piranpa* from the earliest days of exploration. Since the Horn Scientific Expedition of 1894, various scientists have collected specimens and conducted surveys in what is now the IPA. Although this work has been piecemeal and our knowledge of the biodiversity of the region is far from complete, the IPA is known to contain:

- 2 threatened plants and 63 near-threatened plant taxa
- 6 threatened animal species and 9 near-threatened animals
- portions of two sites of international conservation significance
- two sites (one whole, one part) of national conservation significance
- two sites (one whole, one part) of national botanical significance
- six sites (five whole, one part) of bioregional botanical significance.



Members of the IPA Steering Committee, representatives of the IPA program and other government agencies, collaborating scientists and children from Nyangatjatjara College at an IPA planning meeting, Tjitjingati 2011

3.1 Purpose and Scope of the Plan of Management

A Plan of Management is a document that outlines how an area will be managed in the years ahead. This is the first such plan for the Petermann and Katitj ALTs. It is intended to provide expression to the management aspirations and priorities of the traditional owners of the region and contains strategies directed at achieving a management regime consistent with the IUCN reserve category that traditional owners have chosen for the IPA (refer Section 4.1).

Importantly, the provisions of the plan underpin the work program and priorities of the indigenous rangers, who have been entrusted with turning many of the wishes of traditional owners into reality. Beyond the ranger workforce, the plan is also intended to guide the development and implementation of other community-based and CLC-assisted programs in the IPA.

The scope of this Plan of Management is consistent with that described in the *Guidelines for Australian Indigenous Protected Area Management Plans*. These guidelines dictate that such plans should contain the following components:

- **VISION:** The vision of traditional owners for the management of their country. This should include a statement of intent to manage their country in accordance with the designated IUCN reserve category for the IPA
- **STORY:** Information about the traditional owners of the IPA and about the IPA itself. This should include a description of the process by which traditional owners decided to create an IPA over their country
- **GOVERNANCE FOUNDATIONS:** Details about the governance structures and processes that are in place to guide the ongoing decision-making and management of the IPA
- **FOCUS FOR ACTION:** Descriptions of the cultural, natural, social, educational, economic and other values of the IPA; associated threats and opportunities; and management objectives and allied strategies to manage identified threats and realise opportunities
- **FEEDBACK CYCLE:** Concerns an adaptive approach to management in which research and monitoring results are used to evaluate the effectiveness of management policies and actions and adjust them as required.

The scope and contents of the plan are also shaped by the guiding principles and key management themes provided in Sections 4.2 and 4.5 respectively.

Wherever possible, the provisions of this plan are consistent with those contained in the management plans that have been prepared for the other eight neighbouring protected areas as described in Section 1.6. The foundations and benefits of this cross-border management approach are detailed in Section 4.4.

A limited review of this plan will begin five years after it has been formally adopted, in accordance with the provisions of Chapter 9. This review will principally be confined to possible changes associated with:

- the emergence of previously unforeseen management issues and opportunities
- the identification of significant new values
- the results of monitoring and research programs, where they demonstrate that existing strategies are not achieving stated management objectives
- possible adjustments of governance arrangements.

A full review of this Plan of Management will begin approximately 10 years after it has been formally adopted.

3.2 Cultural Foundation

The contents of this plan reflect decisions taken by traditional owner representatives for the entire IPA and judgements made by smaller groups of people for particular estate areas for which they have specific cultural obligations.

Decision-making responsibilities among *Anangu* have historically been undertaken by traditional owners according to their relationship to their land. This relationship exists on the basis of rights and responsibilities established under *Tjukurpa* and handed down from generation to generation. It is often the product of the collective memory of traditional owners who have always had responsibility for an area or domain.

More so than in other regions in Australia, where land tenure is often focused on a skin system based on patrilineal descent, Western Desert land tenure

recognises various criteria in determining traditional ownership. Descent-based affiliation through individual relationships with a father, mother, grandfather or grandmother is one of the most important and common ways for an individual to be associated with land. Criteria of equal significance include '*borning*' places (association to a particular area through being born there) and '*dreaming*' places (spiritual affiliation to a place because a dreaming track to which someone is affiliated passes through that piece of country). Further to these, residence, ceremonial knowledge, adoption, or the death of a close relative in a certain place are all means by which an individual can become associated with land.

Responsibility for decision-making on country is even more complicated than individuals having association to country. People must also be actively involved with kin and country to gain recognition of their rights to that country. Although decision-making is reserved for senior people with high levels of cultural knowledge, there is often ongoing internal debate about individual claims to country.

Anangu will not make decisions for country they have no responsibility for and they are usually inflexible about this issue. If a major decision needs to be made, it not only needs to have the right traditional owners involved, but meetings may be required to be held on the country in question. This can make decision-making, be it for the entire IPA or a particular place in it, extremely challenging as the people who need to be consulted may live in towns, communities or outstations that are great distances apart. Another issue confronting people is the partial or total loss of cultural knowledge about particular places.

Because of these difficulties, *Anangu* are beginning to adopt new ways of decision-making. This includes people with cultural responsibilities for neighbouring estates collectively taking on decision-making roles for certain places for which there are no living owners.

While the planning process adopted by *Anangu* for making decisions about IPA declaration and the contents of this plan is soundly based on traditional cultural foundations, out of necessity, it too has incorporated new ways of working.

3.3 Planning Process

The decision by *Anangu* to seek declaration of their country as an IPA and the development of this management plan are the culmination of four years of intensive participatory planning.

The CLC was successful in obtaining funding in 2008 through the former Australian Government Department of the Environment, Water, Heritage and the Arts to undertake an IPA feasibility project for the Kaṯiṯi and Petermann ALTs. An IPA Development Officer was subsequently appointed in March 2009.

Numerous formal and informal consultations were conducted with traditional owners during the course of the project. These ranged from discussions held with individuals and family groups during country visits, to large community-based meetings. Although the majority of traditional owners who speak for the Kaṯiṯi-Petermann region reside in the communities of Muṯitjulu and Kaṯukatjara – located at the far eastern and western extremities of the IPA respectively – senior traditional owners for the area also live in Alice Springs and in a number of other communities and living areas scattered across the south-west portion of the Northern Territory and neighbouring parts of WA and SA. Given this, ensuring that right people were effectively consulted on matters relevant to them often required extensive travel.

While all of these consultations provided valuable insights and feedback concerning the management of particular places or parts of the IPA, overall guidance and direction were provided by two *Anangu* Planning Committees established in the communities of Muṯitjulu and Kaṯukatjara. Residents of each community selected their committee representatives, who included members of key traditional owner families. Traditional owner representatives from other communities were invited to attend Planning Committee meetings as appropriate.

The key functions of the Planning Committees were to:

- represent broad traditional owner views and aspirations
- act as conduits between the communities and the IPA Development Officer
- advise the IPA Development Officer about the right people to consult about particular areas or topics.

The two committees met frequently during the course of the IPA development project, either individually or jointly, to deliberate on management issues and opportunities such as cultural heritage protection, weed and feral animal control, fire management, soil conservation, tourism and threatened species. Meetings were typically held on country so participants could view issues first-hand, and they often included presentations from *Piranpa* specialists.

At least one interpreter was engaged for all Planning Committee and other community meetings to ensure that both *Anangu* and *Piranpa* participants were able to clearly communicate their concepts and concerns to each other. The development of a *malpa* (companion) program, in which an *Anangu* person worked alongside the IPA Development Officer, ensured that what *Anangu* were saying was being heard correctly.

Regular country visits were also an integral part of the IPA planning process. Such family-based trips allowed people to visit their country, often for the first time in many years. A key motivation for many traditional owners was the opportunities such trips presented to undertake cultural responsibilities and to pass on traditional knowledge to younger members of their family. The trips also allowed people to see the changes in the condition of their country and to discuss management threats and strategies with CLC staff.

More often than not, country visits were combined with work on a variety of land management projects including flora and fauna surveys, burning programs, waterhole cleaning and monitoring and weed control. Exposing traditional owners to such work gave them a sense of the types of work an IPA might offer them or their children. Working alongside project partners such as UKTNP Rangers, Northern Territory Government staff and scientific consultants allowed *Anangu* to develop skills in contemporary land management techniques and contribute traditional knowledge towards shared goals.

The entire IPA development project was overseen by a Steering Committee that included members of both Planning Committees and representatives of Australian Government and Territory Natural

Resource Management agencies. The Steering Committee, which met annually, reviewed project progress and provided feedback and advice. The Planning and Steering Committees, which operated throughout the IPA development phase, now form the basis of the governance structure of the IPA.

3.4 Governance

The IPA has been divided into four management committee regions as a means of ensuring that governance arrangements do not unduly favour the traditional owners of one part of the IPA over another. The eastern and western regions are based on the communities of Muṭitjulu and Kalṭukatjara. The south-west region (comprising the greater Mann Ranges area) is primarily the country of people living in communities of the APY Lands of northern SA. Key people with responsibilities for the northern region (areas north of lakes Amadeus and Neale) largely reside in communities located to the north and north-east of the IPA.

This division reflects the current traditional owner populations in communities in and neighbouring the IPA, in particular, the affiliations to country of key resident families. That said, the extent of each management committee region is indicative only in recognition that cultural responsibilities for many places are shared between residents of a large number of communities located across the greater region.

Four traditional owners from each of the four management committee regions, together with a representative from the Kalṭukatjara Rangers, constitute the Kaṭiṭi-Petermann IPA Management Committee. Established as an IPA-wide forum for decision-making, planning, review and information sharing, the 17-member Management Committee replaces the Planning Committees which operated during the IPA development phase. (If a Muṭitjulu-based ranger group is established, then the senior ranger of this group will also be a member of the committee.)

The committee members chosen to represent each management committee region are selected by traditional owners. Committee membership nominations are called for every five years. In the interests of broad community and traditional owner engagement, the IPA Management Committee may nominate additional members or invite additional

people to participate in committee meetings as appropriate. The committee meets twice annually for intensive planning and review sessions but can be convened at any time as required.

The key roles and responsibilities of the IPA Management Committee are to:

- represent the aspirations of the traditional owners of the IPA in respect to managing the declared area
- assign priorities to management strategies across the IPA, as detailed in this plan, to inform IPA and ranger group(s) resourcing and work programming
- provide direction to the functioning of the ranger group(s) working across the IPA
- review and respond to monitoring and research results, expert advice, and progress on plan implementation from a whole-of-IPA perspective
- act as an information exchange forum between traditional owner groups across the greater region
- through the IPA Coordinator, represent IPA interests at CLC mining meetings, including promoting of environmental considerations and negotiating moratorium zones or other conditions to protect sites of biological and cultural significance from impacts associated with mineral exploration
- represent the IPA at regional and national forums.

Figure 4 shows the relationships between the IPA Management Committee and the other elements of the IPA management structure.



Kalṭukatjara (Docker River) community

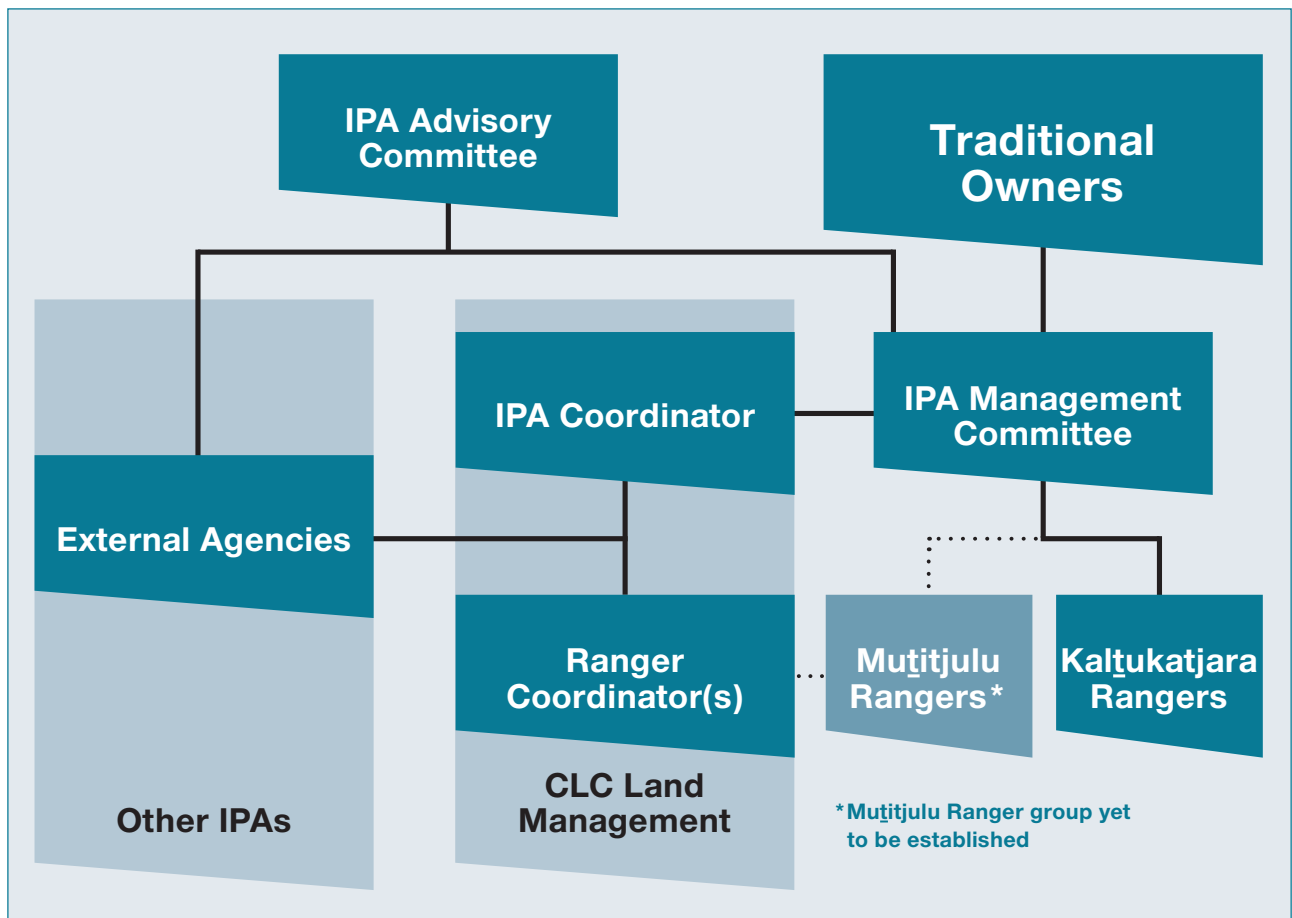


Figure 4 IPA Management Structure



Traditional owners at a meeting in the south-west management region

The IPA Management Committee receives technical advice from the Kaṭiṭi-Petermann IPA Advisory Committee, which meets annually. The scope of the Advisory Committee's functions includes:

- providing expert advice on all aspects of cultural and natural resource management
- reviewing progress on implementing the IPA management plan
- providing advice on the results of monitoring and research programs
- reviewing funding and partnership arrangements.

The Advisory Committee comprises the following people:

- IPA Coordinator
- CLC Coordinator, Regional Land Management
- representative of the IPA program of the Australian Government Department of the Prime Minister and Cabinet
- Park Manager, UKTNP
- representative of the Northern Territory Department of Land Resource Management or Parks and Wildlife Commission
- other experts as required.

The IPA Coordinator, a CLC employee, is responsible to the Manager, Land Management Section, but is also accountable to the IPA Management Committee in performing the primary duties of coordinating IPA governance arrangements and supervising the implementation of the IPA management plan, in particular:

- overseeing the conversion of priority actions, as identified by the IPA Management Committee, into annual work activity schedules
- coordinating IPA work schedules, including those of the ranger group(s), with relevant partner organisations and neighbouring landholders or managers
- providing a range of briefing reports to IPA Management Committee members, the CLC and appropriate stakeholders.

The Kalṭukatjara Rangers, who are supervised by a Ranger Coordinator and administered by the CLC, are directly responsible to the CLC Ranger Program

Coordinator (South). The group is also accountable to the IPA Management Committee in performing its primary role of progressing the aspirations of the traditional owners of the IPA through the on-ground implementation of the management plan provisions. (If established, a Mutitjulu-based ranger group is likely to have similar responsibilities and roles.)

The Kaṭiṭi-Petermann IPA program, including the work of the rangers, is administered by the CLC Land Management Section, which is able to call on the resources and expertise available in other sections of the organisation as required.

Tied to the IPA management structure is a three-tiered Decision-Making Model which is designed to ensure appropriate, adequate and efficient consultation is conducted with traditional owners regarding IPA management activities. It provides a transparent and consistent means to tailor the scope of consultations to suit individual proposals and ensure that activities conducted under this plan conform to the statutory requirements of the *Aboriginal Land Rights (Northern Territory) Act 1976*.



Participant at a cross-border IPA planning meeting

Katiti-Petermann IPA Decision-Making Model

Level 1

Activities requiring consultations with broader traditional owner groups facilitated through the CLC

- Cultural site protection or maintenance – any activities that may interfere with a sacred site
- Decisions relating to commercial ventures (where profits, dividends or royalties will be generated)
- Broad-scale feral animal control, principally aerial operations involving a government agency
- Activities that may adversely affect land or landowners outside the IPA
- Decisions to change the area of the IPA, land uses in the IPA or the role(s) of the IPA Management Committee.

Level 2

Activities requiring Katiti-Petermann IPA Management Committee input

- Decisions regarding the funding/resourcing of management projects across the IPA
- Major one-off capital works, infrastructure provision, plant or operational purchases
- Establishment of formal collaborations and partnerships with non-government and government organisations
- Strategic decision-making related to the implementation of landscape-scale management actions across the IPA, such as fire management programs
- Training and capacity-building decisions regarding IPA Management Committee members and other IPA personnel
- Annual IPA budgeting and financial decision-making
- Development and oversight of annual IPA and ranger work programs.

Level 3

Activities requiring consent of individual traditional owner(s)

- All IPA and ranger work activities carried out on specific traditional owner estates, including country visits and burning that is mainly restricted to one family's country
- All work on or at outstations
- Work and/or visits to particular sacred sites and other culturally sensitive places
- Site-specific feral animal control work.

3.5 Management Partners

The degree to which traditional owner aspirations can be met in relation to the IPA is largely constrained by the number of personnel directly employed to manage the area, the level of resourcing available to them and the capacity of traditional owners themselves. The scale of what can be achieved in the IPA can be significantly increased through the pooling of staff and resources of various government and non-government organisations currently operating in the region. Many of these are working independently towards achieving one or more of the traditional owner aspirations expressed in this plan.

The Katiti-Petermann IPA is in a geographically advantageous position in that it surrounds the UKTNP. For staff working in the IPA, the park has the potential to act as a source of land management expertise; a hub for *Anangu* land management training, education and employment programs; and a key partner in addressing management issues and opportunities that extend across boundaries (refer also Section 4.4).

The proximity of the IPA to the Ayers Rock Resort complex at Yulara also has the potential to benefit IPA management. Owned by the Indigenous Land Corporation, the resort is home to the National Indigenous Training Academy, which provides accredited tourism training programs for indigenous people. Beyond training, the resort has the potential to provide *Anangu* with a variety of employment experiences and pathways. As the principal provider of visitor accommodation and related services, the resort also offers opportunities to promote the IPA to the general public and foster support for the IPA program.

The central campus of Nyangatjatjara College is also situated at Yulara. This community-owned secondary college also has schools at Muṭitjulu, Kalṭukatjara and Imanpa. In addition to providing educational services, the college is a potential partner in IPA country visit trips and land management programs directed at *Anangu* youth. The Yulara campus is well placed to serve as a central meeting or training venue for IPA and ranger group staff working across the NT/SA/WA cross-border region.

The government-operated primary schools at Muṭitjulu and Kalṭukatjara offer opportunities to pass on 'caring for country' messages to *Anangu* children from an early age and the transfer of traditional knowledge through their involvement in IPA bush trips.

Other organisations with locally based staff who have the potential to engage as partners in various IPA programs include:

- [Anangu Jobs](#)
- [Art & Craft Centres \(Maruku Arts, Walkatjara Art\)](#)
- [Kalṭukatjara Community Council](#)
- [MacDonnell Regional Council](#)
- [Muṭitjulu Community Aboriginal Corporation](#)
- [NPY Women's Council.](#)

People in a number of Northern Territory Government agencies actively support *Anangu* land management aspirations in the region. These include staff of the Parks and Wildlife Commission (fire management advice and flora and fauna survey expertise) and Tourism NT (*Anangu* tourism enterprise development).

Partnerships with Aboriginal land management organisations in adjoining parts of WA and SA have the potential to significantly benefit *Anangu* and the management of the IPA (refer Sections 1.6 and 4.4).

CHAPTER 4 Overarching Management



IPA planning meeting at Tjunti

4.1 Protected Area Category

Anangu have determined that the most appropriate IUCN reserve category for the Kaṭiṭi-Petermann IPA is Category VI – Protected area with sustainable use of natural resources. This designation allows for a management regime that aims to protect biodiversity and cultural resources, while permitting the sustainable harvest of traditional resources, including *mai* (bushfood), *kuka* (bush meat), *waru* (firewood), *punu* (wood for artefacts) and natural resources required for medicinal, ceremonial, art and craft or other utilitarian purposes.

In accordance with the IUCN *Guidelines for Applying Protected Area Management Categories*, the primary management objective for the Kaṭiṭi-Petermann IPA as a Category VI reserve is:

- to protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial.

Management of the IPA will also be consistent with the other objectives listed in the guidelines for Category VI protected areas, namely:

- to promote sustainable use of natural resources, considering ecological, economic and social dimensions

- to promote social and economic benefits to local communities where relevant
- to facilitate intergenerational security for local communities' livelihoods – therefore ensuring that such livelihoods are sustainable
- to integrate other cultural approaches, belief systems and world-views within a range of social and economic approaches to nature conservation
- to contribute to developing and/or maintaining a more balanced relationship between humans and the rest of nature
- to contribute to sustainable development at national, regional and local levels (in the last case mainly to local communities and/or indigenous peoples depending on the protected natural resources)
- to facilitate scientific research and environmental monitoring, mainly related to the conservation and sustainable use of natural resources
- to collaborate in the delivery of benefits to people, mostly local communities, living in or near to the designated protected area
- to facilitate recreation and appropriate small-scale tourism.

4.2 Guiding Principles

In addition to the overarching management objectives associated with a Category VI protected area as listed in the previous section, the management strategies contained in this plan are also based on the following fundamental principles:

- **Tjukurpa underpins all activities on country**
Customary law and cultural protocols as defined by *Tjukurpa* govern how country is used and managed by *Anangu*. It underpins all IPA decision-making and activities
- **The right people speak for country**
Individual *Anangu* have obligations to look after their country that are passed down through the *Tjukurpa* and family kinship systems. Decision-making and activities concerning particular estates in the IPA are undertaken by those people with responsibilities to speak for that country
- **Opportunities are created for cultural knowledge transfer between elders and young people**
Elders and young people have cultural responsibilities for the ongoing intergenerational transfer and custodianship of knowledge. Facilitating the transfer of this knowledge to appropriate people is a key component of IPA activities
- **Men and women work together**
Anangu men and women have different responsibilities and knowledge for country under customary law. Neither group can operate alone. IPA decision-making and activities need to involve men and women
- ***Anangu* are kept informed**
As the owners of the IPA, *Anangu* are to be kept informed of all activities undertaken on their country. Adoption of a transparent system for reporting back to traditional owners is imperative to maintaining good working relationships between *Anangu*, IPA staff and external agency personnel
- **Two-way knowledge systems are central to managing country**
The skills and advice of senior *Anangu* knowledge holders and *Piranpa* scientists and land managers are required to ensure that fully informed decisions are made concerning the

management of country. Wherever possible, both customary and Western knowledge and skills are to be sought and applied in land management planning and implementation.

4.3 Two-Way Land Management

Anangu have gained an intimate and intricate understanding of the ecology of the IPA through thousands of years of observation and practice. Up until the depopulation of their country in the early to mid-twentieth century, the transfer of this accumulated knowledge between generations of *Anangu* was essential to their ongoing survival. By contrast, concerted *Piranpa* interest in the ecology of Central Australia is a relatively recent phenomenon. As a result, Western scientific appreciation of the biodiversity and ecological processes of the place remains relatively piecemeal.

These differences in *Anangu* and *Piranpa* ecological perspectives and knowledge of the biodiversity of the IPA, and how to look after it, are not entirely clear-cut today. Since *Anangu* walked the land, a myriad of changes have been wrought upon their country. The introduction and proliferation of feral animal and weed species, altered fire regimes and accelerated soil erosion due to human activities are but a few of these modifications. The storehouse of traditional knowledge and practice still retained by *Anangu* does not directly address these recent changes, whereas controlling these threats to biodiversity has become a focus of contemporary *Piranpa* land management research and expertise.

The critical need to record, share, integrate and apply both *Anangu* and *Piranpa* knowledge and understanding to best look after country is acknowledged by the traditional owners of the IPA. This fundamental requirement for the future wellbeing of the IPA underpins many of the key management strategies contained in this plan.



Yvonne Yiparti, Jim Nyukiti and family, sharing knowledge on country, 2011

4.4 Cross-Border Collaboration

The nine contiguous protected areas located in the NT/SA/WA tri-state border region share more than common boundaries (refer Section 1.6). All are intrinsically linked through:

- shared *Tjukurpa* (stories, sites and responsibilities cut across reserve boundaries)
- shared family ties (many people, including IPA and park staff, have family members living in communities across more than one reserve, and many regularly travel between them)
- shared languages of traditional owners and community residents
- shared cultural knowledge of places and attributes
- shared cultural sites
- shared cultural responsibilities
- shared biodiversity values, such as threatened species (e.g. *tjakura*, *waru*)
- shared threatening processes (e.g. feral animals, wildfires, weed species)

- shared biogeographic regions and ecological communities
- shared social, health and educational challenges across communities
- shared staffing issues
- shared management aspirations and objectives.

Given the large number of connections between these reserves, the case for managing them in a cooperative and complementary way is compelling. Such an approach has the potential to improve protected area management through reducing inconsistencies and duplication and increasing operational efficiency and cost effectiveness. These gains can primarily be achieved through:

- **Complementary Management Policies, Programs and Priorities** as expressed in management plans, sub-plans (e.g. fire management or weed control plans) and operational workplans for ranger groups and through the subsequent on-ground implementation of plan provisions.

The management of values shared across adjoining protected areas (e.g. threatened species, rare plants, cultural sites and knowledge) and threats to the integrity of those values (e.g. wildfires, feral animals, weed species) are best managed cooperatively as neither the values nor threats are constrained by jurisdictional boundaries

- **Sharing of Personnel** can create a cross-border pool of expertise that can be called on as required by staff of any of the adjoining protected areas to assist with particular management issues.

It can also facilitate opportunities for ranger staff from adjoining protected areas to come together and work en masse on a particular project in one or other of the protected areas for a limited duration on a rotational basis, creating efficiencies of scale.

There may also be instances where it is more efficient for rangers from one protected area to do patrols or particular work in part of another protected area located close to a border because of the proximity of that ranger group's base to that area

- **Sharing of Resources**, especially infrequently used but expensive capital items such as heavy machinery, provides opportunities to share costs and maximise the productive use of such items. It can extend to coordinating the use of fixed-wing aircraft or helicopters across protected areas to reduce costs to individual organisations associated with flying aircraft to and from where they are based
- **Sharing of Data Management Systems** and developing data sharing arrangements ensure that complementary software and hardware are purchased to enable the seamless sharing of data relevant to more than one protected area, be it on changes in the distributions of threatened species, feral animals or weed species or changes in fire histories. Coordination can extend to the type(s) of data being collected, say through the use of standardised or complementary CyberTracker sequences, or to the ways in which data are stored and retrieved.

Combined purchases of software and hardware items and the pooling of financial contributions from more than one protected area budget for, say, the development costs of a database, can result in cost savings to individual organisations

- **Cooperative Research and Monitoring Programs** between adjoining protected areas can reduce duplication of effort, ensure consistent methodologies are being used and guarantee that comparable data are being collected. Irrespective of whether staff or consultants are engaged to do this work, working together on research and monitoring programs should result in greater efficiencies and skills sharing between organisations
- **Sharing Staff Training Opportunities** can benefit organisations by saving travel costs and maximising access to on-site training delivery. Protected area personnel who are qualified to train staff in a particular skill can train staff from adjoining protected areas
- **Sharing Funding Applications** for resources or projects that are relevant to more than one protected area can reduce the administrative burden on individual organisations and may be viewed more favourably by funding bodies
- **Improved Staff Morale** can be achieved by creating opportunities for staff from adjoining protected areas to come together to work on particular projects, for training or for planning meetings to exchange experiences and learn from each other. Joint events can help reduce the sense of isolation that remotely based ranger group members can experience
- **Staff Exchange** or secondment opportunities between adjoining protected areas promote professional development and can provide learning opportunities for individuals who can then return to their groups with different ideas that they would otherwise not be exposed to.

Anangu and the managers of each particular protected area support a collaborative cross-border approach to management. Traditional owners involved in planning for the 2014–15 Joint Management Futures project at UKTNP have expressed a strong desire to work across protected area boundaries to realise better outcomes for country and for *Anangu* employment. This commitment to cross-border collaborations is reflected in the contents of this plan.



Cross-border fauna survey participants at Walytjatjata 2010

4.5 Management Themes

Through the IPA development process, four management themes have been identified that define the broad aspirations of traditional owners in managing country in the IPA. Discussions on the values of the IPA, together with related issues and opportunities, management objectives and strategies, as detailed in Part B of this plan, are mostly grouped under these themes which are:

- ***Tjukurpa-ku aṯunymananyi* – Looking After Culture**
The continuation of customary practices on country and the passing down of cultural knowledge between generations is critical to the management of the natural and cultural values of the region and to the spiritual and social wellbeing of *Anangu*
- ***Mantaku aṯunymananyi* – Looking After Country**
The management of threatening processes – such as altered fire regimes, introduced plants and animals, and soil disturbance – is essential for maintaining or enhancing the condition of the cultural and biodiversity values of the region. Managing these threats requires addressing data gaps and marrying customary and Western land management knowledge and techniques
- ***Ngapartji-ngapartji nintiringanyi* – Two-Way Education and Training**
Programs are required to facilitate the

maintenance of customary law, upholding of *Pirānpa* laws, and education of *Anangu* and *Pirānpa* in both traditional and Western approaches to caring for country. Key elements include the provision of training opportunities and the production of culturally appropriate educational materials and pathways into paid employment associated with the IPA

- ***Waaka kutjupa tjuṯa maniku palyalkatintjaku* – Jobs and Economic Development**
Employment opportunities linked to the IPA are essential for the economic development of communities in the region and for retaining traditional owner commitment to IPA designation over their country. Apart from land management programs, other economic development opportunities in the IPA include tourism, the harvest of bush resources and carbon farming.

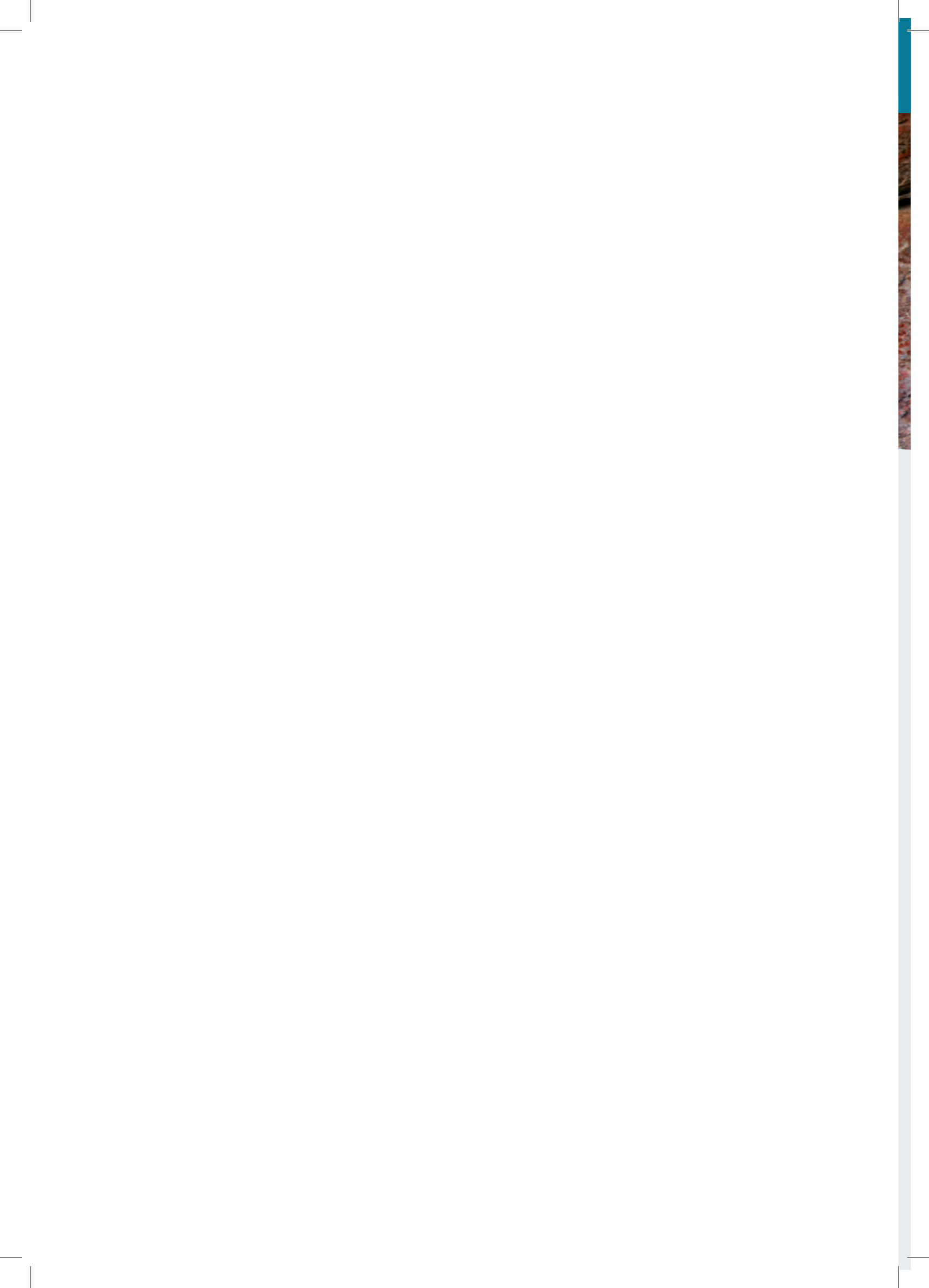
These management themes, and the strategies identified to resolve associated issues and realise opportunities, are often interrelated. In a practical context, individual projects or field trips are commonly directed at implementing multiple management strategies or actions across more than one management theme.





Part B

MANAGEMENT STRATEGIES





Rock art, Walka

5.1 Introduction

For *Anangu*, ‘looking after culture’ and ‘looking after country’ are inextricably linked. For a people whose very existence was dependent on the prudent management of their meagre desert resources, it is hardly surprising that *Anangu* culture is first and foremost ‘of the land’. Looking after that land so as to optimise its productivity was, and remains, a central strand of *Anangu* culture, which encompasses a myriad of interrelated beliefs, practices and knowledge.

Although *Anangu* no longer rely on this well of traditional information for their physical survival, its retention is integral to their cultural survival. It is also vital for the wellbeing of the biodiversity of the IPA.

5.2 Cultural Beliefs and Knowledge

5.2.1 Background

Traditional *Anangu* beliefs and knowledge systems, in all their layered complexity, are defined in the *Tjukurpa*. Consisting of countless songs, stories, practices and *inma* (ceremonies), the *Tjukurpa* describes the origins, attributes, management and uses of every element of the land. It also prescribes who is responsible for certain places, how people interact with each other, and who can go where and

with whom. The all-encompassing *Tjukurpa* is the very core of *Anangu* culture, connecting and sustaining both people and country.

“ *Nganana Tjukurpa wanungku tjukarurungku kunpungku Tjukurpa kanyira kunpu ngarama waakangka.*

By working straight and strong according to the Tjukurpa, we will keep the Tjukurpa strong. ”

Sandy Willie

At the heart of the *Tjukurpa* are the innumerable ancestral beings, who, through their travels and adventures, created the features of the landscape, its plants and animals – and *Anangu* themselves. As they travelled across the country, these heroic figures generated the songs and ceremonies that describe the creation times, the laws for living with the land and all that exists within it and the moral codes for everyday life. For *Anangu*, these ancestral beings still inhabit the land and are embodied in specific places, plants and animals.

To *Anangu*, the travel routes of ancestral beings are especially important. The IPA is crisscrossed by such 'dreaming' tracks, including those associated with *Kungka Kutjara* (Two Sisters), *Kurpany* (Devil Dingo), *Wati Nyiinnga* (Iceman), *Tjitji Kutjara* (Two Children), *Kungkarangkalpa* (Seven Sisters), *Liru* (Poisonous Snake), *Mala* (Rufous Hare-Wallaby), *Tjati* (Red Lizard), *Tjitji* (Children), *Lungkata* (Blue-tongue Lizard), *Kuniya* (Woma Python), *Kaanka Walawuru and Kakalyalya* (Crow, Eagle and Cockatoo), *Kalaya* (Emu), *Tjala* (Honeyant), *Piiwi* (Night Bird) and *Wati Ngintaka* (Perentie Man). Particular places along all such travel routes, where certain events occurred, are regarded as sacred sites.

The *Tjukurpa* stories associated with the creation time ancestors of specific animals or plants often incorporate detailed ecological knowledge of each individual species. Sometimes referred to as Indigenous Ecological Knowledge (IEK), this wealth of information based on thousands of years of observation incorporates knowledge of animal behaviour and habitats; climate patterns and ecological responses; the management requirements of particular water places, plants and animals; and the interrelationships between different elements of the landscape. This aspect of *Tjukurpa* was once critical to *Anangu* survival. Today, *Tjukurpa* still underpins the ways that *Anangu* interpret and view country and guides the activities that *Anangu* deem necessary in order to keep the land healthy.

For *Anangu*, the very act of being on country is regarded as essential to keeping it – and themselves – healthy. Traditionally, keeping country healthy and productive encompassed a prescribed regime of management that included burning practices, the

active maintenance of water places and complex protocols aimed at ensuring the sustainability of hunting and harvesting activities (refer Section 5.3.1). It also required the singing of songs, the passing on of stories and the holding of *inma*, including increase ceremonies for particular plants or animals.

The performance of *inma* remains very important to *Anangu*. Although fewer people have been able to participate in modern times, one major ceremony cycle occurs from late October to early February each year when significant numbers of participants travel through the IPA to designated places to fulfil their traditional ceremonial responsibilities. Regular participation in the ritual performance of song and dance cycles brings the *Tjukurpa* to life.

The depth, breadth and complexity of the information encompassed by *Tjukurpa* mean that the knowledge held by any one individual or group of people can only ever be partial. Different people are responsible for different aspects of *Tjukurpa*. Even those identified as the custodians of certain knowledge must earn the right to it by demonstrating maturity and responsibility. The different roles and responsibilities assigned through *Tjukurpa* to men and women are reflected in the existence of gender-specific knowledge and access restrictions. For men and women, the acquisition of knowledge can be a lifelong process, with the deepest understanding of *Tjukurpa* held by small numbers of senior people.

Irrespective of who 'holds' the knowledge, possession carries with it the responsibility for protecting that knowledge. This means ensuring that any restrictions are enforced and that the transfer of knowledge to the next generation of



Kaltukatjara Ranger Raymond James leads boys for *inma*, Walka cave, 2013



Happy Reid, Yangi Yangi Fox and sisters at Nyira, their mother's burning place

custodians occurs. This oral transfer of *Tjukurpa* is a significant aspect of *Anangu* culture and is critical in educating young people about their roles and responsibilities in looking after their country.

5.2.2 Issues and Opportunities

Previously, the *Tjukurpa* featured in the day-to-day lives of *Anangu* through storytelling and singing. Dances and ceremonies associated with particular animals, plants or places were performed regularly. In the daily search with family members to find food or other resources, children learnt about the ecology, traits and uses of individual species, where to find them and, in the case of animals, how to track and hunt them. The movement of *Anangu* off their country from the 1930s onwards, and the myriad of issues associated with them living sedentary lifestyles in centralised communities, has resulted in a dramatic loss of cultural knowledge.

Loss of Cultural Knowledge

There are still senior *Anangu* alive today who, as young people, led traditional lives and acquired high levels of cultural knowledge. Many such people are elderly and in poor health. With each passing year as the number of such people alive gets smaller and smaller, so too does the trove of knowledge and beliefs that defines *Anangu* culture. In some instances, there are no custodians of particular cultural knowledge left alive and few people remaining who can speak for certain tracts of country. This diminution of *Anangu* cultural knowledge encompasses:

- loss of *Tjukurpa* stories, songs, ceremonies and practices
- loss of knowledge about culturally significant sites. For various parts of the IPA, knowledge of the locations, navigational aids and the very existence of many sites has been lost forever. Sometimes there is no one alive who has personally visited such places, or the remaining knowledge holders live in distant towns or communities and rarely, if ever, visit their country. Other significant sites in the IPA are now overgrown or infilled due to the absence of active management, making them hard to locate. Remoteness and the lack of vehicular access to many such places are contributing factors in the ongoing loss of knowledge about them
- loss of ecological knowledge concerning individual species, particularly those that are

regionally rare or now extinct

- loss of knowledge of traditional land management regimes including burning and sustainable hunting and harvesting practices (refer Section 5.3.2).

These issues are often exacerbated by the reluctance of senior *Anangu* to pass on knowledge to young people if they believe they are not sufficiently mature, respectful or interested. Most elders view the re-engagement of young people with the spiritual, cultural and ecological knowledge embedded in the *Tjukurpa* as being of the highest priority. For them, the revaluing of traditional beliefs and knowledge offers young people a renewed sense of identity and empowerment and the chance to keep *Anangu* culture alive.

Revaluing Cultural Knowledge

Although the value of traditional knowledge systems was recognised by certain explorers, scientists and anthropologists more than a century ago, it is only in relatively recent times that such knowledge has been actively sought out and applied in protected area and biodiversity management. At a local level, traditional knowledge was first incorporated into fire management planning for UKTNP during the 1980s. *Anangu* skills were also utilised during a decade-long wildlife survey of the APY Lands of SA during the 1990s. In recent years, *Anangu* ecological knowledge has been applied during wildlife surveys conducted in the Katiiti-Petermann region, with tracking transects now incorporated into standard survey methodology. Traditional and Western fire management knowledge, skills and priorities have also been combined in fire management projects undertaken in the IPA since 2011.

Mainstream recognition of the importance of the IEK still retained by senior *Anangu* may help build respect for such knowledge among young people. The elevated status given to knowledge holders may encourage indigenous rangers and others to seek out traditional knowledge, reducing the likelihood of more of this information being lost (refer Section 7.2).

Recording and Storage of Cultural Knowledge

Anangu cultural knowledge has always been passed down orally. With the number of senior knowledge holders dwindling with each passing year there is an identified need to document many aspects of *Tjukurpa*. The locations of cultural sites, and the stories and ceremonies associated with them, need to be recorded, as does the remaining wealth of ecological knowledge. Retention of this knowledge is not only critical for current and future generations of *Anangu*, it is also important for the long-term management of the IPA.

The media chosen to record this knowledge and the systems adopted in which to store and retrieve it require careful consideration and design. The use of modern multimedia technology, which is readily embraced by young *Anangu*, provides opportunities for youth to be engaged in the documentation process and is a means of fostering interest in the knowledge of their elders. While the system chosen for the storage of this knowledge needs to be accessible to *Anangu*, it must incorporate *Tjukurpa* rules on information access. Use of traditional knowledge by *Piranpa* needs to be covered by protocols to protect indigenous cultural and intellectual property rights.

Repatriation of Cultural Material

Ever since the first contact between Europeans and Aboriginal people in Central Australia, the way of life and cultural beliefs of *Anangu* have been studied and documented in a variety of forms. Objects were collected and catalogued, while practices, ceremonies and knowledge were chronicled in words, films and sound recordings. In many cases, this material was deposited in public or private museums, libraries and educational institutions in Australia and abroad.

The information stored in these collections may include *Tjukurpa* knowledge that is no longer held by contemporary *Anangu*. The repatriation of this knowledge and the sharing of it with those people identified as its custodians offer opportunities for cultural revitalisation and enrichment and improved management of the IPA.

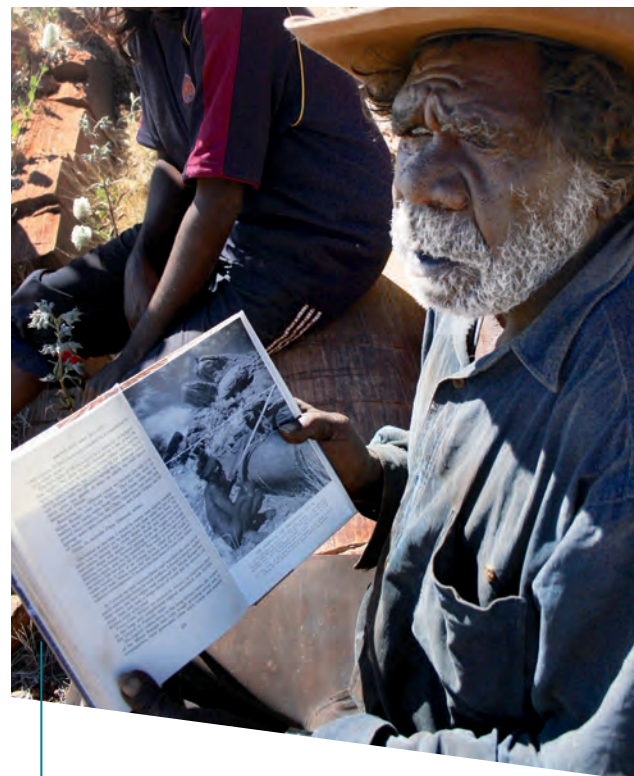
In 2013, a secure 'keeping place' was constructed at UKTNP to house sacred and repatriated material on behalf of the traditional owners of the park.

CLC Cultural Heritage Management Program

In 2012, the CLC began developing an organisation-wide Cultural Heritage Management Program to address the coordination, integration, development and prioritisation of cultural heritage management support and activities. The program encompasses a broad range of cultural heritage matters, including:

- the transmission and recording of cultural knowledge
- customary management activities
- the physical maintenance of culturally significant sites
- training and capacity building
- the development of cultural heritage management plans or related documents (refer Section 5.3.2).

The Cultural Heritage Management Program provides a strategic framework for managing cultural heritage values across the IPA.



Kelly Petermann remembering olden times, and passing on knowledge, Mann Ranges survey 2010

5.2.3 Management Strategies

Management Objective 5.2.3(a)

Support traditional owners in preventing the ongoing loss of cultural knowledge

Management Strategies

1. In conjunction with senior *Anangu*, the IPA Management Committee and CLC Anthropology Section staff, review the cultural knowledge records held by the CLC for the IPA and identify key knowledge gaps.
2. Based on the advice of *Anangu*, identify the best means of addressing key knowledge gaps, including:
 - conducting country visits
 - holding one-on-one or group interviews and cultural mapping exercises
 - undertaking literature reviews.
3. Develop and implement a country visit program as the principal means of supporting the retention and recording of *Anangu* cultural knowledge.

The program will aim to preserve cultural knowledge associated with:

- *Tjukurpa* stories, songs, ceremonies and practices as they relate to particular places or regions
- culturally significant sites (including rediscovering 'lost' or rarely visited sites and knowledge concerning their management)
- ecological attributes (refer also Management Objective 5.2.3[b])
- customary land management practices (refer also Management Objective 5.3.3[a]).

In keeping with the CLC Cultural Heritage Management Operational Guidelines, the program will prioritise country visits based on the following considerations:

- the results of the review of the cultural knowledge already recorded for the IPA (refer Strategy 1)
- the risk of irretrievable knowledge loss due to only a small number of senior *Anangu* knowledge holders remaining alive
- areas of outstanding cultural significance
- estates for which a low level of cultural knowledge has been recorded
- equity among family groups and different parts of the IPA
- a demonstrated interest shown by traditional owners in retaining their cultural knowledge
- a demonstrated interest shown by potential recipients in receiving cultural knowledge
- areas that are difficult for traditional owners to access without logistical support

- areas with low levels of visitation in recent years
- opportunities to mitigate risks to cultural values or sites through undertaking country visits.

Each country visit will aim to contribute to the retention of cultural knowledge through providing opportunities:

- for senior knowledge holders to teach younger people on site through showing and telling
- for *Anangu* to record cultural knowledge for their family or community use in the form of photographs and sound or video recordings, with copies of material to be retained in the IPA database as appropriate (refer Management Objective 5.2.3[c])
- for CLC staff to record appropriate information for inclusion in the IPA management and/or CLC anthropology databases (refer also Management Objective 5.2.3[c]).

The planning and conduct of individual country visits will require:

- coordinating the involvement of senior traditional owners, key knowledge holders, family members and the right young people for the country involved
 - where appropriate, the lodgement of traditional owner identification requests
 - utilising the trip to undertake other IPA land management work priorities
 - where appropriate, involvement of other CLC staff including rangers, the regional anthropologist and IPA partners.
4. Conduct one-on-one or group interviews and cultural mapping exercises with key cultural knowledge holders as directed by *Anangu*. As appropriate, provide opportunities for *Anangu* to record this knowledge for their own use and for suitable material to be recorded and stored in the IPA management and/or CLC databases (refer also Management Objective 5.2.3[c]).
 5. Ensure that work directed at documenting sacred site information, or other culturally sensitive information, is conducted in conjunction with CLC Anthropology Section staff.
 6. In accordance with protocols governing the appropriate use and management of cultural information (refer Management Objective 5.2.3[c]), produce maps, printed photographs, video and sound recordings and other relevant products to assist traditional owners in maintaining and transferring cultural knowledge.

Management Objective 5.2.3(b)

Support the retention and application of Indigenous Ecological Knowledge

Management Strategies

1. Develop and implement an Indigenous Ecological Knowledge (IEK) program designed to:
 - provide opportunities for the systematic intergenerational transfer of this knowledge to young *Anangu*
 - teach this knowledge to *Anangu* and *Pirrapa* ranger group members and IPA staff through both formal and informal means (refer also Management Objective 7.2.3 [a])
 - facilitate the application of this knowledge in planning and day-to-day management of the IPA.

The structure and content of the IEK program will be based on assessments of:

- the extent and type of existing IEK documentation
- the information still held by individual *Anangu* knowledge holders
- IPA management needs for particular IEK.

The program will use a variety of means to promote the transfer of IEK, including:

- country visits and IPA and ranger program field trips
- IEK-specific country trips
- school programs (refer also Management Objective 7.2.3 [b])
- formal IEK training workshops and trips for IPA and ranger staff.

As with the country visits program, the IEK program will include opportunities to record IEK by both *Anangu* and *Pirrapa* and to store appropriate IEK information in the IPA management database for ongoing educational purposes (refer also Management Objective 5.2.3[c]).

Management Objective 5.2.3(c)

Assist traditional owners to manage cultural information

Management Strategies

1. The collection and recording of all cultural knowledge will use the standardised methods and tools developed through the CLC Cultural Heritage Management Operational Guidelines. (This applies to all information collected through the country visit program, knowledge holder interviews, literature reviews and the IEK program.)
2. Identify opportunities for the safe electronic storage, access, use and distribution of cultural information. Based on this research, create and populate an IPA management database with the ability to serve this purpose.

3. Ensure that all information relating to sacred sites is forwarded to CLC Anthropology Section staff for secure storage. Information concerning sacred sites is not to be held elsewhere.
4. Investigate the use of the UKTNP keeping place and other alternatives for the secure storage of physical objects associated with the IPA.
5. In conjunction with senior *Anangu*, the IPA Management Committee and CLC Anthropology Section staff, develop and enforce protocols governing the appropriate use and management of all IPA cultural information and physical items.

Management Objective 5.2.3(d)

Support the repatriation of cultural material associated with the traditional owners of the IPA

Management Strategies

1. Conduct a review of all relevant available publications, including historical records, to locate cultural information related to the IPA which may not be known to contemporary *Anangu*. Make this information accessible to *Anangu* and utilise it, as appropriate, in managing the IPA.
2. In conjunction with CLC Anthropology Section staff, identify relevant organisations, institutions and individuals holding cultural material relevant to the management of the IPA, including but not limited to:
 - ceremonial documentation pertinent to *palunji* (increase ceremony) or other relevant *inma*
 - historical documentation related to the location of sacred sites and water places
 - documentation of traditional land uses.
3. In conjunction with *Anangu*, determine which externally held cultural material is relevant to the management of the IPA and seek its repatriation. The return of physical cultural items will only be sought once a suitable repository or keeping place has been secured and access and use protocols finalised.

5.3 Customary Practices

5.3.1 Background

For *Anangu*, the simple act of ‘being on country’ is the overarching customary practice that overshadows all others. This modest physical act of human contact with the land is central to people being able to fulfil their responsibilities to look after country as defined by *Tjukurpa*. The desire to be on their land and renew their relationships with it is still deeply embedded in *Anangu*.

In historical times, ‘being on country’ was a constant feature of *Anangu* lives. So, too, was the undertaking of a suite of highly prescribed practices that were required to maximise the productivity of the land and the likelihood of *Anangu* survival. These included:

- protecting and maintaining cultural sites (many of which coincided with resource-rich areas such as water places)
- sustainable resource management (including burning practices and various hunting and harvesting protocols).



Sandy Willie burning country near Kalṭukatjara, 2010

“ *Kamiluni nintilpai inmaku, winkiku kana nintiringkula palunyaḷta wananu; tjina wanarala nintiringkula inma kanyini.* ”

My grandmother taught me ceremony, everything. Once I gained my knowledge, I followed her way. We follow their footsteps in learning and holding ceremony. ”

Yvonne Yiparti

As well as performing *inma*, *Anangu* used various practical measures to protect and maintain cultural sites. These included close-in burning work to reduce fuel loads in areas adjoining significant vegetation or other features, removing debris from waterholes and renewing artwork. This work could only be undertaken by the *Nguraritja* (right people) with guidance from senior knowledge holders.

Access restrictions also applied to certain sacred sites. For especially sensitive places, knowledge of their very existence was highly restricted, with visitation only permitted by, or in the company of, senior custodians. Sanctions for violating knowledge and access restrictions for such places could be severe. Access to other sites was, and remains, gender specific or limited to initiates. Customary practices associated with approaching and visiting most sacred sites, irrespective of their degree of sensitivity, usually demanded specific codes of behaviour. Similarly strict protocols also covered the viewing, handling and possession of sacred objects, many of which were stored at sacred sites.

The active management of available water resources was critical to *Anangu* survival. Customary practices such as clearing out vegetation, mud and sand from waterholes and covering seepages and springs with rocks or branches to minimise evaporation were essential to optimising water quality and quantity. These practices, regularly performed at the many water places dotted across the greater landscape, also optimised food production by sustaining local populations of game species reliant on water supplies (refer Section 6.3).

“ *Nyaruni wiru palya kilinara ngura maluku, ukiriku munu ngula nyakupai waru kampanyi munuya kulini: Uwa, waru kampanyi, ngura parari tungu-tunguni – paluru tjana kilinananyi, ngura para kilinananyi maluku ukiriku.*

Paluru tjana malu tjana wirkananyi, turkey, malu tjuta ukiringka ka kulatangka wakalpai.

Burning is right and good, cleaning the country for kangaroo, for new growth, and you'll see the country burning and think: Ok, there's a fire burning in the distance with huge plumes of smoke – that mob is cleaning country for the kangaroos' grasses.

The kangaroos and other animals go to the grass, turkeys and kangaroos, and then you spear them. ”

Reggie Uluru

Burning was conducted as a matter of course on a day-to-day basis. While fire was primarily used as the principal means of maximising food production, it was also used for a variety of other purposes (refer Section 6.6). Burning country remains a key customary practice for *Anangu* today and is applied whenever the opportunity arises. Fires are regularly lit during hunting trips or as people travel across the region for family, community or recreational purposes.

In addition to burning and the maintenance of water places, the traditional land management regime applied across the region included detailed hunting and harvesting protocols and restrictions designed to promote sustainable supplies of game species, bush foods and plant and animal material needed for ceremonial, medicinal and other utilitarian purposes. These conventions included hunting and gathering prohibitions at certain sacred places or sensitive regions, effectively creating 'protected areas' for biodiversity. There were also rules that covered seasonal harvesting restrictions, taboos on individuals eating their totemic animal or plant species and regulations on who could hunt or harvest in certain areas.

While the continuation of customary practices is no longer critical to *Anangu* survival, the partial or total cessation of such activities across all or parts of the region has had profound impacts on *Anangu* and biodiversity.



Cooking a *tinka* (sand goanna)

5.3.2 Issues and Opportunities

With most *Anangu* now living in settlements, sometimes far removed from their traditional estates, opportunities for them to spend time on their country and undertake customary practices are often severely limited. Although a large number of outstations were previously constructed across the region to facilitate traditional owners' desires to live on their country, very few of these have been maintained and only a handful have operational bores or generators. Since 2006, maintenance work has been conducted at eight outstations using UKTNP lease money paid to traditional owners. Despite this, only one outstation (Alpara) in the IPA is currently permanently occupied. The ability of *Anangu* to be on country is also hampered by access difficulties. Most of the IPA is roadless, and those tracks that do exist are usually of a rudimentary nature and only negotiable by four-wheel drives. Very few *Anangu* own such vehicles.

In addition to infrastructure constraints, the diminishing number of surviving senior knowledge holders means that with each passing year more and more knowledge is lost concerning the locations of sacred sites and water sources and the management regimes particular to each. Compounding this issue is disinterest among some young people to take on the roles and responsibilities of custodians of their country and to learn and apply customary land management practices. This includes an appreciation of access restrictions and an understanding of the protocols governing resource harvesting.

As *Anangu* are no longer reliant on locally available natural resources for their survival, adherence to the traditional rules aimed at preventing overharvesting has faltered. Hunting pressure is now heavily concentrated around communities and outstations and along tracks rather than across the entire landscape. This focused hunting effort, in which traditional weapons and techniques have been replaced by firearms, often results in the killing of most game animals observed. The extinction of numerous mammal species from the 1930s onwards, largely as a result of changed fire regimes and predation pressure by introduced animals, has meant that there are fewer animals left to hunt, placing further pressure on surviving game species.

Both the Kaṭukatjara ranger initiative, which began in 2006, and the IPA development project since



Children clean and care for a *kakalyalya* (Major Mitchell's cockatoo) site at Pirrulpakalarintja while traditional owner Millie Okai looks on

2009 have included 'country visit' programs in which senior traditional owners and their families have been provided with the means of visiting and spending time on their country. The availability of reliable four-wheel drive vehicles and helicopter transport through these programs has enabled people to visit remote country, often for the first time in many decades.

Such country trips have been, and continue to be, used by *Anangu* to visit sacred sites and water places, undertake customary activities and teach young people about places and practices. The inclusion of young people on these trips is critical not only to the long-term retention of knowledge about customary land management practices and the building of confidence to apply them, but also as an invaluable way to reinforce the importance of the custodial roles and responsibilities young people have inherited.

In addition to country visits, the ranger and IPA development programs have conducted many field trips throughout the region in recent years, primarily focused on contemporary land management activities such as fire, weed and feral animal



Kalitukatjara Rangers remove wasp nests to protect rock art at Walka, 2013



Kalitukatjara Rangers Leo Watson and Brett Stockman erect a fence to control vehicle movements at Walka, 2012

management and flora and fauna surveys. Senior traditional owners and members of their families are invited on all such field trips, which provide additional opportunities for people to conduct customary activities. Such trips also allow *Pirampa* staff to learn from traditional owners and expose *Anangu* to Western land management approaches and concerns. This has resulted in better understanding among *Anangu* participants of impacts associated with feral animals and weeds, thereby changing hunting and burning regimes.

The reinvigoration of customary land management practices across the IPA is viewed as essential to the health of both *Anangu* and country. The IPA program has the potential to strengthen traditional owner ties with their country and increase the application of customary practices. It also has a central role in facilitating intergenerational transfer of customary land management knowledge and encouraging young *Anangu* to revalue such knowledge.

Recent land management programs have also included works aimed at conserving cultural sites. As part of the CLC Cultural Heritage Management

Program, a cultural heritage management plan was prepared for an important cultural place south of Kaltukatjara called Walka. The plan – developed by traditional owners, rangers and other CLC staff – documents the cultural values of the site and the strategies required to mitigate and monitor threats to these values. The Walka planning exercise is viewed as the first of many, with the skills acquired by CLC staff able to be applied at other cultural sites across the IPA at the request of traditional owners.



Grinding stone at Glen Thirsty



Hand stencil, rockshelter north of Lake Amadeus

5.3.3 Management Strategies

Management Objective 5.3.3(a)

Support traditional owners to fulfil cultural obligations to care for country through customary management activities, including:

- *inma (ceremony)*
- *looking after cultural sites*
- *hunting and harvesting of bush resources*
- *burning country*

Management Strategies

1. Provide coordinated and equitable opportunities for individuals and families to access their country in order to undertake customary practices through:

- the country visit program (refer Management Objective 5.2.3[a])
- annual field work programs of rangers and IPA staff
- annual burning schedules (refer Section 6.6).

2. Develop and implement a cultural site management schedule for physical sites with priorities determined by considering the following criteria:

- the results of the review of cultural knowledge already recorded (refer Management Objective 5.2.3[a])
- the risk of irretrievable loss of the knowledge of the location, significance and management of individual sites
- sites of outstanding cultural significance
- estates for which a low level of cultural site information has been recorded
- a demonstrated interest by traditional owners in managing their sites
- the risk of irreversible damage occurring at a site if management action is not taken
- sites with known tourist visitation or those at which *Anangu* are proposing to conduct tourism activities.

(For the management of culturally significant water places, refer also Management Objectives 6.3.3[a,b]).

3. For each cultural site included on the management schedule, determine:

- the recording, survey and threat assessment requirements
- the need for management intervention and follow-up maintenance and condition monitoring schedules
- whether or not a Cultural Heritage Management Plan or similar planning document is required.

4. Create a comprehensive record of *Anangu* customary land management practices using a variety of appropriate media, including video and sound recordings. Distribute copies of this material to *Anangu* as teaching tools. Store this information in the IPA database for use by *Anangu* and *Pirrapa* ranger and IPA staff.

Management Objective 5.3.3(b)

Encourage the broad adoption of traditional hunting and harvesting protocols designed to manage resources in sustainable ways

Management Strategies

1. Together with IPA Management Committee members:
 - document traditional hunting and harvesting protocols concerning particular species and places that *Anangu* wish to see complied with in the IPA
 - discuss the possible development of sustainable hunting and harvesting plans for popular resource use areas in the IPA, including those in the vicinity of Muṭitjulu and Kaṭukatjara communities. If agreed to by the IPA Management Committee, develop and implement hunting and harvesting plans.
2. If agreed to by the IPA Management Committee, produce and distribute educational material (e.g. posters, booklets, videos) concerning sustainable hunting and harvesting protocols and plans.
3. Develop and implement monitoring programs to measure changes in availability of game species and bush resources in high use areas, including the country around Muṭitjulu and Kaṭukatjara. Use monitoring results to alter protocols, plans and educational material as necessary.

Management Objective 5.3.3(c)

Develop, repair and maintain infrastructure that supports traditional owners in visiting their country

Management Strategies

1. Prepare and implement a program to develop, maintain and protect infrastructure across the IPA that supports traditional owners in accessing and spending time on their country. Such infrastructure may include, but is not limited to:
 - roads and tracks
 - bores
 - hand pumps
 - *wiltjas* (shade shelters)
 - water storage facilities
 - outstation buildings
 - campsites
 - fences.

In determining priorities for infrastructure work, consideration will be given to:

- the potential use of the infrastructure by traditional owners, rangers and IPA staff in implementing land management programs

- the number of *Anangu* likely to benefit from the proposed works
- the potential for co-investment from other organisations
- the capacity and interest of estate group members in funding and maintaining infrastructure into the future
- the importance of infrastructure in supporting sustainable economic development (e.g. tourism)
- the probability of increased visitation associated with new or existing infrastructure increasing risks to environmentally sensitive areas
- the history of previous management concerning particular infrastructure
- the immediate and long-term availability of resources to effect infrastructure projects
- preservation of human life.

2. As part of the infrastructure program:

- assess all existing infrastructure to determine items that are redundant and require replacement, removal and/or rehabilitation. Undertake removal and rehabilitation works as required
- prepare a condition report and associated maintenance schedule for all infrastructure to be retained.

3. Undertake all infrastructure projects in accordance with *Katiti-Petermann IPA Road and Track Construction and Rehabilitation Guidelines* (refer Appendix 7) and the *Environmental Conditions of CLC Grazing Licences* (refer Appendix 8).



Traditional owners Daphne Puntjina (front) and Margaret Anawari (middle) burning country near Lake Neale, Petermann ALT, 2013

6.1 Introduction

Anangu believe that all living and non-living elements of the IPA – including rocks, soil, landforms, plants and animals and elemental forces such as rain, wind and fire – were generated by ancestral beings during the creation time. The ways in which *Anangu* have traditionally looked after every component of the landscape are defined by the laws and responsibilities contained in the *Tjukurpa*. Based on thousands of years of observation and practice, management in accordance with these prescriptions is not only considered essential to keeping country 'healthy', but is also fundamental to the physical, mental, cultural and spiritual wellbeing of *Anangu* themselves.

Whereas *Anangu* management of country has traditionally been driven by the need to procure sufficient food and water to survive in what is a relatively harsh environment, contemporary *Pirranpa* land management has largely focused on maintaining or enhancing biodiversity values. Government legislation and policies at regional, national and even international levels underpin this direction.

While the underlying motivations behind *Anangu* and *Pirranpa* management of country differ, the

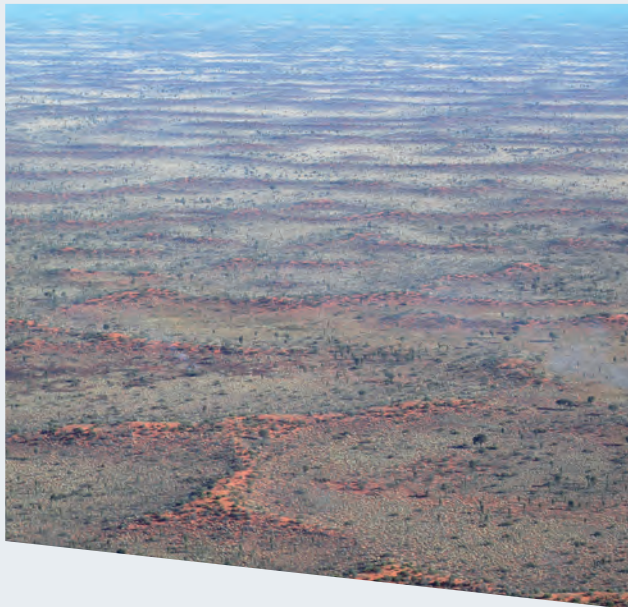
outcomes sought are generally aligned. Replicating traditional land management regimes is viewed as highly desirable by both *Anangu* and *Pirranpa*, though the replacement of the *Anangu* traditional subsistence lifestyle with sedentary community-based living, combined with the introduction and spread of a range of environmental and social changes, requires the marrying of old and new ways of looking after country.



Petermann Ranges near Kaltukatjara

Land Types of the IPA

The country of the IPA is categorised by *Anangu* into the following six basic land types:



Pila/Tali – Sandplains and Sandhills

Flat to undulating *pila* (sandplains) and *tali* (sandhills) of red, windblown sands comprise the main land type of the IPA. In the north, *tali* dominate with a mixture of longitudinal, complex and reticulate dune systems present. The southern and western parts of the IPA have a more even mix of *pila* and *tali* adjacent to *puli* (mountain ranges and rocky hills). The intrinsically flammable nature of the vegetation of this land type underpins the ecology of the region, with fire regimes being a key of plant community composition and faunal assemblages at local and landscape scales.

Vegetation: *Tjanpi* (spinifex – *Triodia* species) dominate, with substrate being a key influence on the distribution of hard and soft species. The shrub layer comprises a mix of *Acacia*, *Grevillea* and *Hakea* species. *Muur-muurpa* (bloodwoods – *Corymbia* species) are common on sandhills and open woodlands of *kurkapi* (desert oak – *Allocasuarina decaisneana*) occur throughout.

Mai (bush foods): *Arnguli* (bush plum – *Santalum lanceolatum*), *kaliny-kalinypa* (honey grevillea – *Grevillea eriostachya*)

Kuka (animals): *Tinka* (sand goanna – *Varanus gouldii*), *kipara* (bush turkey – *Ardeotis australis*)



Puti – Scrub Country

Puti occur on run-on areas of alluvial fans and plains and are usually found adjacent to *puli* (mountain ranges and rocky hills). Soils are relatively rich red loamy sands that support open woodlands or open to dense shrublands of variable composition. This land type is particularly significant for hunting and the harvesting of bush resources.

Vegetation: Dominant plants are *wanari* (mulga – *Acacia anuera*) (occasionally *pakuta* horse mulga – *A. ramulosa*) or *ilykuwara* (witchetty bush – *A. kempeana*) with scattered *witjinti* (corkwoods – *Hakea divaricata* or *H. lorea*), *muur-muurpa* (bloodwoods) and *Senna* species over a mix of non-spinifex grasses.

Mai (bush foods): *Awalyuru* (bush currant – *Psyrax latifolia*), *kurkunyjungu* (sweet secretion on mulga leaves), *parka-parka* (mistletoe – *Lysiana murrayi*), *tarulka* (mulga apple – an insect gall specific to mulga trees)

Kuka (animals): *Malu* (red kangaroo – *Macropus rufus*), *maku lunki* (witchetty grub – *Endoxyla leucomochla*), *tjala* (honey ants – *Camponotus inflatus*)



Puli – Mountain Ranges, Rocky Hills and Outcrops

Puli include the Petermann, Bloods, Rowley, McNicholls and Mann ranges and numerous lesser hills which occur across the IPA. *Puli* may comprise a variety of rock types, including granite, quartzite, conglomerate, sandstone, calcrete and limestone. This land type includes *murpu* (ridges and mountains), *lurngu-lurngu* (boulder scree slopes, fallen blocks or outcrops) and *arpata* (limestone/calcrete rises).

Vegetation: Overstorey species include *kulilypuru* (native pine – *Callitris glaucophylla*), *ili* (desert fig – *Ficus brachypoda*), *wanari puli* (hill mulga – *Acacia macdonnellensis*) and *pilpira* (ghost gum – *Corymbia aparrerinja*) with a mix of grevillea, acacia and eremophila shrubs. The understorey typically consists of *tjanpi* (spinifex – *Triodia* species).

Mai (bush foods): *Ili* (desert fig), *arnguli* (bush plum), *mingkulpa* (bush tobacco – *Nicotiana gossei*)

Kuka (animals): *Tjilkamata/tjirilya* (echidna – *Tachyglossus aculeatus*), *ngintaka* (perentie – *Varanus giganteus*), *kanyala* (euro – *Macropus robustus*)



Urilpa – Open Country

This land type can be found on a belt of red loamy soils adjoining mountain ranges located in the southern half of the IPA. A common feature associated with *urilpa* is *ulpuru* – the dusty sleeping places of *malu* (kangaroos) that are a common game species across this land type.

Vegetation: Understorey species include a mix of *ilintji* (oat grasses – *Enneapogon* species), curly windmill grass (*Enteropogon acicularis*), *wangunu* (woollybutt – *Eragrostis eriopoda*) and *ipiri* (kerosene grass – *Aristida* species) with *iriya* (saltbush – *Atriplex* species) in long-unburnt areas. The scattered shrubs and trees present include *wakalpuka* (dead finish – *Acacia tetragonophylla*), *ilykuwara* (witchetty bush), *wanari* (mulga), *piri-piri* (needlebush – *Hakea leucoptera*) and *Senna* species.

Mai (bush foods): *Wangunu* (woollybutt seed), *kampurarpa* (desert raisin – *Solanum centrale*)

Kuka (animals): *Malu* (red kangaroo), *kalaya* (emu – *Dromaius novaehollandiae*), *kipara* (bush turkey)



Karu – Rivers and Creeks

Karu bed sediments consist of coarse sands and gravels with surface washes of finer yellow sands. The banks of watercourses often comprise red alluvial soils. Numerous small creeks fan away from the *puli* (hills) and *apu murpu* (mountain ranges) of the IPA. Major watercourses in the western region include the Docker and Hull rivers and Chirnside, Shaw, Irving and *Karu Nyitayira* (Armstrong) creeks. *Alpara* (Britten Jones Creek) is the only substantial drainage line in the eastern portion of the IPA.

Vegetation: *Itara* (river red gums – *Eucalyptus camaldulensis* var. *obtusa*) are the dominant canopy species, with scattered *utjanypa* (ironwoods – *Acacia estrophiolata*) and *muur-muurpa* (bloodwoods). Understorey species are a mix of non-spinifex grasses.

Mai (bush foods): *Tjanmata* (bush onion – *Cyperus bulbosus*), *arnguli* (bush plum), *ngapari* (red gum sap)

Kuka (animals): *Kiilykiilykari* (budgerigar – *Melopsittacus undulatus*), *wayuta* (common brushtail possum – *Trichosurus vulpecula vulpecula* [Southern NT])



Pantu – Salt Lakes

Pantu are the bare salt lakes and salt pans of mineral evaporates. The major *pantu* land type in the IPA is the Lake Amadeus – Lake Neale system, which includes a complex matrix of lesser salt pans and channels among sandy saline soils.

Vegetation: Samphire (*Tecticornia* species) low shrubs and *iriya* (salt bush species) fringe *pantu* and are interspersed with *tjanpi* (spinifex), though non-spinifex grasses may be seasonally present. In some areas a band of *ilpili* (tea-tree – *Melaleuca* species) fringes *pantu*.

Mai (bush foods): *Tjanmata* (bush onion), *pantu* (salt)

Kuka (animals): *Kalaya* (emu)

Figure 5 shows the extent and location of each of these six land types in the IPA.

Pirampa have divided the region included in the IPA into four bioregions (refer Figure 6). These relatively large areas, which are characterised by landscape-scale natural features and environmental processes that influence the function of entire ecosystems, are:

- **Central Ranges Bioregion (49% of the IPA)**
This bioregion is characterised by rugged quartzite and granite ranges, which in places exceed 1000 m in elevation, and surrounding sandplains and dunefields. Fire shadow areas in the ranges support relict vegetation communities while major watercourses are lined by river red gums. Gently sloping valleys contain alluvium deposits of red earths, which support acacia shrublands with herb/grassland understoreys and ironwood (*Acacia estrophiolata*) and corkwood (*Hakea divaricata*). On the sandplains and dunes, the vegetation consists of mixed shrublands of *Acacia*, *Eremophila* and *Grevillea* species over spinifex (*Triodia* species) grasslands.
- **Great Sandy Desert Bioregion (50% of the IPA)**
This consists of gently undulating sandplains, sand dunes which may exceed 9 m in height, and vast saline lakes. Vegetation is dominated by hummock grasslands associated with acacia, blue mallee and desert oak stands. Mulga woodlands occupy low-lying troughs and plains, and low samphire shrublands fringe salt lakes. Open woodlands can include eucalypt species.
- **MacDonnell Ranges Bioregion (< 1% of the IPA)**
The characteristic features of the MacDonnell Ranges Bioregion are high relief ranges and foothills. Spinifex hummock grasslands and sparse acacia shrublands are typical vegetation types, with woodlands occurring along the watercourses. This bioregion is represented in the IPA in the north-east corner adjacent to Watarrka National Park.
- **Finke Bioregion (<1% of IPA)**
Landforms of this bioregion are varied and geologically complex. Hummock grasslands, acacia shrublands and saltbush/bluebush open shrublands are the dominant vegetation types. The Finke bioregion is represented by three small areas on the eastern boundary of the IPA.

Pirampa have also identified the following three Sites of Conservation Significance (SOCS) in the IPA (refer Figure 6):

- **Uluru and Surrounds SOCS**
This site, which straddles the IPA and adjoining UKTNP, is considered to be of international significance. It contains nine threatened species (eight vertebrates and one plant), two endemic plant species, large concentrations of cave-roosting bats at Uluru and Kata Tjuta, four relictual plant species and a rich reptile fauna of 83 species at UKTNP (refer also Sections 6.4.1 and 6.5.1).
- **Petermann Ranges and Surrounds SOCS**
This is of national significance. The site is known to contain eight threatened vertebrate species, one plant species endemic to the site, and four species endemic to the Northern Territory (refer also Sections 6.4.1 and 6.5.1).
- **Lake Amadeus and Lake Neale SOCS**
This nationally significant site contains six threatened species (five vertebrates and one plant) and supports several reliable springs. The islands in Lake Amadeus, as well as stands of hollow-bearing trees, are identified as likely to be significant for nesting birds during periods of inundation. Lake Amadeus and Lake Neale are both recognised as Northern Territory significant wetlands (refer also Sections 6.3.1, 6.4.1 and 6.5.1).



Grass trees near Kaltukatjara

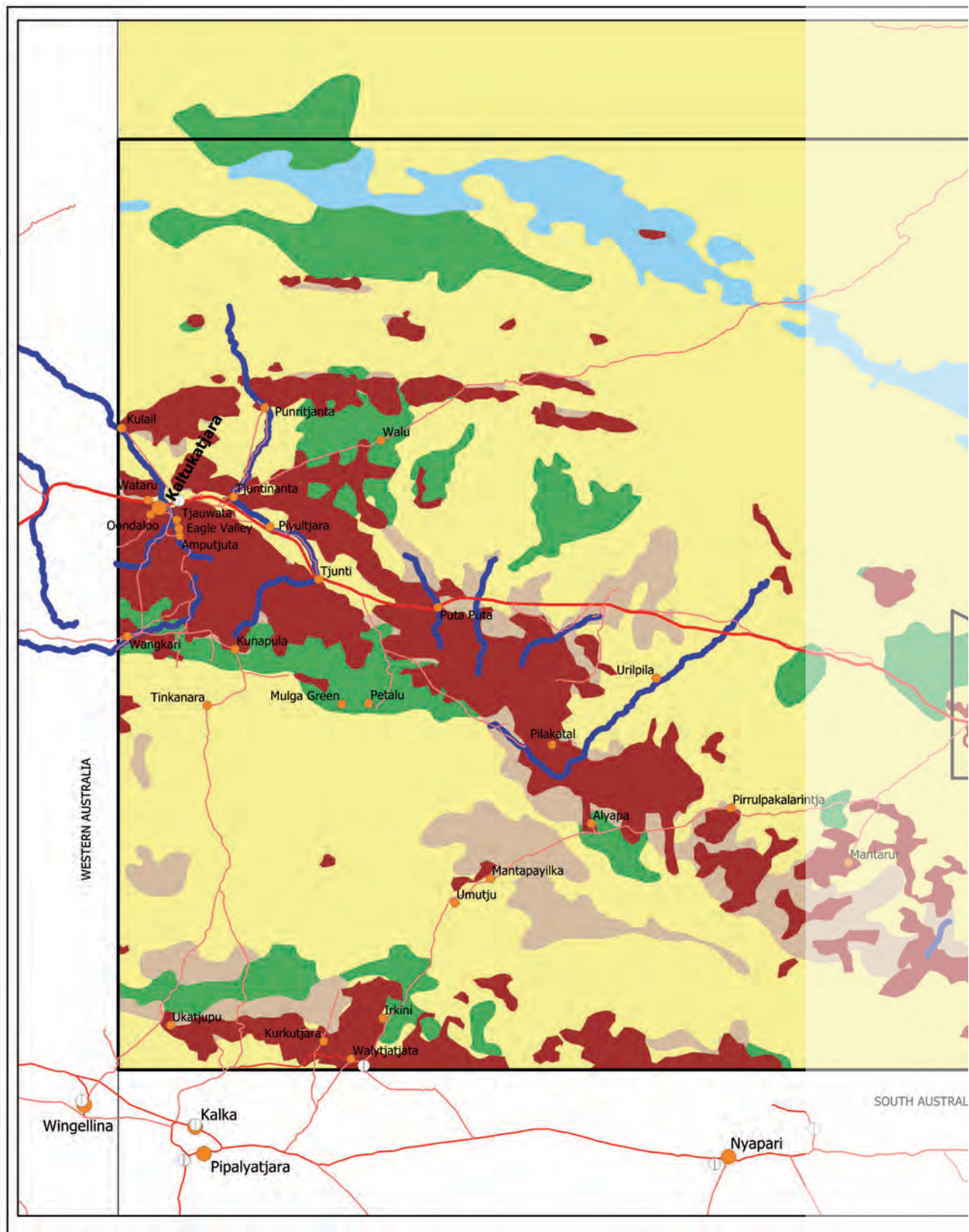
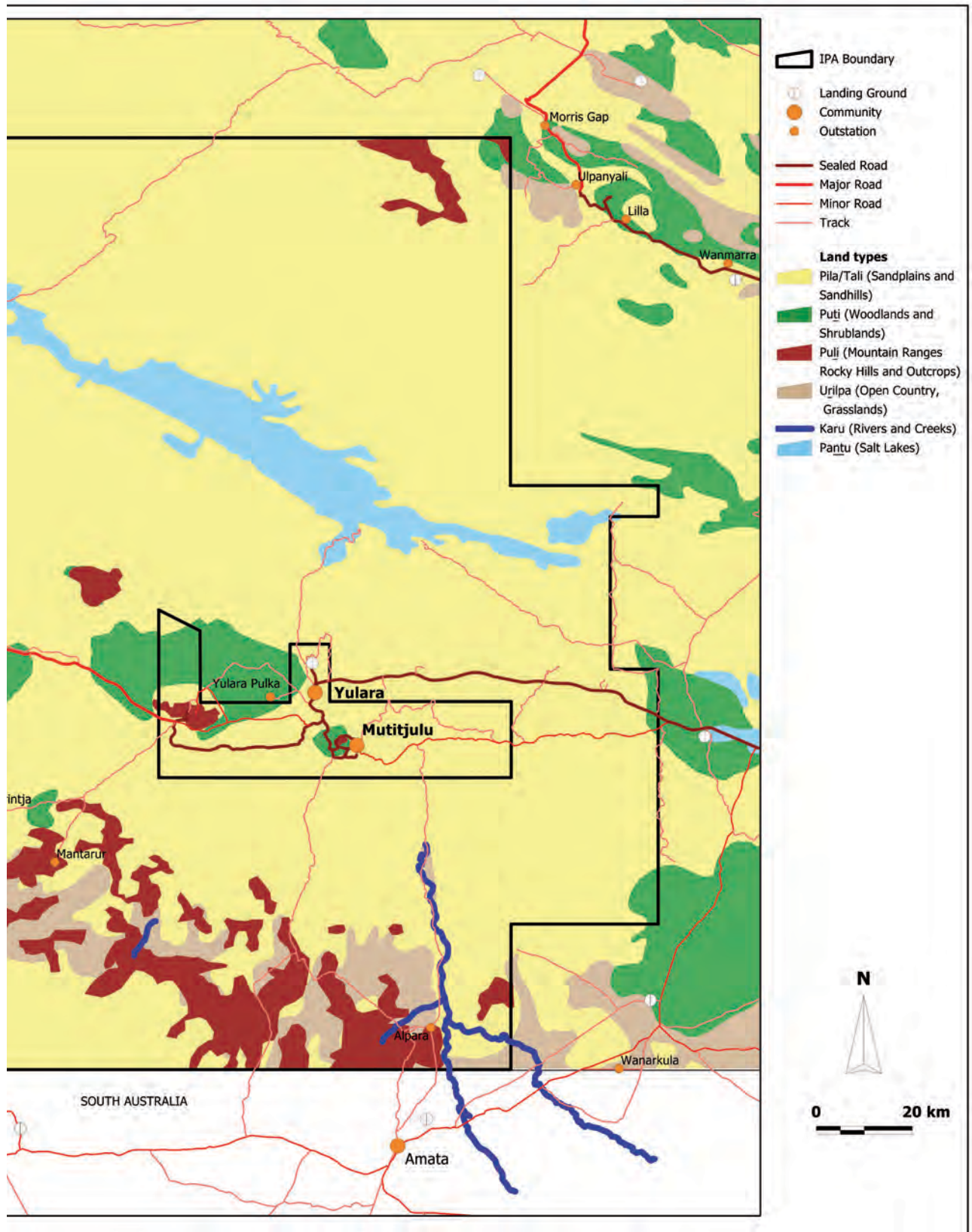


Figure 5 Anangu Land Types



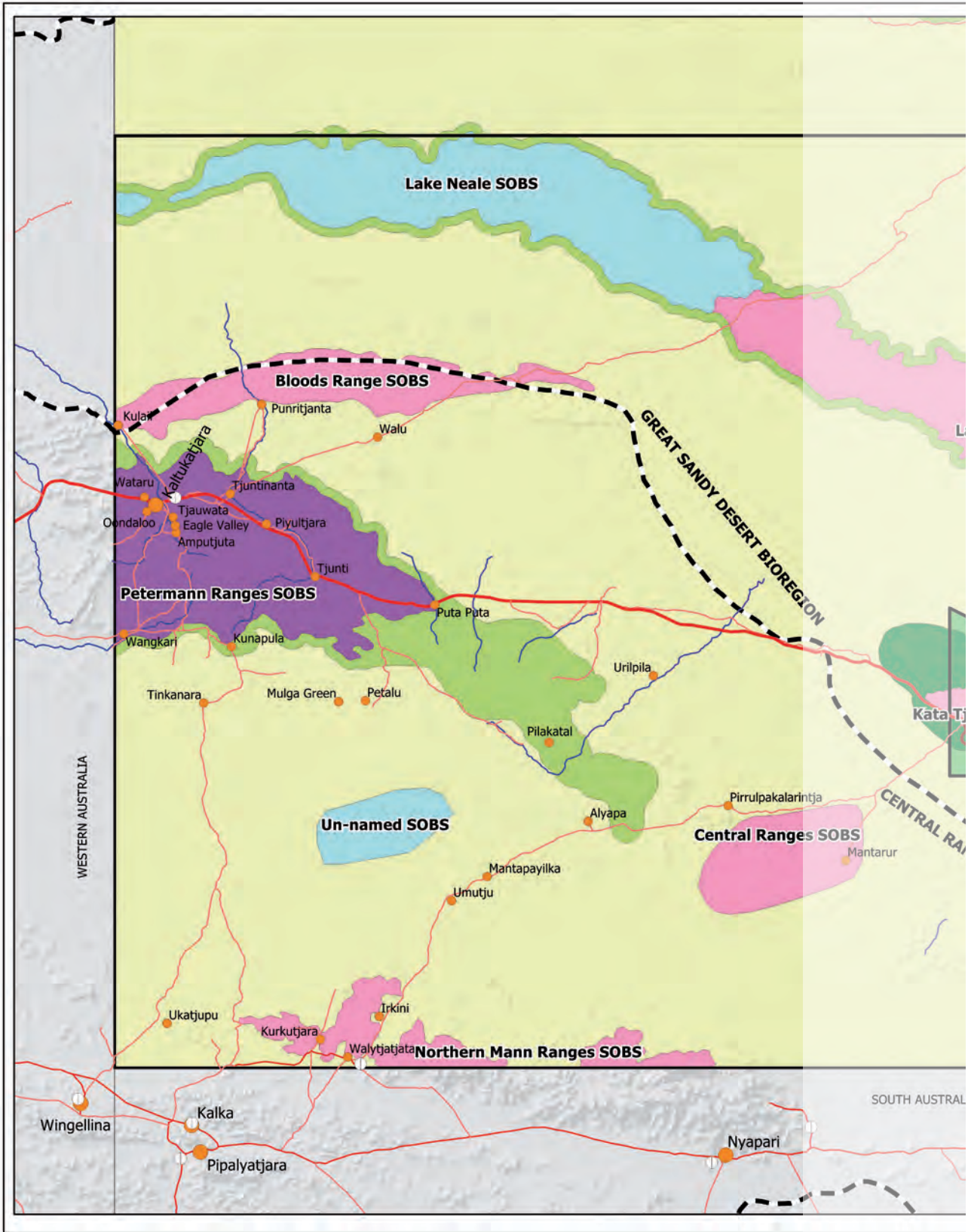
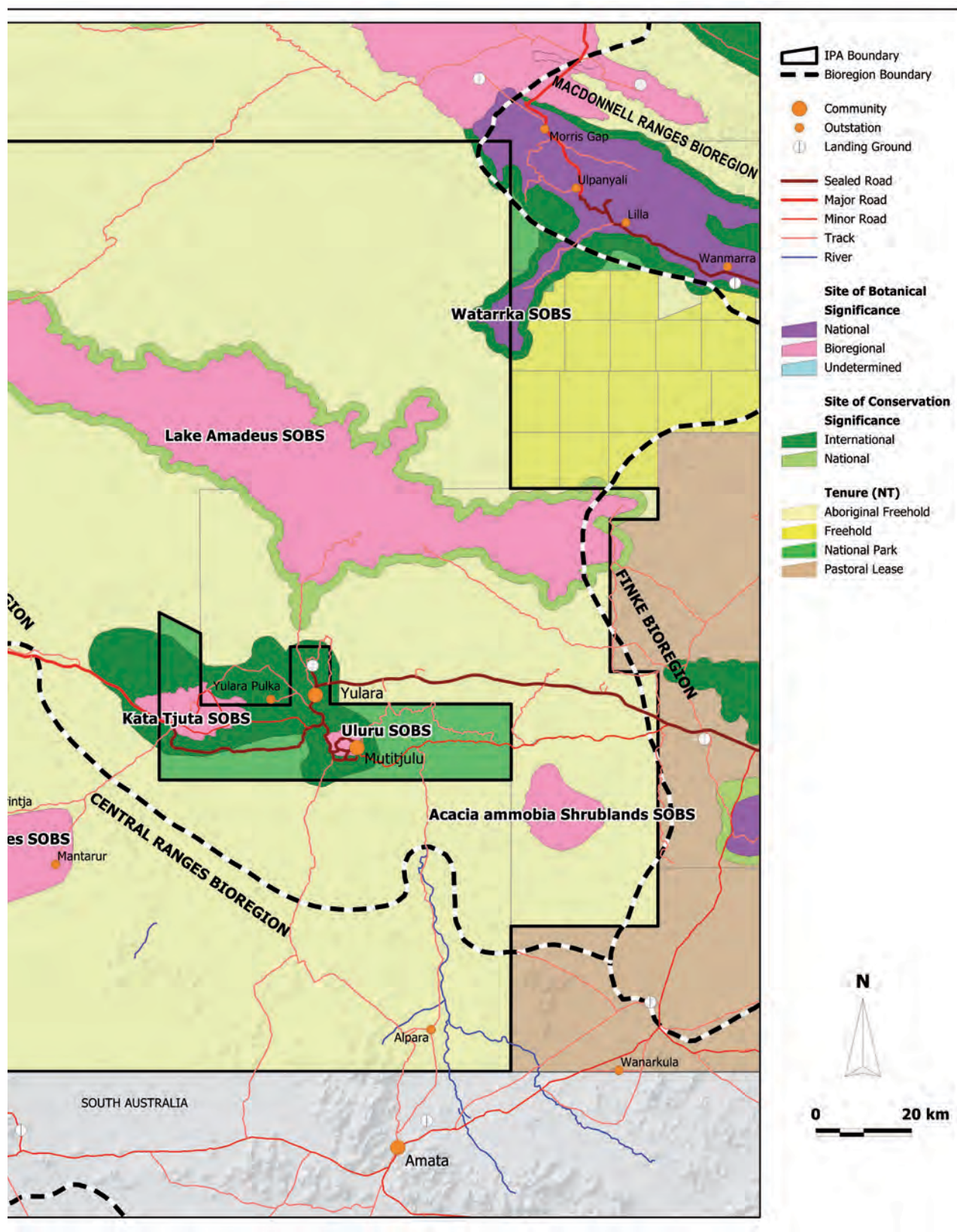


Figure 6 Biological Significance



6.2 Manta – Rocks, Landforms and Soils

6.2.1 Background

The underlying geology of the IPA is largely hidden from view beneath extensive sandplains and dune systems. While isolated outcrops of rock – in the form of low rises, hills and ridges – are scattered across the landscape, significant rocky exposures are uncommon. The largest of these are the east–west aligned Mann Range, which stretches for 400 km along the NT/SA border and the similarly arranged Petermann and Bloods ranges complex, which extends for about 120 km across the central portion of the IPA. These ranges are worn remnants of previously much higher mountains and rise only 500–1000 m above the surrounding plains.

The southern ranges and hills of the IPA, which form part of the Musgrave Province, are composed of gneiss and granitic rocks dated from 1600 to 1050 million years ago. The origins of the landforms themselves date from the Petermann Orogeny (570–530 million years ago), when tectonic movements exposed, uplifted and deformed these basement rocks. The Petermann and Bloods ranges, which predominantly consist of quartzite, granite and sandstone, were also formed during this time.

This rapid period of mountain-building, together with a second phase of tectonic activity between 450 and 300 million years ago, resulted in large amounts of eroded material being deposited in the marine basin which adjoined and partially covered the northern margins of the Musgrave Province. Known as the Amadeus Basin, this geological region occupies the majority of the IPA. Dating from 850 to 350 million years ago, it is characterised by sedimentary rock types such as conglomerates, sandstones and siltstones.

The dominant landforms of the IPA, the *pila* (sandplains) and *tali* (sandhills), are a direct legacy of this geological history of uplift, erosion and deposition. *Pila* and *tali* cover about 60% of the IPA. Many of the dunes are vegetated and not particularly high, and most are parallel, aligned in the direction of the prevailing winds. West of Lake Amadeus they tend to extend in an east–west direction. North of the lake they are aligned south–west to north–east, while in the south–west corner of the IPA they are typically oriented north–west to south–east.

The *pila* and *tali* of the northern half of the IPA are broken by another important IPA landform: *pantu* (salt lakes). The lakes or playas forming the

200 km Lake Amadeus – Lake Neale chain occupy a shallow trough, which marks the course of a paleodrainage channel (refer Section 6.3.1). Other localised landforms to be found in the IPA include claypans, alluvial fans and plains, watercourse channels, laterite and silcrete-capped rises and rubbly mounds of calcrete.

In general, the soils of the IPA are infertile, containing very low levels of phosphorus, nitrogen, potassium, sulphur and organic carbon. The *pila* and *tali* are typically composed of heavily leached red windblown sand. Other more restricted soil types present include thin, infertile soils derived from local weathering of rocky outcrops, colluvial red soils derived from sheet wash near ranges, red brown stony clays on plains and gentle hill slopes, and alluvial sand and gravel associated with watercourses. Saline clays, calcrete deposits, halite, calcareous sands, gypsum and mud deposits are found near the major salt lakes. The most productive soils are those derived from limestone and dolomite parent rocks.

Whereas *Piranpa* view the rocks, landforms and soils of the IPA as the products of eons of geological processes, to *Anangu* they are associated with ancestral beings who travelled throughout the land at the time of creation. Many landscape features – be they individual rocks, hills, ranges or rockholes – are regarded as sacred sites which are imbued with deep cultural significance. Traditionally, various rocks also had crucial day-to-day uses. Grinding stones were essential for preparing seeds, a mainstay of traditional *Anangu* diet. Specific rock types were also utilised in certain tools, such as spears and axes. Ochre was, and still is, used for ceremonial decoration.

Piranpa primarily value the rocks and landforms of the region for their mining potential (refer Section 8.4.1). Although no commercial deposits have been discovered in the IPA to date, the region has been subjected to mineral exploration since the 1880s. Most of the early activity was focused on the discovery of gold, with the spurious claims of people such as Harold Lasseter prompting the launch of many a prospecting expedition. Many *Piranpa* also value the landforms of the IPA, especially the dramatic range country, for their aesthetic appeal.

6.2.2 Issues and Opportunities

While the rocks and landforms of the IPA are generally robust and impervious to human-related impacts, some surface features are susceptible to damage. Soil crusts (formed by liverworts, lichens and mosses), which are particularly important in holding desert soils together, are readily disturbed, as are soft substrates such as calcrete and laterite deposits.

Accelerated soil erosion associated with roads and tracks is a common issue in the IPA. The conversion of sections of vehicular tracks into deep gullies is not confined to hill and range country, but can

occur wherever vehicular activity results in a lowering, however minor, of the natural surface level of the landscape. The pads of feral camels and horses can also lead to localised erosion problems.

While there has been very little mineral exploration in the region in recent times, there is the potential for mining of rare earths, gold and silver, and evaporites around lakes Amadeus and Neale. Exploration for oil and gas reserves has recently increased in parts of the Amadeus Basin outside of the IPA (refer also Section 8.4.1).



Erosion of *urilpa* (open country) caused by a vehicular track and cattle grazing at Alpara

6.2.3 Management Strategies

Management Objective 6.2.3(a)

Protect soil values by minimising the creation of new sites of human-related soil erosion and mitigating existing soil erosion problems

Management Strategies

1. Establish and maintain an inventory of sites of human-related soil erosion.
2. Prepare and implement a prioritised program of soil rehabilitation works based on the above-mentioned inventory and the following considerations:
 - associated risks to cultural and/or biological values
 - the level of significance of the value(s) threatened
 - the level of concern among traditional owners
 - the likelihood of severe and irreversible damage to values if the problem is left untreated
 - the rate of erosion activity
 - the availability of resources to treat erosion problems, including the need to monitor treated sites and undertake follow-up works as required.
3. Undertake assessments of vehicular tracks or sections of tracks exhibiting soil erosion problems and determine which of these require:
 - closure and rehabilitation
 - re-routing
 - upgrading (including erosion control works).

Matters to be considered when making decisions concerning the future of individual vehicular tracks will include:

- the importance of the track in providing traditional owners with access to their estates, including sacred sites
- the importance of the track in providing access to hunting and bush resource harvesting areas
- the strategic value of the track for land management purposes.

Manage each assessed track or section of track according to the above assessments as part of the prioritised program of soil rehabilitation works.

4. Develop a monitoring schedule for treated sites as a means of measuring treatment success and the need for additional remediation work. Undertake follow-up soil erosion mitigation work as required.
5. Prepare and distribute soil erosion educational material for *Anangu*.
6. Liaise with representatives of the Department of Transport, MacDonnell Regional Council, mineral exploration companies and other relevant organisations to ensure that all roads and tracks constructed, maintained or upgraded in the IPA conform to the *IPA Road and Track Construction and Rehabilitation Guidelines* as detailed in Appendix 7 (refer also Sections 8.3 and 8.4).
7. Minimise the creation of new sites of soil disturbance by locating new infrastructure on previously disturbed sites wherever possible.
8. Rapidly stabilise any newly disturbed sites.

6.3 Kapi – Water

6.3.1 Background

Within the IPA, water is the most valued and rarest of resources. Low, unpredictable rainfall and high evaporation rates, combined with the landscape and geology of the region, have resulted in the lack of any appreciable permanent, or even semipermanent, surface waters.

Surface waters include waterholes situated in river channels, isolated soakages, claypans, springs and rockholes and expansive freshwater and saline swamps and lakes. For *Anangu*, water places are categorised as:

- *kapi wala* – running water
- *karu* – creek, creekbed
- *karu-karu* – floodway
- *mina* – waterhole
- *tjintjira* – claypan, swamp
- *wanampitjara* – spring (the most reliable source of water but can be salty)
- *kakanpa* – soak (fed from an underground supply, often found in creeklines)
- *tjunu* – native well (water from soaks that are dug out)

- *tjukula* – rockhole
- *punu kapiku* – water-holding tree.

Several medium-sized watercourses drain the Petermann Ranges; of these, the Hull River and Shaw, Irving and Nyitayira (Armstrong) creeks flow north towards Lake Neale and Lake Amadeus, although their defined surface channels peter out in sand dunes well short of the salt lakes. Docker River and Giles Creek both flow westwards across the border into WA, where they also disappear into sandplains. In the south, a single major watercourse, Alpara (Britten Jones Creek), emanates from the Musgrave Ranges in SA and flows north towards Uluru, before sinking into the surrounding sandplain. Although dry most of the time, after heavy rains all of these watercourses carry significant amounts of water and nutrients from the ranges onto the desert plains and their dissipation into the ground helps recharge local aquifers. Even though this surface water is relatively short-lasting, a distinctive riverine habitat exists, with *itara* (river red gums) forming narrow woodlands along the banks, where particular animal and plant species tend to be found.



Ururru, a semi-permanent waterhole after good rains, Petermann ALT 2007



Lake Neale as seen from the air

Of the other short-lived surface waters replenished after rain, *tjintjira* (claypans) are the first to evaporate. They occur in depressions of soft sediments with low permeability. Claypans can be tens or hundreds of metres across, but the water they hold is usually turbid. Lasting somewhat longer are the many small isolated *tjukula* (rockholes) that occur in granite outcrops in the ranges and on rock platforms. At these places, water collects in hollows formed over long periods through gradual weathering of an initial depression. Traditional management of these water sources included chipping grooves into the rock surface to direct flow into them. *Tjunu* (native wells or soaks), which were traditionally more reliable water sources for *Anangu*, were formed when water seeped into hollows dug in freely permeable sediments. They were usually dug in swales between sandhills or where a sloping surface of hard rock disappeared beneath a plain. Opportunistic sources of water included *punu kapiku* (water-holding trees), in which rain water accumulated in hollows in tree trunks or from which water could be obtained from cut tree roots. Water could also be collected from vegetation in the form of dew droplets.

Tjunu (groundwater) represents the only permanent source of water in the IPA. It has built up over millions of years from rain and floodwater seeping into porous rock or sand and is present throughout the arid zone. Water quality and quantity are highly variable, as is accessibility. This water can be discharged at low points in the landscape through *wanampi-tjara* (springs), but this happens rarely in the IPA. Groundwater can sometimes be quite close to the surface (such as at the base of granite ranges and in dry river beds) and reached by digging. More often, bores are required to access this water, especially if the deeper bedrock aquifers need to be tapped. All water supplies for communities and outstations in the IPA depend on groundwater sourced from wells or bores. The quality of this water is highly variable, and in some cases it does not meet international standards for drinking water.

As in other parts of arid Australia, the groundwater resources of the IPA include several paleodrainage systems where groundwater may be only 10–20 m below the surface. These are the remnants of geologically ancient river valleys that are now completely filled with sand and gravel sediments, and

they can function as high-quality aquifers capable of storing significant quantities of groundwater. Most of the water is several hundred years old, with local recharge (from river flow and sheet flow across the landscape) being minimal in most years and water movement being very slow.

One of the largest paleodrainage systems, with a catchment of 90,000 km², is the Central Australian Groundwater Discharge Zone. It extends for some 500 km from Lake Hopkins in WA (north-west of the IPA) to the sand dunes near the Finke River south-east of the IPA. It is bound on the north by the Cleland Hills and George Gill Range and on the south by the Petermann and Musgrave ranges and covers two-thirds of the IPA. The main surface indicator of this zone is a distinctive chain of *pantu* (salt lakes), the largest of which are lakes Amadeus and Neale. These lakes result from evaporation of saline groundwater that comes close to the surface, leaving ever-growing layers of salts. The lakes are usually dry, as any rainwater evaporates rapidly.

Central to *Anangu* survival in the region was their accumulated knowledge about the location of water places and their judicious use of these scarce resources. For *Anangu*, death by dehydration was a real possibility, so this knowledge was shared by all, such that *Anangu* travelling through country often used fire and smoke signals to communicate to others where water could be found.

“ In olden times Anangu would travel following waterholes. They could see where the water was in their mind. They would take their families and travel through country and stop and camp near waterholes, catch malu and emu. Early in the morning they would get up, have a drink and walk to the next waterhole. If they saw a fire, that would be a signal that people would be camping at that waterhole. If the waterhole was big enough to support two families they would stop and camp, and if it was only a small waterhole that family would continue on to another water place. Sometimes they would camp on a creek and dig for water. Some waterholes were left for animal use only. In an emergency special customary

practices needed to take place prior to accessing this water to calm down the wanampi snake. At each water site Anangu would cover up the water, with sand if it was in the creek, other places with rocks and trees. ”

Janie Miama

Visits to water places often included maintenance activities directed at optimising the quantity and quality of water supplies. These included cleaning out debris, mud and sand to avoid siltation and covering water or seepages with branches or rocks to minimise evaporation. These maintenance practices continue to be undertaken by *Anangu* today.

In traditional times, on the rare occasions when prolonged heavy rain fell, bush foods could be abundant and large pools of water or semipermanent rockholes enabled extended stays in an area. At such times over a hundred people might be camped at the one water source and ceremonies might take place. In contrast, during severe droughts people would be forced to move off their estates to use water on country belonging to others. This often required gift-giving and other forms of exchange to guarantee access. When most known sources were depleted, rain-making ceremonies were performed; and this still occurs today. There are also ceremonies to stop rain falling in a certain area.

Given the necessity of water for life, it is hardly surprising that water places feature strongly in the *Tjukurpa*. A legendary being called *wanampi* (water snake, rainbow serpent) is said to have formed each water place, and one remains at each site as a guardian. To avoid upsetting these custodians, an appropriate traditional owner must be present whenever people visit. Strict rules govern behaviour at waterholes and dictate who can and cannot visit different sites. In addition to cultural significance, certain water places also have considerable recreational value for *Anangu* today. Two such places, Tjilpuka and Ururru, are popular summer swimming holes for residents of Kalṭukatjara community.

“ *Kapi palunya tjananya nyakula ngarinyitu. Kapi ngarinyi munu kapi palyatu, tjulpu iluntja wiya. Tjulpu ilunyi ka itarikatira wantipai parari munu ngura kilinankuku. Ka palunya ngarinyi ka tjitji nyakuku, kapi palya, kutjupa kutjupa ngarintja wiya, wiru ka paluru Anangungku ngura waltjangku kulini, ‘Muntawa palya nyanga ngayuku, uwa palya ngura, palya ngarinyi, kutjupa kutjupa iluntja wiya.’* ”

Of course we check the waterholes. Whether there's water and if the water's good, no dead birds around ... If there is a dead bird you drag it away a good distance and clean the area. Then the children will see the water's fine, there's nothing lying around, it's good and a person will think to themselves about their homeland, 'Okay, this is fine my country is good, everything's right, nothing's dying here.' ”

Reggie Uluru

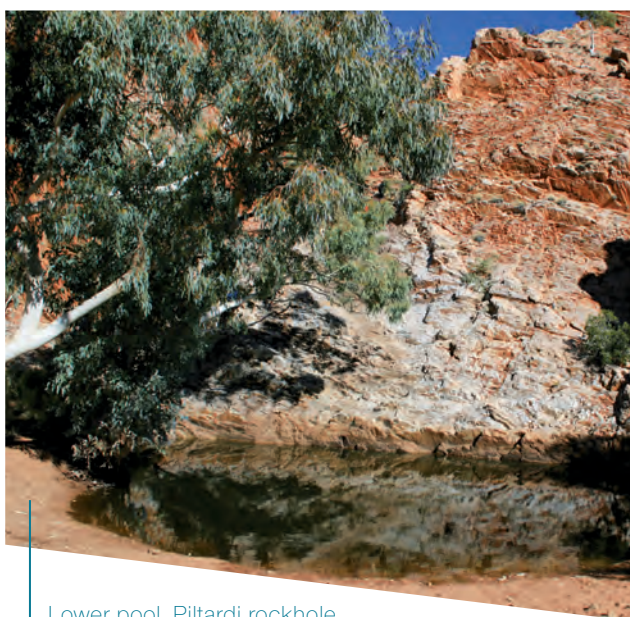
In historic times, natural waters were also critical to the survival of *Piranpa*, who frequently relied on *Anangu* to identify the locations of usable supplies. The depletion of waters by pack animals and the violation of cultural protocols associated with water places sometimes resulted in conflict between *Piranpa* and *Anangu*.

In recent years, the focus for *Piranpa* has shifted to documenting the physical characteristics of the region's water resources (salinity, recharge, discharge, the links between groundwater aquifers) and their biological attributes, such as dependent flora and fauna.

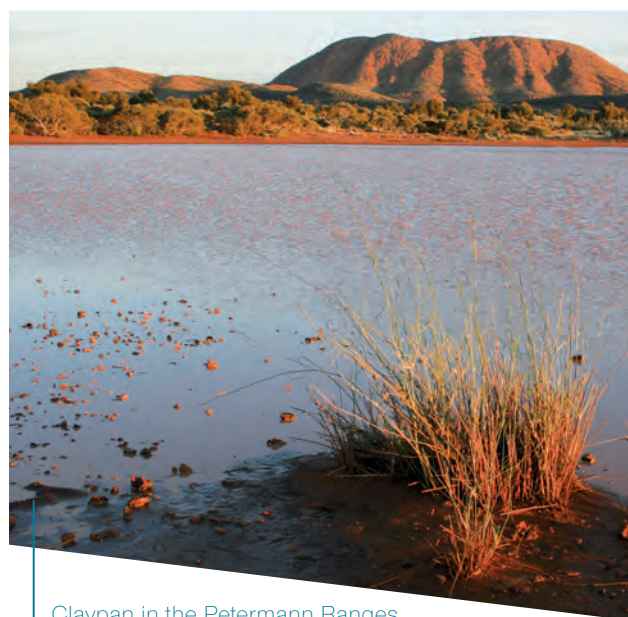
Certain water places of the IPA support highly distinctive habitats, characterised by fire-sensitive and relict plant species and aquatic invertebrates found nowhere else. Many such places are also refuges for highly restricted animal species, some of which were formerly widespread across the region.

Within the IPA, *Piranpa* have formally recognised Lake Amadeus as a wetland of national significance (listed in the *Directory of Important Wetlands in Australia*). It is the largest salt lake located entirely in the Northern Territory. Together with neighbouring Lake Neale, it is also designated as a nationally important Site of Conservation Significance.

While the biodiversity values of such surface waters are highly valued by *Piranpa*, the importance of groundwater systems to particular ecological communities and species is becoming more widely recognised. The geologically complex region between Yulara, Uluru and Kata Tjuta is one of the few well-studied systems of this type, and groundwater characteristics appear to be important in supporting the mulga communities there, as well as the nationally threatened mulgara and great desert skink.



Lower pool, Piltardi rockhole



Claypan in the Petermann Ranges

6.3.2 Issues and Opportunities

Loss of Cultural Knowledge

A key concern for *Anangu* is the ongoing loss of knowledge about water places across the IPA – their names, locations and associated *Tjukurpa* stories and ceremonies. As illustrated in Figure 7, the region now included in the IPA was once dotted with a large number of named water places, many of which were significant cultural sites. With the movement of people off country and the lack of vehicular access to many parts of the IPA, most of these sites are now

rarely, if ever, visited. Knowledge of the locations of many water places has already been permanently lost from personal and collective memories. This loss has been rapid and is continuing, with knowledge of some water places often held by only a small number of senior people who may have visited them as children. As these people pass away, so too does an important part of their culture as water places are lost from their cultural landscape (refer Box 1 and also Section 5.2.2).

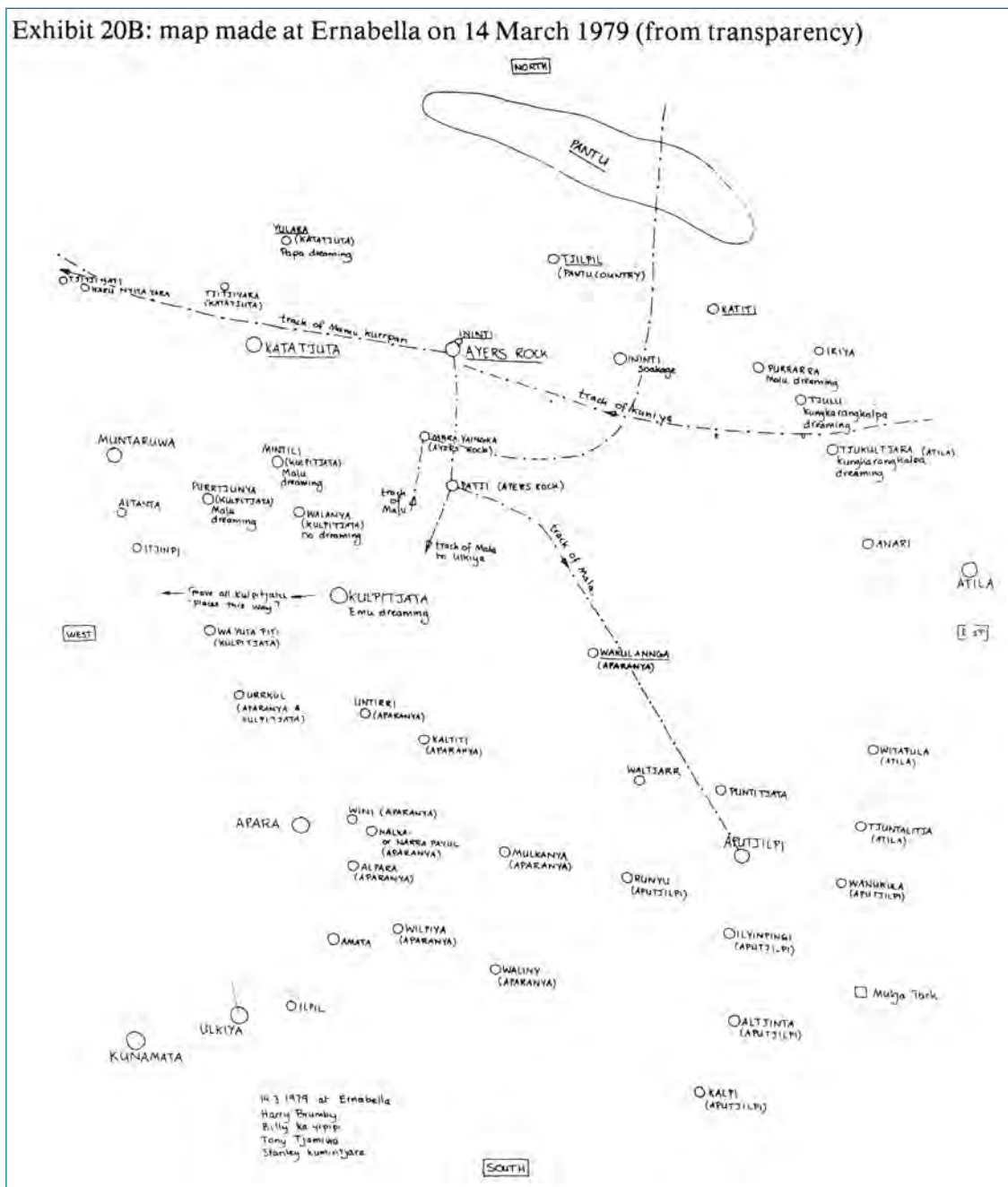


Figure 7 Mapped cultural places, includes eastern portion of the IPA
 [From: Uluru (Ayers Rock) National Park and Lake Amadeus / Luritja Land Claim 1979]

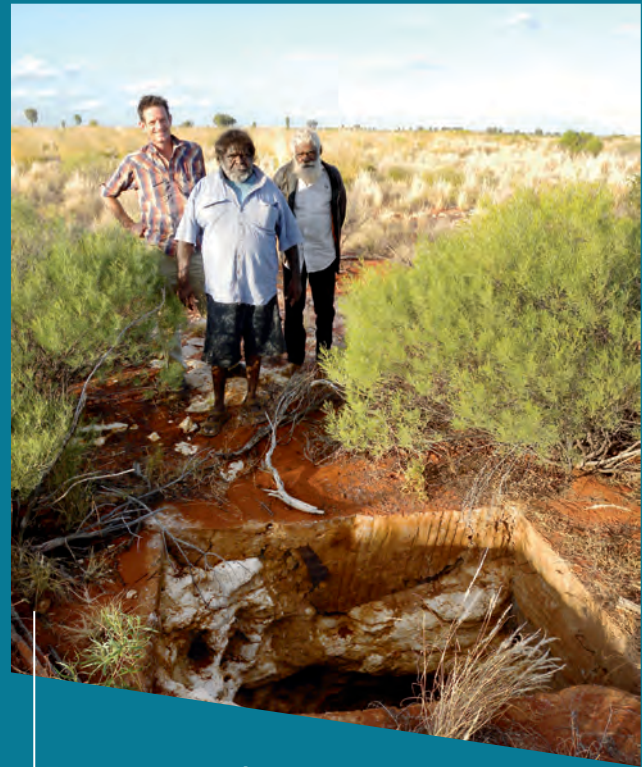
Box 1 Rediscovering Kaṭiṭi

'It's a very important place, shown to us by our grandfathers.' – Colin Nipper, *Land Rights News*, October 2011

Kaṭiṭi well was a key source of water for *Anangu* travelling between Uluru and Watarrka for millennia. Despite being inconspicuous and located on flat ground, the well is of such high cultural significance to *Anangu* that the entire ALT takes its name from the site.

In recent decades Kaṭiṭi was visited only rarely, and not at all since 1986. Ground searches in the period 1991–2010 proved fruitless, and *Anangu* were becoming anxious that it be rediscovered before the remaining handful of senior knowledge holders passed away. A collaborative project between the CLC and UKTNP in 2011 was eventually successful in locating the well.

Prior to the search, a team of senior *Anangu* were assembled to collate and record detailed knowledge about a suite of topics including the well's significance and place in the cultural landscape, use and care of the site, geographical information, vegetation and fire management. The remote location in trackless country and dependence of a key knowledge holder on a portable dialysis facility at Muṭitjulu meant that funding for helicopter time (provided by UKTNP) was critical in the success of the project. Traditional owners were able to locate campsites in the known vicinity of the well from the air, before landing to conduct a thorough ground search.



Traditional owners Colin Nipper and Wongin #1 with CLC staff member Patrick Hookey upon finding Kaṭiṭi well, 2011

Since its rediscovery, the well has been visited as part of successive IPA country visits that have provided opportunities for young people to access and learn about the site directly from senior *Anangu* and to commence patch burning. Traditional owners now wish to create a track to the well to support its ongoing maintenance and provide a base for strategic land management activities in the Lake Amadeus portion of the IPA.

The loss of knowledge about the existence or location of many water places, combined with the difficulties associated with visiting many known water places, means that most such places have not been maintained for many decades. In the absence of regular digging out and cleaning, many of these places have been infilled and no longer provide water for dependent wildlife species. This is likely to have resulted in significant biodiversity changes across large parts of the landscape. At places that may still temporarily hold water, the impacts of feral animals are often extreme.

Feral Animals

Large feral herbivores – such as horses, cattle and camels – use and damage many important water places across the IPA (refer also Section 6.5.2). These feral animals drain waterholes much more quickly than native species, contaminate waters with fecal waste, cause erosion around waterholes leading to sedimentation, and sometimes die at waterholes, leaving a rotting carcass that can pollute the water for many months or years.

Horses are primarily a problem in the Kaltukatjara region, and damage by cattle is confined to the eastern end of the IPA. Livestock agisted at Alpara outstation in the IPA use Kulpitjata and other neighbouring waterholes near the SA border (refer also Section 8.4.2), while cattle from Curtin Springs pastoral lease may use natural springs in the Lake Amadeus area.

By far the greatest feral animal impact on water places is caused by camels, with all but a few difficult-to-access water places in the IPA damaged to some extent (refer Section 6.5.2). A thirsty camel can drink 90 litres of water at a time, and because many water places do not hold large amounts of water they may be emptied very rapidly. The use

of waters by camels also causes serious erosion and vegetation damage at these places (refer Box 2). Additionally, the pads resulting from the movement of camels through the landscape can impede and redirect sheet flows, resulting in local changes in water availability for vegetation. Such changes can damage habitats such as the mulga stands that grow in run-on areas (refer Section 6.4.2).

“ We want lots of scientists, lots of rangers in this area to fix up water because camels are damaging the land. We need to keep waterholes clean so that when we want to go out and have a drink we can get good water. Camels are making a mess. Country is looking good after rain but when summer comes up those camels will be pushing into waterholes again. ”

Kunmanara Smith



Kaltukatjara Rangers remove the carcasses of horses that died from thirst at an empty waterhole near Kaltukatjara, 2013

Between 2004 and 2009, the CLC organised the construction of camel-exclusion fences at six rockholes on the Petermann ALT. Although this fencing program served an important role in engaging *Anangu* with issues associated with camels, the benefits of exclusion fences are highly localised and their maintenance can be problematic. Issues associated with exclusion fencing on the IPA include:

- the potential for exclusion fences to permanently alter or damage sacred sites
- the relative expense of fence construction compared with other camel management options
- the requirement for intensive and ongoing maintenance of exclusion fences
- fencing projects having the potential to undermine the adoption of more effective camel management activities as some *Anangu* believe that once a fence is constructed the camel problem is solved

- animal welfare considerations related to the exclusion of animals from water, the entanglement of animals in fences or their entrapment in fenced exclusion zones
- the choking of waterplaces by vegetation when herbivores are excluded and resultant effects on aquatic animals.

The impacts of feral camels on water places in the IPA have been measured since 2008. Water quality (pH, turbidity, oxygen levels), macroinvertebrate abundance and diversity and vegetation and soil conditions are periodically assessed at six water places: Patji, Wala, Piltardi, Piryultjara, Tjilpuka and Ururru.



Scientists and Kalyukatjara Rangers monitoring water quality at Tjilpuka waterhole

Box 2 Camels at Wala Rockhole

Wala is a small, well-defined spring-fed rockhole that spills over to form a short drainage line. Located south of Muṭitjulu, the rockhole is an important water source for travelling *Anangu* and native animals.

In 2006, traditional owners visiting Wala found it filled in with silt as a result of camels trampling the site. After the silt and debris were removed the water began to flow once again. Traditional owner concerns about the health of such waterholes led to a study of camel usage and impacts at Wala, carried out collaboratively by traditional owners and staff of the CLC, UKTNP and Northern Territory Department of Land Resource Management. The work included water quality testing, microbial analysis, water usage measuring, infra-red camera monitoring of fauna, and assessments of camel-related impact on the nearby vegetation.

Observations over a nine and a half month period in 2007/08 showed that camel usage of the rockhole mainly occurred at night, but also included daytime use during long dry periods. At such

times, there was little opportunity for Wala to refill, thereby reducing the amount of water available to native wildlife. There were very few macroinvertebrates present, and the water was usually unsuitable for drinking due to camel fecal contamination. Shrubs around the rockhole showed signs of heavy browsing, and ground cover was denuded through trampling by camels.



Motion sensor camera footage of camels drinking at Wala Rockhole (photo: Jayne Brimbox)



A shocking image of a herd of starving camels crowded into an empty waterhole at Warupanti, January, 2012

Introduced Plants

Introduced plants also present a significant threat to water places in the IPA. Along the banks of creeks and in floodouts, higher nutrient and moisture levels enable rapid weed establishment, especially at sites already affected by soil disturbance caused by camels. The cycle is perpetuated as seeds are washed downstream in subsequent floods, enabling these plants to spread further across the landscape. More isolated water places in rocky gorges, as places of both human and animal activity, can also be points for weed introduction and subsequent dispersal, being carried on clothing, shoes, feet, vehicles, animal fur and feathers and in bird droppings.

Weeds near water places can form dense monocultures and displace other plant species such as *tjanmata* (bush onion – *Cyperus bulbosus*), which is an important traditional food for *Anangu*.

Excessive weed growth can affect aquatic ecosystem processes by changing factors such as evaporation rates, water table levels and soil nutrients. In addition, watercourses infested with weeds can enhance the spread of fire rather than acting as firebreaks. Fires in buffel grass (*Cenchrus ciliaris*) tend to burn especially fiercely, often killing old hollow-bearing river red gums which provide nest, roost and den sites for native animals.

Buffel grass and couch grass (*Cynodon dactylon*), both present on the IPA, pose significant threats to

water place values as do another seven weed species present in the region (Appendix 4). Though many of these usually die off in dry conditions, they may survive near water places, threatening not only individual wetland habitats, but acting as sources for further infestations (refer also Section 6.4.2).

Groundwater Issues

Traditional owners have some concerns about the potential effects of groundwater extraction on aquifer capacity. This is particularly true in relation to water extraction from the Dune Plains Aquifer in the IPA for use at Yulara resort. Elsewhere, some *Anangu* are concerned about the poor quality of bore water at their outstations. A better understanding of aquifers and their recharge characteristics across the IPA is required so that *Anangu* can make informed decisions about future infrastructure development and the feasibility of enterprises people may wish to pursue. The likely impacts of climate change on groundwater resources, the only reliable water supplies in the IPA, also require investigation.

Beyond knowledge gaps concerning the physical attributes of aquifers, our knowledge about groundwater-dependent plants and animals and their management requirements is far from complete. While considerably more is known about the biodiversity values of surface waters, here too knowledge and understanding are limited and fragmented.



Island in Lake Neale

6.3.3 Management Strategies

Management Objective 6.3.3(a)

Support traditional owners in preventing the ongoing loss of cultural knowledge associated with water places

Management Strategies

1. In conjunction with senior *Anangu*, the IPA Management Committee and CLC Anthropology Section staff, review the cultural knowledge records held by the organisation for water places in the IPA.
2. Develop and implement a research program to fill in knowledge gaps about water places, including their:
 - names
 - locations
 - associated *Tjukurpa* stories
 - management regimes.

Research priorities and the means by which knowledge gaps are to be filled will be guided by the same criteria as those listed in Strategies 2 and 3, Management Objective 5.3.3(a).

Management Objective 6.3.3(b)

Manage important water places in order to maintain or enhance their cultural and ecological values

Management Strategies

1. Develop a water place management schedule based on traditional management practices. The schedule will include details concerning the management regimes to be applied to particular places, such as:
 - types of activities (e.g. protective burning, cleaning out of debris)
 - the regularity of maintenance visits
 - type(s) of surveys and monitoring (if any) to be conducted.

Priority water places will be determined using the same criteria as those listed in Strategies 2 and 3, Management Objective 5.3.3(a), together with consideration of:

- the significance of the biodiversity values present
- the need to undertake works to maintain benefits from previous management efforts
- the presence/absence of other high priority management actions at or near the water place, such as those related to:
 - soil conservation (Section 6.2.3)
 - protection of significant plants (Section 6.4.3)
 - weed control (Section 6.4.3)
 - threatened species programs (Section 6.5.3)
 - feral animal control (Section 6.5.3)
 - fire management (Section 6.6.3).

2. Implement the water place management schedule through field trips specifically undertaken for this purpose or through the incorporation of water place activities into:
 - the IPA country visit program
 - appropriate ranger and IPA program land management trips.
3. Continue the water place monitoring program as a means of measuring the success or otherwise of key management strategies. Consider expanding the program to include additional water places (refer Chapter 9).

(For management objectives and strategies concerning weed and feral animal related impacts on water places, refer Sections 6.4.3 and 6.5.3 respectively.)

Management Objective 6.3.3(c)

Manage groundwater resources in sustainable ways

Management Strategies

1. Support research by tertiary institutions and relevant government agencies into the sustainable use of the groundwater resources of the IPA.
2. Consult with staff of the Power and Water Corporation and Water Resources Division of the Northern Territory Department of Land Resource Management, as appropriate, regarding the management of the Dune Plains Aquifer. Promote the need for sustainable management and regular monitoring of this aquifer.

6.4 *Punu* – Plants

6.4.1 Background

The vegetation of the IPA is dominated by spinifex (*Triodia* species) grasslands, which thrive on the infertile sandy soils that characterise the region. The ubiquitous hummocks of spinifex cover sandplains and dunefields, hills and valleys and extend from the verges of salt lakes to the tops of the highest mountain ranges. Within and adjoining these grasslands are a variety of other vegetation types including woodlands and tussock grass communities. Highly restricted plant species are to be found along sheltered creeklines, gullies and cliffines and around the edges of saltpans. While this vegetation pattern reflects the range of rocks, soils, landforms and aspects present, it is largely a product of fire.

Across the IPA, certain vegetation communities characterise specific land types, whereas others may be found across a variety of land types. Key vegetation types that are readily distinguishable by both *Anangu* and *Pirrapa* are:

- Spinifex grasslands
- Marble gum woodlands
- Hill and range communities
- Mulga woodlands
- Tussock grasslands.

Spinifex Grasslands

Land types: *pila* (sandplains), *tali* (sandhills)

The sandplains and sandhills that account for about 60% of the IPA are dominated by spinifex species, including lobed spinifex (*Triodia basedowii*). This species is especially prevalent on the shallow sands of the northern half of the IPA. It is replaced by feathertop spinifex (*T. schinzii*) in the south-west region, where deeper sands exist. Soft spinifex (*T. pungens*) is also relatively widespread across the IPA, and, as with feathertop spinifex, this resinous plant is able to resprout after fire, as well as regenerate from seeds.

Dominant sandplain shrubs and low trees include a variety of fire-tolerant *Acacia* species and blue mallee (*Eucalyptus gamophylla*). Ghost gums (*Corymbia aparrerinja*) are common in areas of high fire frequency, with trees such as bloodwoods (*C. opaca*) and black gidgees (*Acacia pruinocarpa*) occurring in less frequently burnt country. The swales in dunefields are characterised by stands of blue mallee and desert oaks (*Allocasuarina decaisneana*). In long-unburnt areas, mulga (*Acacia aneura*) woodland can occur between sandhills, while sandhill slopes are typically covered in desert myrtle (*Aluta maisonneuveii*) and horse mulga (*Acacia ramulosa*).



Spinifex grassland community, Petermann ALT

Marble Gum Woodlands

Land types: *pila* (sandplains), *tali* (sandhills)

Woodlands of marble gum (*Eucalyptus gongylocarpa*) form a fringing vegetation community in the sandhills surrounding Lake Neale and Lake Amadeus in the north of the IPA. *Triodia pungens* is the dominant ground cover here, though tussock grasses may be seasonally present. Bloodwoods, umbrella wattle (*Acacia ligulata*) and hopbush (*Dodonaea viscosa* subsp. *angustissima*) also occur in this woodland community.

Marble gums can grow up to 25 m in height and are important hollow-bearing trees that are used by a variety of birds, bats and reptiles, including the nationally vulnerable princess parrot (*Polytelis alexandrae*) (refer Section 6.5.1).



Marble gum woodland community, Petermann ALT

Hill and Range Communities

Land types: *puli* (rocky hills and mountain ranges)

Spinifex communities extend throughout the hills and ranges that cover some 10% of the IPA. The dominant spinifex species present varies from *Triodia spicata* in the Petermann Ranges and eastern Bloods Range, to *T. pungens* in the western portion of Bloods Range and *T. irritans* on the hills and ranges of the southern part of the IPA. The shrub layer comprises mixed *Acacia*, *Eremophila* and *Grevillea* species. Scattered native pine (*Callitris glaucophylla*) occur in fire-protected sites.

The rocky hills and ranges are also refuge areas for other fire-sensitive species such as desert figs (*Ficus brachypoda*), spearbush (*Pandorea doratoxylon*) and native currant (*Psyrax latifolia*). These plants are found in natural fire shadow areas such as cliff edges, screefields and deep gullies. Rare fire-sensitive species include the Mt Conner wattle (*Acacia ammobia*) on Stevenson Peak and Butler Dome. Desert bottlebrush (*Melaleuca faucicola*) is a relict species known from only one fire-protected gorge in the Petermann Ranges.

Mulga Woodlands

Land types: *puti* (scrub country), *puli* (rocky hills and mountain ranges), *pila* (sandplains), *tali* (sandhills)

Woodlands of fire-sensitive mulga cover about 10% of the IPA. They primarily occur on alluvial red-earth plains adjacent to hills and ranges, but are also found across sandplains and dunefields. Mulga communities come in many forms, the commonest of which includes an understorey of woollybutt (*Eragrostis eriopoda*) and patches of hummock grassland. Blue mulga (*Acacia* sp. blue mulga) is a form that occurs in dune swales and hill slopes between Kaltukatjara and Kata Tjuta.

Significant stands of unburnt old-growth mulga occur south of the Petermann Ranges (between Walka and Pitalu), west and south-west of UKTNP, and in the vicinity of Umpiyara and Yulara Pulka

Tussock Grasslands

Land types: *urilpa* (open country)

Non-spinifex tussock grasslands cover about 15% of the IPA. In general, these grasslands are found in a broad swathe running diagonally from south of Docker River to south of Mantarur, though small patches also occur in the south-west corner. Dominant species include woollybutt, curly windmill grass (*Enteropogon acicularis*) and kangaroo grass (*Themeda triandra*). Overstorey species include dead finish (*Acacia tetragonophylla*), witchetty bush (*A. kempeana*) and, less commonly, needlebush (*Hakea leucoptera*). In long-unburnt areas, chenopod shrubs may be found in association with tussock grasslands on granitic hills, as may remnant stands of mulga.

Aside from these major vegetation types, there are a number of other distinctive vegetation communities occupying smaller niches in the landscape. These include corridor woodlands along *karu* (watercourses) of river red gums (*Eucalyptus camaldulensis* var. *obtusa*) with understoreys of tussock grasses, and samphire (*Tecticornia* species) communities or tea-tree (*Melaleuca* species) shrublands which fringe *pantu* (salt lakes).

To date, some 874 plant taxa have been recorded from the IPA, marking it as a region of high species diversity in Central Australia.

Traditionally, *Anangu* held intimate knowledge of very many plant species based on their utilitarian values. Plant parts such as tubers, fruits and seeds were important food items. *Nyuma* (dampers), made from seeds of different grasses, shrubs and trees, were a staple part of people's diets. Many plants were also valued for their medicinal properties, while *mingkulpa* (bush tobacco – *Nicotiana gossei*) was keenly sought after for its mild narcotic effects. Some plants, such as *walkalpa* (*Duboisia hopwoodii*), were used to stupefy game animals by adding leaves to waterholes. Other plants were used for ornamental or ceremonial purposes, as adhesives or as sources of water. Plant material was also essential for creating tools required for everyday survival, especially *wana* (digging sticks) and *piti* (scooped dishes) for women, and *kulata* (spears) and *miru* (spear-throwers) for men. Plants were also utilised for *wiltja* (shelters) and *waru* (firewood).



Jim Nyukiti with timber for making *kali* (boomerang)



A stand of *Xanthorrhoea thurstonii* near Kaltukatjara

Plants remain an important part of *Tjukurpa*, and ceremonies exist for many different species, including all of the main food plants. Individual trees or patches of vegetation may be sacred themselves or act as important markers to nearby sacred sites. Many plants continue to be harvested for food or medicinal purposes, while *punu* (wood) of certain trees is collected for creating contemporary and traditional artefacts to sell to tourists (refer also Section 8.4.1).

For *Piranpa*, the plants of the IPA hold little, if any, utilitarian or economic value. Instead, *Piranpa* values are associated with ecological function of the plant species present, with the focus being on describing and mapping vegetation communities and protecting plant diversity, including rare or threatened species and communities.

The plants of the IPA also perform critical ecological functions, including soil formation and protection, nutrient storage and release and the provision of wildlife habitats and food sources.

Although there are no nationally listed threatened plants known from the IPA, the region contains many species of conservation significance (refer Figure 8 and Appendix 3). Under Northern Territory threatened species legislation (*Territory Parks and Wildlife Conservation Act 2000*) one species, *Melaleuca fulgens* subsp. *corrugata*, is listed as Endangered, and another, *mangata* (*Santalum acuminatum* – quandong) is listed as Vulnerable. Sixty-three taxa recorded in the IPA are listed as Near Threatened, while a further 66 plant taxa are described as Data Deficient, meaning that insufficient information is known about them to determine their status. (Refer Appendix 3 for a complete list of plants of conservation significance in the IPA.) Almost 20 other Near Threatened or Data Deficient species have been recorded in UKTNP and may well occur in the IPA.

The IPA contains all or part of 11 designated Sites of Botanical Significance (SOBS) (refer Table 1 and Figure 6). Of these, two sites are considered to be of national significance and six are of bioregional importance. The significance of a further three sites is yet to be determined.

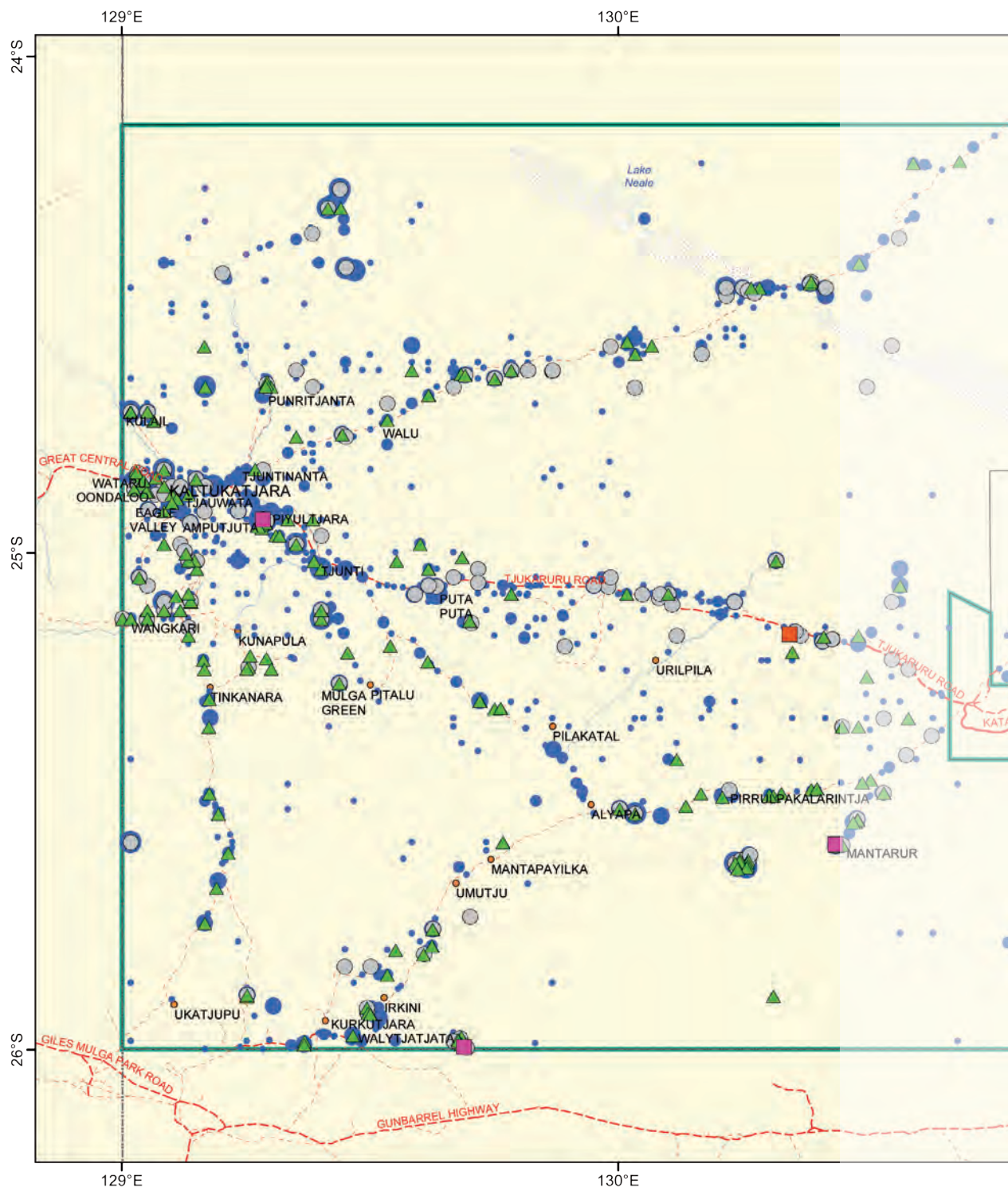


Figure 8 Botanical Sampling Densities, Threatened and Significant Plants

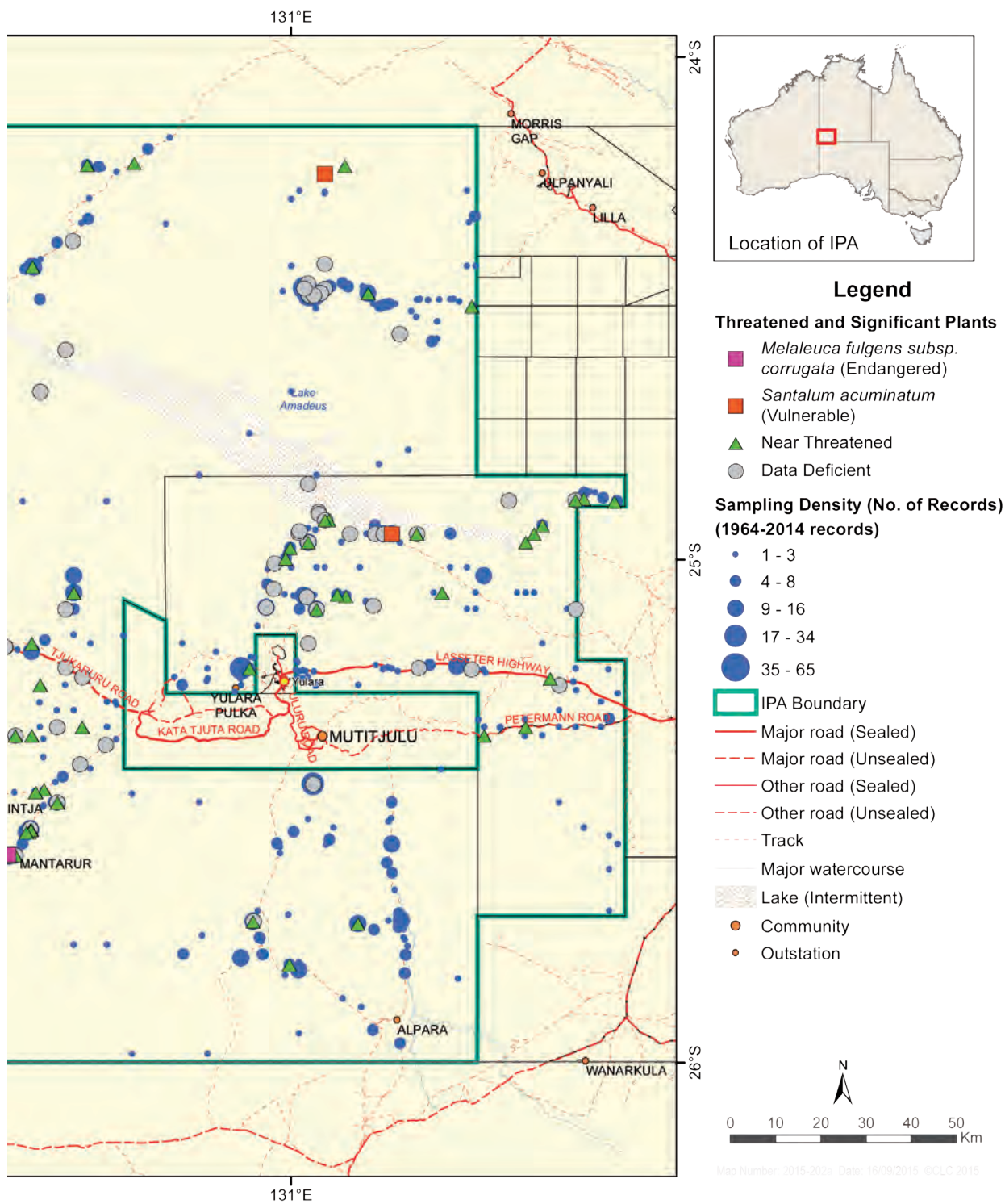


Table 1 Sites of Botanical Significance

SOBS	Significance	Bioregion	Portion contained in the IPA	Values summary *	Corresponding Site of Conservation Significance
Petermann Ranges	National	Central Ranges	All	12 taxa of national significance, 34 taxa of Northern Territory significance, 8 of bioregional significance	Petermann Ranges and Surrounds
Watarrka	National	MacDonnell	Part	14 taxa of national significance, 48 taxa of Northern Territory significance, 11 taxa of bioregional significance	George Gill Range and Surrounds
Bloods Range	Bioregional	Central Ranges	All	7 taxa of national significance, 12 taxa of Northern Territory significance, 2 of bioregional significance	N/A
Lake Amadeus	Bioregional	Great Sandy Desert	All	4 taxa of national significance, 22 taxa of Northern Territory significance, 2 of bioregional significance	Lake Amadeus and Lake Neale
Central Ranges	Bioregional	Central Ranges	All	4 taxa of national significance, 15 taxa of Northern Territory significance, 6 of bioregional significance	N/A
<i>Acacia ammobia</i> Shrublands	Bioregional	Great Sandy Desert	All	Rare plant community 1 taxa of Northern Territory significance	N/A
Northern Mann Ranges	Bioregional	Central Ranges	All	4 taxa of national significance, 6 taxa of Northern Territory significance, 1 of bioregional significance	N/A
Kata Tjuta SOBS	Bioregional	Great Sandy Desert	Part	3 taxa of national significance, 12 taxa of Northern Territory significance, 4 taxa of bioregional significance	Uluru and Surrounds
Lake Neale	Undetermined	Great Sandy Desert	All	Undetermined	Lake Amadeus and Lake Neale
Northern Musgrave Ranges	Undetermined	Central Ranges	All (point location only)	Undetermined	N/A
Unnamed	Undetermined	Central Ranges	All	Undetermined	N/A

* Note the significance categories used in the SOBS classification in 2000 and in this table are now largely superseded by reclassification done in 2010–11 for schedules of the *Territory Parks and Wildlife Conservation Act 2000*

6.4.2 Issues and Opportunities

The key issues associated with vegetation across the IPA are:

- loss of cultural knowledge
- incomplete scientific knowledge
- changed fire regimes
- introduced plants
- feral animals
- changes to surface water flows.

Loss of Cultural Knowledge

With *Anangu* residing on communities, their diets are now focused on store-bought food. The end of people's reliance on bush foods has resulted in a decline in customary practices and in the intergenerational transfer of traditional knowledge associated with food plants. This loss has extended to knowledge about plants traditionally used for medicinal and other purposes.

Beyond the diminution of culture that this trend represents, this loss of knowledge has health and wellbeing consequences for *Anangu*. It also has plant conservation implications, as embedded in traditional plant knowledge are ecological insights and understanding based on thousands of years of observation and practice. From a land management perspective, the loss of such knowledge is especially regrettable, given the relatively poor scientific understanding of the plants of the IPA.

A considerable number of people still hold traditional knowledge about plants, and, with increased visits to country, this knowledge can be revived and passed on to others, especially to young people.

Incomplete Scientific Knowledge

Although *Pirranpa* have collected plant specimens from the region now included in the IPA for well over a century, this collecting has largely been sporadic and opportunistic. It has only been in the last decade or so that work has begun to fill in the many botanical knowledge gaps in a systematic way. This activity gained momentum in 2009 with the commencement of the IPA development project, which incorporated a series of surveys involving government and consultant botanists. As a result of this recent work, a number of new records of rare plants have been made, including of the endangered wrinkled honey

myrtle (*Melaleuca fulgens* subsp. *corrugata*), the Central Ranges wattle (*Acacia tenuior*), the sedge (*Lepidosperma avium*), Symons wattle (*A. symonii*) and a new species of lily (*Caesia* sp. Mann Ranges). Further work will no doubt add to these new records.

Pirranpa understanding of Central Australian plant ecology is far from complete. Considerable potential still remains to combine *Pirranpa* and *Anangu* plant knowledge to better manage the vegetation of the IPA.

Changed Fire Regimes

Prior to the depopulation of country during the first half of the twentieth century, vegetation across the Western Desert consisted of patches in different stages of recovery after fire, the net result of traditional *Anangu* burning practices. With the movement of people off country, this traditional regime of a patchwork of relatively small, low-intensity fires has been replaced by a pattern of larger and more intense wildfires that periodically burn tens or hundreds of thousands of hectares (refer also Section 6.6.2). The implications of this change on the vegetation of the IPA have been profound and include:

- replacement of the fine-scale mosaic pattern of vegetation types and age classes with large expanses of even-aged vegetation communities
- reductions in the distribution of fire-sensitive communities, such as mulga woodlands, and their replacement by fire-tolerant or fire-dependent vegetation types, such as spinifex grasslands
- ongoing loss of already localised relict fire-sensitive plant species
- loss of old-growth vegetation, including hollow-bearing mature trees with attendant impacts on hollow-dependent animal species (refer also Section 6.5.2)
- promotion of the spread of weed species, such as buffel grass, which thrive on being burnt and readily colonise burnt areas
- increased soil erosion, as fire kills soil-crusting plants (liverworts, lichens and mosses) which normally protect desert soils
- destruction of sacred trees and other culturally significant vegetation, which can result in

Tjukurpa sites being lost through the disappearance of key vegetation markers along songlines

- reductions in the distribution and availability of important *Anangu* bush foods.

The widespread nature of these impacts highlights the importance of fire management in the IPA (refer Section 6.5).



Roy Yaltjanki patch burning near Walka, Petermann ALT, 2003

Introduced Plants

The majority of the IPA is free of weeds, especially the sandplain and sandhill country, most of which has low nutrient soils and no vehicle tracks to facilitate the inadvertent spread of weed seeds. Relatively fertile parts of the IPA, such as riparian corridors, are far more vulnerable to weed infestation.

Twenty-three introduced plant species have been recorded from the IPA (Appendix 4), and a further 15 weeds have been recorded in UKTNP and have the potential to spread into the IPA. Most weeds are located in disturbed areas, such as alongside roads and tracks or around communities and outstations. Elsewhere, weed infestations are largely restricted to water places, including creeklines and floodouts.

The impacts of weeds on the native vegetation of the IPA can include:

- declines in the diversity of native plant species

- reduced regeneration success of native plant species
- loss of deep-rooted perennials (which affects recharge rates, soil salinity and erosion)
- increased frequency and intensity of fires, resulting in changes to vegetation composition and structure.

Anangu once considered weeds to be of no consequence – they were just another *punu* (tree or bush) or *ukiri* (green grass). Now, the removal of weed infestations around sacred sites to protect them from fire damage is viewed as an important part of maintaining these places. *Anangu* also recognise that weeds such as buffel grass (*Cenchrus ciliaris*) and ruby dock (*Acetosa vesicaria*) can displace culturally important plants such as *mingkulpa* (bush tobacco – *Nicotiana gossei*) and prized bush food species such as *kampurarpa* (desert raisin – *Solanum centrale*) and *tjanmat̩a* (bush onion – *Cyperus bulbosus*).

The following weed species recorded in the IPA have the potential to cause serious environmental degradation:

- **Buffel grass (*Cenchrus ciliaris*)** out-competes native plant species and markedly increases fuel loads, resulting in severe fire behaviour. Buffel grass favours nutrient-rich soils, such as along watercourses or on calcrete substrates. Numerous dense infestations exist in parts of the IPA
- **Athel pine (*Tamarix aphylla*)** is a Weed of National Significance (WONS) and is listed as a Class A/C weed in the Northern Territory. This invasive species can displace native plant species in riparian zones, resulting in significant alterations to habitat. In the IPA, this species is currently confined to plantings at Kal̩ukatjara and some outstations
- **Couch grass (*Cynodon dactylon*)** poses a significant risk to riparian corridors, paleodrainage systems and saline and freshwater lakes where it has the ability to smother and suppress native vegetation. Couch grass is currently known only from Kal̩ukatjara and Mutitjulu communities
- **Red Natal grass (*Melinis repens*)** is an invasive grass that is unpalatable to native animals. Extensive infestations occur in the Alpara (Britten Jones Creek) area. Unlike buffel grass, red Natal grass does not tend to produce high fuel loads and so is not believed to significantly influence fire dynamics

- Ruby dock (*Acetosa vesicaria*) is an annual forb which appears to be outcompeting *mingkulpa* (bush tobacco) in rocky country. It is relatively common in the Alpara (Britten Jones Creek) and Kulpitjata areas, especially around rabbit warrens and other disturbed places
- Feathertop Rhodes grass (*Chloris virgata*) is an invasive grass that has been recorded at several disturbed sites in the IPA. It has the potential to form dense infestations, so early control of small patches is important
- Mossman River grass (*Cenchrus echinatus*) is an invasive grass listed as a Class B/C weed under Northern Territory legislation. Although there is currently only a single record for this species in the IPA, elsewhere in the region it forms dense infestations around water places. Its spiky seeds are carried in animals' fur
- Castor oil plant (*Ricinus communis*) and coffee senna (*Senna occidentalis*) shrubs are currently confined to disturbed sites around Kal̄tukatjara community. As they are listed as Class B/C weeds under Northern Territory legislation, control of the spread of these species into new areas is important
- Caltrop (*Tribulus terrestris*) is listed as a Class B/C weed under Northern Territory legislation. This mat-forming forb has very spiny fruits and can form dense infestations at disturbed sites.

Significant environmental weeds that are present in UKTNP but are yet to be recorded in the IPA include two Northern Territory-listed weed species: Mexican poppy (*Argemone ochroleuca* – Class B/C weed) and khaki weed (*Alternanthera pungens* – Class B/C weed).



Mangaṭa (quandong) with a ubiquitous high browse line caused by camel grazing

The most effective ways to limit the spread and proliferation of weeds in the IPA are by rapidly identifying and swiftly treating new species and infestations, minimising soil disturbance by feral animals and human activity and by enacting sound weed hygiene procedures (Appendix 6).

Feral Animals

Five feral herbivore species are present in the IPA: camels, rabbits, cattle, donkeys and horses (refer also Section 6.5.2). Camels, which are found at high densities throughout the region, significantly impact on native vegetation through heavy browsing, breaking branches (sometimes to the point of killing individual trees and shrubs) and eating seedlings. Even less severe browsing, if repeated, can stunt tree and shrub growth. Browsing impacts on preferred plant species, some of which are culturally important, are especially critical. Camels have been implicated in the loss of *mangaṭa* (quandong – *Santalum acuminatum*) trees across large parts of the landscape and are considered a key threat to species such as *ili* (desert fig – *Ficus brachypoda*), *ngalta* (desert kurrajong – *Brachychiton gregorii*), *arnguli* (bush plum – *Santalum lanceolatum*), Mt Conner wattle (*Acacia ammobia*), umbrella wattle (*A. oswaldii*) and *kumpalya* (native apricot – *Pittosporum angustifolium*).

Rabbits can potentially denude the country of vegetation, but their presence in the IPA has been significantly reduced since the introduction of the rabbit calicivirus disease in 1996. Despite this, their impact can be significant in a wide range of habitats. Although rabbits prefer green grass and herbage, they will browse mature plants and, during drought, eat the bark and roots of shrubs. They



Anangu harvesting *mangaṭa* fruit

also eat seeds and seedlings, thereby reducing plant survival and recruitment and hence changing the structure and composition of plant communities. Some long-lived arid zone plant communities are especially vulnerable, as recruitment events can be rare (e.g. only triggered by specific combinations of temperature and timing of rainfall). Erosion can be exacerbated by the extensive burrow systems of rabbits, again affecting successful establishment of native plant species. Active rabbit warrens have been recorded recently around Little Puta Puta outstation, Britten Jones Creek and Muwa.

Small numbers of cattle are present in the eastern portion of the IPA where it adjoins the pastoral properties of Curtin Springs and Mulga Park. Cattle from Mulga Park are agisted in the Alpara area in the south-east corner of the IPA, where their impacts on vegetation through grazing and attendant changes to fire regimes have not been determined. The tussock grasslands of the IPA are the largest area of such vegetation in the southern Northern Territory that has never been grazed and, as such, have significant conservation value.

Horses are largely dependent on water sources at Kaltukatjara and nearby outstations. They cause localised impacts on vegetation through overgrazing

and soil disturbance and compete with key game species for palatable forbs and grasses.

Changes to Surface Water Flows

Ground disturbance that alters natural surface contours and water flows can result in impacts on native vegetation. Ditches and drains associated with formed roads, trenched tracks and even vehicle wheel marks can redirect surface flows away from some areas of vegetation and concentrate water at others. Obvious impacts include increased vegetative growth along road and track verges and the presence of weeds, such as buffel grass, along road and track corridors.

During high rainfall events, the funneling of surface flows along unformed vehicular tracks can scour out soil and undermine vegetation, resulting in the development of ever-widening corridors of disturbance.

Although such vegetation disturbance and loss is highly localised, parts of the IPA are crisscrossed with vehicular tracks, especially near the communities of Muṭitjulu and Kaltukatjara, meaning that the cumulative impact on vegetation associated with changed surface water flows is likely to be considerable.

6.4.3 Management Strategies

Management Objective 6.4.3(a)

Support traditional owners in preventing the ongoing loss of cultural knowledge about plants

Management Strategies

1. In conjunction with senior *Anangu*, the IPA Management Committee, CLC Anthropology Section staff and managers of adjoining protected areas, review the cultural knowledge information held for plants of the region.
2. Develop and implement a schedule of activities directed at preserving traditional plant knowledge with priority setting guided by the following criteria:
 - the results of the review of plant knowledge already recorded
 - the risk of irretrievable loss of plant knowledge
 - information related to plants of outstanding cultural significance
 - information related to rare or threatened plant species or information that is considered to be important for the management of vegetation in the IPA
 - a demonstrated interest by traditional owners to pass on particular plant knowledge.

This schedule should be directed at, but not limited to, the preservation of cultural information relating to the management of key areas and plant species utilised for:

- bush foods
- *inma* (ceremony)
- the production of traditional and contemporary artefacts
- firewood
- medicines.

Based on the advice of *Anangu*, identify the best means of preventing knowledge loss, including:

- conducting country visits
- holding one-on-one and group interviews
- undertaking literature reviews.

3. Create a comprehensive record of *Anangu* plant knowledge using a variety of appropriate media, including video and sound recordings. Distribute copies of this material to *Anangu* as teaching tools. Store this information in the IPA database for use by ranger and IPA staff.

Management Objective 6.4.3(b)

Address Piranpa knowledge gaps related to the vegetation of the IPA

Management Strategies

1. Identify and prioritise gaps in *Piranpa* knowledge and understanding of the vegetation of the IPA. Known deficiencies include:
 - the extent and attributes of the marble gum woodlands in the Lake Neale – Lake Amadeus region
 - the range of wrinkled honey myrtle, Mt Conner Wattle, *Acacia* sp. blue mulga and other near-threatened or data-deficient species in the Petermann and Bloods Ranges
 - information concerning rare, restricted and data-deficient plants in the northern Mann Ranges area
 - the distribution and extent of old-growth mulga communities
 - information on fire history, composition and structure of plant communities supporting active *tjakura* warrens.
2. Conduct flora surveys to address data gaps in relation to the vegetation of the IPA, especially the location, extent, status and health of culturally and ecologically significant species and communities.
3. Create improved vegetation maps of the IPA at scale(s) that are useful for management purposes.

Management Objective 6.4.3(c)

Manage the IPA to ensure that the full suite of native plant species and communities is conserved

Management Strategies

1. Combine *Anangu* and *Pirrapa* plant knowledge in the management of the vegetation of the IPA.
2. Develop and implement management regimes designed to optimise the health of:
 - each individual vegetation type (refer also Section 6.6.3)
 - culturally significant plants and vegetation communities, including key harvest areas (refer also Section 8.4.3)
 - rare, localised or threatened species and communities.
3. Where warranted, develop and implement site-specific action schedules to protect culturally and/or ecologically significant plants or communities with restricted distributions that are known to be at risk.
4. Support research directed at improving the management of the vegetation of the IPA.
5. Where appropriate, liaise with staff of adjoining protected areas to facilitate complementary management of native vegetation values and associated research.

(For management objectives and strategies related to sustainable harvesting, changes to surface water flows, feral animal control and fire management, refer Sections 5.3.3, 6.3.3, 6.5.3 and 6.6.3 respectively.)

Management Objective 6.4.3(d)

Reduce the introduction, spread and proliferation of weed species across the IPA

Management Strategies

1. Map all known weed species and populations and collate information on abundance, distribution and past treatment histories.
2. Develop a weed management plan for the IPA to guide weed control activities. In determining priorities, consideration will be given to:
 - weed species that threaten customary or biodiversity values
 - the level of significance of the value(s) threatened
 - legislative requirements related to the control of the species
 - a weed population of limited distribution that has known potential to become a significant problem
 - a species that requires ongoing management to maintain benefits from previous control activities
 - a species that must be controlled to allow another higher priority action to take place

- the location of an infestation in an area of exceptional customary or biological value
- the location of an infestation with regard to its likelihood to be spread by human or other means (i.e. at the headwaters of a catchment or along roadsides)
- the existence of effective and suitable means of controlling the species
- the immediate and long-term availability of resources to effect control or eradication.

Key management priorities already identified include:

- eradication of any infestations of Mossman River grass or couch grass detected in the IPA
- the treatment, removal and replacement of shade plantings of Athel pines at Kal̄ukatjara community and outstations
- treatment of small and isolated buffel grass infestations that threaten to invade ecologically significant areas (e.g. at known rock-wallaby sites).

3. Conduct regular surveys of disturbed areas, including outstations and tracks, to detect:

- new outbreaks of known weed species and expansion of known infestations
- the introduction of new weed species.

Priority will be given to areas of high cultural or ecological significance that are known to be highly susceptible to weed invasions.

4. Establish, equip and promote vehicle clean-down stations at key sites en route to environmentally sensitive areas, especially weed-free areas and those deemed to be at high risk of weed introductions.

5. Consider establishing permanent weed quarantine stations at Muṯitjulu and Kal̄ukatjara communities to reduce the rate of introduction and spread of weed species into weed-free areas.

6. Implement weed hygiene procedures for the use of all IPA and ranger program vehicles when operating off-track in the IPA (as per Appendix 6).

7. Liaise with staff of MacDonnell Regional Council and the Northern Territory Department of Transport regarding the application of weed hygiene procedures for all road maintenance and earthmoving equipment (refer Appendix 6).

8. Minimise new soil disturbance with the aim of limiting opportunities for the introduction of new weed species and expansion of existing weed infestations.

9. Prepare and implement a strategic and systematic long-term monitoring program to measure trends in weed distributions, abundance, introductions and impacts.

10. Develop and apply an evaluation regime to measure the effectiveness of weed control efforts. All control programs will be described and critically reviewed to determine the reasons for success or failure so that future programs can be adapted accordingly to ensure better results.

11. As appropriate, liaise with staff of adjoining protected areas to facilitate complementary management of weed species.

6.5 Kuka – Animals

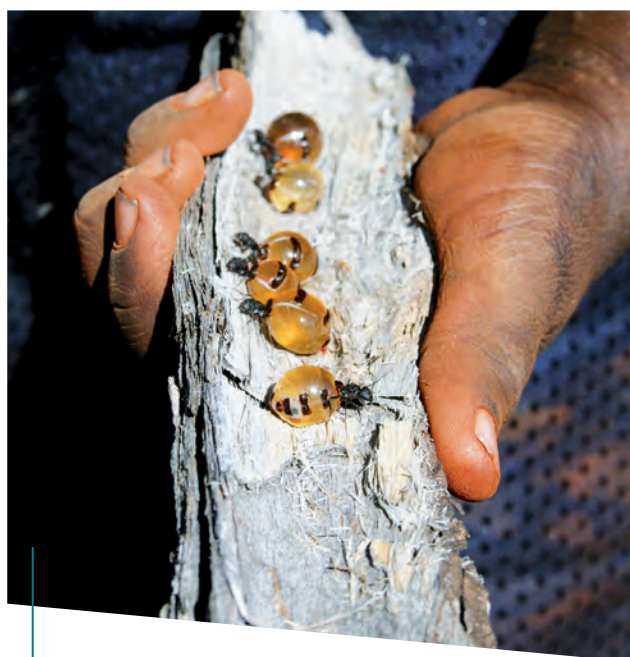
6.5.1 Background

The fauna of the IPA is typical of that found across Central Australia. It includes a suite of invertebrates, reptiles, amphibians, birds and mammals, all of which are adapted to the relatively harsh environment of the place. While the species present, together with their distributions and abundances, largely reflect the natural conditions and constraints of the region, they are also a product of the profound influences exerted by humans – both *Anangu* and *Pirranpa*.

Invertebrates

As is the case globally, invertebrates dominate the IPA. They account for more species, numbers of individuals and biomass than all of the other groups of animals combined. They are essential for soil turnover, nutrient cycling, pollination and decomposition and are important food sources for many birds, reptiles and mammals.

Anangu have extensive knowledge of invertebrates, from ants, spiders and beetles to water insects and plant pests. Several different types of insects or their larvae, as well as the substances they produce (galls, honey dew) were nutritionally critical in traditional times, and some *Anangu* still supplement their diets with such foods. *Tjala* (honey ants – *Camponotus inflatus*), which are an important *Tjukurpa* species, remain very popular, and



Tjala (honeyants)

country trips are regularly undertaken by women specifically to source these ants.

From a *Pirranpa* perspective, identification of the invertebrates of the region has barely begun, with very few resources devoted to documenting their diversity, abundance and important ecological roles. Ants and termites are probably the most well-studied groups, but even these have not been documented for the IPA.

Tjuninguru Ankupai Tjuta – Reptiles and Amphibians

Australian deserts are renowned for their reptile diversity, and the Kaṯiṯi-Petermann region is no exception. Eighty-eight reptile species (16 snakes and 72 lizards) have been recorded in the IPA (refer to Appendix 5 for a complete list). Of these, skinks are the most diverse group, represented by 38 species. These range from large and familiar lizards such as *lungkata* (blue-tongue lizards) to small, seldom-seen species. The region is a key stronghold for one particular skink: *tjakura* (great desert skink – *Liopholis kintorei*) (refer Box 3).

The IPA is home to six species of goanna, including the *ngintaka* (perentie – *Varanus giganteus*), *tinka* (sand goanna – *Varanus gouldii*) and *mulyamaru* (black-headed monitor – *Varanus tristis*). Of the 13 species of dragons present, *ngiyari* (thorny devil – *Moloch horridus*) is the most distinctive. Other common dragon species found here include the *putukalya* (rusty dragon – *Ctenophorus rufescens*) and *tjati* (central netted dragon – *Ctenophorus nuchalis*). Fifteen species of gecko have been recorded in the IPA, these include the beautifully patterned jewelled gecko (*Strophurus elderi*) and the smooth knob-tailed gecko (*Nephrurus laevis*).

The sixteen species of snakes that occur in the IPA include two types of python – *kuniya* (woma python – *Aspidites ramsayi*) and Stimsons python (*Antaresia stimsoni*), and four venomous species – *liru*: king brown snake (*Pseudechis australis*); ringed brown snake (*Pseudonaja modesta*); western brown snake (*Pseudonaja nuchalis*); *wardar* (*Pseudonaja mengdeni*) and curl snake (*Suta suta*).

Reptiles feature prominently in *Tjukurpa* stories of the IPA, which include sites and storylines

associated with *tjati* (dragons), *lungkata* (blue-tongue lizard), *wati ngintaka* (perentie man), *liru* (king brown snake), *kuniya* (woma python) and *wanampi* (water serpent). Reptiles traditionally formed a major component of people’s diet, with species such as sand goanna and perentie still highly sought after.

To *Piranpa*, two reptile species present are especially noteworthy: great desert skink and king brown snake (refer Table 2 and Figure 9), while the rusty dragon is listed as Data Deficient and requires further survey effort. In addition to these species,

the newly described Western Desert taipan (*Oxyuranus temporalis*), which was first recorded in 2006 just across the border in WA, is another species of conservation significance that may also occur in the IPA. The species is known from just two specimens and is listed on the IUCN Red List of data-deficient species.

Of the four frog species recorded in the IPA, most are burrowing frogs, and all four are relatively common in suitable habitats and breed opportunistically in temporary pools of water after rain (refer Appendix 5 for a complete list of frog species).

Table 2 Reptiles of Conservation Significance

Scientific Name	Common Name	Anangu Name	AUS Status (EPBCA)	Northern Territory Status (TPWCA)
<i>Liopholis kintorei</i>	Great desert skink	<i>Tjakura</i>	VU	VU
<i>Pseudechis australis</i>	King brown snake	<i>Liru</i>	-	NT
<i>Ctenophorus rufescens</i>	Rusty dragon	<i>Putukalya</i>	-	DD

(VU=Vulnerable, DD=Data Deficient, NT=Near Threatened; EPBCA = *Environment Protection and Biodiversity Conservation Act 1999*; TPWCA = *Territory Parks and Wildlife Conservation Act*)

Box 3 *Tjakura* – Great Desert Skink

The *tjakura* or great desert skink (*Liopholis kintorei*) is listed as Vulnerable at the national and Northern Territory levels. The combined effects of introduced predators and changed fire regimes have been implicated in the demise of the species. Although rarely eaten today, *tjakura* used to be a source of food for Anangu.

Although known to occur within UKTNP, new populations were found during IPA country trips in 2008 and 2011 on the Petermann ALT in the Pitalu and Muwa areas.

In recent years, the Kalṭukatjara Rangers have managed these populations in accordance with the recovery plan for the species by:

- mapping existing habitats
- establishing permanent monitoring sites
- undertaking patch burning to promote habitat heterogeneity to protect colonies from destructive wildfires
- undertaking training that has increased local capacity for ongoing monitoring and management.



Traditional owner Nyinku Kulitja with a *tjakura* (great desert skink) near Pitalu, Petermann ALT, 2008

Tulu Tjuta – Birds

The IPA is home to a typical desert bird fauna. While only 147 bird species have been recorded to date, this relatively low number is probably due to limited survey effort. By comparison, 176 species are listed for the much smaller area of the adjoining UKTNP, which has been intensively surveyed (refer Appendix 5 for a complete list of birds recorded in the IPA).

Ubiquitous species such as *kiilykiilykari* (budgerigar – *Melopsittacus undulatus*) and masked woodswallows (*Artamus personatus*) are found across all habitat types of the IPA. Budgerigars breed up in boom years after rains to exploit an abundance of available seed, before contracting to reliable waters in dry periods. By contrast, woodswallows are nomadic habitat generalists that exploit a broad range of insects.

Sandhill and sandplain habitats are characterised by nomadic communities of nectivorous honeyeaters that take advantage of seasonally abundant flowers of *Grevillea*, *Hakea* and *Acacia* species. Raptor species such as goshawks, kites and falcons are also common in these habitats, where they typically prey on smaller birds and reptiles. Hollow-bearing trees in creek and river habitats are used by a range of parrot species, including budgerigars, *iranti* (red-tailed black cockatoo – *Calyptorhynchus banksii samueli*) and *kakalyalya* (Major Mitchell's cockatoo – *Lophochroa leadbeateri*).

Mulga stands host mixed feeding flocks of thornbills, wrens and robins as well as more solitary species such as the chiming wedgebill (*Psophodes occidentalis*) and grey shrike-thrush (*Colluricincla harmonica*). Mulga bird communities are defined, in part, by the age of the vegetation. Redthroats (*Pyrrholaemus brunneus*) are found in mature mulga stands that support mistletoe and grow in association with high densities of eremophilas. Other bird species, such as splendid fairy-wrens (*Malurus splendens*) and red-capped robins (*Petroica goodenovii*) prefer shrubby mulga stands of intermediate age.

Many of the 43 migratory bird species listed for UKTNP are also likely to be found in the IPA, especially along the Lake Amadeus – Lake Neale chain of salt lakes. Shorebirds reported from Lake Amadeus include red-capped plovers (*Charadrius ruficapillus*), black-fronted dotterels (*Elseya melanops*) and black-winged stilts (*Himantopus*).

himantopus). Although waterbirds such as grey teals (*Anas gracilis*), pink-eared ducks (*Malacorhynchus membranaceus*) and pacific black ducks (*Anas superciliosa*) have also been recorded at the lake, large aggregations of waterbirds have not been observed there during periods of inundation.

Tjukurpa stories of the IPA feature birds such as *kalaya* (emu – *Dromaius novaehollandiae*), *walawuru* (wedge-tailed eagle – *Aquila audax*), *ruulpa* (red-backed kingfisher – *Todiramphus pyrrhopygius*), *itatura* (black kite – *Milvus migrans*) and *panpanpalala* (crested bellbird – *Oreoica gutturalis*). *Kipara* (bush turkey – *Ardeotis australis*) and *kalaya* remain especially prized food species, though traditionally a range of other bird species – including mallee fowl, budgerigars, galahs and crested pigeons – were also eaten. Birds such as *nyii-nyii* (zebra finch – *Taeniopygia guttata*) and *aralpalpalpa* (crested pigeons – *Ocyphaps lophotes*) were especially significant to *Anangu*, as they acted as marker species that indicated the presence of water.

Piranpa recognise 11 bird species found in the IPA as especially significant (refer Table 3 and Figure 9). The princess parrot (*Polytelis alexandrae*) is listed as Vulnerable at the national and Northern Territory levels. This highly nomadic bird is infrequently sighted and its ecology is little understood. Within the IPA it is occasionally observed in the marble gum woodlands of the Lake Amadeus – Lake Neale region.

Of these 11 species, IPA surveys conducted between 2009 and 2010 recorded princess parrots, redthroats, grey falcons, striated grasswrens and, most significantly, the chestnut quail-thrush, which had not been recorded in the NT for 25 years. Another near-threatened bird, the *wiilu* (bush stone-curlew – *Burhinus grallarius*), has been recorded from UKTNP in the past and may also occur in the IPA.

The *nganamara* (malleefowl – *Leipoa ocellata*) and *pilalpa* (grey currawong – *Strepera versicolor plumbea*) have not been recorded on the Petermann ALT for at least 45 years and are now considered to be locally extinct.

Table 3 Birds of Conservation Significance

Scientific Name	Common Name	<i>Anangu</i> Name	AUS Status EPBC Act	Northern Territory Status
<i>Polytelis alexandrae</i>	Princess parrot	-	VU	VU
<i>Falco hypoleucos</i>	Grey falcon	<i>Wiiny-wiinyapa</i>	-	VU
<i>Amytornis striatus</i>	Striated grasswren	<i>Mirilyirilyi</i>	-	NT
<i>Ardeotis australis</i>	Australian bustard / bush turkey	<i>Kipara</i>	-	NT
<i>Calyptorhynchus banksii samueli</i>	Red-tailed black-cockatoo	<i>Iranti</i>	-	NT
<i>Cinclosoma castaneothorax marginatum</i>	Chestnut-breasted quail-thrush	<i>Pininintanypa</i>	-	NT
<i>Cinclosoma cinnamomeum</i>	Chestnut quail-thrush	-	-	NT
<i>Dromaius novaehollandiae</i>	Emu	<i>Kalaya</i>	-	NT
<i>Lophoictinia isura</i>	Square-tailed kite	-	-	NT
<i>Neophema splendida</i>	Scarlet-chested parrot	<i>Kuran-kuranpa</i>	-	NT
<i>Pyrholaemus brunneus</i>	Redthroat	-	-	NT

(VU=Vulnerable, NT=Near Threatened)



Princess parrots (*Polytelis alexandrae*) (photo: Chris Watson)

Mammals

A century ago, the region now included in the IPA was home to at least 40 native mammal species. Since then, almost half of these species have become extinct, either at a national or regional level. Most of the 22 native mammal species that survive in the IPA are commonly found elsewhere across Central Australia (refer Appendix 5 for a complete list of extant native mammal species recorded in the IPA).

Three macropod species are present. *Maḷu* (red kangaroo – *Macropus rufus*), which inhabit sandplain and mulga country, and *kanyala* (euro – *Macropus robustus*), which occupy the hills and ranges, are the most visible of the native mammals. By contrast, the *waru* (black-footed rock-wallaby – *Petrogale lateralis lateralis*), confined to the most rugged rocky terrain, is listed nationally as a threatened species and is rarely seen.

Eight species of dasyurids (marsupial mice) occur in the region. The surviving species tend to be the smaller members of the family and include five species of dunnarts, as well as the nationally threatened *murtja* (brush-tailed mulgara – *Dasyercus blythi*), fat-tailed antechinus (*Pseudantechinus macdonnellensis*) and the tiny wongai ningau (*Ningau ridei*).

Three native rodent species have been recorded in the IPA: *tarkawara* (spinifex hopping mouse – *Notomys alexis*), *wiltjinypa* (desert mouse – *Pseudomys desertor*) and the sandy inland mouse (*Pseudomys hermannsburgensis*). All three are widespread and relatively common, although their abundance fluctuates with climatic conditions and fire history. All five bat species recorded in the IPA are common where suitable habitat is present (woodlands, caves, tree-lined watercourses). Most roost in tree hollows, under bark, in caves or in rock crevices, and some will take advantage of human-made structures such as roofs of houses and sheds.

Although introduced to Australia as recently as 5000 years ago, *papa inura* (dingo – *Canis lupus dingo*) is recognised as a native animal. It is common across all habitat types. *Tjirilya* (echidna – *Tachyglossus aculeatus*), the most widespread native mammal in Australia, is also found throughout all environments of the IPA – wherever there are ants and termites. The sole possum species in Central Australia, the *wayuta* (common brushtail possum



A fat-tailed antechinus (*Pseudantechinus macdonnellensis*), Petermann Ranges fauna survey 2009

– *Trichosurus vulpecula vulpecula*), was also once relatively common in creekline habitats but has not been seen in the Petermann region since the 1990s and is listed as an endangered species under Northern Territory legislation.

Of the surviving mammal fauna, *Piranpa* consider three species to be threatened with extinction at either the national or Northern Territory levels (refer Table 4 and Figure 9).

The brush-tailed mulgara is very patchily distributed across the landscape, and numbers fluctuate in response to drought and fire. It can be found on sandhills and in hummock grass sandplains.

Although formerly quite common in rocky terrain, the black-footed rock-wallaby has declined over much of its southern Northern Territory range. Healthy populations are known to persist in the Petermann Ranges in a handful of locations, whereas in the adjoining range country in SA the species is regarded as critically endangered, with as few as several hundred animals remaining there. Buffel grass incursions into black-footed rock-wallaby habitat have been implicated in the demise of this species in SA.

Table 4 Mammals of Conservation Significance

Scientific Name	Common Name	<i>Anangu</i> Name	AUS Status	Northern Territory Status
<i>Dasyercus blythi</i>	Brush-tailed mulgara	<i>Murtja</i>	VU	VU
<i>Petrogale lateralis lateralis</i>	Black-footed rock-wallaby	<i>Waru</i>	VU	NT
<i>Trichosurus vulpecula vulpecula</i>	Common brushtail possum	<i>Wayuṯa</i>	-	EN

(VU=Vulnerable, EN=Endangered, NT=Near Threatened, DD = Data Deficient)

Populations of the common brushtail possum have declined significantly across Central Australia, largely due to fire impacting on many of its favoured food plants. It was not found during small-scale targeted searches in the Petermann Ranges in 2005, 2010 or 2012, although fresh scratches and scats found in the Irving Creek region suggest that small numbers of possums may still be present in that area.

Although no official records of the southern marsupial mole (*itjaritjari* – *Notoryctes typhlops*) exist for the IPA, this endangered mammal has been recorded nearby from UKTNP and on APY lands, and there is similar suitable habitat for this species in the IPA.

The only record of the nationally endangered *wilytjinpa* (sandhill dunnart – *Sminthopsis psammophila*) in the IPA was in an area of spinifex grassland with adjacent groves of desert oaks near Lake Amadeus in 1894. Remains of the species have also been found in owl pellets in UKTNP. In SA and WA, where this dasyurid still survives, it prefers large, mature spinifex clumps, suggesting that regular widespread wildfires in the IPA may have been responsible for its local extinction.

Recent surveys in the region suggest that the desert mouse (*Pseudomys desertor*), while not a threatened species, is declining in population in the IPA. Like the *wilytjinpa*, it prefers mature spinifex habitat that has remained unburnt for 10–15 years.

Many of the extant and extinct mammal species of the region are important *Tjukurpa* animals. Best known of these is probably the *mala* (rufous hare-wallaby – *Lagorchestes hirsutus*) because of its association with Uluru, although many other mammal species, including the common brushtail possum,

remain culturally important to specific traditional owner groups through custodianship determined by *Tjukurpa*. Traditionally, *Anangu* would have used most mammal species for food. Today, only *malu* are still commonly hunted, although other species such as *tjirilya* are also caught as opportunities arise.



Brushtail possum sign, Irving Creek

Antipina – Fish

There are no permanent or semipermanent waterbodies known to support *antipina* (fish) in the IPA.

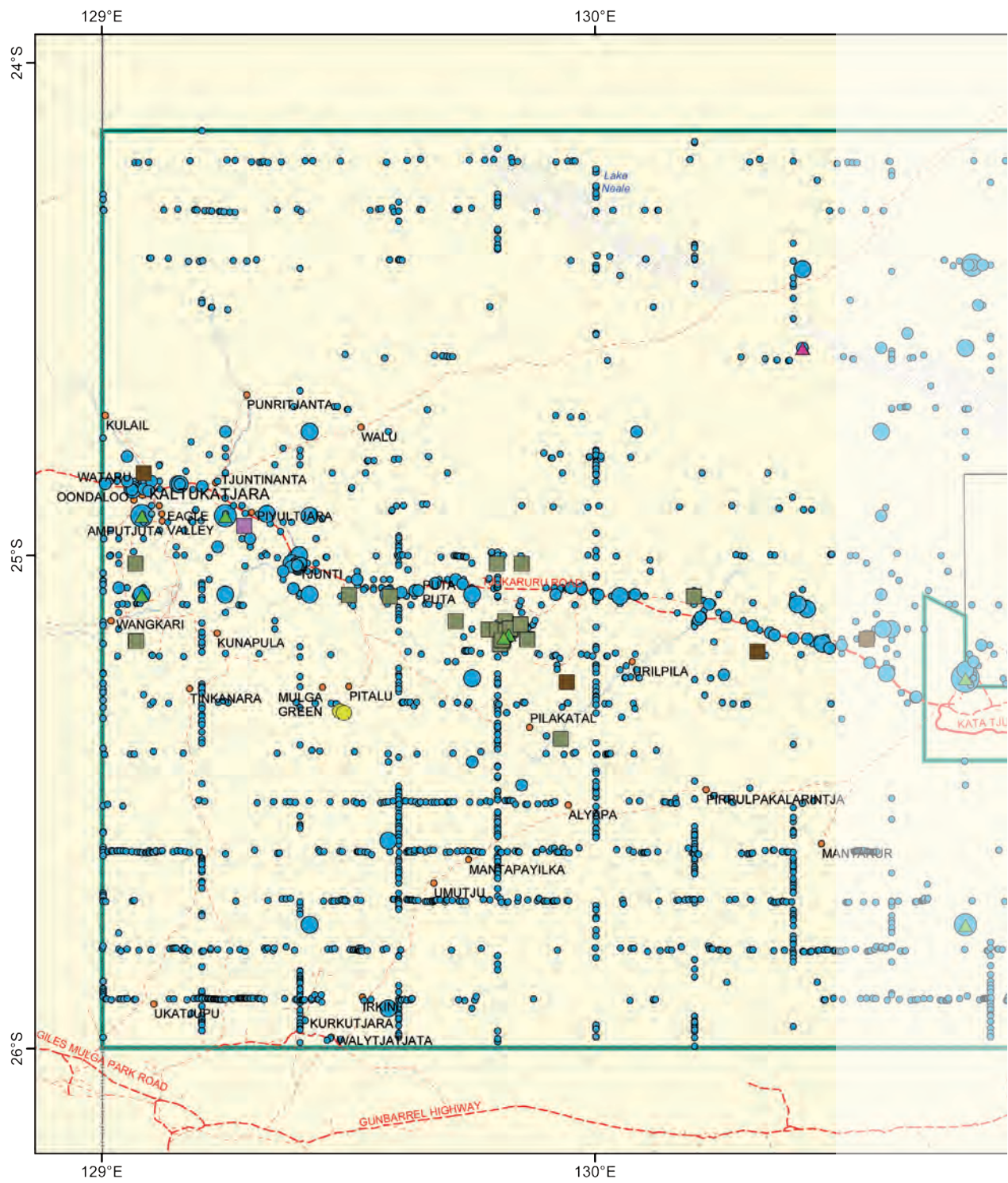
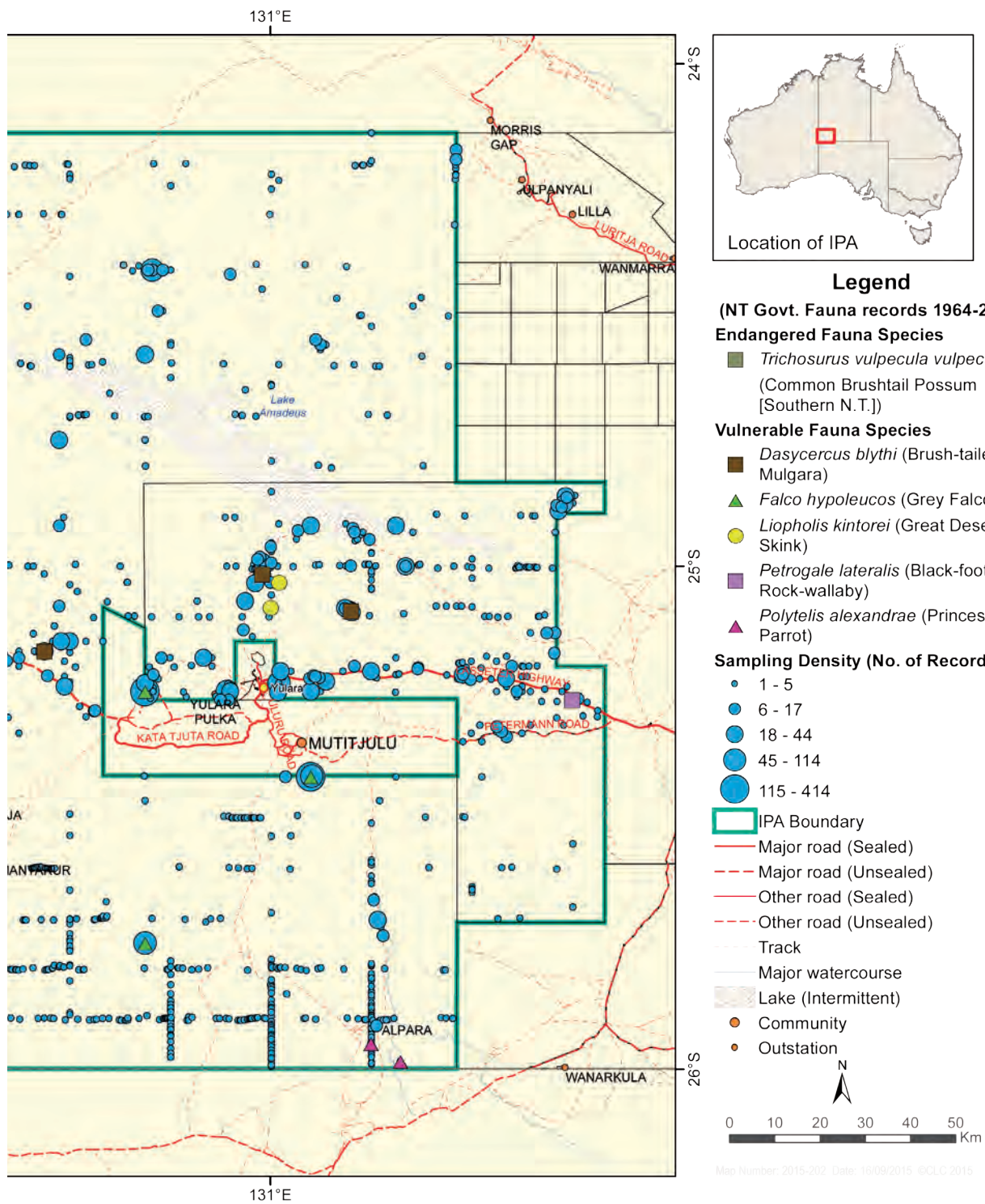


Figure 9 Fauna Sampling Density and Threatened Animals



6.5.2 Issues and Opportunities

“ I don't know how those animals disappeared. After we moved away to Areyonga from Docker River those animals disappeared. Someone came and stole them. ”

Barbara Tjikatu

The spate of mammal extinctions that has occurred throughout Central Australia since the 1920s, including the region now included in the IPA, is not solely a thing of the past. Local mammal extinctions continue, with brushtail possums last recorded in the Petermann Ranges in the mid-1990s. Other once-common species, such as the black-footed rock-wallaby, are now only found in small isolated populations. Such declines are not restricted to mammals. The avifauna of the IPA is also known to have been severely depleted. *Anangu* are saddened by the disappearance of these animals, many of which are key *Tjukurpa* species.

The dramatic and rapid impacts on the wildlife of the Kaṯiṯi-Petermann region, as elsewhere, are due to the cumulative effects of a number of human-created or -induced changes and processes, the interactions of which are not well understood. Factors implicated in the demise of various native animal species and obstacles to their effective management in the IPA include:

- knowledge gaps
- altered fire regimes
- feral animals
- reduced surface water availability
- introduced plants
- overhunting.

Knowledge Gaps

Traditional ecological and ceremonial knowledge about animals that are now regionally extinct is only held by a small and ever-diminishing number of senior people. With *Anangu* no longer reliant on native animals for food, the intergenerational transfer of knowledge about many extant animal

species is also in decline. *Anangu* believe that the failure to conduct required increase ceremonies is a key factor in the demise of various animals (refer also Section 5.2.2).

From a *Piranpa* perspective, the IPA remains one of the least-surveyed regions of the Northern Territory with regards to fauna (refer Figure 9). Relatively little information is available concerning the presence or absence of certain species, trends in animal populations, or the conditions required to support particular threatened species. This paucity of scientific information, combined with the ongoing loss of traditional ecological knowledge, hampers effective wildlife management across the region.



Kaṯukajara Rangers establish pitfall traps during an IPA survey of the Mann Ranges, Petermann ALT 2009

Altered Fire Regimes

The replacement of the traditional *Anangu* burning regime – characterised by a mosaic of small, low-intensity fires – with one defined by larger and more intense wildfires has had severe consequences for native wildlife (refer also Section 6.6.2).

This altered burning pattern has reduced habitat availability for various animals through the replacement of small-scale patchworks of burnt and unburnt country with broadacre expanses of even-aged spinifex grasslands and reductions in the extent of fire-sensitive vegetation.

Although many native animals are habitat generalists, a large number of species have specific fire requirements. Non-burrowing animals rely on spinifex clumps for protection from predators and extreme temperatures. Most spinifex communities in the southern Northern Territory take 15–20 years after being burnt to attain mature form suitable for species such as the desert mouse, wongai ningai, jewelled gecko, Jean’s gecko, striated grasswren and rufous-crowned emu-wren (*Stipiturus ruficeps*).

By contrast, many burrowing reptiles are less dependent on vegetation for shelter and typically can forage in areas in recently burnt country. Many insectivorous and granivorous nomadic birds also favour recently burnt habitats, which produce an abundance of ephemeral plant and insect life after rains. Such species include budgerigars, masked woodswallows and crimson chats (*Ephthianura tricolor*).

Yet other species, such as *tjakura* and mulgara, require adjoining patches of burnt and unburnt country. The complex relationships between individual animal species and fire are illustrated by the staged recolonisation of recently burnt areas by small mammals in which spinifex hopping mice are followed by hairy-footed dunnarts (*Sminthopsis hirtipes*), then sandy inland mice (*Pseudomys hermannsburgensis*) and then mulgara. It may not be until 10–15 years after fire that desert mice (*P. desertor*) and wongai ningai (*Ningauai ridei*) recolonise sites.

The ongoing loss of fire-sensitive plants and communities is known to have impacted on a range of animals that are dependent on such vegetation. This includes the distinct suite of bird species that occupy mature mulga stands and black-footed rock-wallabies and brushtail possums that rely on

fire-sensitive plants such as spearbush and mistle-toe species for food.

Other wildlife impacts associated with the current fire regime include:

- loss of large hollow-forming trees that provide habitat for various birds, mammals and reptiles
- local loss of reptile species dependent on accumulated plant litter for habitat
- local loss of many animal species, including small mammals and reptiles, that are not able to disperse beyond large burnt areas
- concentration of predators at remnant unburnt areas.

Feral Animals

Eight introduced animal species have been recorded in the IPA (refer Table 5). Of these, cats and foxes have had catastrophic impacts on native wildlife, being implicated in the extinction of many medium-sized mammals. Predation by these two species, which are widely distributed across all habitat types, remains a key threat to numerous native mammals, reptiles and ground-nesting birds. While localised control of foxes and cats is possible to some extent, broadacre control is not currently feasible.

Table 5 Feral Animals Present in the IPA

Species Name	Common Name	<i>Anangu</i> Name
<i>Bos taurus</i>	Cattle	<i>Puluka</i>
<i>Camelus dromedarius</i>	Camel	<i>Kamula</i>
<i>Equus asinus</i>	Donkey	<i>Tangki</i>
<i>Equus caballus</i>	Horse	<i>Nyanytju</i>
<i>Felis catus</i>	Cat	<i>Putjikata</i>
<i>Mus musculus</i>	House mouse	<i>Mingkiri</i>
<i>Oryctolagus cuniculus</i>	Rabbit	<i>Rapita</i>
<i>Vulpes vulpes</i>	Fox	<i>Tuuka</i>

Feral camels are also abundant and widespread, with densities in the western and southern portions of the IPA – 3.5 camels per km² – being the highest in Australia. Although numbers fluctuate with migratory movements and responses to seasonal conditions, the

feral camel population has the potential to double every nine years. The most obvious impacts of camels on wildlife are the rapid depletion of ephemeral waters at the expense of native species and the fouling of water places. Elsewhere, camels are responsible for widespread overgrazing and trampling of vegetation used by a range of native animals, including important game species such as *malu* and *kalaya*.

The Australian Feral Camel Management Project (AFCMP), which operated between 2009 and 2013, provided the traditional owners of the IPA with the resources necessary to access remote areas to witness camel-related damage first-hand. As a result of this and a concerted community education program, traditional owners consented to a range of feral camel removal methods across most of the IPA that included mustering and aerial and ground-based shooting. During the life of the project, more than 42,000 camels were removed from the region, primarily through aerial culling operations. Importantly, the AFCMP also provided funding to build the capacity of traditional owners to manage camels at a local level beyond the expiry of the project (refer Box 4).

Rabbit populations in the IPA are currently low, largely due to the effects of the rabbit calicivirus. They are mostly confined to salt lake fringes where

samphire species provide reliable moisture. Active warrens are especially common in areas of calcareous soils where rabbits have filled the ecological niche formerly occupied by the now regionally extinct *mitika* (burrowing bettong – *Bettongia lesueur*). Large warren complexes are also to be found in the Britten Jones Creek and the Tjitjingati, Muwa and Puta Puta Creek areas. Rabbits have been associated with mammal extinctions in Central Australia through competition for food and burrows.

Within the IPA, feral horses are primarily confined to the Docker River area around semipermanent waterholes. The several hundred horses present compete with native wildlife for feed and water. Similar local impacts are associated with cattle, which are currently agisted in the Alpara area under an informal arrangement with the owners of neighbouring Mulga Park station. Elsewhere, cattle occasionally stray from adjoining pastoral properties into the eastern part of the IPA and have been reported grazing at Lake Amadeus.

The small number of donkeys present in Kalukatjara community are thought to have very little impact on native wildlife.



Camel bones surround a denuded soakage,
Petermann ALT

Box 4 Australian Feral Camel Management Project

Through the 2009 Caring for Our Country grant round, the Australian Government provided \$19 million in funding to establish a national program aimed at reducing feral camel-related impacts. The project area incorporated some 3.3 million km² of arid WA, SA, Qld and the Northern Territory with management effort focused on protecting 17 identified environmental assets.

Administered by Ninti One Ltd, the Australian Feral Camel Management Project (AFCMP) involved a consortium of 20 partner organisations including state and territory governments which also contributed substantial resources to the project. With the highest camel densities present on Aboriginal freehold land in the southern Northern Territory, the CLC was a critical partner.

In the initial phase of the AFCMP, CLC staff conducted numerous field trips with traditional owners to remote and often rarely visited country to enable people to witness camel-related damage first-hand. Innovative educational tools were utilised in meetings with individuals and family groups. Some 30 community meetings were convened to seek traditional owner consent to manage camels on people's country. Five of these community meetings were focused on the Kaṭiṭi and Petermann ALTs. The resulting traditional owner approvals covered aerial and ground-based culling of camels and commercial offtake.



Camel tracks, Petermann ALT

Aerial culling operations on Aboriginal lands were conducted in accordance with maps showing cull exclusion zones around sacred sites, outstations, communities and along various vehicular tracks. These culls involved Northern Territory Government shooters, with CLC staff and traditional owners engaged in logistical support. Of the 27 aerial culls conducted in the Northern Territory as part of the AFCMP, 10 were in or adjacent to the Kaṭiṭi and Petermann ALTs. Some 42,000 of the 80,000 camels removed in the Northern Territory during the life of the project were located on these two land trusts.

Five commercial harvest agreements were negotiated by the CLC for the Kaṭiṭi and Petermann ALTs, although none have proceeded to date.

A key objective of the CLC's involvement in the AFCMP was the building of traditional owner capacity to manage camels on their lands for the long term. To this end, traditional owners were trained in camel mustering, trapping and handling skills, humane ground-based shooting, artificial water point installation, yard construction and monitoring of waterhole condition.

The AFCMP ended in November 2013. Aerial survey data from earlier that year indicated the continued presence of some 24,000 feral camels in the Kaṭiṭi-Petermann region.



Camel yards constructed as part of a juvenile diversion program near Kaṭukajara in 2005 provide potential for small scale camel harvesting

The numbers of house mice present in the IPA fluctuate wildly in keeping with the boom and bust cycles that characterise Central Australia. In good seasons, house mice may be present in plague proportions and present threats to native mice through competition for burrows and food.

Anangu and *Piranjpa* perspectives on feral animal control often differ markedly. For *Anangu*, the distinction between introduced and native animals – with one ‘bad’ and the other ‘good’ – is not always clearly recognised. Whereas *Piranjpa* typically have few qualms about using humane lethal control measures for introduced species, *Anangu* have a cultural aversion to killing any animal unless it is required for food or another purpose. This attitude is changing as the effects of introduced species become better understood by *Anangu*.



Camel pad, Lake Amadeus area

Reduced Surface Water Availability

In addition to surface water being consumed by feral camels, its availability to native animals has been significantly reduced by the cessation of the customary *Anangu* practice of clearing out water places. Without regular clearing out of sand and debris, many soakages and other surface waters across the IPA no longer sustain local populations of wildlife species dependent on such places (refer also Section 6.3.2).

Introduced Plants

Weeds can have a considerable impact on native wildlife, especially in areas where they form thick, dense monocultures. Infestations of species such as buffel and couch grass compete with, and prevent recruitment of, preferred food plants of certain native animals. The decline of the common brushtail possum, which is a keystone animal of the Petermann Ranges, has been associated with weeds such as buffel grass fueling hot fires that impact on important food plants along resource-rich *karu* (watercourse) habitats.

Buffel grass infestations tend to burn far more intensely than the native plant species that occupy the same ecological niche, often resulting in the loss of mature trees and hollow-dependent animal species. Such infestations can also harbour feral predators such as foxes and cats.

Overhunting

Traditionally, hunting was governed by protocols to maintain populations of game species for ongoing use (refer also Section 5.3.2). To varying degrees, many *Anangu* are now either unaware of these rules or choose to ignore them.

With *Anangu* now leading sedentary and centralised lifestyles, hunting pressure is highly concentrated in vehicle-accessible country surrounding communities and outstations. Within the IPA, hunting is regularly undertaken in the greater Mutitjulu and Kaltukatjara regions and along major roads and tracks linking communities and outstations. Unregulated hunting in these places has contributed to target species such as *malu* (red kangaroo), *kipara* (bush turkey) and *kalaya* (emu) becoming locally uncommon.

6.5.3 Management Strategies

Management Objective 6.5.3(a)

Support traditional owners in preventing the ongoing loss of cultural knowledge about native animals

Management Strategies

1. In conjunction with senior *Anangu*, the IPA Management Committee, CLC Anthropology Section staff and managers of adjoining protected areas, review the cultural knowledge information held for native animals of the region.
2. Develop and implement a schedule of activities directed at preserving traditional knowledge about native animals, with priority setting guided by the following criteria:
 - the results of the review of native animal knowledge already recorded
 - the risk of irretrievable loss of knowledge about native animals
 - information related to animals of outstanding cultural significance
 - information related to rare or threatened animal species or information that is considered important for the management of wildlife in the IPA
 - a demonstrated interest by traditional owners to pass on particular native animal knowledge.

Based on the advice of *Anangu*, identify the best means of preventing knowledge loss, including:

- conducting country visits
 - holding one-on-one and group interviews
 - undertaking literature reviews.
3. Create a comprehensive record of *Anangu* knowledge about native animals using a variety of appropriate media, including video and sound recordings. Distribute copies of this material to *Anangu* as teaching tools. Store this information in the IPA database for use by ranger and IPA staff.

Management Objective 6.5.3(b)

*Address *Pirānpa* knowledge gaps related to the wildlife of the IPA*

Management Strategies

1. Identify and prioritise gaps in *Pirānpa* knowledge and understanding of the wildlife of the IPA. Known deficiencies include:
 - the number, extent and health of *waru* (black-footed rock-wallaby) colonies
 - the number, extent and health of *tjakuṛa* (great desert skink) populations
 - information on any extant populations of species that have disappeared from the region over the last 10–30 years, including *ninu* (bilby – *Macrotis lagotis*) and *wayuṭa* (common brushtail possum)
 - information related to popular game species in key hunting areas.
2. Conduct fauna surveys to address knowledge gaps in relation to the wildlife of the IPA, especially the location, range, status and health of culturally and ecologically significant species.
3. Develop and maintain baseline data sets for all culturally significant, rare and threatened animal species.

Management Objective 6.5.3(c)

Manage the IPA to ensure the long-term viability of populations of all native animal species

Management Strategies

1. Combine *Anangu* and *Pirrapa* knowledge in the management of the wildlife of the IPA.
2. Implement the provisions of threatened species recovery plans and the recommendations in related documents for all listed threatened species.
3. Develop and implement broadscale and/or site-specific management regimes designed to optimise the viability of populations of culturally significant and rare or threatened animal species. Where appropriate, liaise with staff of adjoining protected areas to develop complementary programs and priorities.
4. Implement monitoring programs for particular threatened animal species to evaluate the effectiveness of the conservation regimes being implemented. Alter species management, as necessary, in response to evaluation results and future research findings.
5. Support research directed at improving wildlife management, especially that related to culturally significant and rare or threatened species.
6. Where appropriate, liaise with staff of adjoining protected areas to facilitate complementary management of wildlife and associated research.

(For management objectives and strategies related to sustainable hunting, changes to surface water flows, weeds and fire management, refer Sections 5.3.3, 6.3.3, 6.4.3 and 6.6.3 respectively.)

Management Objective 6.5.3(d)

Reduce the distribution, abundance and associated impacts of feral animal species

Management Strategies

1. Map all known feral animal species and populations and collate information on abundance, distribution and control histories.
2. Prepare a camel management plan for the IPA based on the achievements of the AFCMP. The plan will be guided by the imperatives of encouraging traditional owner capacity building through their engagement in control and monitoring activities.

The plan will consider ways of improving and expanding the camel management methods used during the AFCMP, including:

- aerial culling
- ground-based culling
- water-trapping
- mustering.

The plan will also contain strategies directed at:

- the use of aerial and ground-based surveys to determine camel numbers and population-hotspots
- creating trigger points for initiating various control activities
- reducing camel incursions into the community of Kaḷtukatjara and outstations and developing rapid response procedures
- facilitating the development of traditional owner employment and enterprise opportunities based on the management of feral camels
- clarifying the role(s) of commercial proponents
- protecting significant cultural and ecological places and attributes including rare and threatened species
- the use of artificial waterpoints and trapping or mustering hubs
- best practice deployment of fences, bores and permanent or portable yards
- the identification, establishment and/or maintenance of a network of vehicular tracks needed for camel management purposes
- maintenance, expansion and/or refinement of the existing water place monitoring program to measure changes in environmental condition associated with management actions (refer also Chapter 9).

As part of the plan, undertake an evaluation of existing camel-exclusion fences to identify:

- factors related to fence design, placement or other matters relevant to the success or failure of individual projects
- impacts on native animal species and vegetation communities
- cost effective and practical fence design to ensure the ongoing exclusion of camels
- factors that may enhance the effectiveness of existing fences.

Use the evaluation results to prioritise the removal or maintenance of existing exclusion fences.

3. Regularly liaise with staff of adjoining protected areas to encourage the adoption of mutually beneficial cross-border camel control strategies and work programs.
4. Initiate a community resident education program at Kaḷtukatjara regarding the management of feral horses.
5. Together with traditional owners, develop and implement a feral horse management strategy for the greater Docker River area.
6. Where deemed appropriate, develop and implement local-scale feral predator baiting, trapping or shooting programs to protect highly vulnerable populations of rare or threatened animal species. Liaise with staff of adjoining protected areas to encourage:
 - adoption of complementary control activities
 - shared research projects
 - knowledge transfer.
7. Develop and apply an evaluation regime to measure the effectiveness of all feral animal control efforts. All control programs will be described and critically reviewed to determine the reasons for success or failure so that future programs can be adapted accordingly to ensure better results. Share evaluation results between staff of adjoining protected areas.

(For management objectives and strategies related to the management of cattle, refer Section 8.4.3.)

6.6 Waru – Fire

6.6.1 Background

“ Warungkala nyarulpai ngura munu. Anangu winki atunmankuntjaku.

With fire we ensure the survival and wellbeing of the land and the people. ”

Yvonne Yiparti

The IPA is a highly flammable landscape, one which has been profoundly shaped by the deliberate application of fire. Waru (fire) was an essential component of traditional Anangu life, being the key tool available to people to optimise and sustain food production. In hunting, fire was applied to herd or flush out wildlife or to lure game species that were attracted by smoke or new plant growth. It was also used to maximise the harvest of bush foods such as grass and mulga seeds, desert raisins and bush plums. Half of the 25 or so plant species that were staple food items for Anangu are promoted by regular burning. Fire was also used for signalling; as a weapon against enemies; to clear campsites and travel routes; for light, warmth and cooking; as a crucial element of inma; and for the protection of sacred sites.

Traditionally, Anangu burnt the country as they travelled, with fire probably applied most intensively in and around high resource use areas such as watercourses and along travel routes between water places. Such burning was widespread across the landscape. Although fires were undoubtedly lit throughout the year, most burning activity occurred in late winter and spring (August to October). This burning regime produced a mosaic of small-scale fires and a correspondingly tight mix of different vegetation patch sizes, types, ages and fuel loads. Most likely, this fire pattern created a network of firebreaks that reduced the likelihood of lightning-ignited fires burning uninterrupted during the most damaging of fire seasons. That said, away from the most intensively managed sites and routes, it is likely that large wildfires were common in seldom-visited country.

“ Tjukururungku nyaruntjaku ka ukiri pakanma kuwaritja panya nyakula nganana pukularintjaku: ‘Muntawa nganampa ukiri pulkanya pakanu nganana waru tilintja tjuta’ Alatji pukularintjaku nyakula, uwa nyaru uwankara ngaranyi palya ka ukiri winki pakani ka nyuntu pukularinma: ‘Muntawa ngayulu tilintjanya nyangatja ukiritjara ka mingkiri or tjakura or tjinguru nyarungka nyinantjaku ukiri palula alatjiku.’ Uwa nyara paluru ngaranyi tjukururu kulintjaku muntawa nyangatja alatji.

Burning should be done properly to create new growth, and when we see this we’re happy: ‘See, our grasses are plentiful where we’ve burnt’. This makes us happy to see, yes; there’s plenty of cleared land and the grass is growing so you’re going to be happy: ‘Ah, here where I’ve burnt is covered in grass for the animals like mice and skinks and others that live on the grasslands’. This is the way it should be and you’ll understand that. ”

Ronnie Allen



Grassland fire at Kalaya Tjunta



Traditional owner burning country, Petermann ALT

The ecology of the IPA reflects this prolonged history of ‘firestick farming’ (refer also Sections 6.4 and 6.5). Most plant species in the spinifex communities that dominate the region are highly adapted to regular burning. Almost all plant species in these communities set seeds within 2–3 years of a fire. This is an especially important response given that although spinifex can generally carry a fire every 7–10 years, this inter-fire period may be much shorter following periods of high rainfall. Many overstorey species, including eucalypts, grevilleas and acacias, resprout almost immediately after fire. Trees such as corkwoods and desert oaks have thick bark that provides insulation from the heat of low-intensity fires, while the pale coloured bark of ghost gums, river red gums and marble gums reflects heat.

Many grass species in the IPA, be they in spinifex or non-spinifex communities, thrive on fire, with the most frequently burnt areas dominated by grasslands. The first rains after a fire trigger a flush of growth of short-lived grasses and forbs that can be progressively replaced over time by spinifex. If fire is absent for approximately 30 years, spinifex plants start to senesce and develop dead patches in their centres.

Not all plant species of the IPA thrive on fire. Although *wanari* (mulga – *Acacia aneura*) may regenerate after fire through seed germination, two successive fires within a 10–15 year interval will usually kill entire stands. Extensive groves of dead *wanari* across the IPA, now replaced by spinifex communities, attest to the impact of fire on this community. The most fire-sensitive plants, such as the desert fig or *ili* (*Ficus brachypoda*), are readily killed by even mild winter fires. Such species have highly localised distributions, being confined to sites that afford natural protection from fires such as gorges, rock outcrops or escarpments.

As with the vegetation, many native wildlife species inhabiting the IPA are also adapted to a regime of regular burning. Many reptile, bird and mammal species are habitat generalists and occur across a variety of vegetation types and post-fire age classes. Certain species, though, are reliant upon specific habitat attributes created by particular fire regimes. Recently burnt country, medium-aged spinifex (5–9 years old), old spinifex (15–20 years) and mulga stands each support their own distinctive assemblages of dependent animal species. Some animals are reliant upon neighbouring vegetation patches of different post-fire ages.

6.6.2 Issues and Opportunities

Altered Fire Regimes

“ Back in the old times people would travel from waterhole to waterhole with fire sticks – even in summer, they would travel at night, not in the hot time of day. These days there are a lot of big fires destroying quandong trees and other bush foods. These are big fires – too big.”

Pantjiti McKenzie

“ Every year it's changing, not going back to how it was. Now it's different. Iriti [long ago] we would light fires to look after the country. A long time ago it used to be really nice country. Last couple of years, really big fires destroyed a lot of land.”

Kunmanara Smith

The movement of Aboriginal people off their traditional lands to pastoral stations and settlements, which began in the first half of the twentieth century, resulted in dramatic changes in fire regimes across Central Australia. The mosaic of vegetation patches of differing post-fire ages and burnt-area firebreaks created by traditional burning practices was converted to a landscape dominated by large expanses of vegetation of uniform type and age. Small, regular human-lit fires were replaced by lightning-ignited wildfires which, after high rainfall episodes and the resultant build-up of high fuel loads, periodically became landscape-scale conflagrations. This fire pattern has characterised the Katiti-Petermann region for almost a century, with extreme fire seasons recorded in 1922, 1976, 1984–85, 1989–90, 2000–02 and 2012–13. The scale of such wildfires is illustrated by those that occurred in the summer of 2012-13, which burnt some 13,763 km² - almost a third - of the Katiti and Petermann ALTs (refer Figure 10). A decade previously in 2002, wildfires burnt more than 60% of the IPA area.

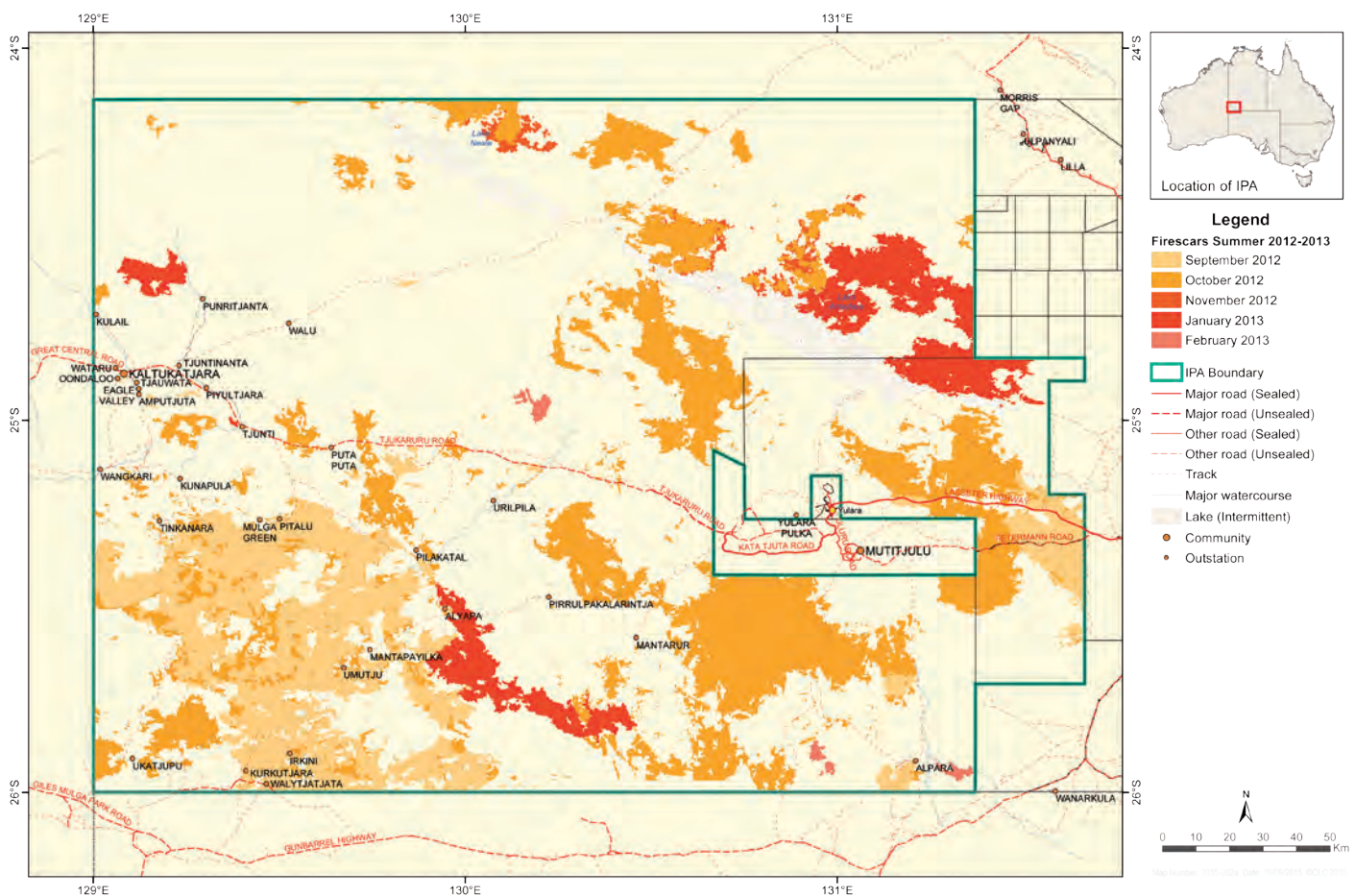


Figure 10 Extent of Wildfires in the Katiti-Petermann IPA 2012-13

Such large fires not only reflect the uninterrupted build-up of high fuel loads across vast areas, they are also a product of changes in fire seasonality. Many fires now occur in the hotter summer months when electrical storms are most common.

The implications of this altered fire regime for the cultural values of the IPA have been, and continue to be, severe. Uncontrolled wildfires have destroyed or damaged various sacred sites and ‘marker’ trees traditionally used by *Anangu* for navigation. Changed fire patterns have also contributed to reductions in the availability of traditional food and medicinal plants and game species.

The ecological impacts associated with this changed fire regime have been profound (refer Sections 6.4.2 and 6.5.2). Repeated summer wildfires have substantially changed the composition, structure and distribution of vegetation at a vast scale, promoting the dominance of homogenous, even-aged spinifex communities. These changes have included the incremental loss of fire-sensitive plant communities and species. The current fire regime has also contributed to the regional extinction of many native animal species and the decline of others. It may also result in widespread soil erosion, as the summer wildfire season is also the time of year when rain is most likely to occur.

Loss of Traditional Fire Knowledge, Practices and Protocols

For many *Anangu*, fire continues to be integral to daily family life. It remains an important source of heating and cooking and is used to clear campsites or to signal for assistance. In vehicle-accessible areas it is still used for hunting. Despite this, only a small number of senior people still retain a detailed understanding and appreciation of traditional fire knowledge, practices and protocols.

The loss of traditional fire knowledge that has occurred among members of the last few generations of *Anangu* has often been accompanied by a corresponding loss of confidence in burning, although not in everyone. Many people continue to light fires, sometimes at inappropriate times of year or places or frequency, resulting in detrimental outcomes for country.

For many senior *Anangu*, the intergenerational transfer of traditional knowledge, including that relating to fire, is of the utmost importance. Creating opportunities for traditional owner family groups to access their country and work together is central to achieving this aspiration. The building of knowledge and confidence and the reclaiming of responsibility and control by young people are essential if fire is to once again be used across the landscape in beneficial ways.



Prescribed burn in old spinifex, south of Lake Amadeus

Concerted action has been taken in recent years to address the key fire-related issues in the region, including the loss of traditional fire knowledge. The foundations for effective fire management in the IPA have been established through the:

- completion of a regional fire management strategy principally directed at biodiversity conservation
- convening of community fire planning workshops to document traditional owner burning priorities
- securing of external grant funding to implement burning programs
- formation of the Waru Committee – a regional *Anangu* fire management committee representing traditional owners of the SA/WA/NT border country.

In 2008, the CLC commissioned the preparation of a fire management strategy for the Petermann region. Initially covering the 2008–2012 period, the strategy was subsequently reviewed and updated in 2011. It provides general and site-specific guidance for the protection of biodiversity values including rare and threatened species, and details particular burn priorities for each year.

Complementing this strategy, community-based fire workshops were convened during 2011 and 2012 to

record the cultural burning priorities of traditional owners. The identified burns were to protect sacred sites and manage popular hunting and bush food harvest areas.

The combined natural and cultural value burn priorities, as identified in the fire strategy and community workshops, have since formed the basis of the burning work conducted across the region. The capacity of the Kalutkatjara Rangers and IPA staff to undertake burning trips was enhanced in 2011 through an Australian Government Caring for Our Country grant administered by Territory Natural Resource Management. This project, which involved 50 *Anangu* in 25 separate burning trips, demonstrated the enthusiasm of *Anangu* to engage in burning work.

This successful project was followed by a far more ambitious fire project during 2012–13. Also funded under the Caring for Our Country program, this project covered Aboriginal lands in the NT/SA/WA border region and was a collaborative effort between the CLC, Ngaanyatjarra Council (WA) and APY Council (SA). *Anangu* empowerment and control were central to this project, which was governed by a group of senior *Anangu*, known as the Waru Committee, representing each of the three jurisdictions. Some 58 prescribed burning trips



Waru Committee delegate Ronnie Allen and CLC fire officer Ben Kaethner present fire scar imagery, tri-state waru planning, Umutju 2012

were conducted as part of this project, including ground-based, aerial incendiary and aerially assisted burns in which people were transported to remote sites by helicopter to light fires. More than 2500 km² of country was burnt, including fires lit:

- for cultural reasons (sacred site protection, hunting and bush food management)
- to break up large expanses of contiguous high fuel loads
- to protect particular biodiversity values
- to protect infrastructure (communities, outstations).

A key objective of the project was to create opportunities for the intergenerational transfer of traditional fire knowledge and protocols. To this end, of the 136 *Anangu* engaged in the Northern Territory part of the project, 46 were young people and a further 44 identified as 'learners'. Both groups

were able to work alongside and gain knowledge from senior people. Community awareness-raising materials concerning the responsible use of fire were also produced as part of the project.

The collaborative model adopted in the tri-state fire project represents the future direction of fire management across the IPA. Beyond the three Aboriginal land management organisations that partnered in this project, staff of UKTNP, Bushfires NT, Department of Environment, Water and Natural Resources (SA) and the Country Fire Service (SA) were also involved, providing training, planning and technical support. Extending this cooperative approach to include MacDonnell Regional Council, Yulara resort and neighbouring pastoral property staff has the potential to further improve regional fire management.

6.6.3 Management Strategies

Management Objective 6.6.3(a)

Manage fire so as to:

- *protect human life and community and outstation infrastructure*
- *protect sites of cultural significance*
- *maintain or enhance the productivity of key hunting and customary resource use areas*
- *maintain or enhance the condition of biodiversity values*
- *protect infrastructure on adjoining properties.*

Management Strategies

1. Expand the scope of the existing fire management strategy for the Petermann region to cover the entire IPA and prescribed burns directed at:

- protecting communities and outstations
- protecting cultural sites
- managing the productivity of key hunting and bush food harvesting areas
- maintaining or enhancing the condition of biodiversity values
- creating effective burnt-area firebreaks along or near IPA boundaries.

Update the fire management strategy as required in response to:

- seasonal conditions
- recent wildfires
- completed prescribed burns

- directions from annual community fire planning meetings and those of the Waru Committee.

Within the context of the fire management strategy:

- Prescriptions directed at protecting Kal̄ukatjara and outstations will be developed in consultation with community residents, outstation owners and staff of MacDonnell Regional Council and Bushfires NT. All such prescriptions will be regarded as high priority actions, though the need for such work will vary according to seasonal conditions.
- Fire management prescriptions and priorities concerned with protecting cultural sites and managing hunting and harvesting areas will be made by appropriate traditional owners.
- Prescriptions directed at biodiversity conservation will be based on:
 - the overriding aim of replacing the current fire regime of large, intense wild-fires with a fine-scale mosaic of small fires so as to create diverse vegetation patch sizes, types, ages and fuel loads
 - the need to protect fire-sensitive communities and relict species
 - the need to protect remaining old-growth vegetation, including hollow-bearing trees, mature mulga woodlands and old-growth spinifex communities
 - fire management actions identified in recovery plans or related documents for threatened species
 - the known needs of species and communities that require specific fire regimes for their survival
 - managing fire so as not to promote the spread of weed species
 - managing fire so as to minimise the creation or exacerbation of soil erosion problems.
- Priority setting for biodiversity conservation burns will be guided by:
 - the level of significance of the biodiversity values
 - the likelihood of success for a given fire management activity
 - fire management actions which must be implemented to maintain benefits from previous management.
- Known high priority fire activities related to biodiversity conservation include prescribed burns to protect and maintain habitats for:
 - black-footed rock-wallaby colonies in the Petermann Ranges
 - great desert skink populations at Pitalu and Muwa
 - potential relictual brushtail possum populations at Irving Creek
 - a range of fire-sensitive plant species and communities in quartzite and granite ranges
 - princess parrot breeding in marble gum woodland near Lake Amadeus.
- Prescriptions concerning boundary firebreaks and priorities will be determined in consultation with neighbouring landowners and managers.

2. Fire management activities will be tailored to individual situations, but may include the following ground and aerial components:
 - ground burns adjacent to roads and tracks to strengthen their role as firebreaks and reduce the risk of roadside ignitions
 - ground burns, including aerially assisted burns, patch burning and strategic and opportunistic burns to protect or enhance the condition of cultural or ecological values
 - localised fuel reduction activities, including back-burning and slashing to protect community or outstation infrastructure
 - landscape-scale aerial incendiary operations to break up large areas of contiguous and high fuel loads or to create strategic fire breaks. (Adoption of this method across all or part[s] of the IPA is dependent on its acceptance by traditional owners.)

Management Objective 6.6.3(b)

Support traditional owners in preventing the ongoing loss of cultural knowledge about fire

Management Strategies

1. In conjunction with senior *Anangu* and members of the *Waru* and IPA Management Committees, review the traditional fire knowledge recorded for the region.
2. Develop and implement a schedule of activities directed at preserving traditional fire knowledge, with priority setting guided by the following criteria:
 - the results of the review of fire knowledge already recorded
 - the risk of irretrievable loss of knowledge
 - information which is considered to be important for ongoing fire management in the IPA
 - a demonstrated interest by traditional owners to pass on particular fire knowledge.

Based on the advice of *Anangu*, identify the best means of preventing knowledge loss, including:

- conducting country visits
 - holding one-on-one and group interviews
 - undertaking literature reviews.
3. Create a comprehensive record of *Anangu* fire knowledge using a variety of appropriate media, including video and sound recordings. Distribute copies of this material to *Anangu* as teaching tools. Store this information in the IPA database for use by ranger and IPA staff.
 4. Under direction from the *Waru* Committee, create and distribute additional educational material among community residents concerning traditional fire knowledge, practices and protocols (refer also Section 7.2.3).

Management Objective 6.6.3(c)

Undertake fire planning and management in collaboration with managers and owners of neighbouring land

Management Strategies

1. Support the ongoing operation of the Waru Committee and assist in building the capacity of its members.
2. Continue to conduct community-based annual fire planning meetings at Muṭitjulu, Kalṭukatjara and Areyonga.
3. Regularly review the fire management strategy to reflect priorities identified through annual community-based fire planning meetings and those of the Waru Committee.
4. Meet with representatives of UKTNP and Watarrka National Park and the owners of Mulga Park and Curtin Springs pastoral properties on an annual basis to devise and update boundary fire management activities for inclusion in the fire management strategy and to identify shared resources, personnel, expertise and funding opportunities.

(Refer Appendix 9 for descriptions of annual IPA and regional fire planning cycles and the roles and responsibilities of respective parties.)

CHAPTER 7 Ngapartji-ngapartji nintiringanyi – Two-Way Education and Training



Kalitjkatjara Rangers undertake quad bike training, CLC Ranger Camp, Ross River 2010

7.1 Introduction

While both *Anangu* and *Pirrapa* cultures view education as critically important, there are distinct differences in their underlying approaches to teaching and learning. *Anangu* education has traditionally been about *Tjukurpa* and customary practices, with learning commonly occurring while watching and participating in everyday life. It is deemed to be most effective when it is practical, active and ‘on country’. By contrast, the *Pirrapa* approach to education is based on the classroom, with formal instruction presented by a trained teacher. It often involves learning about concepts in a theoretical way, according to a prescribed curriculum.

The gulf between these two approaches is closing, as the merits of both educational styles are increasingly acknowledged by both *Anangu* and *Pirrapa*. This acceptance of the benefits of both ways is also reflected in the shared view that ‘two-way’ land management is necessary to properly look after the IPA (refer Sections 4.2 and 4.3). ‘Two-way’ land management requires ‘two-way’ education and training.

7.2 Education and Training

7.2.1 Background

Formal schooling, in particular, the acquisition of English literacy and numeracy skills, is an increasingly important requirement for rangers to be able to work effectively in the IPA. In the Northern Territory, school attendance is compulsory for all children from the age of 6 until 17 (or until Year 10 is completed). Within the south-west portion of the Northern Territory, the Department of Education and Training operates primary schools at Yulara, Mutitjulu, Kalitjkatjara and Imanpa. Secondary education is provided by Nyangatjatjara College, an independent school established by Nyangatjatjara Aboriginal Corporation in 1997 to cater for students who speak Pitjantjatjara as their first language. The main college campus is at Yulara. Three smaller campuses exist at the communities of Mutitjulu, Kalitjkatjara and Imanpa. Further afield, six secondary schools are located in Alice Springs, one of which is dedicated to teaching remote area Aboriginal students.

All primary and secondary schools in the Northern Territory teach a common curriculum, though sufficient flexibility is available to cater for local needs. Within the south-west region, formal education about country, including bush skills, is taught alongside literacy and numeracy in both primary

and secondary school contexts. Community elders are involved in school activities, including country visits, with students of all ages. Students from both Mutitjulu primary school and Nyangatjatjara College participate in junior ranger program activities conducted by Parks Australia staff employed at UKTNP.

Senior secondary school students can participate in 'work experience' programs, which provide short-term, on-the-job placements designed to introduce young people to jobs that may match their interests and skills.

Formal education and training is available beyond the school system for people who may have little, if any, school-based education. Anangu Jobs is the regional non-government provider for remote employment and training programs administered through the Department of the Prime Minister and Cabinet. It runs training centres at Kaltukatjara, Imanpa and Mutitjulu and provides a range of pre-vocational and vocational courses, including basic numeracy and literacy skills and business studies. Anangu Jobs also works with other training providers to tailor education and training delivery to local employment opportunities.

School leavers can learn occupational skills through Vocational Education and Training (VET) programs

at places like Nyangatjatjara College. Depending on the type of education or training sought, Anangu may need to travel to Alice Springs or further afield. A variety of specialised VET courses are offered by several organisations including Charles Darwin University and Batchelor Institute, both of which are tertiary education institutions. Batchelor Institute of Indigenous Tertiary Education (BIITE) was specifically established for the tertiary education of indigenous people. It provides a range of tertiary qualifications in the fields of education and humanities, health and sciences, business and community studies, and community education and training.

Within the region, education and training in land management are available through the CLC-administered ranger group based at Kaltukatjara and opportunities available through Parks Australia at UKTNP. Members of the Kaltukatjara ranger group undertake a comprehensive training program that incorporates both Western and traditional land management skills and understanding (refer Tables 6 and 7). As required, basic literacy and numeracy training are also offered. While BIITE provides most of this training, a variety of other education and training providers deliver individual components of the training program, which is overseen by the CLC Ranger Trainer. Group and personalised support is available through the CLC's Ranger Mentors.



Learning fauna survey techniques

Table 6 Overview of CLC Ranger Group Training Program

Compulsory Training for all CLC Rangers
CLC Workplace Induction
Baseline Workplace English Language Literacy and Numeracy (WELL) test
WELL (or equivalent) training (currently unavailable, but funding being sought)
Basic First Aid
4WD training for licensed drivers
Certificate II (or higher) in Conservation and Land Management
Quad bike operation
Safe chemical handling
Chainsaw operation
Advanced Training and Skills Development (optional)
Certificate III and IV in Conservation and Land Management
Certificate IV in Training and Assessment
Certificate II in Multimedia or basic filming and editing training
Basic Wildfire Awareness
Fire Fighter I
Aerial incendiary operations
Water monitoring methodology
Sensor camera setup and operation
CyberTracker use (CLC in-house training)
Tourism (Certificates I–III)
Horsemanship
Rural Operations (units from Certificate III)
Firearms safety and awareness
Field butchery
Computer and IT certificate courses
Horticulture and nursery training
Welding and metal fabrication certificate courses
Occupational Licensing (optional)
SMARTtrain Chemical Application
Firearms licensing (corporate)
Construction Industry White Card
Heavy Machinery Operator Licence
‘C’ Class Northern Territory Drivers Licence

Table 7 Customary Land Management Training

Customary Land Management Training
<i>Anangu</i> identification skills (names for plants, animals, landforms, etc.)
<i>Anangu</i> habitat types and ecological associations
Tracking skills
<i>Tjukurpa</i> associated with particular areas of country, or sites or species
Seasonal indicators
Bush foods – names and correct harvesting procedures and preparation techniques
Bush medicines – correct species identification and production methods
Dances and <i>inma</i> associated with particular areas of country
Burning procedures and protocols

Senior *Anangu* knowledge holders educate rangers in customary land management practices through practical instruction during field work and in formal training sessions pertaining to particular tasks or projects.

Leaseback arrangements at UKTNP include obligations for Parks Australia to provide training opportunities that build the capacity of *Anangu* to fill park administration and management roles. Ranger traineeships are also available to *Anangu*. These include formal training courses and on-the-job skill acquisition in conservation and land management.

Tourism associated with the IPA has the potential to generate significant employment and enterprise development opportunities for *Anangu* (refer Section 8.3). CLC and Tourism NT staff have provided a small number of traditional owners with tourism education support as a first step in helping them fulfil their tourism aspirations. Additional tourism training is available at the National Indigenous Training Academy at Yulara, which was established in 2011 by the Indigenous Land Corporation. The Academy offers nationally accredited training directed at fostering the involvement of indigenous people in the hospitality and tourism sectors.

7.2.2 Issues and Opportunities

Anangu face often insurmountable barriers to educational uptake and achievement, be it the acquisition of basic literacy and numeracy skills or the successful completion of post-school training courses. Socio-economic disadvantage, geographic isolation, substandard housing and historical underinvestment in infrastructure mean that school and post-school learning are characteristically attempted in social settings dominated by high rates of unemployment, chronic health problems, early mortality, violence, substance abuse, youth suicide and self-harm.

For *Anangu*, creation of the Katiti-Petermann IPA offers the prospect of increased resources and opportunities to educate young people on country about their culture, including customary land management practices (refer Chapter 5). 'Being on country' remains a fundamental motivating factor for many *Anangu*, young and old. IPA and ranger field work, which typically involves family members of all ages, exposes young people to Western and traditional land management techniques, community role models, and the potential for future employment in culturally valued roles. Such ongoing opportunities, combined with a formal program of school/IPA country visits and the development of initiatives such as junior ranger programs, ranger cadetships and work experience placements may all encourage school-aged children to stay at school.

The IPA program also has the potential to coordinate the delivery of *Pirampa*-devised education and training courses that *Anangu* need so they can take advantage of the existing and future employment in land management and other business opportunities associated with the IPA (refer Chapter 8). School and community-based promotion of education and training pathways to achieve land management employment are likely to be worthwhile.

The training able to be provided to Katiti-Petermann IPA and ranger staff would be enhanced through the coordination and sharing of training schedules and courses by government and non-government land management organisations operating in the region (refer also Section 4.4). Over recent years, the Kalukajara Rangers have participated in joint training activities with staff from UKTNP. There are considerable benefits to the on-site

delivery of training that this model allows, including reduced travel costs and the absence of distractions associated with the main training venues located in Alice Springs.

In some cases, training units in nationally accredited programs are poorly adapted for use by indigenous staff. To address this problem in a unit relating to fire management, the CLC collaborated with fire management experts and training organisations to develop fire management training materials tailored to suit the learning needs, cultural aspirations and specialised knowledge of rangers and traditional owners. The *Fire Management in Central Australia* training resource kit, produced by the CLC in 2012, is now being used by BIITE staff to deliver nationally accredited fire awareness units. This training resource is a good example of the application of two-way learning principles.

The creation of a formal staff exchange program between organisations such as the CLC, APY and Ngaanyatjarra Councils, Parks Australia and the Northern Territory Parks and Wildlife Commission would also increase training and skill enhancement opportunities.

The development of a formal *malpa* program, in which senior traditional owners and individual *Pirampa* staff are paired up to encourage two-way learning, would also be beneficial. Adoption of such a program would permit *Pirampa* staff to gain an accelerated understanding of traditional knowledge, protocols and skills. It would also enhance the traditional role of senior *Anangu* as respected knowledge holders by enabling them to transfer information concerning Western land management approaches to other community residents.

The IPA program can also play an important role in fostering greater community understanding of contemporary land management issues and solutions. Many community residents do not appreciate the links between threats such as changed fire regimes, feral animals and weeds, and changes to resources that they value, be they game species or bush tucker plants. Rangers and IPA staff, together with IPA Management Committee members, can lead efforts in raising community awareness of these and other IPA-related matters and in engendering widespread ownership of issues and support for solutions. Representatives of other

community-based organisations, including schools, community education centres, aged care facilities, councils, job providers and government departments can also help disseminate IPA

educational messages. In addition to the spoken word, newsletters, story books, posters and DVDs can also be used in such community educational programs.



Title scene from 'It's Good to Burn Country Right Way', a stop-motion DVD produced to raise community awareness about the cultural and physical dangers of irresponsible burning



Nyangatjatjara College students from Kalukukatjara, Imanpa and Mutitjulu, document buffel grass distribution using CyberTrackers

7.2.3 Management Strategies

Management Objective 7.2.3(a)

Encourage Anangu and Piranpa ranger and IPA staff to gain the necessary skills and knowledge to manage the IPA ‘two-ways’

Management Strategies

1. Investigate and pursue the development of a common training program for *Anangu* and *Piranpa* ranger and IPA staff with representatives of all adjoining protected areas and relevant training providers, namely:

- Central Land Council
- Anangu Pitjantjatjara Yankunytjatjara Council
- Ngaanyatjarra Council
- Parks Australia (UKTNP)
- Northern Territory Parks and Wildlife Commission (Watarrka NP)
- Batchelor Institute of Indigenous Tertiary Education
- Charles Darwin University
- Northern Territory Department of Education and Training
- Anangu Jobs.

The training program should include:

- identification of common training needs that meet the requirement of the CLC Ranger Program and IPA Management Committee members
- identification of suitable local training venues
- development of a register of training expertise available from within partner organisations
- development of course materials or training resources better suited to *Anangu* participants
- creation of a schedule of annual training needs and opportunities that are accessible to all regional partners
- development of joint training opportunities.

2. Continue to engage senior *Anangu* knowledge holders in formal instruction and on-the-job training of *Anangu* rangers and IPA staff in cultural knowledge and customary land management practices, including the management of cultural sites, water places, plants, animals and fire.

3. Investigate and pursue the development of accredited training in customary land management knowledge and skills for uptake by *Anangu* and *Piranpa* ranger and IPA staff. Examine ways of aligning the attainment of certain knowledge levels with financial incentives and career progression.

The development of this training should be undertaken in the context of the entire CLC Aboriginal Ranger Program and should include:

- involvement of senior *Anangu* in advisory and review roles
- supporting key knowledge holders to develop training and assessment methodologies, processes and protocols
- involvement of senior *Anangu* and rangers in training and accreditation trials.

4. Explore and pursue opportunities for staff exchanges and personnel sharing among the adjoining protected areas.
5. Investigate and progress the creation of a land management skills register of staff of all adjoining protected areas. Use the register to access locally available advice and assistance across the region.
6. Support the holding of regular meetings of staff of all adjoining protected areas as a means of exchanging experiences and ideas and planning joint activities.
7. Establish a *malpa* program that pairs individual *Piranpa* ranger and IPA staff with senior *Anangu* knowledge holders.

Management Objective 7.2.3(b)

Develop educational opportunities and pathways that link primary, secondary and community education to employment outcomes in conservation and land management

Management Strategies

1. Work with local primary and secondary schools and appropriate community-based organisations to develop and implement an annual schedule of school country visits. Such visits will involve senior *Anangu* knowledge holders and ranger staff, with the aim of exposing students to both traditional and Western land management practices and understanding.
2. Investigate and progress the development of junior ranger activities for students of Muṭitjulu and Kalṭukatjara primary schools in conjunction with UKTNP staff and members of the Kalṭukatjara Ranger group.
3. Liaise with local education partners to develop and implement vocational training opportunities for interested secondary school students and graduates, including:
 - work experience placements
 - ranger cadetship programs.

Management Objective 7.2.3(c)

Promote increased community awareness and understanding of a range of land management issues and IPA activities

Management Strategies

1. Seek the advice of senior *Anangu*, rangers and members of the IPA Management Committee and *Waṛu* Committee about the need to develop community awareness-raising material about land management issues such as fire, feral animals and weeds. In response to this advice, produce and distribute a range of educational products including, but not limited to:
 - educational picture books, films, posters, signs and maps
 - language-based field guides and sound recordings.
2. Collaborate with staff of relevant government agencies, including those of UKTNP, Bushfires NT and Northern Territory Government Department of Land Resource Management to deliver community information sessions regarding key threats to the biodiversity values of the IPA.
3. Regularly report on IPA and ranger group activities to traditional owners using a variety of media, including newsletters, videos, posters and community meetings.
4. Produce a community-accessible version of this Plan of Management appropriate for speakers of Pitjantjatjara/Yankunytjatjara that can be used by people with little or no English literacy or numeracy skills.
5. Investigate and pursue the development of a community-accessible interactive database as a means of keeping community residents informed of IPA and ranger group activities.
6. Produce and distribute educational material to staff of local businesses, government departments and community-based organisations concerning the IPA and relevant restrictions.

(For management objectives and strategies concerning education relating to sustainable hunting/harvesting and tourism, refer Sections 5.3.3 and 8.3.3 respectively.)

CHAPTER 8 *Waaka kutjupa tjuta maniku palyalkatintjaku* – Jobs and Economic Development



Kaltukatjara Rangers Mary Gibson and Elaine and Ruby James maintain Kaltukatjara campground infrastructure

8.1 Introduction

Historically, the far south-west corner of the Northern Territory has experienced little in the way of economic development. With the exception of Uluru and Kata Tjuta, which have attracted significant numbers of visitors since the 1950s, tourism development in the region has been limited. The region is largely situated beyond the bounds of what constitutes viable pastoral country, and commercial deposits of mineral resources have yet to be found despite considerable exploration effort over many years.

Economic opportunities available to *Anangu* wishing to stay on their country were largely confined to dogging until the 1960s, from which time onwards some people were engaged in producing artworks and carved wooden artefacts for sale or were in service roles catering for tourists visiting Uluru.

The virtual absence of industry, apart from tourism, has meant that most *Anangu* wishing to remain on their country today have needed to rely on welfare payments to survive. While this has contributed to many of the contemporary social issues faced by community residents, it has also been a factor in people maintaining links with their country and retaining significant amounts of the traditional

skills and knowledge base necessary to manage their land. The absence of many development-related impacts has also resulted in the biodiversity values of the region remaining in relatively good condition. It is these values, together with the preservation of traditional *Anangu* skills and connections, that may well underpin the future economic development of the region.

Potential exists to create or expand a number of employment or business opportunities based on traditional *Anangu* skills, knowledge and interests and to build satisfying career paths for people. These include a range of options focused on land management work, the establishment of small-scale tourism enterprises and the commercial harvest of bush resources.

Although the barriers to *Anangu* realising the benefits associated with these opportunities are many and varied, capacity shortcomings present initial hurdles that must be overcome. The overriding need to build *Anangu* capacity should drive the pace and ways in which business development is pursued in the IPA to maximise the longevity of any resulting enterprises and the gains they deliver to *Anangu*.

8.2 Land Management

8.2.1 Background

An *Anangu* ranger group has been based at the community of Kalṭukatjara since 2006. Administered by the CLC and currently funded through the Australian Government's Working on Country program, the ranger group employs between four and six people, with female rangers included in the group since 2013. The rangers typically work 3.5 days per week and are overseen by a Ranger Coordinator. The ranger group office has an adjoining workshop in which are garaged a troop carrier, trailer, quad bikes and an all-terrain vehicle. The group also maintains a variety of equipment, including welding gear and equipment required for weed and fire management purposes.

Senior traditional owners have tasked the Kalṭukatjara Rangers with implementing their land management aspirations and priorities on the Kaṭiṭi-Petermann IPA. Traditional land management has been coupled with work directed at addressing contemporary management issues. To date, ranger group activities have included burning, waterhole management, feral animal and weed control, cultural site protection, recording of traditional knowledge, participating in flora and fauna surveys and maintaining tourism infrastructure at the Kalṭukatjara campground and Tjunti (Lasseter's Cave). To enable the rangers to undertake these and other tasks in a safe and proficient manner, they all undergo intensive training (refer Section 7.2.1).

In addition to the jobs available in the Kalṭukatjara ranger group, CLC land management programs in the Kaṭiṭi-Petermann region have generated many casual employment opportunities for *Anangu*. Traditional owners of country on which land management work is being conducted usually accompany and work alongside rangers and other CLC staff. Every effort is made to include extended family groups in such casual on-country employment. Funding provided for the IPA development phase and related grants in recent years have significantly increased the number of casual employment opportunities available to *Anangu* in land management work. For example, the *Anangu* Tjuṭa Cooperative Fire Management project, which was funded under the Caring for Our Country program during 2012–13, generated casual employment for more than 400 *Anangu* living in the communities of the NT/SA/WA border region.



Kalṭukatjara Rangers Conrad Abbott, Selwyn Burke and Peter Bennett undertake a fuel reduction burn near Kalṭukatjara, 2010

Elsewhere in the region, leaseback arrangements at the Australian Government-administered UKTNP include obligations to provide employment opportunities to promote Aboriginal administration, management and control of the national park. Currently, some 25% of positions at the park are held by Aboriginal people, with a quarter of these (two positions) held by local *Anangu*, with other *Anangu* engaged on a casual basis. As part of the vision for the Joint Management Futures project recently developed by UKTNP Board members, a second indigenous ranger group is proposed, based in Muṭitjulu Community. It is intended that this new group will work across both UKTNP and the IPA to improve management of cultural and biodiversity assets.

At Watarrka National Park, which is jointly managed by traditional owners and the Northern Territory Parks and Wildlife Commission, high priority is given to providing *Anangu* with flexible and direct employment. The Commission's ranger training scheme is one means by which *Anangu* can join the park's ranger workforce. Additionally, under the park lease, preference is given to local Aboriginal people and businesses to undertake contract work in the national park, such as infrastructure construction and maintenance, fencing and weed management.

8.2.2 Issues and Opportunities

Land management work has strong cultural foundations for *Anangu*, as it is aligned with *Tjukurpa* obligations, utilises traditional ecological knowledge and fosters individual and family connections with place. Such work, which is universally supported by traditional owners, can be extremely beneficial to people's mental and physical wellbeing. Given all of this, land management work is highly appealing to many *Anangu* and is more likely to sustain the interest and commitment of individuals than most other potential employment opportunities available in the region.

Ultimately, *Anangu* aspire to be fully responsible for all aspects of land management associated with the IPA. Central to achieving this goal is the ranger program. While rangers receive considerable training and mentoring to build individual and group capacity, there remains a pervasive need for assistance in areas such as leadership, management, coordination, governance and logistics. At present the CLC provides this through centralised administrative support, opportunities for rangers to participate in interstate leadership training programs and more advanced certificate-level training in conservation and land management, mentoring in group management and logistics skills provided by indigenous Support Officers, and the engagement of a Ranger Coordinator.

Although certain *Anangu* have a broad range of skills and experience in land management work and are encouraged to take on considerable responsibility, various educational, social and cultural factors impact on people's performance. These include:

- **Low level of literacy and numeracy:** This can reduce people's ability to work effectively in certain roles and tasks and result in rangers avoiding training courses in contemporary land management matters or resigning altogether, due to feelings of inadequacy or disillusionment
- **Remote location work:** The need to be away from families for extended periods of time when ranger work occurs at remote locations can impact on ranger motivation and work attendance
- **Unfamiliarity with Western work practices:** Western-style work ethics, practices and expectations may be foreign to *Anangu* and counter to how they and members of their extended families operate

- **Family and individual money issues:** Rangers may experience pressure (humbug) from family members to share out their income, greatly reducing the personal financial incentive for them to continue working. Furthermore, the material needs or desires of *Anangu* are usually far less than those of *Piranpa*, meaning that there is often less financial need for people to undertake full-time employment
- **Cultural restrictions:** Traditional owners continually express the need to have the right people for country involved in activities undertaken on the IPA. Consequently, *Anangu* rangers can feel uncomfortable about doing work on country they are not culturally connected to, especially if the right people are not present. Similarly, certain activities (e.g. weeding, seed collection) can be regarded as 'women's work', and men may be reluctant to participate. Although men and women can work together at many of the same sites, and are happy to camp and attend training courses together, cultural issues can arise if women and men are required to travel together
- **High mobility:** *Anangu* have many familial and cultural responsibilities (mourning, caring for elders and children, ceremonial commitments) that often require a high level of mobility in the region. Occasionally, individuals are required to relocate to adjacent communities for periods of months or years to reduce cultural tensions or fulfil social responsibilities.

Anangu residing in Mutitjulu have long sought the establishment of a ranger group in their community which could be tasked with managing country beyond the boundaries of UKTNP. Given the size and east-west extent of the IPA, having ranger groups based at both Kaltukatjara and Mutitjulu would potentially allow for more efficient management of the region and provide more equitable access to employment and country visit opportunities.

Although casual land management work opportunities tend to be evenly spread among men and women, historically women have been underrepresented as rangers on the IPA. This is due to a combination of cultural, family and resourcing issues. Given that looking after country requires the expertise and knowledge of both men and women (e.g. sacred sites are often specific to gender; women have extensive

knowledge about plants and small animals that men are often not familiar with), supporting and expanding the involvement of women in land management work is important for the future of the IPA.

The IPA and other theme-based CLC land management programs, such as fire or feral animal control,

offer the prospect of increased and more regular opportunities for *Anangu* to engage in paid land management work into the future. Such opportunities should be managed so as to guarantee equity, align with cultural protocols and build personal and community capacity, ownership and pride in IPA work.



Anangu undertaking *waru* (black-footed rock-wallaby) surveys in Mann Ranges

8.2.3 Management Strategies

Management Objective 8.2.3(a)

*Support the retention and growth of the *Anangu* ranger workforce*

Management Strategies

1. Within the bounds of current enterprise agreements, employment legislation, grant funding conditions and the capacity of the CLC, investigate and pursue *Anangu* ranger work models that are culturally appropriate. These may include:
 - scope for rangers to undertake blocks of intensive seasonal work
 - flexible employment arrangements to allow for work on a week-on/week-off basis, rather than continuous part time employment
 - job-sharing opportunities that allow more than one person to share a single ranger position to allow greater employment flexibility, particularly for women
2. When recruiting for ranger positions, preference the employment of suitable ranger cadetship participants (refer Section 7.2.3).
3. Explore the adoption of a flexible employment scheme with adjacent IPAs and ranger groups to accommodate the cultural and familial responsibilities of rangers who require mobility and relocation in the region (refer Section 7.2.3).
4. Maintain an equal representation of women in the ranger workforce by:
 - identifying and mentoring women with an interest in working as rangers

- developing projects and activities in the ranger workplan suited to the capabilities, interests and cultural responsibilities of female rangers
 - working with local job providers to assist women to prepare job applications and attend interviews
 - creating identified female ranger positions
 - ensuring the composition of interview panels is gender-balanced
 - seeking support from relevant community-based organisations to assist with facilitating women ranger work opportunities
 - working with female members of the IPA Management Committee to provide support for female rangers.
5. Investigate and pursue opportunities for a second ranger program based at Mutitjulu.
 6. Develop and pursue career and capacity-building pathways for *Anangu* with the long-term aim of *Anangu* occupying all ranger and IPA management positions.

Management Objective 8.2.3(b)

Provide casual land management employment opportunities for Anangu

Management Strategies

1. Develop and maintain a casual employment register for *Anangu* that includes information on:
 - individual work histories, including days of casual employment per year
 - levels of interest in different types of land management work
 - respective estate areas and particular cultural responsibilities
 - existing knowledge and skill levels.
 Use the register to ensure:
 - equitable access to casual employment opportunities
 - that the right people are engaged for work on particular parts of the IPA
 - people's skills and interests are matched with particular tasks
 - people's individual training needs are met.
2. Develop and implement a casual staff training program based on information contained in the casual employment register. Such a program should produce personalised training schedules designed to deliver the skills needed by each individual to proficiently undertake their preferred work activities.
3. Ensure that the right traditional owners are employed to oversee field work and country visits undertaken on their particular estate areas.
4. Use local interpreters (employed on a casual basis) for all significant meetings related to the IPA.
5. Create a register of key cultural knowledge holders to be employed for formal instruction and on-the-job training of rangers and IPA staff and to teach students during school country visits (refer Section 7.2.3).

8.3 Tourism

8.3.1 Background

“ We want our children to learn about their culture and to be able to share it through tourism. We want to show tourists our country – when visitors respond to our country we feel happy and proud. This tourism work can help make money for our children’s future, bringing health, education and independence ... ”

– from the draft *Kaltukatjara Region Aboriginal Tourism Plan 2013*

The rich cultural and natural values of Central Australia are a major drawcard for visitors from around the world. Economically, Central Australia is the most tourism-reliant region in the country. It receives almost half a million visitors each year, 40% of whom are from overseas. These international visitors are described by the tourism industry as ‘experience seekers’, in that they pursue authentic interactions ‘off the beaten track’ and opportunities to immerse themselves in local culture. Developing new experiences aimed at attracting more of these visitors and encouraging them to stay longer has

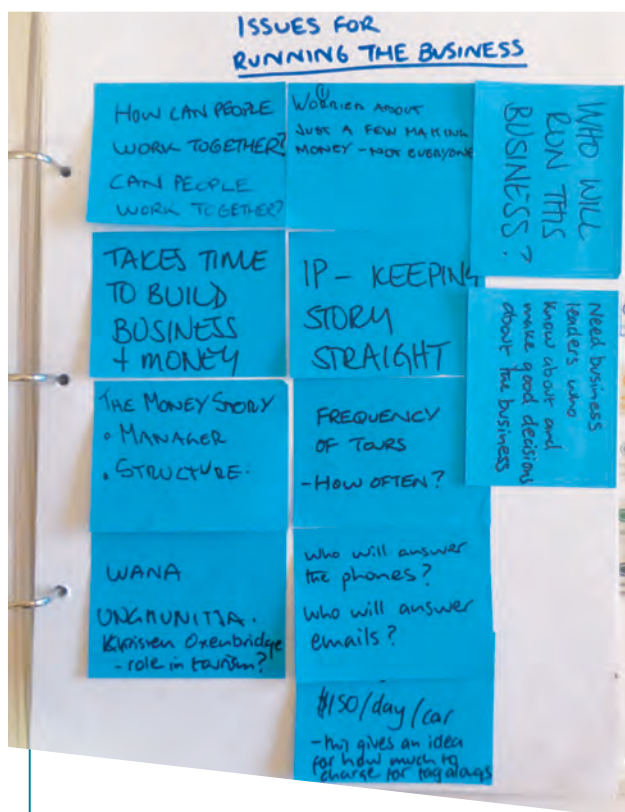
become an important focus of the Central Australian tourism industry.

Underpinning the current efforts to increase the international profile of Central Australia has been the branding of a sizeable part of the region, including the eastern portion of the *Katiti-Petermann IPA*, as Australia’s Red Centre National Landscape. Jointly developed by Tourism Australia and Parks Australia, the National Landscapes program aims to achieve environmental, social and economic outcomes in relation to a collection of iconic Australian places of great cultural, natural and spiritual significance.

Contained in the Red Centre National Landscape is the arguably single-most recognisable symbol of Australia and one of its highest profile visitor destinations. The monolith of *Uluru*, located in the World Heritage-listed *UKTNP*, attracts between 260,000 and 350,000 visitors per year. The various needs of these visitors are largely catered for at the nearby *Ayers Rock Resort* at *Yulara*, which has a major airport, coach and car hire services, a tour and activity booking hub, retail outlets and a range of cafes, restaurants and accommodation types. The purchase of the resort by the *Indigenous Land Corporation* in 2011 has been accompanied by increased opportunities for *Anangu* to gain training and employment in the hospitality and tourism industries.

Watarrka National Park, to the north-east of the *IPA*, receives in excess of 200,000 visitors per year. Visitors to the park are catered for at *Kings Canyon Resort* and *Kings Creek station*, which have similar visitor services and infrastructure to those available at *Yulara*, though at greatly reduced scale and variety.

Despite *UKTNP* being surrounded by the *IPA* and *Watarrka National Park* adjoining it, tourism in the *IPA* itself is in its infancy. The east-west *Tjukururu Road*, which joins *UKTNP* with the *WA* border through to *Laverton* and beyond, is marketed as part of the ‘*Outback Way*’. The road attracts an increasing number of visitors, most of whom are independent travellers. All such visitors are required to obtain a transit permit from the *CLC* which authorises the permit holder to access *Tjunti (Lasseter’s Cave)* for sightseeing, with camping only allowed at the *Kaltukatjara campground*. Permit holders are also able



Notes from *IPA* tourism planning workshop, *Kaltukatjara*, 2012

to access Kaltukatjara in order to purchase fuel and other supplies at the community store.

Except for the transit traffic using the Tjukaruru Road, there is very little authorised tourism activity in the IPA. Privately organised cultural tourism trips involving traditional owners are conducted on a sporadic basis at or near outstations such as Umutju and Umpiyara. Beyond this, private groups or individuals occasionally apply for permits to visit places in the IPA for recreational purposes.

Recently, preliminary scoping studies and feasibility trials have been conducted in relation to five potential cultural tourism ventures in the eastern half of the IPA that have been advocated by traditional owner family groups for their country. These include both day tour and overnight camping proposals and are focused on Pantu, Kulpitjata, Patji, Umpiyara and Pirrulpakalarintja.

In the western region, traditional owners of Walka rockshelter, which is located south of Kaltukatjara, have long expressed an interest in conducting cultural tours. As a precursor to this, a cultural heritage management plan has been prepared and implemented for the site to ensure future tourism activities do not unduly impact on its values.

In 2011, a tourism awareness and assessment workshop was conducted with traditional owners of the western portion of the IPA. Following this, preliminary planning has been undertaken for new indigenous tourism products in the Kaltukatjara region, including visits to Walka, Tjunti (Lasseter's Cave), Ngarngurr and Piltardi.

8.3.2 Issues and Opportunities

The Kaṯiṯi-Petermann IPA has considerable tourism potential. For many *Piranpa*, its stark mountain ranges and vast sandplains, broken by salt lakes and sand dunes, embody the essential characteristics of 'Outback Australia'. The rich *Anangu* culture that permeates all of these landforms, and the prospect of learning about it, adds to the tourism appeal of the place for many people.

Compared to most other IPAs located in remote regions, the Kaṯiṯi-Petermann IPA has a significant advantage with regards to realising its tourism potential due to its proximity to Uluru and the associated visitor hub of Yulara. This favourable

position is further enhanced by the motivations and interests of a significant number of the visitors to Uluru, the 'experience seekers'. Niche tourism products in which visitors can interact with *Anangu* – such as cultural immersion trips; tag-along 4WD tours; artist, birdwatching or natural history camps; or walking tours – all represent a good match for these types of visitors and the aspirations of traditional owners of the IPA. Such authentic small-scale tourism products are also likely to appeal to a proportion of domestic visitors to the region including retirees, families and young independent travellers.

“ *Ngayulu unytjuringanyi kunpu palyantjaku, ngunytjulu ngayuku wantikatingu ngura pulkanya, ngaltutjara. Tourism-ngka kanyiltjikitjangku unytjuringanyi, waaka palyantjaku wirura kunpu kanyintjaku tjitji malatja malatja ku.* ”

I want to create something strong for the important country left to me by my mother, ngaltutjara. I want to hold it through tourism, to create work to better look after it and keep it strong for future generations. ”

Daisy Walkabout

Anangu recognise the potential benefits of IPA tourism in relation to their health and wellbeing. If done properly, *Anangu*-controlled tourism activities could provide important employment, training and business opportunities for current and future generations in a region where there are few alternative means of income generation. It could help strengthen young people's personal ties to country and their desire to fulfil their *Tjukurpa* responsibilities, as well as promoting personal pride in their culture. By doing so, it could also help alleviate some of the social problems which bedevil community life by giving people a sense of purpose. Income generated by tourism could also create an independent revenue stream to fund IPA management activities.

Conversely, if not managed appropriately, tourism in the IPA may result in inter- and intra-family conflicts and community disharmony. The need to observe site access and behaviour protocols, involve the right traditional owners or knowledge



Tourists participate in a trial tourism venture at Tjinti, 2010

holders and be equitable in the provision of tourism project support are just a few of the cultural sensitivities that need to be considered. Failure to observe these and various other cultural and social conventions may result in the loss of community support for individual enterprises and threaten their viability.

Poorly planned or executed tourism ventures may also result in environmental degradation such as localised soil erosion, water contamination or weed introduction problems. Such issues can be mitigated through careful consideration of site selection, the positioning and type(s) of visitor facilities provided and the need for protective measures; the formulation of appropriate operational procedures; and the development of monitoring and evaluation systems. Such planning should ideally be in place prior to commencement of individual tourism developments or activities on the IPA.

In addition to cultural and environmental considerations, tourism development in the IPA is severely hampered by the limited capacity of most *Anangu* to currently manage and operate tourism ventures. Many people have limited appreciation of what running a business entails, and lack the necessary skills or experience to undertake the required tasks. This, combined with unrealistic expectations, poor literacy and numeracy skills, the absence of

appropriate role models or a commonly shared work ethic, and the impacts of health, family and social issues on their availability, are all real barriers to *Anangu* engagement in the tourism sector. For these reasons, the development of tourism in the IPA needs to occur at an appropriate pace and in ways that build *Anangu* capacity.

Given current local capacity shortcomings, the involvement of existing tourism industry operators as partners with *Anangu* to implement individual tourism ideas may be beneficial in the short to medium term. That said, experience on the adjacent APY Lands of SA suggests that an IPA tourism model in which *Anangu* wishing to undertake specific tourism enterprises and enter into one-on-one arrangements with industry partners is likely to benefit from the creation of an overarching *Anangu* tourism entity. Such a body, which would represent all *Anangu* families and individuals keen to develop tourism products, could act as a centralised booking, marketing, mentoring and training hub and as a means of linking individual tourism ventures.

As a first step in creating a tourism strategy for the IPA, *Anangu* have identified four distinct tourism zones and the types of activities or developments they regard as appropriate in each (refer Section 8.3.3 [a]).

8.3.3 Management Strategies

Management Objective 8.3.3(a)

Support the development of Anangu-controlled tourism enterprises

Management Strategies

1. Support *Anangu* aspirations concerning the development of tourism activities and infrastructure in the IPA in accordance with the following tourism zones:
 - **Uluru Environs:** *Day or part-day excursions* (e.g. collecting bush foods, painting or wildlife tracking, activities such as balloon flights or camel rides), *Overnight stays at outstations* (e.g. for special interest groups), *Special events* (e.g. weddings or commercial functions)
 - **Kaltukatjara Community:** *Tourism hub* (provision of traveller services such as food, fuel, souvenirs and accommodation, base for short and overnight tours)
 - **Tjukururu Road Corridor:** *Travellers campsites*, including possible use of nearby outstations, *Interpretive activities*, location or theme-focused short-duration interpretive walks
 - **Remote Areas:** *Niche bush activities and camps* (such as tag-along tours, extended walks, cultural immersion activities or art camps using the various vehicular tracks north and south of the Tjukururu Road which link communities, outstations and cultural sites).
2. In association with the IPA Management Committee, develop a Tourism Strategy for the IPA. The strategy will:
 - be based on the four identified tourism zones and associated activities and infrastructure as described in Strategy 1 (above)
 - recommend terms of reference, a suitable business model, structure, required skill sets, and funding for the establishment and operation of an overarching *Anangu* tourism entity aimed at providing overall support, coordination and planning of *Anangu*-generated tourism products
 - detail pathways for the acquisition of skills and knowledge that *Anangu* need to successfully pursue tourism ventures
 - provide guidelines for appropriate environmental planning, monitoring and enforcement measures
 - minimise duplication and overlap of tourism products
 - match market demands with potential products proposed by *Anangu*
 - investigate the need and opportunities for joint ventures.
3. Provide advice to the IPA Management Committee on issues relating to all individual tourism proposals so that the Committee is able to make fully informed decisions regarding support or opposition to such proposals.

4. In advice to the IPA Management Committee, recommend that priority support levels for individual tourism ideas generated by traditional owners be determined by the extent to which they:
 - create opportunities for meaningful livelihoods for families and communities
 - facilitate attainment of skills by community members and the creation of income to be re-invested into other community enterprises
 - result in the creation and operation of quality Aboriginal-owned and -controlled products that build a stronger reputation in the tourism industry
 - respect Aboriginal culture and promote reconciliation through engagement with visitors
 - promote the sharing and passing on of information to family members and young people so they can keep country and knowledge safe for future generations.
5. For externally generated tourism proposals, ensure the advice provided to the IPA Management Committee includes information relating to the:
 - viability of the proposal, track record of proponents and their ability to meet financial commitments
 - delivery of meaningful social and economic benefits to traditional owners including, employment, training and business development
 - willingness and ability of proponents to develop a sustainable working relationship with traditional landowners
 - protection of sites of significance and amelioration of impacts on local culture, community, environment and other stakeholders.
6. Create and implement a hierarchy of environmental and cultural impact assessments, management planning and monitoring and evaluation requirements to be applied to individual tourism proposals based on their potential to impact on the environmental and cultural values of the IPA.
7. Measure tourism operator compliance with all environmental and cultural impact mitigation actions and regularly report on operator performance to the IPA Management Committee.
8. Create complementary logos for the IPA and IPA-related tourism products.
9. Produce and apply a style guide for all IPA tourism signs and infrastructure with the aim of creating a high-quality signature appearance at all sites of tourism activity.

8.4 Other Opportunities

8.4.1 Background

Beyond land management and tourism-related work, employment and economic development options in the IPA are severely restricted. The commercial harvest of bush resources, pastoralism, mining and carbon farming are a few industries that offer the prospect of additional, albeit limited, business or job opportunities.

The collection of *punu* (wood) for the manufacture of artefacts such as carved animals, traditional weapons and utensils represents the main commercial use of bush resources in the IPA. Residents of Mutitjulu and Kaltukatjara are among the 800 artists and craftspeople from the Ngaanyatjarra, Pitjantjatjara and Yankunytjatjara lands of the NT, SA and WA who sell their wooden products to Maruku Arts. Established in 1984 as the trading arm of Anangu Uwankaraku Punu Aboriginal Corporation, Maruku is based at Mutitjulu and has a retail outlet in the UKTNP cultural centre complex.

While Aboriginal people have been harvesting bush foods for sale in Central Australia for over 30 years, the industry remains small, with the most successful operations reliant on individuals and families building personal relationships with buyers. Within the IPA, commercial harvesting is almost non-existent. That said, plant species with commercial potential as food items, such as *Solanum centrale* (desert raisin) occur in the region as do various species favoured for land rehabilitation purposes.

The IPA region is largely unsuitable for pastoral development. Livestock grazing is confined to suitable grassland in the Alpara area in the south-east corner of the IPA through an informal agistment arrangement between Anangu and the owner of the adjoining Mulga Park station.

Although the mining potential of the Petermann region was first investigated in the latter part of the nineteenth century, it was not until the sensational claims of Harold Lasseter in 1929 of the existence of a rich gold reef that prospectors were drawn to the area in substantial numbers. Despite exhaustive searches since that time, there have been no reported discoveries of gold or other precious metals in the region. The IPA is not regarded as prospective for oil or gas production, although the extensive salt deposits in the Lake Hopkins – Amadeus – Neale



Janet Inyika prepares *punu* for sale

chain may prove to be economical at some time in the future.

‘Carbon farming’ is a recent term that refers to land managers earning carbon credits by reducing greenhouse gas emissions and storing carbon in vegetation and soils through changes to land management practices. These credits can then be sold to individuals and businesses that want or need to offset the greenhouse gas emissions of their business operations. The potential for Central Australian land managers to gain carbon credits has yet to be tested but is likely to be limited. Within the IPA, opportunities to accrue credits may eventually be possible in relation to the management of fire and feral camels.

8.4.2 Issues and Opportunities

The collection of bush resources on the IPA by *Anangu* represents a continuation of a key aspect of traditional use of country. The harvest of wild produce also fulfils a cultural need to be on country, fosters intergenerational transfer of traditional knowledge, strengthens social and family bonds as people work together, is one of the few economic activities open to women and promotes self-esteem through rewarding the application of *Anangu* knowledge and skills. It also generates an independent source of income for people in a culturally appropriate way, in that individuals can tailor their production to suit their personal financial needs and other priorities in their lives.

It is unknown to what degree the ongoing harvest of *punu* on the IPA for artefact production and sale is sustainable. It is likely that overharvesting has occurred in areas close to communities and outstations and along popular travel routes. Any future bush food or *punu* harvest operations would need to consider sustainability issues, and the viability of any such proposals will also be influenced by the prices offered by buyers, market types and scales, and seasonal and spatial variability in the abundance and availability of produce.

Pastoral enterprise is likely to remain a minor land use on the IPA. An evaluation of the impacts of the existing pastoral activity is overdue, and any future proposals to expand livestock grazing will need to be assessed against potential degradation of the IPA's cultural and natural values. Formal regulation of livestock grazing is required through the development of grazing licences that would include terms and conditions designed to mitigate adverse impacts on the values of the IPA (refer Appendix 8). There are limited employment opportunities for *Anangu* in pastoral enterprises elsewhere in the region. The only Aboriginal-owned or -operated commercial pastoral operations in the region are a small-scale cattle enterprise on Angas Downs IPA and the Yunyarinyi Community (Kenmore Park) pastoral enterprise east of Ernabella on APY Lands.

Mineral exploration and mining activities provide potential employment and financial benefits to traditional owners, opportunities to access rarely visited country, and the prospect of new infrastructure such as roads. They may also result in irreversible impacts on the cultural and natural values of the IPA and contribute to community social



Bush food harvest; *mangata* (quandong)

problems, if not managed appropriately. Mineral exploration activity in the region is currently limited to a single exploration licence that targets gold and base metals and is located south-west of Kaltukatjara. There are a number of exploration licence (mineral) applications pending approval through the *Aboriginal Land Rights (Northern Territory) Act 1976*, including on the surface area of Lake Amadeus. Companies are mainly targeting fertiliser minerals such as potassium. A number of petroleum applications (exploration permit applications) are also pending in the wider region.

The provisions of the *Aboriginal Land Rights (Northern Territory) Act 1976* effectively require the consent of the traditional owners of the land trusts that constitute the IPA for exploration activity to occur. The CLC has a vital role in ensuring that traditional owners are provided with all relevant information to ensure that decision-making regarding mineral exploration is fully informed. While traditional owner consent can include the imposition of exclusion areas and a wide range of conditions, once permission has been granted for exploration in a specific area, the development of any subsequent mining operation cannot be refused.

Environmental monitoring and compliance of mining exploration and extraction activities are governed under the Northern Territory *Mining Management Act* and the Northern Territory *Environmental Assessment Act* and are the responsibility of the Northern Territory Government. However, the CLC may have specific requirements for environmental protection, rehabilitation and access restrictions based on traditional owners' aspirations. All mining-related agreements brokered by the CLC also cover sacred site protection matters, responsibility for which is a statutory function of the CLC under the *Aboriginal Land Rights (Northern Territory) Act 1976*. Conditions that are typically written into mineral exploration

contracts include:

- annual site visits for traditional owners to inspect exploration activities and to ensure that sacred site clearances have been adhered to
- criteria relating to site rehabilitation and road and track construction (refer Appendix 7)
- submission of annual workplans detailing all proposed works
- the lodgement of annual work reports describing all activities undertaken.

Carbon farming is yet to be tested in desert systems and there are no standardised techniques to apply in the arid zone. A major problem is the lack of baseline data required to assess changes in carbon storage or emission. Baseline levels are difficult and expensive to measure in deserts, where the distribution of nutrients is very patchy and unpredictable in both space and time. Though specific methodologies have yet to be developed for the arid zone, potential future opportunities to achieve carbon sequestration have been identified through improved fire management and reductions in numbers of feral ruminant herbivores (camels). Both of these areas offer the potential to offset existing IPA management costs, provided specific carbon-accounting methodologies are developed.

8.4.3 Management Strategies

Management Objective 8.4.3(a)

Support the sustainable harvest of bush resources

Management Strategies

1. Work with traditional owners and community arts organisations, including Maruku Arts and Tjanpi Desert Weavers, to identify key harvest species and areas used for the commercial production of art and craft items.
2. Assess the likely impacts of harvest activities on known environmental values, particularly rare or threatened species and areas of conservation significance.
3. As appropriate, develop and distribute species and/or harvest area protocols designed to:
 - ensure harvest activities are consistent with any species or site-specific conservation plans or strategies
 - eliminate or reduce impacts on significant environmental values
 - prevent overharvesting of key commercial resource species
 - reduce the risks associated with harvest activities of introducing and spreading weed species
 - reduce the risk of creating new soil erosion problems associated with harvest-related vehicle use.
4. Assist *Anangu* to engage with the bush food industry by linking buyers to harvesters. As necessary, develop bush food harvest protocols as per Strategy 3 (above).

Management Objective 8.4.3(b)

Support the increased involvement of Anangu in regional mining and pastoral employment opportunities

Management Strategies

1. Work collaboratively with relevant CLC staff to develop partnership programs with

training providers, prospective mining companies and pastoral stations operating in the south-west region aimed at maximising mining or pastoral employment opportunities for traditional owners associated with the IPA. This may include measures such as:

- establishment of suitably trained *Anangu* work teams to undertake environmental service delivery contracts (weed and fire management, feral animal control) on pastoral stations in the region.
2. Enhance relevant skills of interested rangers and casual IPA staff to enable them to take up work opportunities in the mining or pastoral sectors through:
 - advocacy with training providers for the delivery of block-based training programs for *Anangu* to complete core Certificate I and II units specific to mining or pastoral jobs.

Management Objective 8.4.3(c)

Minimise impacts associated with livestock grazing on cultural and natural values

Management Strategies

1. Work with staff of the CLC Rural Enterprise Unit to assess the existing informal cattle agistment arrangements in the Alpara area with regards to extent, stocking rate and related impacts on cultural and natural values.
2. If continuation of livestock grazing in the Alpara area is considered appropriate, develop a grazing licence with the owner of Mulga Park station that provides suitable financial benefits to traditional owners. Any such licence will include conditions directed at:
 - protecting culturally significant sites
 - mitigating existing soil erosion problems and preventing the development of new sites of erosion concern
 - managing existing weed infestations and minimising the risk of new weed introductions
 - protecting natural water resources
 - monitoring changes in the condition of cultural and natural attributes of the licence area (refer Appendix 8).
3. Ensure the licensee(s) complies with conditions contained in any grazing licence(s) issued. Report breaches of conditions and the results of monitoring to the IPA Management Committee for consideration.
4. Investigate reports of cattle straying from Curtin Springs station onto the IPA. If reports are verified, request the owners of Curtin Springs to remove the cattle and enact strategies to reduce the likelihood of continued livestock incursions.
5. Subject any new livestock grazing proposals to rigorous assessments regarding their viability, likely impacts and potential benefits to traditional owners. Report the findings of such assessments to the IPA Management Committee for consideration.

Management Objective 8.4.3(d)

Minimise impacts associated with mineral exploration and mining on cultural and natural values

Management Strategies

1. Collate environmental information and define values for areas subject to mineral exploration applications in the IPA and provide information to CLC Mining Section for use in mining consultations.
2. Assess the potential for proposed mineral exploration and subsequent extraction activities to have negative impacts on values in the IPA. In particular, identify:
 - potential for mineral exploration activities to interfere with or enhance current land management activities
 - potential for the introduction and spread of weeds
 - potential for soil erosion issues stemming from road and track construction
 - potential disturbance of habitat or destruction of populations of threatened or significant animals species
 - potential disturbance or destruction of significant or threatened plant populations or vegetation communities
 - potential for pollution from mineral exploration and mining activities
 - the combined impacts of soil erosion, introduced weeds and pollution on areas of outstanding value associated with wetlands and watercourses, SOCS, SOBS and culturally significant sites
 - the presence of any values that may trigger the *Environment Protection and Biodiversity Conservation Act 1999*
 - potential impacts on groundwater and hydrology
 - potential impacts on significant landforms
 - potential impacts on sites of historical significance.
3. Through CLC mining meetings and other processes, ensure that traditional owners are fully informed regarding the environmental implications of proposed mineral exploration and mining activities in the IPA. To this end, provide traditional owners with:
 - an outline of potential consequences of proposed mineral exploration and subsequent extraction activities and their likely impacts on key environmental or other values
 - a set of possible operational conditions and criteria for their consideration which may be incorporated into the terms of the exploration agreement, such as:
 - measures to mitigate the impacts of weeds, soil erosion and pollution on known values
 - mineral exploration exclusion zones designed to protect key cultural and environmental values.
4. In collaboration with CLC Mining Section staff, develop a schedule of strategic infrastructure requirements to support ongoing land management activities in the IPA for possible inclusion in negotiations with mineral exploration proponents. Such infrastructure may include:
 - roads and tracks
 - water points, including bores, hand pumps and tanks.

5. Work with CLC Mining Section staff to develop environmental assessment criteria and accompanying policies and protocols to guide consultative processes for all future mining exploration applications in the IPA.

Management Objective 8.4.3(e)

Explore and progress viable carbon abatement opportunities

Management Strategies

1. Investigate and pursue opportunities to develop carbon abatement initiatives in the IPA, including:
 - research and feasibility studies exploring the science and viability of carbon abatement programs and methodologies
 - carbon abatement opportunities that offer the potential to offset existing costs associated with IPA management, specifically those related to feral animal control and fire management.



Ranger Raymond James, vegetation photo point monitoring, Bloods Range survey 2009

9.1 Monitoring

Monitoring changes in the condition of the values of the IPA over time is essential for gauging the success or otherwise of the management strategies being used to achieve the IPA management objectives as stated in this plan.

As it is not possible to measure the condition of all values in the IPA, a limited number of performance indicators is required, with their selection based on priority issues and an understanding of their significance, sustaining processes and threats. In respect of the four management themes of this plan, performance indicators for monitoring and subsequent evaluation should be aligned with the key objectives of each theme.

It is a condition of IPA funding that a Program Logic and Monitoring, Evaluation, Reporting and Improvement (MERI) plan be completed and implemented. The purpose of a MERI plan is to ensure that milestones related to Caring for Our Country targets, as well as traditional owner objectives and aspirations outlined in this plan, are met. Though MERI plans are developed for the life of an IPA funding agreement (usually five years), they are reviewed annually with the aim of fostering an adaptive management approach.

It is the role of the IPA Coordinator to collate data generated against MERI criteria on an ongoing basis and to undertake a desktop evaluation of project outcomes prior to reporting at the end of each financial year. The extent and scope of a MERI plan for the IPA will be contingent on the resourcing, capacity and funding available to implement this plan.

Establishment and maintenance of a monitoring schedule to measure progress against key performance indicators related to the four management themes of this management plan will require:

- establishment and maintenance of an appropriate, representative data collection schedule tailored to suit locally specific values and threats and designed such that rangers are the principal people involved in data collection
- striking a balance between qualitative and quantitative measures to ensure strong community engagement in the monitoring and evaluation process and a rigorous scientific basis to future management decisions
- monitoring sites and methodologies that, wherever possible, conform to existing IPA, CLC, regional or national monitoring initiatives

- establishment and maintenance of a monitoring database in which to store and integrate baseline and historical information related to key performance indicators
- tailoring of the design of CyberTracker or other digital data collection platforms to link with, and inform, reporting against key performance indicators
- training of rangers and key traditional owners in data collection and monitoring program design and implementation.

9.2 Evaluation and Review

Understanding the nature and rate of change in the condition of values as indicated by the results of monitoring allows the effectiveness of chosen management regimes to be evaluated, adapted and improved.

It is the role of the IPA Coordinator, with assistance from relevant CLC staff, to collate MERI data for comparison against the previous year's performance. Added to this, IPA Management Committee members are required to undertake qualitative evaluation of IPA performance through identifying and recording 'stories of most significant change'.

This annual evaluation of performance is circulated to the IPA Advisory Committee in advance of its annual meeting. Committee members are required to provide advice and feedback regarding the effectiveness of management efforts particular to their areas of expertise and, where necessary, recommend changes to management strategies or monitoring programs.



Peter Latz surveying for rare plants, Butler Dome

9.3 Management Strategies

Management Objective 9.3(a)

Develop and implement a monitoring, evaluation and review framework to optimise management effectiveness

Management Strategies

1. Complete a Program Logic and MERI Plan within one year of the IPA declaration.
2. Establish an appropriate and representative data collection schedule in line with the MERI plan and management plan provisions that is tailored to suit specific values and threats of the IPA and to suit ranger data collection skills. The schedule will include data directed at gauging progress against key management objectives for each of the four management themes.
3. The monitoring regime for the IPA will include the collection of information concerning:
 - game species and bush resource availability (Management Strategies 5.3.3[b]3 and 8.4.3[a]3)
 - soil erosion site remediation effectiveness (Management Strategy 6.2.3[a]4)
 - water place condition responses to management actions (Management Strategy 6.3.3[b]3)
 - weed-related matters, including effectiveness of weed control efforts (Management Strategies 6.4.3[d]9 and 6.4.3[d]10)
 - feral animal control effectiveness (Management Strategy 6.5.3[d]7)
 - livestock grazing in the Alpara area (Management Strategy 8.4.3[c]2).
4. Develop supporting CyberTracker or other relevant digital recording platform sequences and training schedules relevant to the collection of data by rangers and aligned with MERI plan and management plan requirements.
5. Provide training in the design and implementation of monitoring programs to relevant IPA and ranger staff.
6. Establish an IPA database in line with CLC land resource information management systems to store and analyse data collected through the implementation of the MERI and management plans.
7. Liaise with staff of adjoining protected areas to develop complementary monitoring programs for shared values and threats so as to facilitate the identification of trends in condition in relation to management actions across the greater landscape.
8. Prepare an annual evaluation report for consideration by the IPA Management Committee and Advisory Committee based on MERI results and progress in

implementing the provisions of the management plan. Consider making changes to the contents of the management plan and any relevant subsidiary documents in response to feedback on annual evaluation reports.

9. Undertake a limited five-year review of the IPA management plan to assess:
 - traditional owner views on the adequacy of the plan in reflecting their aspirations
 - effectiveness of the IPA governance structure, management arrangements and partnerships
 - suitability of the monitoring program to measure changes in the condition of values
 - changes required in response to the findings of monitoring program results
 - pertinent new research findings, the emergence of previously unforeseen management issues or opportunities and the identification of significant new values.
10. Commence a full review of the management plan approximately 10 years after its formal adoption.

CHAPTER 10 Plan Implementation



Kaltukatjara Rangers digging holes for pitfall traps, Lake Amadeus survey 2010

Plan Implementation

Implementation of this management plan will be undertaken in the context of the annual works programs of the Kaltukatjara and possible future Muṯitjulu ranger groups and those of other regional or specialist CLC staff. Where appropriate, partner organisation support will be used to expedite implementation of the plan provisions. The rate and degree of plan implementation will depend on the availability of core and supplementary funding, together with staffing and resourcing levels.

Each individual management strategy or action in this plan will be assigned a relative priority (as listed below) using the following criteria:

High Critical to achieving stated management objectives; if deferred could potentially result in an unacceptable loss of cultural/biological/economic values

Medium Important to achieving stated management objectives; can be deferred without an unacceptable loss of cultural/biological/economic values

Low Actions to be undertaken once high/medium priorities have been completed

Ongoing Actions to be undertaken as required.

High priority actions are regarded as key milestones that should be implemented within two to five years of the declaration of the IPA. In many instances, these actions will provide a framework to implement a large number of related actions and will serve as a foundation for the orderly and strategic achievement of key management objectives.

Priority levels will be allocated to all management strategies and actions by the IPA Management Committee within one year of the declaration of the IPA.



Part C

APPENDICIES



Appendix 1. Abbreviated forms

AFCMP	Australian Feral Camel Management Program
ALT	Aboriginal Land Trust
APY	Anangu Pitjantjatjara Yankunytjatjara
BIITE	Batchelor Institute of Indigenous Tertiary Education
CLC	Central Land Council
DD	Data Deficient
EPBCA	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
IEK	Indigenous Ecological Knowledge
IPA	Indigenous Protected Area
IUCN	International Union for the Conservation of Nature
MERI	Monitoring, Evaluation, Reporting and Improvement (Plan)
NRS	National Reserve System
NT	Near Threatened
SA	South Australia
SOBS	Sites of Botanical Significance
SOCS	Sites of Conservation Significance
TPWCA	<i>Territory Parks and Wildlife Conservation Act 2000</i>
UKTNP	Uluru – Kata Tjuta National Park
VET	Vocational Education and Training
WA	Western Australia
WELL	Workplace English Language and Literacy
WONS	Weeds of National Significance

Appendix 2. Pitjantjatjara/Yankunytjatjara Glossary

<i>ailuru</i>	drought or dry times when food is scarce	<i>kapi</i>	water
<i>Aṅangu</i>	Yankunytjatjara and Pitjantjatjara-speaking traditional owners	<i>kapi wala</i>	running water
<i>antipina</i>	fish	<i>karu</i>	rivers and creeks
<i>araḷapaḷpaḷpa</i>	crested pigeons – <i>Ocyphaps lophotes</i>	<i>karu-karu</i>	floodway / swale between dunes
<i>arnḡiḷi</i>	bush plum – <i>Santalum lanceolatum</i>	<i>kiilykiilykari</i>	budgerigar – <i>Melopsittacus undulatus</i>
<i>arpata</i>	limestone/calcrete rises	<i>kipara</i>	bush turkey / bustard – <i>Ardeotis australis</i>
<i>awalyuru</i>	bush currant – <i>Psyrax latifolia</i>	<i>kuka</i>	bush meat / animals
<i>ilji</i>	desert fig – <i>Ficus brachypoda</i>	<i>kulḷata</i>	spears
<i>ilykuwara</i>	witchetty bush – <i>Acacia kempeana</i>	<i>kulji</i>	hot time / summer
<i>inma</i>	ceremonies / songs	<i>kulilypuru</i>	native pine – <i>Callitris glaucophylla</i>
<i>inuntji</i>	season when acacias flower profusely and there is plenty of green growth (January–March) / fresh plant growth	<i>kumpalypa</i>	native apricot – <i>Pittosporum angustifolium</i>
<i>ipiri</i>	kerosene grass – <i>Aristida</i> species	<i>kuniya</i>	woma python – <i>Aspidites ramsayi</i>
<i>iranti</i>	red-tailed black cockatoo – <i>Calyptorhynchus banksii samueli</i>	<i>kuran-kuranpa</i>	scarlet-chested parrot – <i>Neophema splendida</i>
<i>iriya</i>	saltbush – <i>Atriplex</i> species	<i>kurkunyjungu</i>	sweet secretion on mulga and other plant leaves made by scale insect
<i>iṯara</i>	river red gum – <i>Eucalyptus camaldulensis</i> var. <i>obtusa</i>	<i>ilintji</i>	various grasses, including oat grass – <i>Enneapogon</i> species
<i>iṯatura</i>	black kite – <i>Milvus migrans</i>	<i>liru</i>	poisonous snake / king brown snake – <i>Pseudechis australis</i>
<i>iṯjaritjari</i>	southern marsupial mole – <i>Notoryctes typhlops</i>	<i>lungkaṯa</i>	blue-tongue lizard – <i>Tiliqua multifasciata</i>
<i>kaaṅka</i>	crow – <i>Corvus</i> species	<i>lurngu-lurngu</i>	scree slopes, fallen blocks or outcrops
<i>kakalyalya</i>	Major Mitchell's cockatoo – <i>Lophochroa leadbeateri</i>	<i>mai</i>	bush foods
<i>kakanpa</i>	soak (fed from an underground supply)	<i>maku lunki</i>	witchetty grub – <i>Endoxyla leucomochla</i>
<i>kaḷaya</i>	emu – <i>Dromaius novaehollandiae</i>	<i>mala</i>	rufous hare-wallaby – <i>Lagorchestes hirsutus</i>
<i>kaliny-kalinypa</i>	honey grevillea – <i>Grevillea eriostachya</i>	<i>maḷpa</i>	companion / friend
<i>kampurarpa</i>	desert raisin – <i>Solanum centrale</i>	<i>maḷu</i>	red kangaroo – <i>Macropus rufus</i>
<i>kanyaḷa</i>	euro / hill kangaroo – <i>Macropus robustus</i>	<i>manta</i>	rocks, landforms and soils
		<i>mina</i>	waterhole / rain / water
		<i>mingkiri</i>	mice
		<i>mingkulpa</i>	bush tobacco – <i>Nicotiana gossei</i>

<i>mirilyirilyi</i>	striated grasswren – <i>Amytornis striatus</i> or fairy-wrens – <i>Malurus</i> species
<i>miru</i>	spear-throwers
<i>mitika</i>	burrowing bettong – <i>Bettongia lesueur</i>
<i>mulyama<u>ru</u></i>	black-headed monitor – <i>Varanus tristis</i>
<i>murpu</i>	ridges and mountains
<i>murtja</i>	mulgara – <i>Dasyercus blythi</i>
<i>muur-muurpa</i>	bloodwood – <i>Corymbia</i> species
<i>ngalta</i>	desert kurrajong – <i>Brachychiton gregorii</i>
<i>ngan<u>amara</u></i>	malleefowl – <i>Leipoa ocellata</i>
<i>ngap<u>ari</u></i>	sweet lerp insect secretion found on gum leaves
<i>ngint<u>aka</u></i>	perentie – <i>Varanus giganteus</i>
<i>ngiy<u>ari</u></i>	thorny devil – <i>Moloch horridus</i>
<i>ngura</i>	country
<i>ngur<u>aritja</u></i>	right people / traditional owner
<i>nyanytju</i>	horse – <i>Equus caballus</i>
<i>nyii-nyii</i>	zebra finches – <i>Taeniopygia guttata</i>
<i>ny<u>inga</u></i>	cold time / frost
<i>nyuma</i>	dampener
<i>paku<u>ta</u></i>	horse mulga – <i>Acacia ramulosa</i>
<i>palu<u>ni</u></i>	increase ceremony
<i>panpan<u>palala</u></i>	crested bellbird – <i>Oreoica gutturalis</i>
<i>pan<u>tu</u></i>	salt lake / salt
<i>papa</i>	dog / dingo
<i>parka-parka</i>	mistletoe – <i>Lysiana murrayi</i>
<i>pila</i>	sandplains
<i>pil<u>alpa</u></i>	grey currawong – <i>Strepera versicolor plumbea</i>
<i>pil<u>pira</u></i>	ghost gum – <i>Corymbia aparrerinja</i>
<i>pininintan<u>ypa</u></i>	chestnut-breasted quail-thrush – <i>Cinlosoma castaneothorax marginatum</i>
<i>Pir<u>anpa</u></i>	whitefella

<i>piri-piri</i>	needlebush – <i>Hakea leucoptera</i>
<i>piriyakutu</i>	when the west wind blows (August–September)
<i>piti</i>	scooped dish
<i>pul<u>i</u></i>	mountains / rock
<i>puluka</i>	cattle – <i>Bos taurus</i>
<i>pun<u>u</u></i>	wood / tree / plants / wooden artefact
<i>pun<u>u</u> kapiku</i>	water-holding tree
<i>put<u>i</u></i>	scrub country
<i>putukalya</i>	rusty dragon – <i>Ctenophorus rufescens</i>
<i>ruul<u>pa</u></i>	red-backed kingfisher – <i>Todiramphus pyrrhopygius</i>
<i>tali</i>	sandhills
<i>tangki</i>	donkey – <i>Equus asinus</i>
<i>tarkaw<u>ara</u></i>	spinifex hopping mouse – <i>Notomys alexis</i>
<i>tarulka</i>	mulga apple – an insect gall specific to mulga trees
<i>tinka</i>	sand goanna – <i>Varanus gouldii</i>
<i>tjakura</i>	great desert skink – <i>Liopholis kintorei</i>
<i>tja<u>la</u></i>	honey ant – <i>Camponotus inflatus</i>
<i>tjanma<u>ta</u></i>	bush onion – <i>Cyperus bulbosus</i>
<i>tjan<u>pi</u></i>	spinifex – <i>Triodia</i> species
<i>tjati</i>	central netted dragon – <i>Ctenophorus nuchalis</i>
<i>tjintj<u>ira</u></i>	claypan / swamp
<i>tjirilya</i>	echidna – <i>Tachyglossus aculeatus</i>
<i>tjit<u>ji</u></i>	children
<i>tjukul<u>a</u></i>	rockhole
<i>Tjukur<u>pa</u></i>	Dreaming / Law
<i>tjul<u>pu</u></i>	birds
<i>tjun<u>u</u></i>	native well (soaks that are dug out)
<i>tuuka</i>	fox – <i>Vulpes vulpes</i>
<i>ukir<u>i</u></i>	green grass
<i>ulpur<u>u</u></i>	the dusty sleeping places of <i>ma<u>lu</u></i> (kangaroos)
<i>uril<u>pa</u></i>	open country

<i>utjanypa</i>	ironwood – <i>Acacia estrophiolata</i>
<i>wakalpuka</i>	dead finish – <i>Acacia tetragonophylla</i>
<i>walawuru</i>	wedge-tailed eagle – <i>Aquila audax</i>
<i>walkalpa</i>	<i>Duboisia hopwoodii</i>
<i>wana</i>	digging stick
<i>wanampi</i>	water snake / rainbow serpent
<i>wanampi-tjara</i>	spring
<i>wanari</i>	mulga – <i>Acacia anuera</i>
<i>wanari puli</i>	hill mulga – <i>Acacia macdonnellensis</i>
<i>wangunū</i>	woollybutt – <i>Eragrostis eripoda</i>
<i>waru</i>	fire / firewood
<i>waru</i>	black-footed rock-wallaby – <i>Petrogale lateralis</i>
<i>wati</i>	man
<i>wayuta</i>	common brushtail possum – <i>Trichosurus vulpecula vulpecula</i> Southern NT
<i>wiilu</i>	bush stone-curlew – <i>Burhinus grallarius</i>
<i>wiiny-wiinyapa</i>	grey falcon – <i>Falco hypoleucos</i>
<i>wiltja</i>	shade shelters
<i>wiltjinypa</i>	desert mouse – <i>Pseudomys desertor</i>
<i>wilytjinpa</i>	sandhill dunnart – <i>Sminthopsis psammophila</i>
<i>witjinti</i>	corkwoods – <i>Hakea divaricata, H. lorea</i>

Appendix 3. Plants of Conservation Significance in the IPA

Records extracted from the Northern Territory Government Flora Atlas database in 2015.

Conservation status as assigned under the Territory Parks and Wildlife Conservation Act 2000 (TPWCA).

EN = Endangered; VU = Vulnerable; NT = Near Threatened; DD = Data Deficient

Species	Common Name	Conservation Status (TPWCA)			
<i>Melaleuca fulgens</i> subsp. <i>corrugata</i>		EN	<i>Goodenia glandulosa</i>		NT
<i>Santalum acuminatum</i>	Quandong	VU	<i>Goodenia havilandii</i>		NT
<i>Acacia abbreviata</i>	Tanami Wattle	NT	<i>Goodenia occidentalis</i>		NT
<i>Acacia ammobia</i>	Mt Conner Wattle	NT	<i>Grevillea pterosperma</i>	Desert Grevillea	NT
<i>Acacia tenuior</i>		NT	<i>Gunniopsis quadrifida</i>	Sturts Pigface	NT
<i>Androcalva luteiflora</i>		NT	<i>Gunniopsis septifraga</i>		NT
<i>Arthropodium strictum</i>	Chocolate Lily	NT	<i>Hibiscus brachychlaenus</i>		NT
<i>Brachyachne prostrata</i>		NT	<i>Juncus continuus</i>		NT
<i>Cassinia laevis</i>	Cough Bush	NT	<i>Laxmannia arida</i>		NT
<i>Chthonocephalus pseudevax</i>	Ground-heads	NT	<i>Leucopogon sonderensis</i>	Mt Sonder Beard-heath	NT
<i>Commicarpus australis</i>		NT	<i>Maireana pentatropis</i>		NT
<i>Corynotheca licrota</i>	Club-fruit Lily	NT	<i>Melaleuca faucicola</i>	Desert Bottlebrush	NT
<i>Cuphonotus andraeanus</i>	Downy Mother-of-Misery	NT	<i>Menkea sphaerocarpa</i>		NT
<i>Dampiera dentata</i>		NT	<i>Minuria multiseta</i>		NT
<i>Dodonaea microzyga</i> var. <i>microzyga</i>		NT	<i>Monotaxis luteiflora</i>		NT
<i>Duperreya commixta</i>		NT	<i>Ophioglossum lusitanicum</i>	Austral Adders Tongue	NT
<i>Einadia nutans</i> subsp. <i>nutans</i>		NT	<i>Orianthera centralis</i>		NT
<i>Enneapogon caerulescens</i> var. <i>caerulescens</i>		NT	<i>Osteocarpum salsuginosum</i>	Bone Fruit	NT
<i>Eragrostis subtilis</i>		NT	<i>Ozothamnus</i> sp.		NT
<i>Eremophila alternifolia</i>	Narrow-leaf Fuchsia Bush	NT	Petermann Ranges		NT
<i>Eremophila clarkei</i>		NT	<i>Parietaria cardiostegia</i>		NT
<i>Eremophila maculata</i> subsp. <i>brevifolia</i>	Spotted Fuchsia	NT	<i>Prostanthera centralis</i>		NT
<i>Eriachne scleranthoides</i>	Mt Olga Wanderrie	NT	<i>Prostanthera wilkieana</i>		NT
<i>Eucalyptus sparsa</i>		NT	<i>Ptilotus royceanus</i>		NT
<i>Frankenia punctata</i>		NT	<i>Quoya loxocarpa</i>		NT
<i>Gilesia biniflora</i>	Gilesia	NT	<i>Rhodanthe laevis</i>	Smooth Sunray	NT
<i>Glischrocaryon aureum</i> var. <i>angustifolium</i>	Yellow Popflower	NT	<i>Scaevola collina</i>		NT
<i>Glycine</i> sp. <i>Talipata</i>		NT	<i>Senecio glossanthus</i>	Slender Groundsel	NT
<i>Goodenia brunnea</i>		NT	<i>Sida calyxhymenia</i>	Tall Sida	NT
			<i>Stenanthemum petraeum</i>		NT
			<i>Swainsona oliveri</i>		NT
			<i>Tecticornia disarticulata</i>		NT
			<i>Tecticornia pruinosa</i>		NT
			<i>Trachymene bialata</i>		NT
			<i>Tricoryne elatior</i>	Yellow Rush Lily	NT
			<i>Vittadinia obovata</i>		NT

<i>Xanthorrhoea thorntonii</i>	Desert Grass Tree	NT	<i>Haloragis odontocarpa f. rugosa</i>	Mulga Nettle	DD
<i>Acacia helmsiana</i>		DD	<i>Harmsiodoxa brevipes</i>		DD
<i>Acacia incurvaneura</i>		DD	<i>Heliotropium epacrideum</i>		DD
<i>Acacia macdonnellensis</i> subsp. <i>teretifolia</i>	Hill Mulga	DD	<i>Hibiscus arenicola</i>		DD
<i>Acacia mulganeura</i>	Bloods Range Mulga	DD	<i>Isoetopsis graminifolia</i>		DD
<i>Acacia nyssophylla</i>		DD	<i>Isolepis australiensis</i>		DD
<i>Acacia olgana</i>	Mt Olga Wattle		<i>Ixiochlamys nana</i>	Small Fuzzweed	DD
<i>Acacia oswaldii</i>	Umbrella Wattle	DD	<i>Lachnagrostis filiformis</i>	Blowngrass	DD
<i>Acacia prainii</i>	Prain's Wattle	DD	<i>Lawrenzia viridigrisea</i>		DD
<i>Acacia pteraneura</i>		DD	<i>Lepidosperma avium</i>		DD
<i>Acacia</i> sp. blue mulga	Blue Mulga	DD	<i>Maireana appressa</i>		DD
<i>Acacia symonii</i>	Symons Wattle	DD	<i>Millotia greevesii</i> subsp. <i>helmsii</i>	Woolly Sand Daisy	DD
<i>Amyema miraculosa</i> subsp. <i>boormanii</i>	Fleshy Mistletoe	DD	<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	Native Tobacco, Pituri	DD
<i>Austrostipa plumigera</i>		DD	<i>Oldenlandia</i> sp. Central Ranges		DD
<i>Austrostipa trichophylla</i>		DD	<i>Olearia arida</i>		DD
<i>Brachyscome ciliaris</i> var. <i>ciliaris</i>		DD	<i>Osteocarpum acropterum</i> var. <i>acropterum</i>	Babbagia	DD
<i>Brachyscome ciliaris</i> var. <i>lanuginosa</i>	Variable Daisy	DD	<i>Sclerolaena symoniana</i>		DD
<i>Caesia</i> sp. Foster Cliff		DD	<i>Sonchus hydrophilus</i>	Native Sow-thistle	DD
<i>Caesia</i> sp. Mt Mann		DD	<i>Sporobolus scabridus</i>		DD
<i>Calandrinia disperma</i>		DD	<i>Stackhousia muricata</i> var. <i>annual</i>		DD
<i>Calandrinia remota</i>	Round-leaf Parakeelya	DD	<i>Swainsona acuticarinata</i>		DD
<i>Comesperma viscidulum</i>		DD	<i>Swainsona cyclocarpa</i>		DD
<i>Daucus glochidiatus</i> var. <i>mulga hills</i>	Australian Carrot	DD	<i>Swainsona disjuncta</i>		DD
<i>Eragrostis lanicaulis</i>		DD	<i>Swainsona tenuis</i>		DD
<i>Eremophila arachnoides</i> subsp. <i>tenera</i>		DD	<i>Synaptantha tillaeacea</i> var. <i>hispidula</i>	Synaptantha	DD
<i>Eremophila arenaria</i>		DD	<i>Tecticornia calyprata</i>		DD
<i>Eremophila hughesii</i> subsp. <i>hughesii</i>		DD	<i>Tecticornia indica</i> subsp. <i>bidens</i>		DD
<i>Eremophila hughesii</i> subsp. <i>sanguinensis</i>		DD	<i>Tephrosia</i> sp. dunes		DD
<i>Eriochlamys eremaea</i>	Woolly Mantle	DD	<i>Tietkensia corrickiae</i>		DD
<i>Erodium angustilobum</i>		DD	<i>Trichodesma zeylanicum</i> var. <i>grandiflorum</i>	Cattle Bush	DD
<i>Goodenia rupestris</i>	Rock Hand-flower	DD	<i>Tricoryne</i> sp. <i>divaricate</i>		DD
<i>Hakea rhombales</i>		DD	<i>Triglochin isingiana</i>		DD
<i>Haloragis odontocarpa f. pterocarpa</i>	Mulga Nettle	DD	<i>Triodia helmsii</i>		DD
			<i>Zygophyllum iodocarpum</i>	Violet Twinleaf	DD

Appendix 4. Weed species in the IPA

Records extracted from the Northern Territory
Government Flora Atlas database in 2015.

Species	Common Name
<i>Acetosa vesicaria</i>	Ruby Dock
<i>Bidens bipinnata</i>	Cobblers Pegs
<i>Brassica tournefortii</i>	Turnip Weed
<i>Cenchrus ciliaris</i>	Buffel Grass
<i>Cenchrus echinatus</i>	Mossman River Grass
<i>Chloris virgata</i>	Feathertop Rhodes Grass
<i>Citrullus colocynthis</i>	Bitter Paddy Melon
<i>Citrullus lanatus</i>	Paddy Melon
<i>Cucumis myriocarpus</i>	Prickly Paddy Melon
<i>Eragrostis barrelieri</i>	Pitted Lovegrass
<i>Eragrostis minor</i>	Small Stinkgrass
<i>Euphorbia hirta</i>	Asthma Plant
<i>Hypochoeris glabra</i>	Smooth Cats-ear
<i>Lactuca serriola</i>	Prickly Lettuce
<i>Malvastrum americanum</i>	Spiked Malvastrum
<i>Melinis repens</i>	Red Natal Grass
<i>Ricinus communis</i>	Castor Oil Plant
<i>Senna occidentalis</i>	Coffee Senna
<i>Solanum nigrum</i>	Black Nightshade
<i>Sonchus oleraceus</i>	Milk Thistle
<i>Tamarix aphylla</i>	Athel Pine
<i>Tribulus terrestris</i>	Caltrop

Appendix 5. IPA Fauna Species List

Records extracted from the Northern Territory Government Fauna Atlas database in 2014. Extant species records only – species not recorded from the IPA within the last 50 years are excluded.

denotes species not recorded from the IPA in the Northern Territory Government Fauna Atlas database, but which have been observed in the IPA by herpetologist and CLC employee Martin Campbell

* denotes introduced species

Reptiles	
<i>Antaresia stimsoni</i>	Stimson's Python
* <i>Aspidites ramsayi</i>	Woma Python
* <i>Brachyurophis fasciolatus</i>	Narrow-banded Burrowing Snake
<i>Brachyurophis roperi</i>	Northern Shovel-nosed Snake
<i>Brachyurophis semifasciatus</i>	Half-girdled Snake
<i>Carlia triacantha</i>	Three-Spined Rainbow Skink
<i>Ctenophorus caudicinctus</i>	Ring-tailed Dragon
<i>Ctenophorus isolepis</i>	Military Dragon
<i>Ctenophorus nuchalis</i>	Central Netted Dragon
<i>Ctenophorus pictus</i>	Painted Dragon
<i>Ctenophorus rufescens</i>	Rusty Dragon
<i>Ctenotus brooksi</i>	Brook's Ctenotus
<i>Ctenotus calurus</i>	Blue-tailed Ctenotus
<i>Ctenotus dux</i>	Chief Ctenotus
<i>Ctenotus grandis</i>	Grand Ctenotus
<i>Ctenotus helenae</i>	Helen's Ctenotus
<i>Ctenotus leae</i>	Lea's Ctenotus
<i>Ctenotus leonhardii</i>	Leonhardi's Ctenotus
<i>Ctenotus nasutus</i>	Long-Snouted Ctenotus
<i>Ctenotus pantherinus</i>	Leopard Ctenotus
<i>Ctenotus piankai</i>	Pianka's Ctenotus
<i>Ctenotus quattuordecimlineatus</i>	Fourteen-Lined Ctenotus
<i>Ctenotus saxatilis</i>	Rock Ctenotus
<i>Ctenotus schomburgkii</i>	Schomburk's Ctenotus
<i>Ctenotus septenarius</i>	Seven-Lined Ctenotus
<i>Cyclodomorphus melanops</i>	Slender Blue-tongued Lizard
<i>Delma borea</i>	Rusty-topped Delma
<i>Delma butleri</i>	Unbanded Delma
* <i>Delma haroldi</i>	Neck-barred Delma
<i>Delma nasuta</i>	Sharp-snouted Delma
<i>Delma tincta</i>	Black-necked Snake-lizard

<i>Demansia psammophis</i>	Yellow-faced Whip Snake
<i>Diplodactylus conspicillatus</i>	Fat-tailed Gecko
<i>Diporiphora lalliae</i>	
<i>Diporiphora winneckeii</i>	Canegrass Dragon
<i>Egernia eos</i>	Central Pygmy Spiny-tailed Skink
<i>Eremiascincus intermedius</i>	Northern Narrow-banded Skink
* <i>Eremiascincus richardsonii</i>	Broad-Banded Sand Swimmer
* <i>Furina ornata</i>	Orange-naped Snake
<i>Gehyra montium</i>	Centralian Dtella
<i>Gehyra nana</i>	Northern Spotted Rock Dtella
<i>Gehyra purpurascens</i>	Purplish Dtella
<i>Gehyra variegata</i>	Tree Dtella
<i>Heteronotia binoei</i>	Bynoe's Gecko
<i>Lerista bipes</i>	Two-Toed Lerista
* <i>Lerista desertorum</i>	Desert Lerista
<i>Lerista labialis</i>	Sand Lerista
<i>Lerista taeniata</i>	Ribbon Lerista
<i>Lerista xanthura</i>	Yellow-Tailed Lerista
<i>Lialis burtonis</i>	Burton's Legless Lizard
<i>Liopholis kintorei</i>	Great Desert Skink
<i>Liopholis striata</i>	Striated Egernia
<i>Lophognathus longirostris</i>	Long-nosed Water Dragon
<i>Lucasium damaeum</i>	Beaded Gecko
<i>Lucasium stenodactylum</i>	Crowned Gecko
<i>Menetia greyii</i>	Grey's Menetia
<i>Moloch horridus</i>	Thorny Devil
<i>Morethia ruficauda</i>	Red-Tailed Snake-Eyed Skink
* <i>Nephrurus amyaee</i>	Rough Knob-tailed Gecko
<i>Nephrurus laevis</i>	Smooth Knob-tailed Gecko
<i>Nephrurus levis</i>	Three-lined Knob-tailed Gecko
<i>Notoscincus ornatus</i>	Ornate Snake-Eyed Skink
* <i>Parasuta monachus</i>	Hooded Snake
<i>Pogona minor</i>	Dwarf Bearded Dragon

<i>Pseudechis australis</i>	King Brown Snake
* <i>Pseudonaja mengdeni</i>	Gwardar
<i>Pseudonaja modesta</i>	Ringed Brown Snake
<i>Pseudonaja nuchalis</i>	Western Brown Snake
<i>Pygopus nigriceps</i>	Western Hooded Scaly-foot
<i>Ramphotyphlops endoterus</i>	Interior Blind Snake
<i>Ramphotyphlops grypus</i>	Long-beaked Blind Snake
<i>Rhynchoedura ornata</i>	Beaked Gecko
<i>Simoselaps anomalus</i>	Northern Desert Banded Snake
<i>Strophurus ciliaris</i>	Spiny-tailed Gecko
<i>Strophurus elderi</i>	Jewelled Gecko
* <i>Strophurus jeanae</i>	Southern Phasmid Gecko
<i>Suta suta</i>	Curl Snake
<i>Tiliqua multifasciata</i>	Centralian Blue-Tongue Lizard
<i>Tiliqua occipitalis</i>	Western Blue-Tongue Lizard
* <i>Tympanocryptis centralis</i>	Centralian Earless Dragon
<i>Tympanocryptis cephalus</i>	Pebble Dragon
<i>Tympanocryptis lineata</i>	Lined Earless Dragon
<i>Varanus brevicauda</i>	Short-tailed Pygmy Monitor
<i>Varanus eremius</i>	Rusty Desert Monitor
<i>Varanus giganteus</i>	Perentie
<i>Varanus gilleni</i>	Pygmy Mulga Monitor
<i>Varanus gouldii</i>	Sand Goanna
<i>Varanus tristis</i>	Black-tailed Monitor

Amphibians

<i>Litoria maini</i>	Main's Frog
<i>Neobatrachus sutor</i>	Shoemaker Frog
<i>Notaden nicholsii</i>	Desert Spadefoot Toad
<i>Platyplectrum spenceri</i>	Spencer's Frog

Birds

<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater
<i>Acanthiza apicalis</i>	Inland Thornbill
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill
<i>Acanthiza robustirostris</i>	Slaty-backed Thornbill
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk
<i>Accipiter fasciatus</i>	Brown Goshawk
<i>Actitis hypoleucos</i>	Common Sandpiper
<i>Aegotheles cristatus</i>	Australian Owllet-nightjar

<i>Amytornis purnelli</i>	Dusky Grasswren
<i>Amytornis striatus</i>	Striated Grasswren
<i>Anas gracilis</i>	Grey Teal
<i>Anas superciliosa</i>	Pacific Black Duck
<i>Anthus novaeseelandiae</i>	Australasian Pipit
<i>Aphelocephala leucopsis</i>	Southern Whiteface
<i>Aphelocephala nigricincta</i>	Banded Whiteface
<i>Aquila audax</i>	Wedge-tailed Eagle
<i>Ardea pacifica</i>	White-necked Heron
<i>Ardeotis australis</i>	Australian Bustard
<i>Artamus cinereus</i>	Black-faced Woodswallow
<i>Artamus minor</i>	Little Woodswallow
<i>Artamus personatus</i>	Masked Woodswallow
<i>Artamus superciliosus</i>	White-browed Woodswallow
<i>Barnardius zonarius</i>	Australian Ringneck
<i>Cacatua sanguinea</i>	Little Corella
<i>Cacomantis pallidus</i>	Pallid Cuckoo
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper
<i>Calyptorhynchus banksii samueli</i>	Red-tailed Black Cockatoo (Central Australia)
<i>Certhionyx variegatus</i>	Pied Honeyeater
<i>Chalcites basalus</i>	Horsfield's Bronze-Cuckoo
<i>Chalcites osculans</i>	Black-eared Cuckoo
<i>Charadrius australis</i>	Inland Dotterel
<i>Charadrius ruficapillus</i>	Red-capped Plover
<i>Charadrius veredus</i>	Oriental Plover
<i>Chenonetta jubata</i>	Australian Wood Duck
<i>Cheramoeca leucosterna</i>	White-backed Swallow
<i>Cincloramphus cruralis</i>	Brown Songlark
<i>Cincloramphus mathewsi</i>	Rufous Songlark
<i>Cinclosoma castaneothorax</i>	Chestnut-breasted Quail-thrush
<i>Cinclosoma castanotum</i>	Chestnut Quail-thrush
<i>Cinclosoma cinnamomeum</i>	Cinnamon Quail-thrush
<i>Circus assimilis</i>	Spotted Harrier
<i>Climacteris affinis</i>	White-browed Treecreeper
<i>Colluricincla harmonica</i>	Grey Shrike-thrush
<i>Conopophila whitei</i>	Grey Honeyeater
<i>Coracina maxima</i>	Ground Cuckoo-shrike
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike
<i>Corvus bennetti</i>	Little Crow
<i>Corvus coronoides</i>	Australian Raven
<i>Corvus orru</i>	Torresian Crow

<i>Coturnix pectoralis</i>	Stubble Quail
<i>Cracticus nigrogularis</i>	Pied Butcherbird
<i>Cracticus tibicen</i>	Australian Magpie
<i>Cracticus torquatus</i>	Grey Butcherbird
<i>Cygnus atratus</i>	Black Swan
<i>Daphoenositta chrysoptera</i>	Varied Sittella
<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck
<i>Dicaeum hirundinaceum</i>	Mistletoebird
<i>Dromaius novaehollandiae</i>	Emu
<i>Egretta novaehollandiae</i>	White-faced Heron
<i>Elanus axillaris</i>	Black-shouldered Kite
<i>Elanus scriptus</i>	Letter-winged Kite
<i>Euseyornis melanops</i>	Black-fronted Dotterel
<i>Emblema pictum</i>	Painted Finch
<i>Epthianura aurifrons</i>	Orange Chat
<i>Epthianura tricolor</i>	Crimson Chat
<i>Erythronyx cinctus</i>	Red-kneed Dotterel
<i>Eulophus roseicapilla</i>	Galah
<i>Eurostopodus argus</i>	Spotted Nightjar
<i>Falco berigora</i>	Brown Falcon
<i>Falco cenchroides</i>	Nankeen Kestrel
<i>Falco hypoleucos</i>	Grey Falcon
<i>Falco longipennis</i>	Australian Hobby
<i>Falco peregrinus</i>	Peregrine Falcon
<i>Falco subniger</i>	Black Falcon
<i>Fulica atra</i>	Eurasian Coot
<i>Geopelia cuneata</i>	Diamond Dove
<i>Geopelia striata</i>	Peaceful Dove
<i>Geophaps plumifera</i>	Spinifex Pigeon
<i>Gerygone fusca</i>	Western Gerygone
<i>Grallina cyanoleuca</i>	Magpie-lark
<i>Haliastur sphenurus</i>	Whistling Kite
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard
<i>Hieraaetus morphnoides</i>	Little Eagle
<i>Himantopus himantopus</i>	Black-winged Stilt
<i>Hirundo neoxena</i>	Welcome Swallow
<i>Lalage sueurii</i>	White-winged Triller
<i>Lichenostomus keartlandi</i>	Grey-headed Honeyeater
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater
<i>Lichenostomus plumulus</i>	Grey-fronted Honeyeater
<i>Lichenostomus virescens</i>	Singing Honeyeater
<i>Lichmera indistincta</i>	Brown Honeyeater
<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo
<i>Lophoictinia isura</i>	Square-tailed Kite

<i>Malacorhynchus membranaceus</i>	Pink-eared Duck
<i>Malurus lamberti</i>	Variegated Fairy-wren
<i>Malurus leucopterus</i>	White-winged Fairy-wren
<i>Malurus splendens</i>	Splendid Fairy-wren
<i>Manorina flavigula</i>	Yellow-throated Miner
<i>Melanodryas cucullata picata / westralensis</i>	Hooded Robin (Mainland)
<i>Melopsittacus undulatus</i>	Budgerigar
<i>Merops ornatus</i>	Rainbow Bee-eater
<i>Microeca fascians</i>	Jacky Winter
<i>Milvus migrans</i>	Black Kite
<i>Neophema splendida</i>	Scarlet-chested Parrot
<i>Neopsephotus bourkii</i>	Bourke's Parrot
<i>Ninox novaeseelandiae</i>	Southern Boobook
<i>Nymphicus hollandicus</i>	Cockatiel
<i>Ocyphaps lophotes</i>	Crested Pigeon
<i>Oreoica gutturalis</i>	Crested Bellbird
<i>Pachycephala rufiventris</i>	Rufous Whistler
<i>Pardalotus rubricatus</i>	Red-browed Pardalote
<i>Pardalotus striatus</i>	Striated Pardalote
<i>Petrochelidon ariel</i>	Fairy Martin
<i>Petrochelidon nigricans</i>	Tree Martin
<i>Petroica goodenovii</i>	Red-capped Robin
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant
<i>Phaps chalcoptera</i>	Common Bronzewing
<i>Plegadis falcinellus</i>	Glossy Ibis
<i>Podargus strigoides</i>	Tawny Frogmouth
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe
<i>Polytelis alexandrae</i>	Princess Parrot
<i>Pomatostomus superciliosus</i>	White-browed Babbler
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler
<i>Porphyrio porphyrio</i>	Purple Swamphen
<i>Psephotus varius</i>	Mulga Parrot
<i>Psophodes occidentalis</i>	Chiming Wedgebill
<i>Ptilonorhynchus guttatus</i>	Western Bowerbird
<i>Purnella albifrons</i>	White-fronted Honeyeater
<i>Pyrrholaemus brunneus</i>	Redthroat
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet
<i>Rhipidura albiscapa</i>	Grey Fantail
<i>Rhipidura leucophrys</i>	Willie Wagtail
<i>Smicromis brevirostris</i>	Weebill

<i>Stipiturus ruficeps</i>	Rufous-crowned Emu-wren
<i>Sugomel niger</i>	Black Honeyeater
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe
<i>Taeniopygia guttata</i>	Zebra Finch
<i>Threskiornis spinicollis</i>	Straw-necked Ibis
<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher
<i>Todiramphus sanctus</i>	Sacred Kingfisher
<i>Tribonyx ventralis</i>	Black-tailed Native-hen
<i>Tringa glareola</i>	Wood Sandpiper
<i>Turnix velox</i>	Little Button-quail
<i>Tyto javanica</i>	Eastern Barn Owl
<i>Vanellus miles</i>	Masked Lapwing
<i>Vanellus tricolor</i>	Banded Lapwing

<i>Taphozous hilli</i>	Hill's Sheath-tailed Bat
<i>Trichosurus vulpecula vulpecula</i>	Common Brushtail Possum (Southern N.T.)
<i>Vespadelus finlaysoni</i>	Finlayson's Cave Bat
* <i>Vulpes vulpes</i>	Fox

Mammals	
* <i>Camelus dromedarius</i>	Camel
<i>Canis lupus</i>	Dingo
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat
<i>Dasycercus blythi</i>	Brush-tailed Mulgara
* <i>Equus asinus</i>	Donkey
* <i>Equus caballus</i>	Horse
* <i>Felis catus</i>	Cat
<i>Macropus robustus</i>	Common Wallaroo
<i>Macropus rufus</i>	Red Kangaroo
* <i>Mus musculus</i>	House Mouse
<i>Ningauai ridei</i>	Wongai Ningauai
<i>Notomys alexis</i>	Spinifex Hopping-mouse
* <i>Oryctolagus cuniculus</i>	Rabbit
<i>Petrogale lateralis lateralis</i>	Black-footed Rock-wallaby
<i>Pseudantechinus macdonnellensis</i>	Fat-tailed Antechinus
<i>Pseudomys desertor</i>	Desert Mouse
<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse
<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart
<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart
<i>Sminthopsis ooldea</i>	Ooldea Dunnart
<i>Sminthopsis youngsoni</i>	Lesser Hairy-footed Dunnart
<i>Tachyglossus aculeatus</i>	Echidna
<i>Tadarida australis</i>	White-striped Free-tailed bat

Appendix 6. IPA Weed Hygiene Procedures

1. Clean down procedures

Mobile/On-site

The cleaning of vehicles and machinery on-site prevents weed seed contaminants being spread to an adjoining weed-free or less infested area/property/road.

Mobile/Field Site Selection

- The most important point to consider is run-off. Ensure the site is away from watercourses and drains. This will prevent weed seeds, grease and detergents polluting the watercourse.
- The site should be relatively flat (a slight slope or railway sleepers may prevent water logging) to help prevent run-off.
- The site must be easily identified for future reference as this location will need monitoring for future weed outbreaks. (a painted post, tree, distinguished landmark or GPS recording is ideal)
- An area that is well grassed will reduce mud during cleaning down and assist as competition for any weed seed that later germinates.
- Traditional owners should be consulted to determine a suitable clean down site.
- The site should be close to the infested area to prevent further spread.
- Avoid crossing the property boundary prior to cleaning-down (unless the infestation is also located on the adjoining property at similar or higher densities).
- Small clean downs may be conducted at the landholders shed facilities (with permission) prior to leaving the property.

Suggested Equipment

- A mobile water tanker or spray unit is ideal
- Water may also be pumped from a dam or cattle trough/tank
- High pressure water from a gurney or pump
- An air compressor for removing dry material (radiators and grain headers)
- Broom/dust pan (cleaning cabins) or handheld cordless vacuum

- A garden hose may be adequate for small clean downs
- Use ziplock bags to collect any weed seeds found in cleaning.

2. Vehicle inspection checklist for machinery operating within the IPA *

Cars, 4WD, Trucks and Trailers

1. Ensure that the vehicle is unlocked and you have access to the boot and bonnet.
2. Inspect the interior of the vehicle, especially:
 - Foot wells, check carpets and mats for burrs, seeds, mud
 - Tool boxes
3. Inspect inside the boot of the vehicle. Remove any contents if required to facilitate the inspection of the following:
 - Carpet (deposits of hay, weed seeds, burrs and/or soil or water)
 - Spare tyre area
 - Other recesses in the boot/rear of the vehicle
4. Inspect the engine bay, especially:
 - Radiator
 - Grill
 - Top of transmission gearbox
 - Recess under windscreen wipers
5. Inspect the underside of the vehicle, especially:
 - Wheel arches, wheel trims, flares, step treads, bumpers
 - Mud flaps
 - Tyre rims (particularly the rear side)
 - Axels and diffs
 - Spare tyres on 4WD's and station wagons are often suspended underneath. Note: these are a potentially high risk area as contaminants collect inside the horizontally-positioned rim.

6. Inspect boxes and/or cartons present in the vehicle if you cannot ascertain their contents.

7. For utes and trucks, inspect the floor of the tray and channels of tail gates, side guards and under chassis rails. Gaps in the floor welds or boards and bolt holes.

8. Inspect trailers – check wheels, guards, trays, channels of draw bar and under body.

Wheeled loaders and compactors

Check all areas, with particular attention to the following:

1. Drivers cab

- Check externally under and around driver's cab.
- Check under mats in cab.
- Remove/lift seat; remove/lift floor pans to allow checking to top of transmission. Check air conditioner filter (if fitted) – shake/tap filter to check if clean.

2. Tracks/track frame

- Examine tracks carefully.
- Ensure inspection/cover plates are removed to allow inside track area.
- Check idler wheels (these support the tracks).

3. Belly plates

- Belly plates should be removed to allow inspection and cleaning.

4. Rear plates

- Rear plates at back of dozer should be removed to allow inspection and cleaning.

5. Hydraulic cover plates

- Hydraulic cover plates should be removed to allow inspection and cleaning.

6. Engine

- Check radiator core and engine area for residues.
- Remove and check the air filter/cleaner (these often require destruction where they are clogged).
- Check carefully the void space between the oil and radiator cores.

7. Battery box

- Lift/remove the battery to check for contamination (battery box may be at side/rear or under seat).

8. Fuel cells

- Are removable therefore dirt etc can pack between the tank and the frame.

9. Blade

- Ensure that edge of blade top/bottom is not split – this allows soil to be packed very tightly in the hollow.
- Check cutter points/wear blades.
- Check trunction arms.
- Check carefully the pivot points and adaptors at the rear of the front blade – these allow the blade to change height and angle. Sometimes soil has compacted and is difficult to dislodge.
- Check all hollow sections.

10. Ripper support frame

- Check carefully if any contaminants have entered this section. The tynes may need to be removed.

11. Tynes

- Tynes need careful inspection. Contamination may often be removed by water blasting, but tynes may need to be removed in some cases.

* Checklists have been adapted from Queensland Weed Seed Spread Project 2000.

Appendix 7. IPA Road and Track Construction and Rehabilitation Guidelines

(Guidelines have been taken from those contained within CLC ALRA exploration deeds.)

For more specific details on constructing whoa-boys and undertaking other remedial earthworks, refer to the *Introduction to Soil Erosion* factsheet (Northern Territory Government 2007).

1. Location

- 1.1 Proposed road locations will be identified on the ground and, where necessary, checked by interpretation of aerial photographs prior to finalising their positions.
- 1.2 The physical and biological environment and the identification of potential impacts outlined in the environmental profile will be considered when locating the roads to ensure roads are located in areas of low erodibility, and low vegetation density and that the environmental impact of the road is minimised.
- 1.3 Wherever possible roads will ascend or descend along ridges and be located along the contour when traversing slopes.
- 1.4
 - a) roads will be kept out of drainage lines
 - b) roads will avoid claypan areas and salt lakes
 - c) road construction will avoid clearance through stands of shrubs and trees
 - d) roads will avoid restricted or unusual habitats as identified in the environmental profile.
- 1.5 Use of existing roads will be made wherever possible.
- 1.6 No more than one road will be constructed between any two sites of exploration activities and all transport operations will be confined to this road.
- 1.7 If the CLC consents, a second access road may be constructed if it is necessary for the conduct of the project.

2. Construction

- 2.1 Roads constructed by pushing with a grader or bulldozer will be regarded as temporary dry weather access tracks. Vehicle use will be avoided during wet weather.
- 2.2 The blade depth used in road construction and the consequent windrow development will be minimised especially on sand plains, dune systems, gibber plains and dissected tablelands.

- 2.3 Roads located across slopes, should have adequate cross drainage to disperse water across the road, to the downslope side. Trafficable cross banks will be constructed at regular intervals sufficient to catch water running down the road and divert it to the downslope side. Using this form of construction, drains on the upslope side of the road are avoided, thus avoiding the need for culverts.
- 2.4 Borrow pits utilised in the construction and maintenance of roads will be operated according to the specifications for effective rehabilitation of borrow pits in part of this annexure.

3. Rehabilitation

- 3.1 Roads will be rehabilitated at the cessation of exploration activities (unless the company intends to utilise that road in the future and has approval from the CLC) and the rehabilitation will take place where possible prior to the next rains at the end of the field season for which the road was constructed.
- 3.2 The windrows of top layer soil and vegetation created during construction will be respread evenly across the track. The track will then be tyned with the grader rippers.
- 3.3 If the CLC directs, on completion of exploration activity the company will rehabilitate the access roads by deep ripping. If in the opinion of the CLC the seed store in the top layer and the respread vegetation proves to be non-viable after first rain after rehabilitation the company will revegetate the access road.

Appendix 8. Environmental Conditions of CLC Grazing Licences*

Article 1 Aboriginal People and Sites

- 1.1 The licensee must not hinder or interfere with the entry upon, occupation or use of the licence area by Aboriginal people entitled by Aboriginal tradition to do so.
- 1.2 The licensee must:
 - a) comply with all requests for the protection of sites on the licence area which are sacred or otherwise significant according to the instructions of traditional Aboriginal landowners
 - b) prevent its agents, employees and contractors from entering such sites unless they are entitled to do so in accordance with Aboriginal tradition.

Article 2 Sustainable Land Management

- 1.1 The licensee's cattle operation on the licence area must be environmentally sustainable and in accordance with current industry best practice for pastoral land management.
- 1.2 The licensee will stock the licence area conservatively having regard to the availability of feed and water.
- 1.3 The CLC may engage an expert pastoral consultant to inspect the licence area and advise on appropriate pastoral management practices.
- 1.4 The licensee will implement any pastoral management practices that are recommended in a report prepared by an expert pastoral consultant referred to in clause 2.3.
- 1.5 The licensee must not do any of the following in the licence area without the written consent of the CLC:
 - a) use the licence area for any other purpose than grazing cattle
 - b) graze more than the maximum head of cattle (including calves and weaners) at any one time
 - c) overgraze, i.e. graze more cattle than is environmentally sustainable
 - d) cause soil erosion or other environmental degradation to the licence area
 - e) lop, prune, damage or remove any native tree, timber, shrub, bush or other growth, alive or dead, other than for the purpose of maintaining improvements and fire breaks

- f) use fire
- g) introduce or propagate any new plant or animal species (other than stock horses)
- h) disturb or remove any rock, clay, sand, gravel or other constituents of the soil, other than for the purpose of maintaining improvements
- i) disturb, destroy, bait or remove any wild animals or birds (including wild dogs) or other wildlife, other than feral horses, donkeys and camels
- j) interfere with any environmental monitoring points set up within the licence area.

- 1.6 The licensee must, at its own expense, maintain appropriate fire breaks around the licence area.
- 1.7 The licensee must comply with all reasonable requests made by the CLC on behalf of the licensors in relation to any monitoring points within the licence area, including taking, and providing to the CLC photographs of the licence area.

Article 3 Feral Animal and Weed Control

- 1.1 The licensee is responsible for keeping the licence area free from feral horses, donkeys and camels.
- 1.2 The licensee is responsible for keeping the licence area free from declared weeds and must comply with relevant weed management plans approved pursuant to the *Weeds Management Act 2001*.
- 1.3 The licensee must comply with all notices and orders issued by any government department or agency requiring an infestation of a declared weed within the licence area to be removed or otherwise controlled. If the licensee fails to comply with a notice or order within a reasonable time, the CLC may arrange for the removal or control of the infestation and the licensee must pay the costs of the operation.

* Conditions are standard to all CLC grazing licences.

Appendix 9. Annual IPA and Regional Fire Planning Cycles Stakeholder Summaries

Waru Committee

Peak Aboriginal tri-state fire planning body. Meets annually to define strategic fire management goals with regards to regional fuel loads, long-range forecasting and natural and cultural resource values. The committee has a key role in advocacy for, and promotion of, contemporary and traditional fire management.

PARTNERS: CLC, Ngaanyatjarra Council, APY Council

MEETINGS: Annually, usually in November

WHO: Elected delegates from communities in the Kaṯiṯi-Petermann IPA and neighbouring parts of SA and WA

Kaṯiṯi-Petermann IPA Management Committee

Governance body for the IPA, the Management Committee meets annually to define, plan and review fire management priorities. Responsible for the strategic allocation of fire management resources across the IPA on an annual basis. Regional fire management interests and concerns identified here feed up to the Waru Committee.

PARTNERS: UKTNP

MEETINGS: Annually, usually in November

WHO: Four elected delegates from each of the IPA management regions plus the head Kaṯukatjara ranger

Community Fire Planning Meetings

These open community meetings are convened by IPA Management Committee delegates in their respective communities and provide a forum to identify local fire management priorities and concerns. Regional planning and review outcomes from Waru and IPA Management Committee meetings are presented to build and refine local burn plans and broker community participation in their implementation. Local fire management interests and concerns from community meetings feed up to the IPA Management Committee.

PARTNERS: Regional Councils and local service providers, community ranger groups

MEETINGS: Annually, usually in March

WHO: IPA Management Committee delegates, traditional owners and interested community members

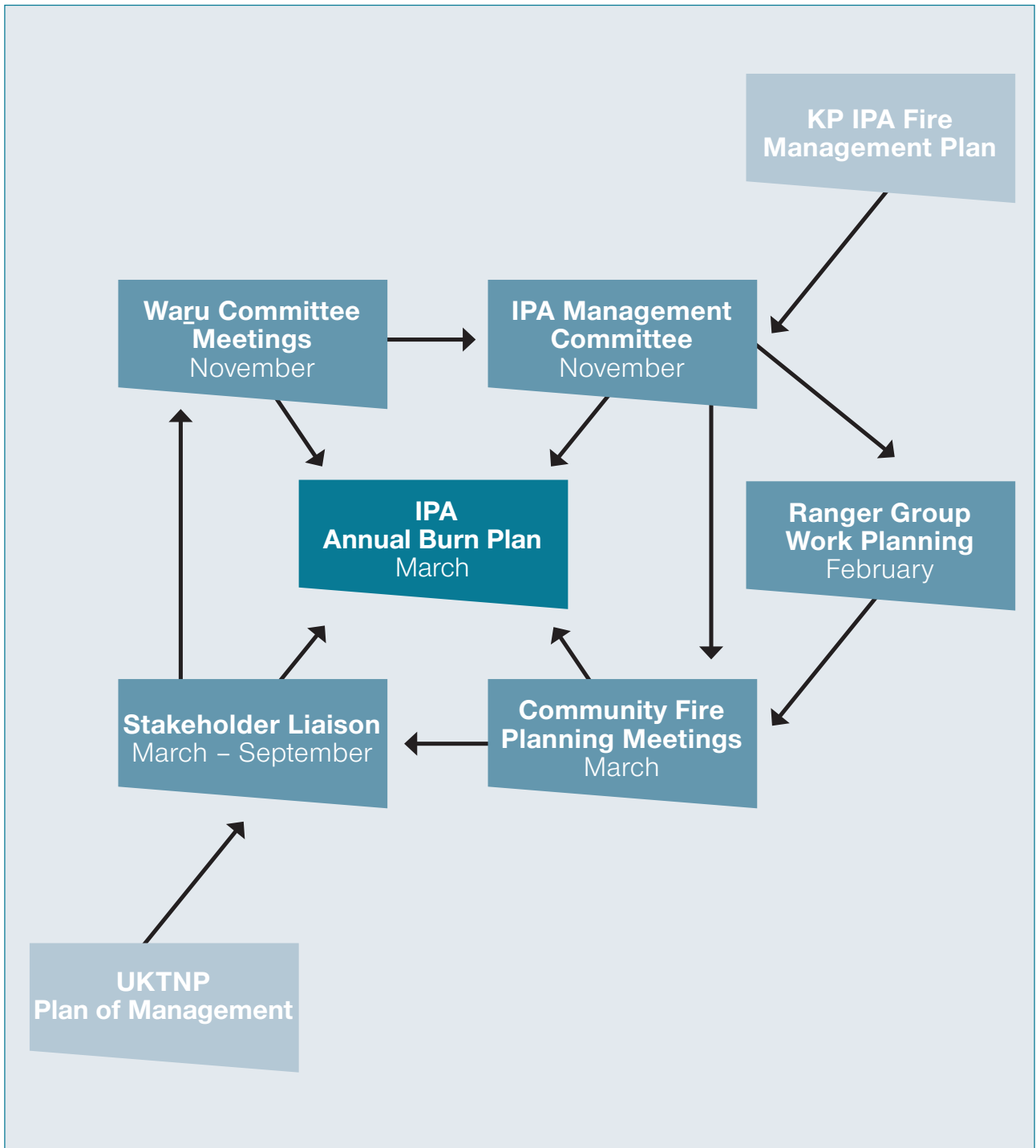
Stakeholder Liaison

A series of stakeholder consultation and planning meetings is required to enhance cross-border fire management outcomes and ensure the safe and effective execution of IPA fire management priorities. Stakeholder fire management interests and concerns identified here feed up to the IPA Management Committee.

PARTNERS: Traditional owners of adjacent ALTs, personnel from UKTNP and Curtin Springs and Mulga Park pastoral leases.

MEETINGS: Periodic, depending on the level of interest shown by respective stakeholders

WHO: IPA coordinator, IPA Management Committee delegates, stakeholder representatives



Selected Relevant References

- Burbidge, A.A., Johnson, K.A., Fuller, P.J. and Southgate, R.I. (1988). "Aboriginal Knowledge of the Mammals of the Central Deserts of Australia". *Australian Wildlife Research* Vol.15(1), 9–39.
- CLC (2008). *A Fire Management Strategy for the Petermann Region*. A report prepared for the CLC by Desert Wildlife Services. Alice Springs.
- CLC (2015). *Katitj-Petermann IPA Fire Management Guidelines for Biodiversity Conservation*. A report prepared for the CLC by Desert Wildlife Services. Alice Springs.
- Director of National Parks (2010). *Uluru-Kata Tjuta National Park Management Plan 2010–20*. Tjukurpa Katutja Ngarantja. Canberra.
- Dudley, N. (ed.) (2008). *Guidelines for Applying Protected Area Management Categories*. IUCN, Gland, Switzerland.
- Duguid, A., Barnetson, J., Clifford, B., Pavey, C., Albrecht, D., Risler, J. and McNellie, M. (2005). *Wetlands in the arid Northern Territory*. A report to Environment Australia on the inventory and significance of wetlands in the arid NT. Parks and Wildlife Commission of the Northern Territory. Alice Springs. Accessed online: <http://www.lrm.nt.gov.au/plants-and-animals/landscapes-and-wetlands/aridwetlands>.
- Edwards, G.P. and Allan, G.E. (eds.) (2009). *Desert Fire: fire and regional land management in the arid landscapes of Australia*. DKCRC Report 37. Desert Knowledge CRC, Alice Springs.
- Edwards, G.P., Zeng, B., Saalfeld, W.K., Vaarzon-Morel, P. and McGregor, M. (2008). *Managing the impacts of feral camels in Australia: a new way of doing business*. DKCRC report 47. Desert Knowledge CRC, Alice Springs.
- Gillen, J.S., Hamilton, R., Low, W.A. and Creagh, C. (eds.) (2000). *Biodiversity and the re-introduction of native fauna at Uluru-Kata Tjuta National Park*. Proceedings of the cross-cultural workshop on fauna re-introduction, Yulara, NT. Bureau of Rural Sciences, Canberra.
- Hall, N. and Simpson, A. (2013). Tourism Product Development Workshop. Report for the CLC prepared by Stepwise consultants.
- Harrison, L., McGuire, L., Ward, S., Fisher, A., Pavey, C., Fegan, M. and Lynch, B. (2009). *An inventory of sites of international and national significance for biodiversity values in the Northern Territory*. Department of Natural Resources, Environment, the Arts and Sport, Darwin.
- Hill, R., Walsh, F., Davies, J., and Sandford, M. (2011). *Our Country Our Way: Guidelines for Australian Indigenous Protected Area Management Plans*. CSIRO Ecosystem Sciences and Australian Government Department of Sustainability, Water, Environment, Population and Communities, Cairns. Accessed online: <http://www.environment.gov.au/indigenous/ipa/toolkit/pubs/guidelines.pdf>
- IAD Press (1996). *Pitjantjatjara/Yankunytjatjara to English Dictionary*. Revised 2nd edition. Alice Springs.
- Kimber, R.G. (1983). "Black Lightning: Aborigines and Fire in Central Australia and the Western Desert". *Archaeology in Oceania* Vol.18(April), 38–45.
- Morton, S.R, Short, J. and Barker, R.D. (1995). *Refugia for Biological Diversity in Arid and Semi-Arid Australia*. Report to the Biodiversity Department of Environment, Sport and Territories. CSIRO, Australia.
- Northern Territory Government (2007). *Introduction to Soil Erosion*. Factsheet. Vegetation & Land Management, Natural Resource Management Division, Alice Springs.
- Southgate, R. and Moseby, K. (2008). *Track-based monitoring for the deserts and rangelands of Australia*. WWF, Australia. Accessed online: http://www.wwf.org.au/crawl_publications.cfm?1884%2FTrack-based-monitoring-for-the-deserts-and-rangelands-of-Australia.
- Varzon-Morel, P. (2010). "Changes in Aboriginal Perceptions of Feral Camels and of their Impacts and Management". *The Rangeland Journal* Vol.32(1), 73–85.
- Walsh, F. and Mitchell, P. (2002). *Planning for country: cross-cultural approaches to decision-making on Aboriginal lands*. Jukurrpa Books/IAD Press, Alice Springs.
- White, W., Albrecht, D., Duguid, A., Latz, P. and Hamilton, M. (2000). *Plant species and Sites of Botanical Significance in the Southern Bioregions of the Northern Territory Vol 2: Significant Sites*. A report to the Australian Heritage Commission from the Arid Lands Environment Centre. Alice Springs.



Enquiries should be made to:

Central Land Council
27 Stuart Highway
Alice Springs, NT 0870
PO Box 3321
Alice Springs NT 0871
Tel: 08 8951 6211
www.clc.org.au