

New partnerships for managing large desert landscapes: experiences from the *Martu Living Deserts Project*

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Abstract. Native fauna in Australia's arid zone has declined significantly since European settlement; however, Martu country in the Western Desert of Western Australia retains a diversity of iconic and threatened species that were once more widespread. An innovative partnership between The Nature Conservancy, BHP Billiton and the Martu people (represented by Kanyirninpa Jukurrpa – KJ) is achieving positive social, cultural, economic and environmental outcomes, which builds on funding from the Australian Government for land management on Martu country. The partners support Martu people in fulfilling their desire to conserve the cultural and natural values of their 13.7 million ha native title determination area. Through KJ as the local delivery partner, Martu people are returning to work on country to clean and protect waterholes; improve fire management; control feral herbivores and predators; manage cultural heritage; and actively manage priority threatened species (such as the Greater Bilby and the Black-flanked Rock-wallaby). The project provides significant employment opportunities for Martu men and women in ranger teams working throughout their country. It is also generating measurable social, cultural and economic benefits for Martu people and environmental benefits for part of the most intact arid ecosystem anywhere on Earth.

Additional keywords: conservation, country, culture, threatened species.

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Introduction

Australia is an extremely dry continent. Aridlands comprise ~46% of continental Australia, of which 59% (211 million ha) is owned and managed by its Traditional Owners (analysis based on maps in Altman 2014). Return of land to Traditional Owners has increased significantly over the past two decades through native title determinations and land buy backs.

Salmon and Gerritsen (2013) suggest that off-reserve conservation by Aboriginal people and pastoralists will be a necessary component of the overall conservation effort in Australia's rangelands. In recent years, Indigenous land managed for conservation increased dramatically. For example, since the Australian Government's Indigenous Protected Area (IPA) program began in 1997/98 there have been 72 IPAs declared by Traditional Owners covering 65 million ha across Australia as a whole with 20 of these (covering almost 50 million ha) within the aridlands (as at November 2015).

Managing land for conservation outcomes is challenging in vast, remote and sparsely populated areas. Indigenous ranger programs have been established to meet this challenge and are now estimated to employ 1400 people, including 600 people working in IPAs of which 562 are Indigenous Australians. However, as government funding is limited for Indigenous

ranger positions, partnerships are increasingly being formed between Indigenous groups, environmental non-government organisations and private sector organisations to supplement and build on government funding and support.

Here, we outline one such partnership between Martu Traditional Owners, Kanyirninpa Jukurrpa (KJ; an indigenous corporation), The Nature Conservancy and BHP Billiton together in what is termed the *Martu Living Deserts Project*. This project supports capacity building across all of KJ's programs and builds upon a strong foundation that was created with financial support from other partners such as the Australian Government (through its *Working on Country* and *Caring for our Country* programs) and the regional natural resource management organisation, Rangelands NRM Western Australia (Rangelands NRM). In addition to those partners, Martu and KJ have worked closely with government agencies such as the Western Australian Department of Parks and Wildlife, the Department of Agriculture and Food Western Australia and CSIRO that provide technical expertise for on-ground land management activities. The efforts of these organisations are also important in assisting Martu people achieve their aspirations. Building on foundational efforts of previous programs and partnerships is a common feature of

conservation and natural resource management in Australia (e.g. Fitzsimons *et al.* 2013).

The Martu people of Australia's Western Desert region have been living on and managing their land for thousands of years. Martu country has been described as 'the harshest physical environment on earth ever inhabited by man before the Industrial Revolution' (Gould 1969). It is perhaps for this reason, coupled with the region's extreme remoteness, that Martu people were among the last Indigenous Australians to come into contact with European Australians, as recently as the 1960s. There are extensively documented accounts of Martu people, still alive today, having their first contact with 'whitefellas' as recently as 1964 (Davenport *et al.* 2005). Martu people moved off the land from the 1920s and 1960s with the encouragement of 'whitefellas' and the provision of more readily available food. After a long struggle, Martu were granted exclusive native title to their lands in 2002 – the second largest native title determination in Australian history (13.6 million ha or roughly twice the size of the Australian State of Tasmania or the US State of Alabama). The largest current determination is the 16.77 million ha Ngaanyatjarra lands, which adjoin Martu lands to the south-east. The Martu native title area extends over large parts of the Great Sandy, Little Sandy and Gibson Deserts (Fig. 1). After their native title was recognised, the priority for Martu people was to

find a way to leverage those rights in a way that would enable them to go back to their country, teach young people about country and look after country. These cultural imperatives drove Martu people to seek partners they could work with to manage their land while improving economic opportunities for their people.

Here, we outline the establishment of the Martu land management program, the values of Martu country that were identified for protection, the threats to those values, how those threats are being addressed, results so far, future directions and challenges, before drawing some conclusions.

Building a land management program

Through KJ (based in Newman, in Western Australia's Pilbara region) Martu people set about developing ways to fulfil their cultural imperatives and manage their lands. Early support came from several partners including the Australian and Western Australian governments and Rangelands NRM. Recognising the region's immense ecological and cultural value, BHP Billiton and The Nature Conservancy (TNC) formed a partnership with KJ in 2010 to support Martu people in managing their lands as part of the *Martu Living Deserts Project* or *Warrarnpa Kana* in Martu *wangka* (language). BHP Billiton operates some of the world's largest iron ore mines in the Pilbara to the west of Martu

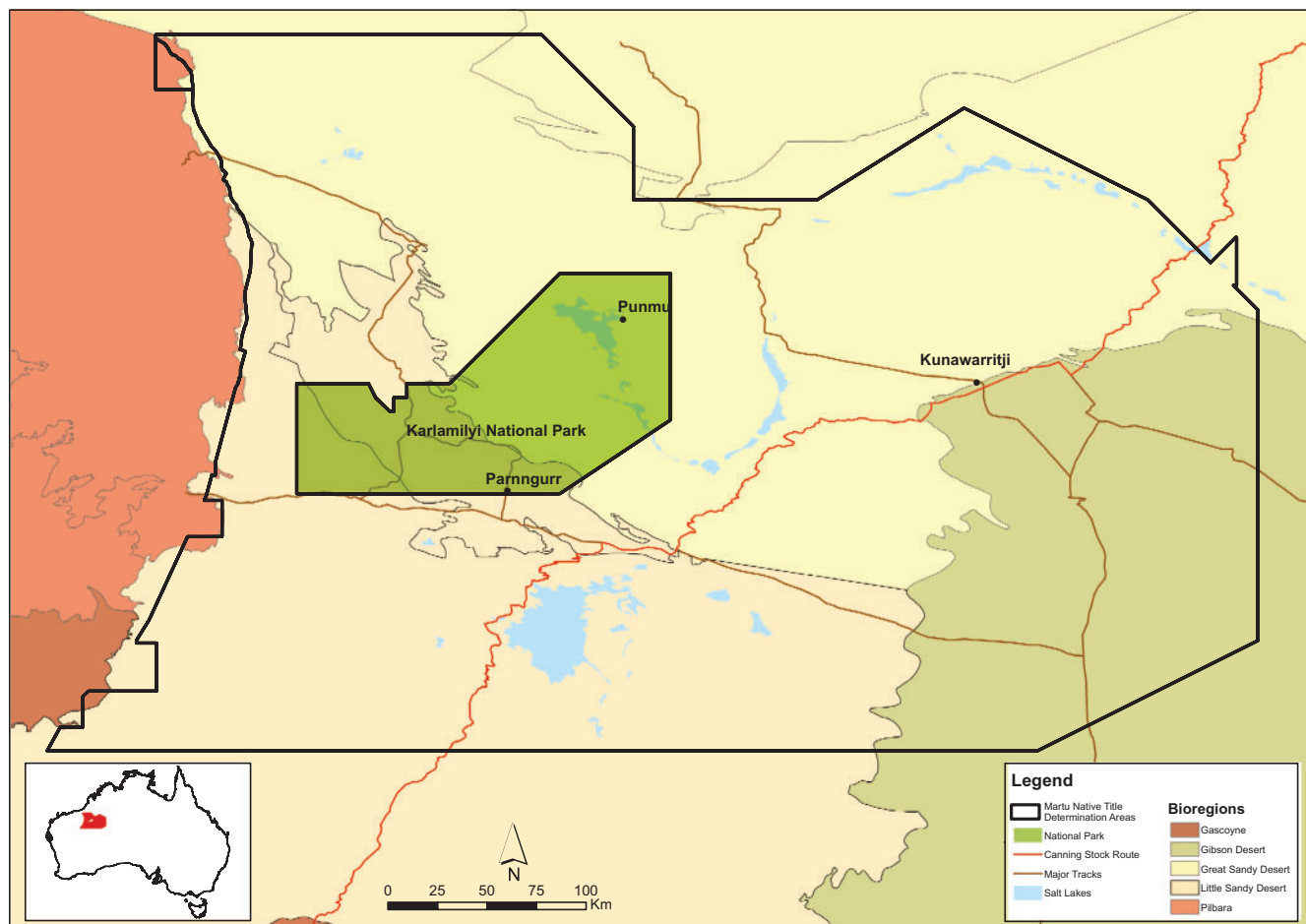


Fig. 1. Martu country showing the location of the Martu Native Title Determination Area and Karlamilyi National Park.

country and invests significantly in Pilbara communities. They are the principal corporate sponsor of this project. The Nature Conservancy is one of the world's largest conservation organisations working to protect ecologically important lands and waters for nature and people. In Australia, TNC works in large landscapes to address pressing conservation threats. These include the tropical savannas of northern Australia (e.g. Fitzsimons and Looker 2012; Fitzsimons *et al.* 2012; Game *et al.* 2013), Gondwana Link and the Great Western Woodlands (e.g. Bradby 2013; Bradby *et al.* 2014; Fitzsimons *et al.* 2014), temperate bays and estuaries of southern Australia (Fitzsimons *et al.* 2015) and the aridlands of central Australia. In the *Martu Living Deserts Project*, TNC acts as the overall project manager providing conservation science, strategy, policy and sustainable finance expertise for the project.

Hill *et al.* (2012) developed a typology of indigenous engagement in environmental management – Indigenous-governed collaborations; Indigenous-driven co-governance; agency-driven co-governance; and agency governance. Hill *et al.* (2012) suggest that supporting Indigenous governance without, or with only a limited requirement for power sharing with other agencies sustains the distinct Indigenous cultural purposes underpinning Indigenous Ecological Knowledge, and benefits knowledge integration. The *Martu Living Deserts Project* most closely aligns with Indigenous-driven co-governance of their typology but differs in that it is not a government-formulated initiative, rather a joint interest of the traditional owners, KJ, BHP Billiton and TNC.

A key feature of the project and its land management program has been the will of the Martu people to manage their lands for what the wider community would identify as nature conservation. For thousands of years Martu people depended on their country for the provision of all the resources they needed to survive. Gadgil *et al.* (1993) note this dependency leads to Aboriginal people having a stake in conservation and the enhancement of biodiversity. As outlined below, Martu people have demonstrated that the restoration of their lands to a more 'healthy' state is high on their list of priorities.

Ecological values

Australia's arid interior is one of the largest continuous areas of arid ecosystems in the world and is the most intact (Sanderson *et al.* 2002). The Martu native title determination area (NTDA) is in the north-west of these aridlands and at 13.6 million ha is one of the largest individual landholdings in Australia. Although many of Australia's aridlands have suffered significantly over the past 200 years, Martu lands remain relatively intact. In all, 15 vertebrate animals (eight mammals, four birds and three reptiles) and 29 plants of international, national or state significance can still be found on Martu country (see Fig. 2 and Tables 1 and 2).

Like most of Australia, Martu country has suffered several mammal extinctions since European settlement. Several species that once occurred in the arid zone, including on Martu country, have become extinct including the Lesser Bilby. Others like the Western Barred Bandicoot, Golden Bandicoot, Crest-tailed Mulgara and Mala (Rufous Hare-wallaby) can no longer be found on Martu country but survive in isolated pockets elsewhere such as offshore islands (Woinarski *et al.* 2014). Despite this, Martu

country retains important populations of several animal species that are considered threatened in Australia and internationally (see Table 1), including the Greater Bilby and Black-flanked Rock-wallaby. In addition, Northern Quolls have recently been discovered on the northern border of Karlamilyi National Park (Turpin and Bamford 2014) and in 2014, Martu rangers observed breeding Australian Painted Snipe in wetlands south-west of Lake Dora in Karlamilyi National Park. A recent sighting of the cryptic Night Parrot in the Pilbara suggests this species might also be present on Martu country as there are at least four historical records near the Canning Stock Route in the Martu NTDA (Davis and Metcalf 2008).

There is a high diversity of arid zone reptiles in the bioregions intersected by Martu country, particularly skinks (genera *Ctenotus* and *Lerista*). Significantly, Lake Disappointment, which is within the Martu NTDA, is home to two reptile species found nowhere else on Earth. The Lake Disappointment Ground Gecko and Lake Disappointment Dragon are only known from low samphire shrubs fringing Lake Disappointment, foraging on bare salt crust between shrubs (Storr 1978; Doughty *et al.* 2007).

In addition, other features, such as Lake Disappointment itself, which is a nationally significant wetland, are recognised for their geomorphology, waterbird and other values (Environment Australia 2001), whereas other assets such as the Percival Lakes and Lake Auld have been identified as having bioregional significance (Kendrick 2001). Martu country includes a diverse range of landscapes. It covers part of three bioregions (Great Sandy Desert, Little Sandy Desert and Gibson Desert) and five subregions (Trainor, Rudall, Mackay, McLarty and Lateritic Plain) (Department of the Environment 2012). The region includes areas recommended for future reservation by the Western Australian Environmental Protection Authority (EPA 1975) – Lake Disappointment and Percival Lakes, and adjoins another – Rudall River – that was subsequently reserved (now called Karlamilyi National Park).

The Martu native title determination area surrounds the 1.28 million ha Karlamilyi National Park and adjoins the 6.7 million ha Birriliburu IPAs to the south, which in turn is part of an interconnected network of desert IPA covering more than 40 million ha – a large proportion of the relatively intact Australian aridlands. As such, managing the assets contained within the Martu lands makes this project of global significance for intact desert landscapes and significantly enhances what is the largest desert conservation network in the world.

Establishing a plan

For Martu, achieving healthy country is a process which begins with *yaninpa ngurrarakarti* (going to country), continues with *ngurraku ninti* (knowledge of country) and completes the cycle with *kanyirninpa ngurrara* (holding/caring for country) (Kanyirninpa Jukurrpa 2013).

KJ, who on behalf of and in consultation with the Martu people, have been looking after country through land management (*Kanyirninpa Ngurrara*) and culture and heritage programs (*Puntura-ya Ninti*), undertook a planning process with the Martu people. The resulting Healthy Country Plan was developed using an adapted version of The Nature Conservancy's

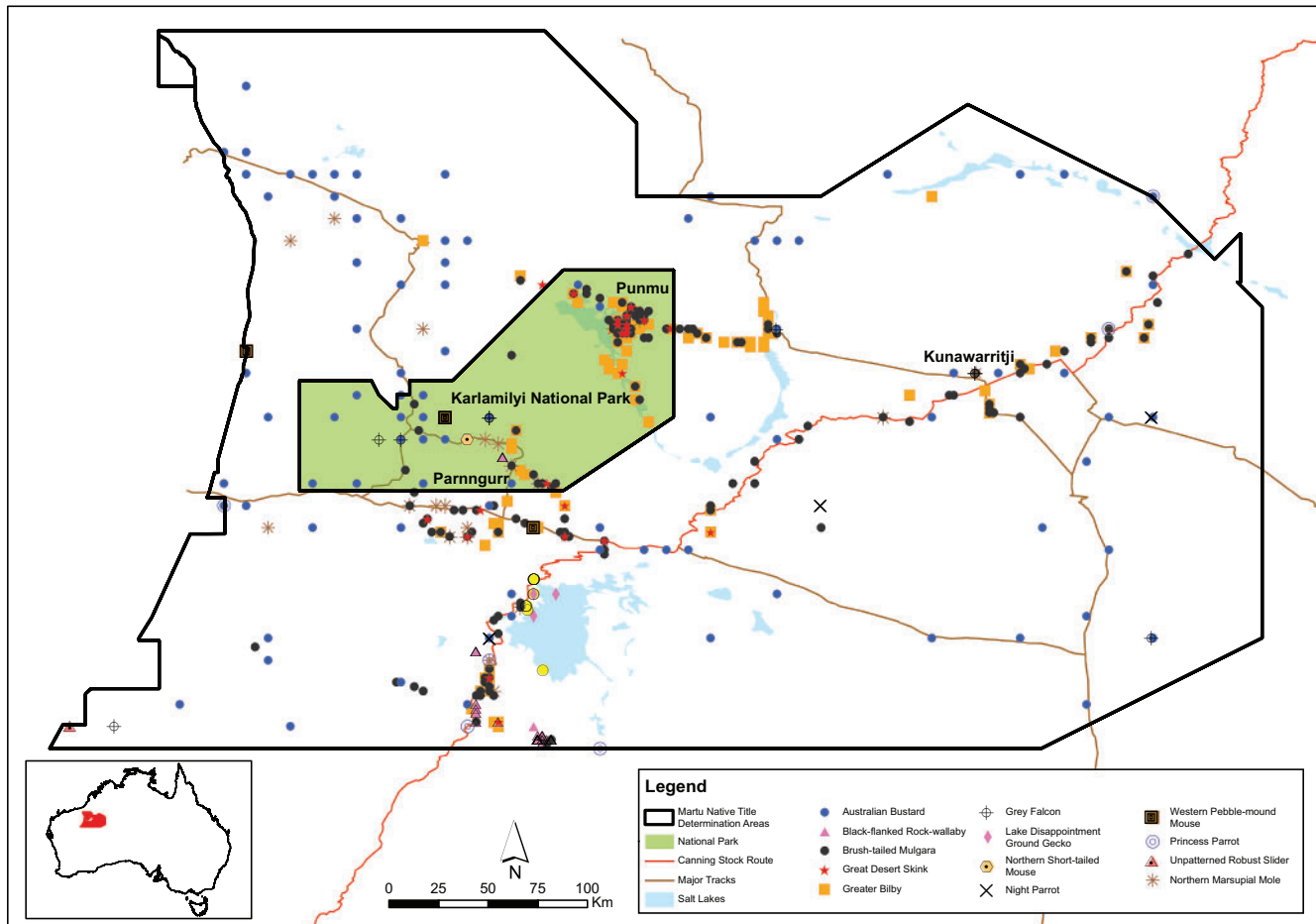


Fig. 2. Recorded occurrences of a range of significant species on Martu country.

Conservation Action Planning approach (Moorcroft 2012). The Healthy Country Planning process uses an adaptive approach whereby the results of regular monitoring of specified indicators inform a continuing planning cycle. Plans are amended and updated as required so that work stays on track to achieve an agreed vision (e.g. Moorcroft 2012). The *Martu Kanyirninpa Ngurra Plan* (referred to as the *Martu Healthy Country Plan*) sets out Martu aspirations for management of their *ngurra* (country) from 2013 to 2023.

By using this methodology in placing Martu people and their aspirations for their country at the heart of the planning process, the project aims to avoid the pitfall of treating 'Indigenous people as workers executing plans developed by others rather than as genuine partners in the design and implementation of management plans' (Petty *et al.* 2015; p. 140).

Describing a Martu vision

The Martu healthy country planning process identified and reached consensus on Martu people's vision for their future when their children grow up and they will go back to country easily; have the *ninti* (knowledge), people, money and equipment to look after country; have plenty of bush tucker (*kuwiyi* and *mirrka*); have jobs for themselves and their young people; see

young people learn both ways; and keep *Jukurrpa* (dreaming) and *ninti* strong.

Martu values identified for their country

To assist in achieving this vision Martu people identified eight key values they want to protect on their lands (KJ 2013):

Martu traditional cultural and ecological knowledge

Knowledge of traditional Martu ways of living in and from their lands is inextricably linked to Martu people's sense of their existence. Although changes to Martu lifestyles since contact with European Australians has affected this knowledge, the survival today of elders who were born in *pujiman* (bushman) times means that relative to many other Aboriginal groups' knowledge remains strong. The continuance of this knowledge is critical for the cultural wellbeing of Martu people and the effective ongoing management of the land for multiple objectives.

Martu having livelihoods based on their country and knowledge

Martu people have a strong connection to their country and a cultural imperative to live on, and look after, it. As a result they

Table 1. Fauna of international, national or state significance on Martu country (the Martu Native Title Determination Area and Karlamilyi National Park combined)

Data from the Atlas of Living Australia as at March 2015 and Kanyirninpa Jukurrpa as at December 2014

Scientific name	Species	Common name	International status (IUCN Red List ^A)	Conservation status National status (EPBC Act ^B)	State status (WA Wildlife Conservation Act 1950 ^C)
Mammals					
<i>Dasyiscercus blythi</i>	Brush-tailed Mulgara		Least Concern	Not listed	Priority 4
<i>Dasyurus hallucatus</i>	Northern Quoll		Endangered	Endangered	Endangered
<i>Macrotis lagotis</i>	Greater Bilby		Vulnerable	Vulnerable	Vulnerable
<i>Petrogale lateralis lateralis</i>	Black-flanked Rock-wallaby		Not Assessed (full species is Near Threatened)	Vulnerable	Endangered
<i>Notoryctes caurinus</i>	Northern Marsupial Mole		Data Deficient	Not listed	Priority 4
<i>Leggadina lakedownensis</i>	Northern Short-tailed Mouse		Least Concern	Not Listed	Priority 4
<i>Pseudomys chapmani</i>	Western Pebble-mound Mouse		Least Concern	Not Listed	Priority 4
<i>Trichosurus vulpecula arnhemensis</i>	North-western Brush-tailed Possum		Not Assessed (full species is Least Concern)	Not listed	Vulnerable
Birds					
<i>Falco hypoleucos</i>	Grey Falcon		Vulnerable	Not Listed	Vulnerable
<i>Pezoporus occidentalis</i>	Night Parrot		Endangered	Endangered	Critically Endangered
<i>Polytelis alexandrae</i>	Princess Parrot		Near Threatened	Vulnerable	Priority 4
<i>Rostratula australis</i>	Australian Painted Snipe		Endangered	Endangered	Endangered
Reptiles					
<i>Diplodactylus fulleri</i>	Lake Disappointment Ground Gecko		Not yet assessed	Not Listed	Priority 2
<i>Liopholis kintorei</i>	Great Desert Skink		Vulnerable	Vulnerable	Vulnerable
<i>Lerista macropisthopus remota</i>	Unpatterned Robust Slider		Not yet assessed	Not listed	Priority 2

^AIUCN Red List = International Union for the Conservation of Nature Red List of Threatened Species 2015–4 (<http://www.iucnredlist.org/>).^BEPBC Act = Australian *Environment Protection and Biodiversity Conservation Act 1999 List of Threatened Fauna* (<http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl>).^CWestern Australian *Wildlife Conservation Act 1950* Wildlife Conservation (Specially Protected Fauna) Notice 2015 status:

Priority 1 listing under the WA Wildlife Conservation Act (1950): Poorly-known species (on threatened lands). Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

Priority 2 - Poorly-known species (on conservation lands): Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

Priority 3 listing under the WA Wildlife Conservation Act (1950): Poorly-known species (some on conservation lands). Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

Priority 4 - Rare, Near Threatened and other species in need of monitoring: (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

highly value opportunities that enable them to derive a livelihood from remaining on their country and managing it to maintain its values particularly as they relate to the availability of bush foods.

Important cultural sites

Although all Martu country is important to Martu people there are several specific sites that are particularly significant and sacred.

Knowledge of these places and adherence to certain practices in relation to them are important for Martu people.

Small animals including a variety of threatened species like the bilby (mankarr)

Martu country supports a rich diversity of small vertebrates important to Martu people. Its intact nature, partly as a

Table 2. Flora of international, national or state significance surviving on Martu country (the Martu Native Title Determination Area and Karlamilyi National Park combined)
Data current at March 2015

Species Scientific Name	International Status (IUCN Red List ^A)	Conservation Status National Status (EPBC Act ^B)	State Status (WA Wildlife Conservation Act ^C)
<i>Acacia auripila</i>	Not Assessed	Not Listed	Priority 2
<i>Acacia sclerosperma</i> subsp. <i>glaucescens</i>	Not Assessed	Not Listed	Priority 3
<i>Comesperma pallidum</i>	Not Assessed	Not Listed	Priority 3
<i>Dampiera atriplicina</i>	Not Assessed	Not Listed	Priority 3
<i>Eragrostis lanicaulis</i>	Not Assessed	Not Listed	Priority 3
<i>Eremophila forrestii</i> subsp. <i>viridis</i>	Not Assessed	Not Listed	Priority 3
<i>Eremophila maculata</i> subsp. <i>filifolia</i>	Not Assessed	Not Listed	Priority 1
<i>Eremophila pallida</i>	Not Assessed	Not Listed	Priority 2
<i>Eremophila</i> sp. Rudall River (P.G.Wilson 10512)	Not Assessed	Not Listed	Priority 2
<i>Eremophila tenella</i>	Not Assessed	Not Listed	Priority 1
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	Not Assessed	Not Listed	Priority 4
<i>Evolvulus alsinoides</i> var. <i>alsinoides</i>	Not Assessed	Not Listed	Priority 3
<i>Fuirena incrassata</i>	Not Assessed	Not Listed	Priority 3
<i>Goodenia hartiana</i>	Not Assessed	Not Listed	Priority 2
<i>Goodenia lyrata</i>	Not Assessed	Not Listed	Priority 3
<i>Goodenia modesta</i>	Not Assessed	Not Listed	Priority 3
<i>Goodenia nuda</i>	Not Assessed	Not Listed	Priority 4
<i>Goodenia purpurascens</i>	Not Assessed	Not Listed	Priority 3
<i>Goodenia virgata</i>	Not Assessed	Not Listed	Priority 2
<i>Hibiscus</i> sp. Durba Hills (R. Davis 11193)	Not Assessed	Not Listed	Priority 1
<i>Indigofera ammobia</i>	Not Assessed	Not Listed	Priority 3
<i>Ptilotus mollis</i>	Not Assessed	Not Listed	Priority 4
<i>Sauropus arenosus</i>	Not Assessed	Not Listed	Priority 3
<i>Scaevola</i> sp. Isabella Range (R.D. Royce 1918)	Not Assessed	Not Listed	Priority 1
<i>Thysanotus</i> sp. Desert East of Newman (R.P. Hart 964)	Not Assessed	Not Listed	Priority 2
<i>Tribulus minutus</i>	Not Assessed	Not Listed	Priority 1
<i>Atriplex flabelliformis</i>	Not Assessed	Not Listed	Priority 3
<i>Maireana</i> sp. Patience (C.P. Campbell 1052)	Not Assessed	Not Listed	Priority 1
<i>Tecticornia</i> sp. Sunshine Lake (K.A. Shepherd <i>et al.</i> KS 867)	Not Assessed	Not Listed	Priority 3

^A<http://www.iucnredlist.org/>.

^B<http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora>.

^C<http://florabase.dpaw.wa.gov.au/> (See Table 1's notes for descriptions of Priority 1 – 4).

consequence of its extreme remoteness and long and continuing history of management by traditional owners, means that it remains a viable habitat for a range of species listed as threatened due to losses elsewhere (see Table 1).

Water sources

The availability of freshwater is a critical success factor for the survival of wildlife in this desert landscape. In *pujiman* days it was also critical for Martu people as they moved through their country and remains extremely important for Martu people today. Ephemeral sources include rockholes, lakes and claypans whereas more permanent sources include soaks, springs and waterholes within river systems. More than a thousand freshwater sources have been identified and mapped on Martu lands (Fig. 3).

Lakes

Martu country contains three major river and lake systems that flow particular during and after periods of heavy rain. Unlike most river systems, however, they do not flow towards the sea but rather

drain into large desert lakes like the iconic Lake Disappointment (*Kumpupirntily*).

Food from plants

Traditionally up to 120 plant species were used by Martu for food. Many of these are still used today including fruits (e.g. bush tomato), roots, seeds, grasses, herbs, nectar, gum and fungi. Management of the landscape particularly through fire has always been and remains important to Martu people as a means of stimulating the production of food from plants.

Bush meat

Hunting is an important aspect of Martu culture and a traditional source of protein. Some species are no longer abundant enough to be hunted and are the subject of active management for their conservation. Others like the Euro (*Kirti Kirti*), Emu (*Karlaya*) and Sand Monitor (*Parnajarrpa*) remain part of the Martu diet. Martu have also taken to hunting introduced animals for food particularly cats, and also camels and rabbits.

Threats to identified values

Though largely intact on Martu lands, particularly when compared with other parts of arid Australia, the values identified by Martu people are negatively impacted by several significant threats.

Feral herbivores such as camels and donkeys

Camels in particular are a significant problem on Martu lands. First brought to Australia in 1860, camels remained in use as a means of transportation in the arid centre of the country until the early decades of the 20th century when they were progressively superseded by the automobile. Many camels were subsequently released into the wild and formed the founders of the extensive feral camel population in Australia today. Feral camels place significant grazing pressure on the environment by reducing the available food for native browsers and birds, selectively grazing particular plant species and hindering recruitment, trampling fragile vegetation leading to erosion particularly on sand dune systems and seriously degrading and sometimes destroying waterholes and soaks used by native species (Edwards *et al.* 2008).

Altered fire regimes dominated by large hot summer wildfires

Martu people have used fire for thousands of years to manage their lands for higher food production. In *pujiman* days, this created a heterogeneous landscape with a range of habitat types in various stages of post fire recovery and maturation. This in turn supported a more diverse range of animal species (Bird *et al.* 2013). After Martu people moved off the land from the 1950s and 1960s their fire practices changed significantly and quickly resulting in dramatically increased fire size and intensity (Burrows *et al.* 2006). This meant that when fires do occur in the hot season as a result of lightning, they are larger and highly destructive, resulting in a more homogenous landscape.

Unauthorised tourist visitation

The Canning Stock Route traverses Martu country from north-east to south-west. A permit system operates to assist in managing movement of four wheel drive tourists along this track. At times, however, tourists travel along the track without a permit, venture off the stock route or visit sacred sites that are not appropriate for visitors. This causes issues for Martu people including damaging vegetation, the occasional need for Martu to rescue them and the offence caused by ignoring Martu cultural norms.

Inappropriate development impacting on cultural and other values

When development is unplanned and poorly carried out it can cause unacceptable environmental and cultural damage that can be difficult or impossible to rectify in such remote areas.

Knowledge not being transferred to younger generations

Knowledge of Martu country (*ninti*) is extensive and has been passed from one generation to the next for millennia. This knowledge is essential for Martu to be able to carry out their obligations to look after country and keep their culture alive and strong. When Martu people moved off the land in the 1950s and

1960s, the transfer of this *ninti* to younger generations was more difficult and remains of high concern for surviving Martu elders.

Feral predators such as cats

It is believed that cats first became feral in Australia around Sydney in 1820 and in Australia's north-west by 1870, with one record close to Martu country at Nullagine from ~1888 (Abbott 2008). Cats prey heavily on birds, lizards and small mammals and have been demonstrated to be a significant factor in the demise of many native species across Australia. The Red Fox also poses a significant threat. Many of the mammal extinctions in the Western Desert can be at least partly attributable to the spread of foxes (Kinnear *et al.* 2002).

Invasive weeds

The major weed on Martu country is Buffel Grass, grown widely across Australia's pastoral lands as fodder. It is a vigorous coloniser that out-competes native grasses particularly near water sources and water-gaining habitats.

New unplanned roads

There are few roads on Martu country. They assist Martu rangers manage their country but can also increase access for others and lead to the creation of other tracks, which destroy vegetation, provide access to areas that are culturally sensitive and act as pathways for weed and feral predator encroachment.

Martu no longer living on country

Empty *ngurra* (no Martu on country) is a major threat to Martu culture and the ongoing management of country. Martu have been managing their country for thousands of years. The movement of Martu into missions, stations and towns in the middle of the last century led to their country becoming 'sick'. Without Martu on country, fires became larger and more destructive, water sources lost quality and native species declined.

Climate change

Martu country is already a very harsh environment in which to survive with extremely high temperatures in the hot season and unreliable rainfall. Martu are concerned that the climate is getting even hotter and drier with the effect of climate change also likely to lead to more extreme flooding events.

Managing the threats to Martu country

The partners in the *Martu Living Deserts Project* are working together to support Martu communities and help them achieve their aspirations to look after their country (by mitigating these identified threats) in balance with sustainable economic development. As part of the project, KJ employs ~17 staff out of its Newman office and a further 40, predominantly Martu people, on country in a variety of ranger and allied positions. In addition, they employ ~240 Martu each year in casual ranger positions working on country.

These Martu men's and women's ranger teams:

- Manage feral herbivores and predators through culling and baiting in collaboration with the Western Australian

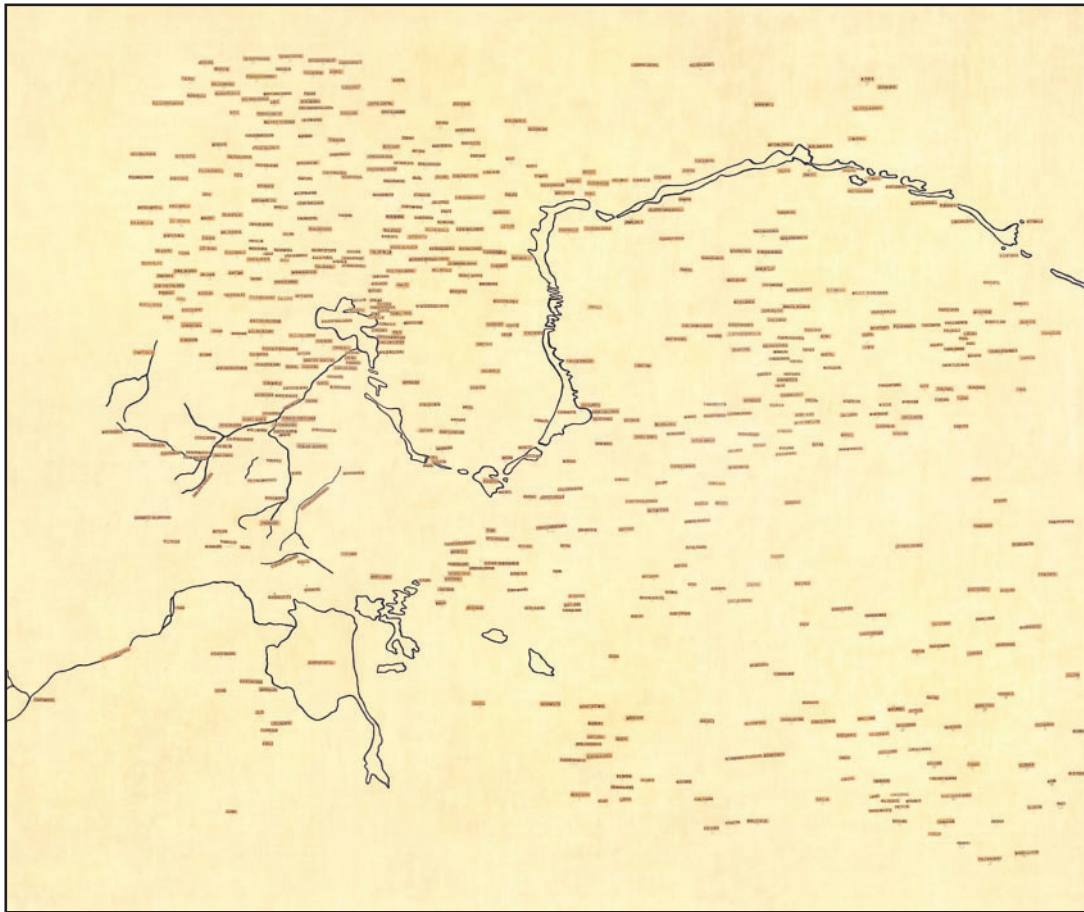


Fig. 3. Waterholes known to Martu people on their country, indicated by brown text (Source: Kanyirninpa Jukurrpa).

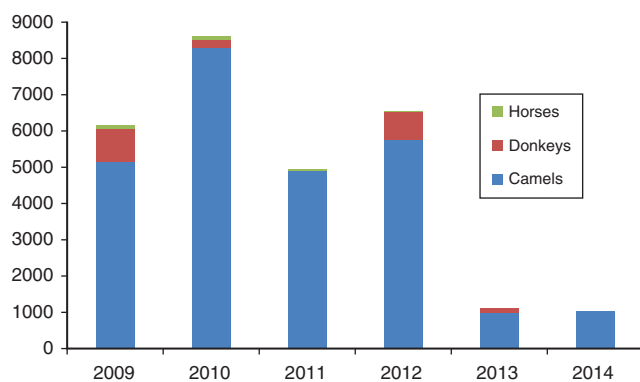


Fig. 4. Number of feral herbivores culled on Martu country (Source: Kanyirninpa Jukurrpa).

Department of Parks and Wildlife and Department of Agriculture and Food.

- Conduct cool season burns that are smaller and less intense than hot summer wild fires and result in a more diverse range of habitat types for threatened species.
- Map, maintain and monitor waterholes (Fig. 3).

- Actively manage threatened species like the Greater Bilby and the Black-flanked Rock-wallaby (including a population translocated by KJ in conjunction with the Western Australian Department of Parks and Wildlife). This is achieved, for example, through cool season burning and feral cat control.
- Engage tourists by checking permits and giving presentations at major camping sites along the Canning Stock Route.
- Remove Buffel Grass from key sites to protect important assets such as near sacred sites and tourist hotspots.

Management results to date

Environmental results

As at June 2015 more than 26 000 camels and 2000 donkeys have been removed from Martu lands since 2009 as part of the Project (see Fig. 4). The reduced number of camels that were able to be culled in recent years suggests the population of camels on Martu country has fallen significantly. The lower number of culled animals in recent years is not a result of reduced effort but rather of herds being fewer in number and harder to find. Preliminary results by the (then) Department of Environment and Conservation in 2011 showed significant evidence of historical grazing by camels but promising vegetation recovery and limited grazing following intensive culling efforts

and good rainfall (Anon. 2011; Clarke 2011). This positive effect of camel culling is supported by anecdotal observations by Martu rangers of the improved health of their country especially around waterholes.

With the support of the Department of Parks and Wildlife, the area baited for feral cats has increased to 40 000 ha. This aims to keep down the numbers of this key introduced predator of young rock-wallabies. Although more work is required to demonstrate the effect this program is having on other native wildlife populations, monitoring of the original and translocated rock-wallaby populations shows they remain healthy. A further six rock-wallaby populations have been confirmed around Parnngurr in Karlamilyi National Park, resulting in a total of eight known populations of this threatened flagship species on Martu country.

The women's ranger teams continue to monitor the presence of significant species on Martu country as part of their work, using Cybertracker. Species recorded include those of special interest to Martu (e.g. Australian Bustard and Euro); ferals (e.g. camels and cats); and threatened species (e.g. Great Desert Skink and Black-flanked Rock-wallaby). This data helps to form an ongoing record of species presence, which can be used for analysis of species distributions.

Cool season burning is one of the significant activities for the Martu rangers during the cool field season and now accounts for ~170 000 ha per annum. This helps to reinstate a traditional patchy burning regime that existed on Martu country before European contact. Following a return to country from the mid-1980s, this mosaic burning pattern has been re-established on parts of Martu country particularly around Martu communities. Fig. 5 shows the changing fire patterns that occurred in an area south of Parnngurr over time from *pujiman* days through to the present. The *Martu Living Deserts Project*, in conjunction with other partners, is helping to extend this cool season burning to more remote parts of Martu country.

More than 70 waterholes have been cleaned. This includes the removal of dead camels and built-up silt, which then allows clean water to become available. In combination with the control of camels, this has resulted in a sustained supply of high quality water for the benefit of people and wildlife. The waterhole database now contains a total of 1118 records of individual waterholes many mapped with the aid of helicopters or visited during return to country and ranger trips.

Social and economic results

Over the past 5 years almost 350 Martu have been employed by KJ making KJ, the largest employer of Martu people (see Fig. 6).

Research by Social Ventures Australia (2014) has found that KJ's on-country programs, including the *Martu Living Deserts Project*, have delivered a wide range of positive social, economic and cultural outcomes. They estimated this value to be \$55 million over five financial years (FY10–FY14) from a \$20 million investment: a Social Return on Investment ratio of 3 : 1 (i.e. for every dollar invested, ~\$3 of social, economic and cultural value was created). Martu people are the primary beneficiaries of this value. The Australian and Western Australian Governments also benefit through reductions in justice and welfare costs. Social Ventures Australia (2014) estimates that, over the 5-year period, KJ's activities saved 41 years of Aboriginal incarceration, saving the Western Australian Government \$3.7 million. A further \$4.2 million in savings also occurred over this period through a reduction in alcohol-related crime.

Future directions and key challenges

By working together in this innovative project, the partners are providing Martu people with the opportunity and capacity to look after their country as they know how by assisting with 'Western'

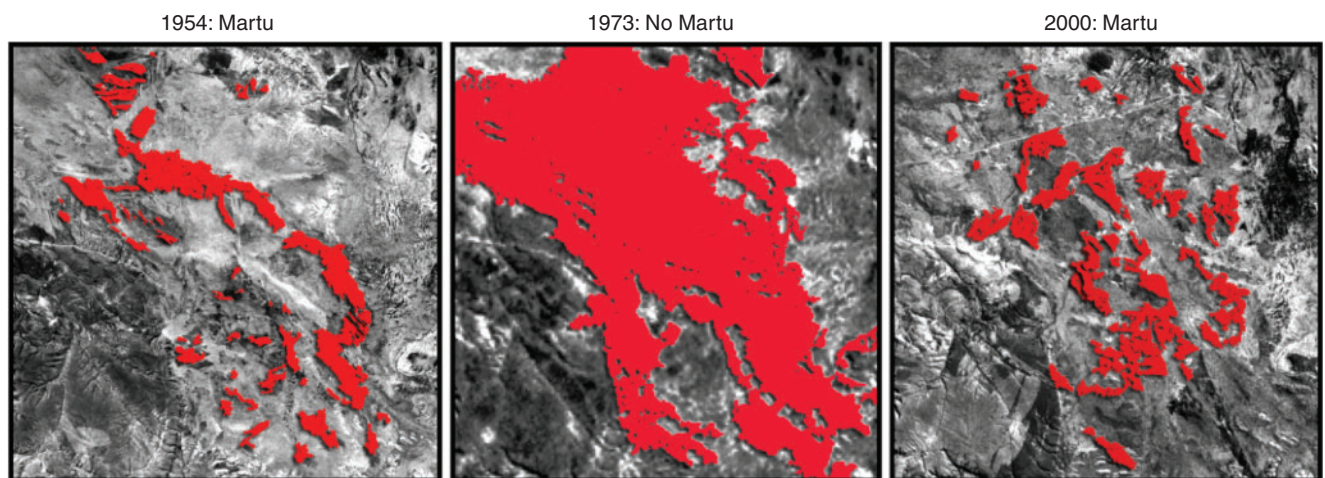


Fig. 5. Fires between Yulpul and Parnngurr rockhole – comparative burning patterns on Martu country over time. The images above are from aerial photographs (1954) and satellite images (1973 and 2000) of the Yulpul region just south of Parnngurr (total area is 144 km²). This area has always been an important location for living, hunting and gathering. The areas in red are recent burns at the time the image was made. The images show the dramatic effects of wildfire that devastated the country when the Martu mosaic in the area collapsed during the years when they left their homelands. With the return of Martu people to the area in 2000, some mosaic burning regime has been re-established (R. Bliege Bird, N. Taylor, D. W. Bird, B. F. Coddling, C. Taylor, F. Walsh, unpubl. data).

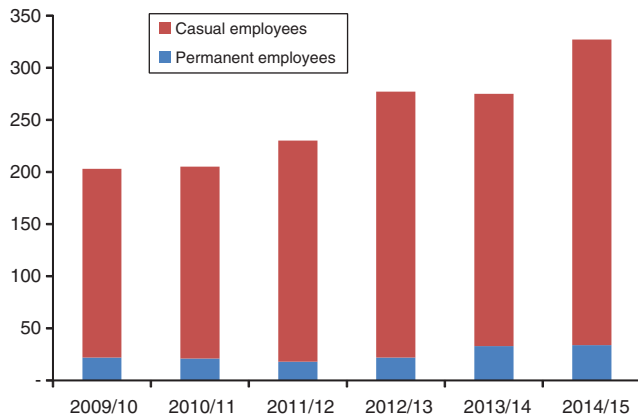


Fig. 6. Numbers of Martu employed by Kanyirninpa Jukurrpa (Source: Kanyirninpa Jukurrpa).

land conservation planning, logistics and financing/economics. As noted by Barbour and Schlesinger (2012; p. 36), 'Indigenous Australians do not want to become spectators in the research process, giving away knowledge, or labourers to Western conservation agendas. They want to be active partners in developing better understandings of the environment and implementers of management that reflects shared agendas'.

Plans for the long-term funding of the project are also ongoing with the support of all the partners involved. Ultimate success for the project such as the sustained availability of resources for Martu to care for their country, the intergenerational maintenance of knowledge and the recovery of threatened species, will be measured in decades to come. For the present and near-term future, the positive improvements in the health of the country and the people encourages everyone involved to keep working hard to maintain and strengthen the project for the benefit of all involved. The nature of the partnership that governs the project (a corporate funder, an environmental not-for-profit non-government organisation and a local indigenous delivery partner) and the fact that all parties contribute to project decision-making, has proven a successful formula to date. The ongoing support of other agencies, such as the national and state governments, adds further to improving opportunities for Martu to manage their country. Consistent with the findings of Popova (2014), the collaborative work between the partners that brings a variety of skill sets to the project aimed at fulfilling the conservation objectives of the traditional owners has been successful in improving the indigenous economy, social wellbeing and the environment.

Strategies and actions that continually engage Martu people at the centre of the project are critical to its success. Davies *et al.* (2011, p. 147) found that 'engagement with land management can lead desert Aboriginal people to feel that their own actions are consistent with their own sense of the right and proper way for them to behave towards land, family and community. This increased 'sense of control' impacts positively on health by moderating the impact of sustained stress from health risk factors in the environment and lifestyle'. Examples of this in the project include the Martu Leadership Development Program and the

online Community Access Library that stores more than 30 000 media items (such as documentary films). Both these initiatives are very popular with Martu people and not only keep them informed and engaged in the project but provide the information for them to be involved in setting the project's priority activities.

As the project matures it also aims to further diversify its funding sources. One example of that is to explore the potential traditional burning as a form of carbon abatement to generate revenue for the project, based on successful models in northern Australia (e.g. Walton and Fitzsimons 2015). For the Martu native title area, this could potentially include reducing emissions from spinifex burning and through the accumulation of woody biomass from mulga species.

Like other parts of the Australian aridlands, the immense geographical scale of the project area makes field work logistics, finding home bases for employees and communications a major undertaking. The seasonality of the region with the extreme heat and potential flood conditions during the hot season means field work is generally limited to cooler months.

In addition, there are complexities inherent in working on country across different tenures. For example, Karlamilyi National Park lies at the heart of, and is surrounded by, the Martu native title determination area. Managed by the Western Australian Government's Department of Parks and Wildlife, the national park operates according to different governing instruments. Although KJ and the Department of Parks and Wildlife already collaborate closely on several land management programs, opportunities exist for further work to achieve shared aspirations for conservation.

Conclusions

The *Martu Living Deserts Project* is proving to be a successful ongoing partnership providing initially positive results for land management, nature conservation and for Martu wellbeing. The remoteness and harsh conditions of Martu country are two of the contributing factors to this success. Although not immune from the threat of altered fire regimes and introduced species, these factors have resulted in less inappropriate development and a relatively intact environment. This remoteness also meant contact with non-indigenous Australians came relatively late meaning that traditional *pujiman* (bushmen) survive today, capable of passing onto younger generations their knowledge of how to look after country.

The ability of KJ as an organisation to maintain a focus on their land management and Martu cultural programs has also been a significant factor in success to date. By helping to build KJ's capacity and investing in their programs, the project has built further on the backing of a wide variety of partners to support Martu people in achieving their aspirations for country.

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The *Martu Living Deserts Project* fundamentally depends upon on productive engagement with the Martu people who provide cultural and land management advice, as well as the personnel to conduct the ranger program on their country. The authors wish to acknowledge their strong commitment to manage their country and improve the lives of the people in their communities. The authors would also like to acknowledge the generous support of BHP Billiton as the principal project sponsor, and other partners that work with KJ

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