Northern Territory

NATURAL RESOURCE MANAGEMENT PLAN

2016-2020

ARID LANDS REGION

Territory Natural Resource Management

VISION

"Territorians working together to manage our environment's natural, cultural and economic values for the benefit of all."

FOR MORE INFORMATION

This publication is available on request through contacting info@territorynrm.org.au

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Territory Natural Resource Management

Australian Government

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FOREWORD

Welcome to the Natural Resource Plan 2016-2020

This plan is a comprehensive strategy for all Territorians. It is a plan for maintaining the health of our land, water, biodiversity and coastal resources for the next five years and because that health is a responsibility we all share, the TNRM team has consulted widely across the Territory in putting it together.

The plan builds upon our previous NRM plans through establishing a strong adaptive approach to natural resource management. This approach is one where we all learn by doing; it utilises science and traditional knowledge; it draws on the experiences of the many people and organisations that will be involved in delivering its strategies.

TNRM will again be active participants over the years of the plan. We will be encouraging collaboration and partnerships and shared and complimentary approaches from all involved in natural resource management – from governments to scientists, from business to community organisations and everybody in between. We'll also have an ongoing role in reviewing the progress of the plan.

Finally, with the renewed focus of the Australian Government on developing northern Australia, this NRM plan clearly demonstrates the links between a healthy and sustainable environment and the Territory's economic and social future.

As Chair, I look forward to being part of the effort in bringing to reality the many objectives outlined throughout the plan.

Clare Martin

Chair, Territory Natural Resource Management

Desert wildflowers

ABOUT THIS PLAN

The development of the Arid Lands Regional Action Plan has been facilitated by Territory Natural Resource Management (TNRM) in collaboration with landholders, Traditional Owners, pastoralists, government, industry groups, Aboriginal organisations and community groups. The plan provides an integrated and collaborative approach to ensure sustainable management of our water, land, soils and biodiversity in the Arid Lands region built on strong partnerships between all stakeholders.

The purpose of the plan is to encourage investment from a diverse range of sources, build community capacity to engage in NRM through knowledge sharing, skills and partnerships and to identify strategies and priority actions which will help us better look after the Arid Lands. By engaging multiple sectors the plan aims to promote a shared vision for the management of the unique cultural and natural resources in the Arid Lands.

The plan draws on the Northern Territory Natural Resource Management Plan (NRM plan) and Arid Lands Regional Action Plan 2010-2015. It is one of four Regional Action Plans for the NT. As part of the planning process we have undertaken a review of the previous plan to reflect on the progress we have achieved and to improve the way we undertake and prioritise natural and cultural resource management activities in the Arid Lands. This plan aims to support and build upon the good work that our stakeholders have undertaken over many years.

Our Vision

The vision of the plan is for

> *"Territorians working together to manage our environment's natural, cultural and economic values for the benefit of all."*

Our Assets

Assets have been classified and identified by the stakeholders in the Arid Lands region as the attributes that they want to protect and maintain. These include physical attributes such as intact grasslands, water holes and healthy populations of birds, reptiles and mammals and Aboriginal cultural sites and landscapes. They also include social assets such as knowledge, NRM networks, organisational capacity and people being in the landscape to manage it. Assets provide people in the Arid Lands region with resources essential for day to day living and support primary industries such as pastoralism, tourism and other important economic initiatives in the region. They also support an important and often unrecognised customary economy for Aboriginal people as well as providing their cultural and spiritual well-being. There were eight key assets identified by stakeholders for the Arid Lands region:

- People on Country
- Community Knowledge
- Freshwater Systems
- Healthy Soils
- Grasslands/ Rangelands
- Cultural Landscapes and Sites
- Biodiversity and Conservation Sites
- Ranges

Pressures on our Assets

Our assets are increasingly under pressure from the predicted impacts of climate change, inappropriate fire regimes, feral animals, weeds and more intensive resource use form development. Ten broad categories of key pressures and uses for our assets were identified during planning workshops relevant to this plan:

- Loss of Knowledge and Access
- Feral Animals
- Mining and Energy Production
- Inappropriate Fire Regimes
- Recreation and Other Activities
- Invasive Plants
- Primary Industries
- Pollution
- Climate Change and Severe Weather
- Residential and Commercial Development

Our Programs to Look After Country

Programs have been split into nine themes each containing strategies, priority actions and milestones for looking after our assets and minimising the negative impacts of the key pressures and uses.

1. Managing Fire
2. Preventing and Managing Weeds
3. Reducing the Impacts of Feral Animals
4. Industry Adoption of Sustainable Practices
5. Water Resources and Soil Management
6. NRM Based Economic Opportunities
7. Minimising Ecological Footprints of Development
8. Managing and Protecting Key Natural and Cultural Assets
9. Knowledge, Capacity and Engagement

Monitoring our Success

This plan is designed to be a living document used to promote stakeholder engagement around NRM programs. It is intended to promote continual improvement and ongoing review of the approach to complex NRM issues over the life of the plan. It is also a useful tool to assist NRM stakeholders to adopt a 'collective impact' framework improving how many projects and partners align towards having a greater impact at the landscape scale.

ARID LANDS REGIONAL PROFILE

The Arid Lands is a region of iconic landscapes which are internationally renowned for their outstanding natural values, extraordinary geological landforms and living Aboriginal culture which dates back 50,000 to 65,000 years. Both the stunning landscapes and Aboriginal culture of the region are major drawcards for domestic and international visitors to the region.

The climate of the region is characterised by extremes with temperatures ranging from around 40°C in the summer to below 0°C in the winter overnight. Rainfall varies from year to year, but overall the climate is dry most of the time. There is also a long history of pastoralism in the region. The region is unique in that it has not been subjected to the same development pressure of urban expansion or intensive agriculture as have other parts of Australia and thus the natural landscapes are still largely intact.

The Arid Lands consists of a diversity of habitats including rugged ranges and gorges, woodlands, desert rivers, rockholes, mulga woodland, spinifex grasslands and sand country. The gorges provide important refuges for a collection of plants and animals within some of the least modified deserts in the world. Numerous biologically significant plants and animals are found in the region, 24 Sites of Conservation Significance are listed, of which eight are internationally significant. Exemplary geological features are found in the region, including: Uluru-Kata Tjuta National Park, a World Heritage National Park which is listed for both its outstanding universal natural and cultural values; Tjoritja/West MacDonnell National Park; and Watarrka National Park (Kings Canyon).

The richness of Aboriginal cultures in the Arid Lands is demonstrated by the diversity of Traditional Owners living in the region including Pitjantjatjara, Yankunytjatjara, Luritja, Ngaanyatjarra, Arrernte, Pintupi, Warlpiri, Alyawarra, Anmatyerre, Warumungu and Kaytetye people. There are numerous sacred sites listed under the Northern Territory Aboriginal Sacred Sites Act, as well as culturally significant places in the landscape. Indigenous languages are the main language for many Aboriginal people and a vast body of in-depth traditional ecological and cultural knowledge drives ceremonial and cultural practices that continue today.

The environmental and cultural values of the region are under increasing pressure from a number of threats such as wildfires, feral animals including cats, rabbits, camels and introduced plants such as Buffel Grass. There are 62 threatened species listed under NT Government legislation and 39 threatened species listed under Australian Government legislation including the Northern Quoll, Greater Bilby, Golden Bandicoot and Central Rock Rat. The impact of these factors on culturally significant species for Aboriginal people, as well as a loss of traditional Aboriginal knowledge and threats to culturally significant sites is also a significant issue. The productivity of the landscape for pastoralism is also at risk from these factors.

These values underpin the livelihoods of pastoralists and Aboriginal people and the viability of industry and other commercial enterprises in this remote region.

Major Mitchell Cockatoos

Waterhole

Soil erosion workshop

ARID LANDS REGIONAL PROFILE

LAND

49% of the NT's land mass 685,000km²

55% Aboriginal freehold land 375,7500km

36% pastoral lease 246,600km

23% of land is protected areas

95% of this are Indigenous Protected Areas

over 85% of land is classified as "Very Remote" by ABS

PEOPLE

41,000 19% of the NT's population

LAJAMANU

regional centre ALICE SPRINGS 28,000

YEUNDUMU

PAPUNYA

HERMANNSBURG

approximately 300,000 visitors per year

Majority of the population in "very remote" areas are ABORIGINAL

ECONOMY

pastoralism

mining

tourism

horticulture

Aboriginal customary economy

regional service delivery and defence

18% to NT Gross State Product $2.9 billion

NATURAL RESOURCES

24 Sites of Conservation Significance

39 Nationally listed threatened species

62 species threatened in the NT

10 Weeds of National Significance

SOCIAL AND ECONOMIC ASSETS IN NRM

Socio-economic Status

The Arid Lands region has unique social, economic and environmental characteristics that raise particular challenges in terms of creating sustainable livelihoods and delivering NRM activities. There is a clear link between social and ecological resilience, particularly for social groups or communities in the Arid Lands that are dependent on ecological and environmental resources for their livelihoods.

The Arid Lands has one of the lowest population densities within Australia at just one person for every five square kilometres. Over 85% of the region is classified as “very remote” with the remaining area being classified as “remote”, according to the Australian Bureau of Statistics (ABS) because of the extremely large distances needed to travel to access essential services and infrastructure. These factors have major implications for the costs of extension services needed to deliver NRM activities, as well as the social resilience of Aboriginal people to cope with the impacts of disadvantage, which impacts on their ability to undertake NRM.

The economy of the region is sustained by the mining, tourism and primary industries, particularly cattle stations and is underpinned by government funding for regional service delivery and defence. The Central Australia region contributes an estimated 18% ($2.9 billion) of the NT Gross State Product. Of this, the largest industry sectors are mining ($552 million), construction ($313 million) and health care and social assistance ($240 million).

Tourism is also a significant driver of the economy in the Arid Lands and it influences almost all other industries in the region as well as the infrastructure needs. Uluru Kata-Tjuta National Park draws over 40% of visitors to the NT every year. According to a study conducted by the Australian Government, the economic importance of tourism in Central Australia relative to the importance of the region’s economy ranked as the highest within Australia at 24.3 % with the national average being 3%. The pastoral industry also contributes significantly to the economy in the region supplying both the domestic market and increasingly the international market.

Social Indicators

During the planning process it was often stressed that human social and cultural aspects of NRM were vital in the NT. Two vital asset categories identified in regional planning workshops related to the social sphere were Community Knowledge and People on Country. It is important to develop indicators that allows us to measure progress against social capacity in NRM activity. NRM activities often have substantial and sustained impact on working relationships, social networks, organisations and individuals beyond the immediate activity. It is important that this is captured and measured through the NRM plan. Therefore, throughout this NRM plan social indicators are embedded throughout the programs and capture aspects such as:

- Effective working relationships and social networks in NRM
- Engagement of regional stakeholders and partnerships developed and strengthened in delivery of NRM
- Organisational capacity
- Stakeholder satisfaction with regional NRM planning and implementation
- Participation, skill-development and employment of Aboriginal people in NRM
- Knowledge of sustainable practices
- Participation in environmental and cultural resource management programs

Muru-warinyi Ankkul Rangers (Tennant Creek) and the Anmatyerr Rangers (Ti-Tree)

LAND TENURE

The Arid Lands region is dominated by three main types of land tenure: Aboriginal land, pastoral lease and protected areas. There is significant cross-over between these land tenure types with each type of land often being managed as the other, for example, Aboriginal land is managed both as protected areas and for pastoral operations.

Aboriginal Land

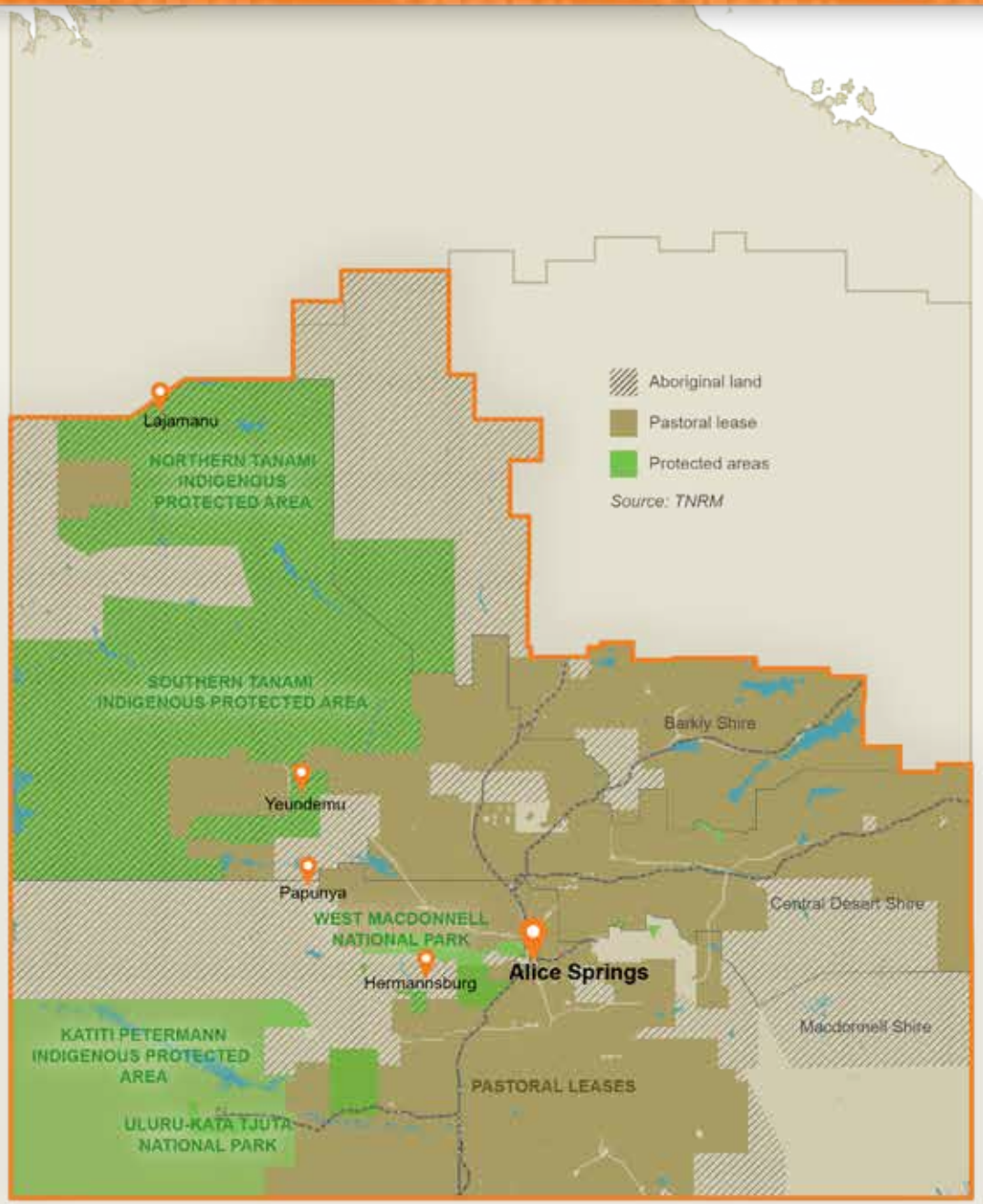
In terms of Aboriginal ownership, the Arid Lands is a unique part of Australia because over 55% (375,750 km square) of the region is under Aboriginal freehold title, held by Aboriginal Land Trusts and administered by the Central Land Council. Exclusive native title is also recognised over sections of Aboriginal freehold title under the Native Title Act 1993. In some areas where freehold title does not exist, Aboriginal people have been granted non-exclusive native title rights or have come to agreements with pastoralists under Indigenous Land Use Agreements.

Pastoral Lease

The Arid Lands region contains over 60 pastoral leases which make up approximately 36% (246,600 km^2) of the area. The average size of cattle stations in central Australia is around 3000km^2. Many are family owned and have been for many generations, with some families managing a number of pastoral leases. The Indigenous Pastoral Program has also increased the number of pastoral operations being run on Aboriginal land and strengthened ties between the pastoral industry and Aboriginal land owners.

Protected Areas

Nearly 23% of the Arid Lands region is classified as a protected area. Most of this area consists of Indigenous Protected Areas (IPA's), the largest being the Southern Tanami IPA (101,600km^2). There are also significant parks and reserves in the region managed by the NT Government under the Territory Parks and Wildlife Conservation Act. The majority of these parks are managed through joint management arrangements with Traditional Owners. Uluru-Kata Tjuta National Park is a Commonwealth reserve on Aboriginal freehold land that is jointly managed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The region also contains Newhaven Wildlife Sanctuary, which is one of Australia's largest non-government protected areas covering 2,620km^2.

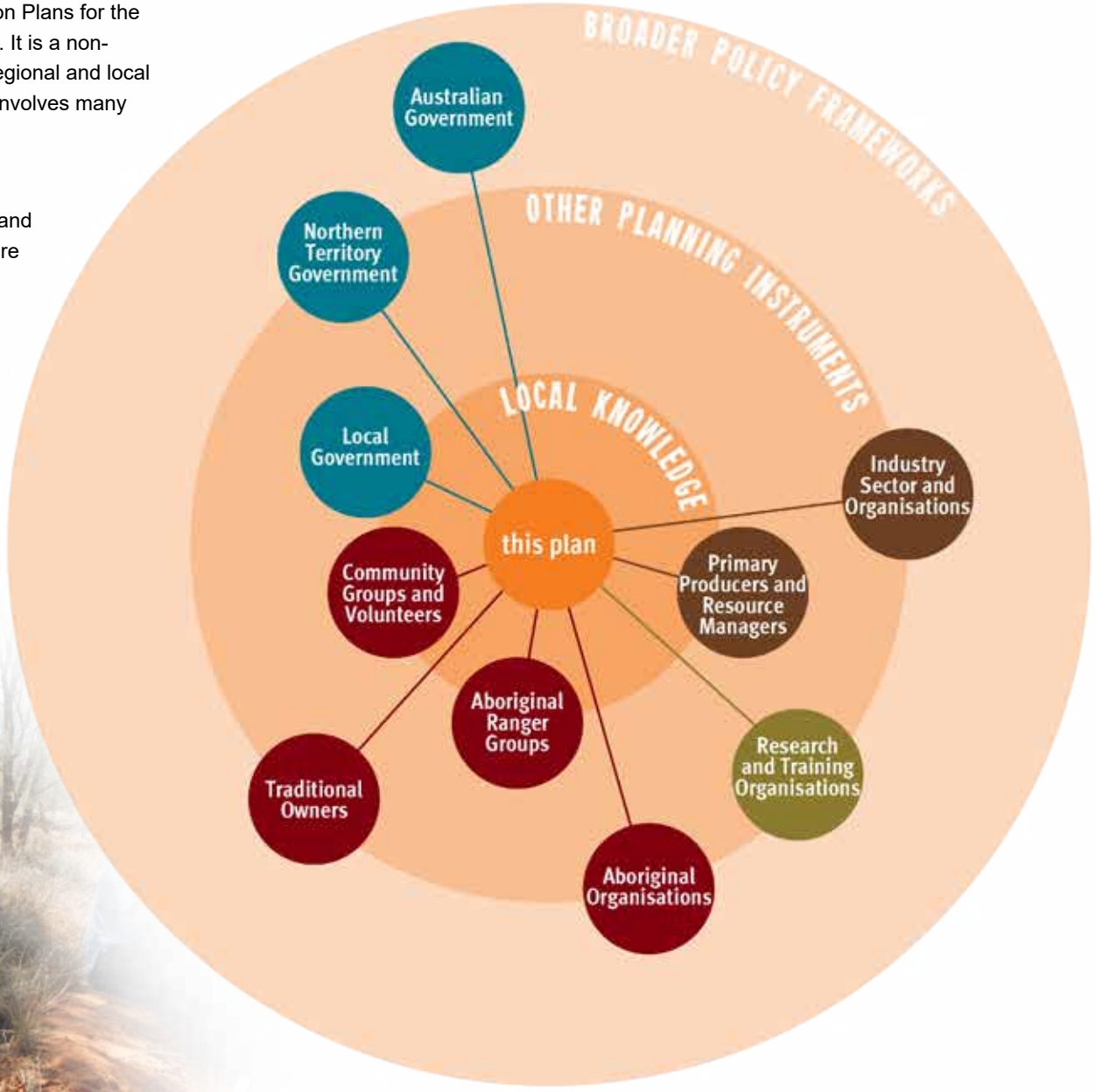


HOW DOES THIS PLAN RELATE TO YOU?

The Arid Lands Regional Action Plan is one of the four Regional Action Plans for the NT that supports the broader NT NRM Management Plan 2016-2020. It is a non-statutory plan which takes into account broader policy frameworks, regional and local planning initiatives and local knowledge. Implementation of the plan involves many stakeholders and effective partnerships are critical to the delivery of investment in NRM.

This plan provides an integrated approach which aims to strengthen and develop strong partnerships and shared goals which are vital to ensure a collaborative approach to sustainable management of our water, land, soils and biodiversity in the Arid Lands. This plan takes into account the wide range of perspectives and local knowledge from many local stakeholders who are involved in NRM. Importantly, it recognises that a strategic and integrated approach involving everyone with an interest in natural and cultural resource management at all levels is vital in caring for and managing the Arid Lands.

Erosion control planning on cattle station



HOW DID WE DEVELOP THE PLAN?

TNRM facilitated a planning process to review NRM priorities in the region. Given the broad nature of NRM and the variety of stakeholders involved it was important to be participatory in our approach to planning. To do this, TNRM utilised the Open Standards for the Practice of Conservation (henceforth, Open Standards) planning framework as it utilises participatory methods that were very useful for planning with multi-stakeholder and diverse groups. This planning framework is increasingly being used by a number of organisations in Australia and around the world and is sometimes also referred to as "Healthy Country Planning" or "Conservation Action Planning". It provides a systematic framework for developing, implementing, monitoring and improving NRM activities.

The development of this plan included planning workshops, interviews, meetings and submissions from a wide variety of stakeholders inclusing Landcare groups, pastoralists, Aboriginal organisations and rangers, government, industry and key experts from research institutions.

1

Review of 2010-2015 NRM Plan

Workshops, meetings and interviews were conducted with community groups, experts and organisational representatives to review the 2010-2015 NRM plan. The plan had a number of measures of achievement linked to the agreed targets. These were assessed and summarised in a Plan Review that was published in November 2014.

2

Regional Workshop

A regional workshop was held in Alice Springs to discuss stakeholders' concerns and priorities for NRM in the region and the most effective ways to address these.

3

Meetings with Local/Regional Experts

A number of meetings were held with local and regional experts to further assist in the development of draft strategies and priority actions.

4

Expert and Sector Input

Industry groups and key government agencies were consulted about the plan and provided input and feedback.

5

NT-wide Prioritisation Workshop

A two-day workshop was held in Darwin with local and regional experts from all regions of the NT was held, including stakeholders from the Arid Lands to further review the plan and to prioritise which strategies and actions were the most feasible and likely to have the greatest impact on looking after our assets.

6

Public Comment for Plans

The Arid Lands Regional NRM Plan was released for public comment and feedback.

7

Publication

Publication of the 2016-2020 NT-wide and Arid Lands NRM Plan.

CLIMATE CHANGE IN THE RANGELANDS

Climate change has been rated as a very high threat to many of the assets identified in this plan. It will also intensify future NRM challenges facing people in the Arid Lands region. In 2012, the Australian Government established the regional NRM Planning for Climate Change Fund, with the aim of improving the capacity of regional NRM organisations and their stakeholders to plan for climate change. Updated climate change projections based on regional clusters around Australia were produced by the CSIRO and Bureau of Meteorology. The Arid Lands region falls within the Northern Rangelands regional projections for climate change. A detailed analysis of climate change projections for Australia's NRM regions is provided at the Climate Change in Australia website: www.climatechangeinaustralia.gov.au

RANGELANDS CLIMATE PREDICTIONS

Average temperatures will continue to increase in all seasons (very high confidence).

More hot days and warm spells are projected with very high confidence. Fewer frosts are projected with high confidence.

Changes to rainfall are possible but unclear.

Increased intensity of extreme rainfall events is projected, with high confidence.

On an annual and decadal basis, natural variability in the climate system can act to either mask or enhance any long-term human induced trend, particularly for rainfall in the next 20 years.

AdaptNRM

Climate Change Adaptation Tools and Resources for NRM

AdaptNRM is a national initiative that aims to support NRM groups in updating their NRM plans to include climate adaptation planning. CSIRO and the National Climate Change Adaptation Research Facility (NCCARF) have provided NRM groups with materials and data products about key individual topics that are regionally and nationally relevant. This plan utilises this information to improve the capacity and resilience of our stakeholders to deal with the impacts of climate change. More information relevant to adaptation and NRM is available through the AdaptNRM website: http://adaptnrm.csiro.au

Western Macdonnell Ranges

CLIMATE CHANGE ADAPTATION

Climate change adaptation is about the ways in which our planning and management approaches need to be continually adjusted to better cope with the challenges imposed by a changing climate. The Australian Government's Regional Planning for Climate Change Fund supported researchers and NRM regional bodies to collaborate on developing adaptation priorities for NRM plans. Priorities for research were identified for the Rangelands region against a number of relevant NRM issues and key adaptation strategies that have been included in this plan, which are specific to the Arid Lands, are summarised in the table. Whilst the climate change research has been incorporated into this plan it is also recognised that our knowledge, experience and approach to adaptation are rapidly evolving. It is recommended that through ongoing review of this plan and related strategic plans that stakeholder groups work through adaptation planning at the local and regional scale. It will be necessary to increasingly integrate adaptation strategies into NRM planning and management activities in the Arid Lands.

Planning for climate change in the Arid Lands encompasses many unique challenges including small declining populations, poor institutional and governance capacity, large distances, different seasonal cycles from temperate Australia and limited investment in and access to arid zone specific information and expertise. Climate change risks exacerbate many of the existing pressures on the region's natural and cultural assets. This will impact upon the natural resources and the livelihoods of people in the region creating the need for innovative solutions to NRM issues and increased resilience of stakeholders to adapt to changes over the life of this plan.

The full reports from the Rangelands Climate Change cluster research can be found at: www.nintione.com.au/resource/AustralianRangelandsAndClimateChange.

PRIORITY	KEY ADAPTATION STRATEGY
Fire Risk	Fire regimes will be modified as warmer temperatures will both increase the duration of the fire season and the fire intensity. The predicted increase in grass fuel loads will also exacerbate the risk of fire and the potential damage that fire poses to infrastructure, ecosystems and human lives.
Freshwater Systems	Climate change will increase pressure on our scarce water resources which are environmentally, culturally and economically significant. The management and restoration of aquatic refugia is a critical adaptation strategy.
Buffel Grass	Buffel Grass has been shown to acclimatise to higher temperatures and to maintain competitiveness and response to fire under increased CO_2. Containment strategies are needed for new infestations.
Grasslands	Increased temperatures and variable rainfall will have an effect on the grasslands and soils which will require a ongoing cautious approach to stocking levels and strict controls of total grazing pressure.
Biodiversity	Climate change will increase pressure on native plants and animals. Options require increased knowledge and careful consideration of the relevant species.
People	Increased temperatures and more frequent heatwaves will impact on the people of the region, especially those living remotely. Development and social programs must consider adaptation responses.
Drought	Increased need for developing and implementing drought management strategies through utilising climate forecasting services and linking to decision making for grazing and other land use.
Pastoral Production	Projected climate change will require a gradual process of adaptation that may require practice change, structural change and supporting legislation to achieve the best long-term results for the pastoral industry and the natural resources on which grazing is based.
Soil	Land managers should endeavour to maintain critical levels of ground cover so as to minimise soil and nutrient loss via dust resulting from wind erosion in dry times.

Source: This is based on research undertaken for the Rangelands NRM cluster.

Ruby Gap Nature Park, Photo: Peter Donohoe

ASSETS

People on Country

Includes remote livelihoods of Aboriginal people, pastoralists and others living throughout the region

Community Knowledge

Includes Indigenous and non-Indigenous knowledge and skills and scientific knowledge

Freshwater Systems

Includes waterholes, salt lakes, soaks, wetlands, clay pans, temporary lakes, rock holes and small permanent spring-fed streams and aquifers

Healthy Soils

Includes soil fertility, structure, health and productivity

Grasslands/Rangelands

Includes spinifex grasslands and associated acacias and desert oak trees

Cultural Landscapes and Sites

Includes Aboriginal sacred sites, heritage places, cultural landscapes and iconic World Heritage sites

Biodiversity and Conservation Sites

Includes threatened species, Sites of Conservation Significance, key conservation sites and healthy habitat

Ranges

All ranges including: Greater MacDonnell Ranges; Uluru and surrounds; the Petermann Ranges; and associated refuge and aquatic habitat

THREATS AND ASSETS

During regional planning workshops participants were asked to identify the main threats and then rank these according to the scope, severity and irreversibility as per the criteria used in the Open Standards planning framework. The highest ranking threats to assets were then identified and strategies and objectives formed to minimise this threat or pressure on an asset. Strategies were also prioritised in terms of likely impact and feasibility. For example, whilst a threat may have scored very high in some instances a feasible strategy was not identified to minimise that threat. This table is intended to be a useful tool for NRM plan review community meetings where there is a diversity of interests. This process formed the basis of the development of the Regional NRM plan.

Threats	People on Country	Community Knowledge	Freshwater Systems	Healthy Soils	Grasslands/ Rangelands	Cultural Landscapes and Sites	Biodiversity and Conservations Sites	Ranges	Summary threat rating
Climate change/extreme weather	very high		medium	high	medium	low	high	high	very high
Feral herbivores			high	medium	high	high	high	medium	high
Loss of knowledge and access	high	high			high	medium			high
Inappropriate fire regimes					medium	high	medium	high	high
Development/infrastructure				high		low			medium
Horticulture and agriculture			medium	medium	low				medium
Feral predators						medium	high	medium	medium
Mining pollution	low		medium			medium			medium
Water use and pollution	medium		high			low		low	medium
Human disturbance			low	medium		medium	low	low	medium
Unmanaged grazing/overutilisation			medium	high	medium		low		medium
Weeds			high		medium	medium	medium	low	medium

ASSET AND PRESSURE DESCRIPTIONS

PEOPLE ON COUNTRY

GOAL: *By 2030, the number of people living in the Arid Lands region has been maintained or increased with well-established remote communities gaining livelihoods through the sustainable use of natural resources.*

People on country refers to the livelihoods of Aboriginal landowners, pastoralists and others in the broader NRM support network. People are integral to the viability and success of NRM programs. This goal is broad and encompasses strategies throughout the NRM plan aiming to strengthen local and regional support networks, government policies and community engagement to support a healthy, thriving, remote population that is well supported by and engaged in economic activities in the Arid Lands.

People are needed on country to manage fire, weeds and feral animals. Aboriginal people also have customary obligations to care for country and perform ceremonies. A broad range of socio-economic benefits as well as conservation outcomes are attributed to Aboriginal people living on and managing custodial lands. Aboriginal ranger groups today provide paid employment for many people. The Central Land Council's community ranger program consists of 11 ranger groups and employs more than 90 Aboriginal people as rangers on their country. There is considerable scope to expand the network of rangers and continue to build their capacity in NRM. The pastoral industry has also been an important source of employment on pastoral lands, with responsibilities extending to weed, feral animal and fire management.

Pressure/Uses

Loss of Knowledge/Lack of Access

Difficulties in being able to access custodial lands and sacred sites due to the remoteness of the region and lack of appropriate resourcing to facilitate this hinders the ability to visit country and carry out cultural and natural resource management. Active networks and policies that support people to occupy remote Aboriginal communities and to implement NRM activities are required. Supportive policies that build remote area infrastructure such as roads and communications that assist both pastoralists and Aboriginal communities in the region are also required.

Climate Change and Severe Weather

Extreme weather and climate will put more pressure on remote rangelands livelihoods. These difficulties are likely to intensify as the climate changes, with an increase in temperature and the number of hot days.

Condition	Trend
VERY GOOD	
GOOD	STEADY
FAIR	
POOR	

Indicators

- Economic status of communities and outstations
- Number of Aboriginal ranger groups engaged in cultural and natural resource management
- Funding and capacity of pastoral Landcare activities
- Population statistics
- The number of NRM enterprises developed in the region
- Economic status of pastoral industry in the region (number of people employed, etc.)

Mustering cattle

Elders planning for country

COMMUNITY KNOWLEDGE

GOAL: *By 2030, access to and sharing of local landholder knowledge, data and scientific information and Aboriginal knowledge (where appropriate) has improved and is utilised to make informed NRM decisions.*

Cultural and natural resource management requires knowledge and skills, whether this is to restore biodiversity values, to undertake sustainable production or to undertake custodial obligations. The diminishment of this has led to a degradation of other assets described in this plan. Loss of community knowledge impedes our capacity to manage the environment and operate successful businesses based on natural resources.

Aboriginal people possess a wealth of knowledge about the Arid Lands and associated management practices that have shaped the Arid Lands for many thousands of years. This knowledge has been handed down through generations and today is contributing to our understanding of species declines and extinctions. A critical step to ensure the maintenance of this knowledge is to recognise and support Aboriginal people to be able to share their insights and stories about the landscape through supporting on country visits. Collaborative projects between scientists and Aboriginal people to document traditional knowledge are also of vital importance. Today, Aboriginal ranger groups are also increasingly incorporating western approaches into their management of country.

The scientific community and community groups hold a wealth of invaluable expertise and on ground understanding vital to carrying out NRM work in the Arid Lands region. Further scientific research in partnership with land managers is required to continue building the knowledge base. Pastoral production is based on an extensive body of knowledge about natural resource management that has been developed over the years since cattle livestock first grazed in the area.

It is imperative that the expertise and insight of stakeholders in the region be captured, valued and shared, so practices and decisions are informed by these knowledge systems. As part of this process stakeholders need to share innovation, improved practices and new information. Formal training and education also have a role in ensuring natural resource managers have the understanding they need to manage effectively.

Pressure/Uses

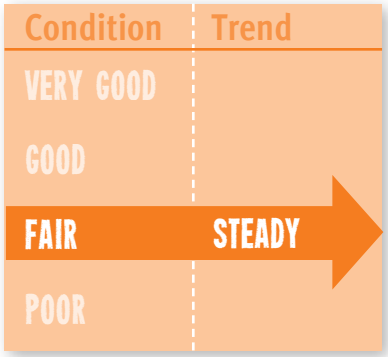
Loss of Knowledge/Lack of Access

Traditional Aboriginal knowledge is reaffirmed by continually being on country and the diminishment of this has had a significant impact on the capacity of Aboriginal people to manage cultural landscapes and sites. Access to ancestral land is difficult in rugged and remote areas. Adequate policies, funding and resources are needed to support both outstation living to facilitate people being able to visit and care for their country.

A loss of knowledge can occur through a loss of technical staff in support organisations, researchers and NRM innovators where there are inadequate systems to share, record and utilise this knowledge. This can lead to the duplication of effort or repeatedly making similar mistakes in our approaches to NRM.

Lack of Capacity and Resources

Knowledge building takes resources, time, commitment and appropriate policies to support this. Most success in building community knowledge has been achieved when opportunities are provided for sharing hands-on experiences of respected members of the industry. Effective extension is costly and increased funding is required, if it is to be strategically delivered with follow-up support.



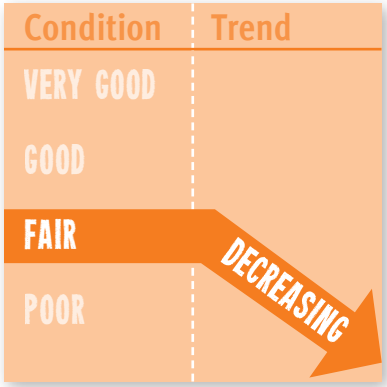
Indicators

- Number of Indigenous traditional ecological knowledge (TEK) projects
- Number of pastoral and agricultural knowledge-sharing projects
- Number of opportunities for inter-generational knowledge transfer
- Number of properties/land trusts with property/NRM plans
- Utilisation of traditional and scientific knowledge systems in NRM
- Number of projects that record cultural knowledge

ASSET AND PRESSURE DESCRIPTIONS

FRESHWATER SYSTEMS

GOAL: *By 2030, the condition of half of the freshwater systems in the Arid Lands has improved.*



The Arid Lands supports a restricted but significant range of freshwater systems that include both groundwater and surface water systems including water holes, salt lakes, soaks, wetlands, clay pans, temporary lakes, rock holes and small permanent spring-fed streams and aquifers. Permanent water bodies in the Arid Lands support endemic and relict aquatic species. There are no permanently flowing rivers or perennial lakes in the region. Many rivers and creeks remain dry throughout the year and only flow when there is rainfall. Aboriginal people hold extensive knowledge of water sources in the region that was critical for survival in the landscape for many thousands of years and many water sources are sacred sites.

These aquatic ecosystems support a significant percentage of the aquatic and terrestrial biodiversity in the region and provide restricted habitats for some rare and unique plant and animal species that play an important role in maintaining healthy aquatic ecosystems, in an otherwise arid landscape. When inundated, inland lakes can hold water for several months and provide critical habitat for waterbirds and migratory shorebirds, as well as drinking water for many bird species such as Budgerigars and Zebra Finches. The Arid Lands region has 24 Sites of Conservation Significance, many of which are wetlands. Eight are of international significance and the remainder of national importance. The NT Government recognises riparian vegetation as sensitive and in need of protection in the Arid Lands.

Freshwater provides an important ecosystem service to the people of the Arid Lands region. Residents of Alice Springs are the highest water users in the region and among the highest in Australia. Pastoralism is heavily reliant on the availability of water and freshwater rock holes provide an important drawcard for tourism to the region. Because of the absence of surface water in the Arid Lands, groundwater is the primary consumptive water resource.

Indicators

- Density and diversity of birds using wetlands for nesting and breeding
- Water extraction, use and recharge
- Mapped feral animal management effort and impact
- Water quality

Pressure/Uses

Feral Animals

Camels, horses and donkeys can trample on and destroy waterholes, wetlands and riparian vegetation. This can result in additional impacts such as erosion of banks and sedimentation of aquatic ecosystems. They can also foul waterholes making them uninhabitable for fish and other species.

Invasive Plants

Riparian areas and wetlands are particularly subject to invasion by exotic weeds such as Athel Pine, which can displace native plants, disrupt water flows, promote erosion, lower water tables and cause salinization of the surface soils.

Water Use

Pumping water from deep underground to supply Alice Springs with water is expensive. More water is taken from the aquifers than they receive from rainfall or river recharges and as result some bores are dropping more than a metre every year.

Mining and Energy Production

As well as water extraction, the impacts of mining can include hydraulic fracturing. Concerns have recently been raised about its impact particularly on groundwater levels and contamination.

Primary Industries

Overgrazing and unrestricted cattle access to waterholes can degrade riparian vegetation and habitats, cause erosion, degrade water quality and spread weeds. River, riparian areas and wetlands are potentially sensitive to surface water and groundwater extraction for agricultural and industrial use.

Climate Change and Severe Weather

The impacts of climate change on freshwater systems are likely to be significant in the Arid Lands with increased temperatures and more hot days predicted.

Recreation and Other Activities

Recreational use and tourism can have a range of adverse impacts on freshwater systems, such as water quality, increased erosion and the loss of riparian vegetation.

HEALTHY SOILS

GOAL: *By 2030, soil erosion issues are decreased and soil fertility maintained through use of improved practices.*

Soils in Central Australia derive from strongly weathered parent material are generally shallow, low in fertility and nutrient levels and are susceptible to erosion. The vast majority of soils have limitations regarding productivity that predisposes the land to degradation. Land managers across the Arid Lands face problems of erosion, loss and declining productivity. The management of soil is of vital importance in land management practices. Low nutrients in soils affect the quality of cattle grazing pasture. To be of economic value properties are vast in size with some paddocks being hundreds of square kilometres in area.

Under the Soil Conservation and Land Utilisation Act areas of land that are subject to soil erosion or that are likely to become subject to soil erosion may be declared as Areas of Erosion Hazard, such as the rural area to the south of Alice Springs which restricts inappropriate land uses or activities in that area. The Centralian Land Management Association (CLMA) has implemented the Ecosystem Management Understanding (EMU) project to help land managers make practical management decisions. Aboriginal ranger groups and pastoralists are undertaking a number of projects to reduce soil erosion.

Pressure/Uses

Primary Industries

Overstocking in some pastoral areas in the past has led to the degradation of soils and the use of appropriate techniques to minimise erosion over pastoral properties is a key strategy in this plan.

Feral Animals

Grazing and trampling by feral animals (horses, donkeys, rabbits and camels) reduces ground cover, compacts soil and causes erosion.

Recreation and Other activities

Driving vehicles on unsealed roads can damage vegetation and create deep tracks leading to erosion.

Cattle

Mt Riddock Station

Condition	Trend
VERY GOOD	
GOOD	
FAIR	STEADY
POOR	

Indicators

- % ground cover – soil stability
- Adoption of best management practices in the pastoral and horticultural industries
- Sediment load in watercourses
- Number of integrated land use plans that consider and address land degradation issues
- Productivity and health of soils in horticultural areas

ASSET AND PRESSURE DESCRIPTIONS

GRASSLANDS/RANGELANDS

GOAL: *By 2030, Grasslands have a diversity of age structures without an increase in the extent of Buffel Grass.*

In the Arid Lands region, spinifex grasslands dominate vast areas of sandy deserts forming extensive hummock grasslands and acacias and desert oak are the dominant trees. River gums and saltbush dominate the floodplains of the inland rivers and saline lakes. A variety of plant species and age structures indicate a healthy rangeland ecosystem that supports a healthy diverse arid ecosystem.

Spinifex grasslands provide habitat for many Arid Land threatened species, several of which have declined to the extent that they are rarely seen. Over 16 types of birds are commonly found in spinifex grasslands. Many reptiles also occur in this habitat including the threatened Great Desert Skink. Of the numerous mammal species found, the Brush-tailed Mulgara and the Greater Bilby are classified as Vulnerable.

Maintaining the condition of rangelands and grasslands is important for both biodiversity conservation and pastoral production. Pastoralism relies on productive grasslands and efforts to protect and improve grazing land health will benefit biodiversity.

Pressure/Uses

Invasive Plants

Buffel Grass is an important production grass for pastoralism in the Arid Lands region. However, its introduction into arid and semi-arid rangelands represents a key threatening process for conservation values. It is an aggressive coloniser, which grows vigorously after rain and takes nutrients out of the ground displacing native grasses. It is also a major threat to the prevalence of plants utilised by Indigenous people. It is also changing fire regimes because it promotes high-intensity fires that reduce native plant diversity and can affect vegetation structure. Watercourses infested with Buffel Grass provide channels for spreading fires. Some pastoralists are also concerned that productivity of Buffel Grass dominated pastures can also decline in the longer term.

Inappropriate Fire

Disruption to Aboriginal fire regimes and high-intensity fires has contributed to the loss of biodiversity and the degradation of grasslands and rangelands. Restoring fire regimes by reducing their frequency, severity and extent is necessary for many species and helps regenerate pasture. A patchy fire system will provide shelter for species that like to feed in the open, but also need protection from predators, such as cats.

Primary Industries

Grasslands in the region are sensitive to overgrazing and some areas have been severely degraded. Pastoralism, by its nature, places pressure on grassland-reliant species, as cattle preferentially graze the most palatable species and remove the cover, forage and seed used by native animals.

Feral Animals

Introduced animals including rabbits, camels, donkeys and horses have caused substantial degradation in the area by adding to the total grazing pressure. They can substantially reduce pastoral values by damaging pastoral fence lines, degrading pasture and impacting on rotational grazing programs aimed at managing native pasture resources.

Climate Change and Extreme Weather

Climate change will increase temperatures leading to more hot days, more intense fires and could increase the likelihood of drought-like conditions. While managers have little capacity to influence the climate, they can improve the resilience of natural and production systems to such conditions by maintaining the landscape in good shape.

Indicators

- Proportion of original grassland extent covered by Buffel Grass
- Proportion and extent of soft native perennials
- Area burned under appropriate fire regimes per season
- Relative proportion of spinifex patch ages
- Condition of native pastures
- Extent of grassland covered by Buffel Grass
- Extent of Buffel Grass on non-pastoral land

Spinifex fire

CULTURAL LANDSCAPES AND SITES

GOAL: *By 2030, culturally significant sites are being managed to reduce the impacts of threats and cultural knowledge is maintained.*

The whole landscape of the Arid Lands has cultural significance for Aboriginal people in the region. Traditional Owners refer to the creation period when ancestral beings created the landscape and its wildlife as they travelled. Many important cultural elements manifest themselves in the Arid Lands as identifiable geographic forms, such as the MacDonnell Ranges, which were created by caterpillar ancestral beings. Today, the region remains alive with the spirits of these ancestral beings and traditional law that informs ceremony, songs, stories and dances that guide how country is looked after. Places or sites of cultural significance may also be ceremonial grounds, rock art galleries or pigment deposits used for cultural practices. Uluru-Kata Tjuta National Park is internationally recognised as a World Heritage property for both its natural and cultural values.

A sacred site has particular significance and refers to a place within the landscape that is sacred to Aboriginal people. Sacred sites include places within the landscape such as hills, rocks, waterholes, trees, plains, lakes and other natural features. Often sacred sites are connected with creation stories and may have significance to several tribal groups across vast areas. They give special meaning to the natural landscape. Custodians of sacred sites have responsibilities to protect and maintain them. Aboriginal sacred sites are recognised and protected as an integral part of the NT's and Australia's cultural heritage through the Northern Territory Aboriginal Sacred Sites Act Sacred Sites Act and the Aboriginal Land Rights (Northern Territory) Act 1976.

Pressure/Uses

Loss of Knowledge and Lack of Access

Loss of knowledge and access is considered one of the main pressures on cultural landscapes and sites. A lack of appropriate resources and support for Traditional Owners to be able to access and manage country threatens this asset. If custodial land is under different ownership, this may also hinder or prevent access to sites.

Recreation and Other Activities

Many sites are threatened by human disturbance from tourism and other recreational activities and need to be managed for visitor impact.

Feral Animals

Feral predators (cats and foxes) and large feral herbivores (camels and horses) can damage cultural sites. Active management of invasive animals and fire management is an important role for site custodians and Traditional Owners.

Inappropriate Fire

Inappropriate fire regimes (often fuelled by Buffel Grass) can threaten sites, for example rock art sites.

Indicators

- Statutory protection and management of sacred sites
- Number of cultural sites being visited annually
- Knowledge of cultural sites
- Programs supporting inter-generational transfer of knowledge
- Condition of Aboriginal languages

Traditional burning of spinifex country

ASSET AND PRESSURE DESCRIPTIONS

BIODIVERSITY AND CONSERVATION SITES

GOAL: *By 2030, diverse populations of threatened species are maintained at 2015 levels and Sites of Conservation Significance are maintained in good condition.*

The biodiversity of the Arid Lands is a broad reaching asset class that focuses mainly on vegetation condition, threatened and susceptible species and landscape function. The Arid Lands region has 24 Sites of Conservation Significance. Eight are of international significance and the rest of national significance. Many of the sites hold water for many months, which is essential for supporting the biodiversity in an arid environment. Recognised internationally for its biodiversity values, the South-west Tanami Desert provides habitat for populations of threatened species such as the Bilby, Brush-tailed Mulgara, Australian Bustard and Great Desert Skink and it is a stronghold for these and other rare or declining species in the NT.

Threatened species in the region include 25 plant species, and five reptiles, 13 mammal, 17 bird and 10 snail species. These include the Mallee Fowl and Night Parrot, which are critically endangered in the NT and the Gouldian Finch, Southern-Marsupial Mole, Crest-Tailed Mulgara and Sandhill Dunnart that are endangered on a national level.

Pressure/Uses

Invasive Plants

Buffel and Couch Grass severely affect the values of many Arid Land Sites of Conservation Significance and threatened species populations. They also alter fire regimes leading to more intense and frequent fires that has further influence on vegetation condition.

Feral Animals

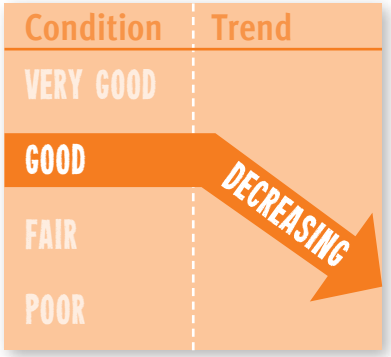
Camels, horses and donkeys facilitate ecosystem change and threaten this asset. Cats and foxes are present in large numbers across most of the region and are having significant impacts on native mammals (including threatened species such as the Bilby, Black-footed Rock-wallaby and Mulgara species), birds and reptiles (including the nationally threatened Great Desert Skink and Slater's Skink).

Primary Industries

The spread of pastoral land use throughout Australian rangelands is a contributing factor to the decline and local, or total, extinction of some components of the biota - notably many arid-zone mammals but also some plant and bird species.

Inappropriate Fire

More intense and frequent fires due mainly to the spread of Buffel Grass are a threat to biodiversity and conservation sites.



Indicators

- Conservation status of threatened species
- Number of different native flora and fauna species - % of expected species within normal ranges of natural variation
- Presence of viable population of indicator species

Rainbow Bee-eater (Source: Peter Donohoe)

Spinifex hopping mouse

RANGES

GOAL: *By 2030, the health of ecosystems including aquatic areas and diversity of habitat within the Ranges is maintained or improved on 2015 levels.*

The ranges of the Arid Lands provide critical habitat and refuges for many species. They contain long-lasting and permanent springs and rock holes that support a wide range of plants and animals that survive only in areas with higher moisture in the otherwise arid landscape of Central Australia. Their gullies and gorges also provide refugia for plants that are fire sensitive. Species, such as the MacDonnell Ranges Cycad and Black-footed Rock-wallaby are only found in ranges.

The ranges are also highly valued for their outstanding scenic values and they attract tourists from all over the world. There are many Aboriginal sacred sites and culturally significant sites associated with ranges in the region. Many of the ranges are listed as either nationally or internationally significant such as the Greater MacDonnell Ranges, Uluru and surrounds and the Petermann Ranges. Other significant range areas in the Arid Lands include Mount Liebig, the Dulcie Ranges and Mount Conner.

Pressure/Uses

Ranges in the Arid Lands face the same pressures and threats as the rest of the landscape but have some particular challenges.

Inappropriate Fire

Fires can be particularly intense in ranges, where fires spread rapidly up steep terrain. Intermittent periods of above average rainfall generate massive fuel loads and fires that can spread over hundreds of square kilometres. Exotic pasture grasses, such as Buffel Grass, also fuel fires and facilitate the spread of fire along watercourses in gorges and gullies.

Feral Animals

Horses, donkeys and camels have caused significant damage to sites within the ranges. Predation by feral cats and foxes is a threatening process for several vertebrate species in the ranges.

Primary Industries

Ranges are vulnerable to overgrazing as cattle can cause erosion in sensitive areas.

Invasive Plants

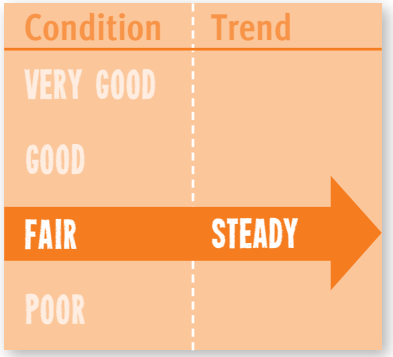
Controlled weeds is challenging in remote and rugged ranges, as access can be difficult. Athel Pine, Buffel Grass and Couch Grass are widespread and considered major management issues.

Recreation and Other Activities

Highly frequented areas and sites within the ranges can have detrimental impacts. Tourism needs to be managed carefully to minimise damage to critical ecosystems.

Climate Change

Due to the unique microclimates provided by waterholes, altitude and sheltered areas in the ranges, climate change has been identified as a threat to the species that depend on them.



Indicators

- Number of ranges identified and managed for conservation values
- Number of Aboriginal ranger groups actively managing these sites
- Number of active weed management plans on these sites
- Number of active feral animal management plans on these sites
- Number of conservation agreements on pastoral lands on these sites
- Number of waterholes fenced to exclude livestock and feral animals
- Patterns of fire seasonality and extent in ranges
- Health of waterholes in ranges ecosystems

HOW TO READ THE PLAN

Background

The background provides a brief summary of the purpose of the program including the overall issues and challenges in delivering it. It also refers to how the program relates to other programs in the plan.

Strategies

Strategies are related management activities or approaches intended to achieve an objective in the plan. A number of strategies are combined in a program to achieve the program objectives.

Priority Activities

Within each strategy there is a series of priority activities that need to be completed to implement the strategy and achieve the objective. Only the main activities are listed here.

Milestones

Milestones are outcomes that we would expect to achieve if the strategy and activities were being delivered. Milestones are 'signposts' that we are moving towards achieving an overall objective. They tell us whether the assumptions made in developing the strategy are correct and whether the activities are being delivered and achieving the intended results.

Objectives

An objective is a statement that details a desired outcome of a project, such as reducing a critical threat. If the project is well thought out and designed, achieving the objectives should help improve asset condition (make them better).

Assets Improved

Assets are the priority things we want to see in good condition to achieve our vision. Different strategies are targeted towards different assets. Only the main relevant assets are listed against each strategy. Each asset has a goal and if the plan is achieved it should lead to achieving the ssset goals.

- People on Country
- Community Knowledge
- Freshwater Systems
- Healthy Soils
- Grasslands/ Rangelands
- Cultural Landscapes and Sites
- Biodiversity and Conservation Sites
- Ranges

Key Measures of Achievement

Key measures of achievement are the things we actually measure that indicate whether the key strategies are being implemented in this program. They indicate activity and actions as well as impact and outcome.

Key Collaborators

The key collaborators are the main groups that are considered responsible for the delivery of the strategies in the plan. In most cases, the full list of stakeholders is very long, however those listed are considered the primary stakeholders to implement and review the program.

PROGRAM 1
MANAGING FIRE

Background

Fire is managed in the Arid Lands region for different purposes depending on the land use, often with different objectives pursued on pastoral, Aboriginal and conservation land. The fire regime is mainly influenced by significant annual/decadal rainfall variability with widespread fire events occurring when rainfall conditions result in a build-up of fuel loads. Fire management is used for natural and cultural management objectives, infrastructure protection, wildfire mitigation and landscape health. The overall objective of this program is to support fire management in Arid Lands to implement a fine-scale patch mosaic in the landscape resulting in improved vegetation condition, biodiversity, cultural knowledge transfer, pastoral productivity and economic benefits

Strategies	Priority Activities	Milestones
HIGH PRIORITY 1.1 Collaborative approaches to strategic fire management are extended across the Arid Lands region	• Strengthen multi-stakeholder regional fire management working groups and establish new ones where necessary to manage cross tenure fire management and planning • Continue and extend regional Aboriginal fire management committees over large areas of Aboriginal land • Support initiatives that provide long-term and flexible funding ensuring it is available for preventative fire management within six months of above average rainfall • Conduct annual reviews and annual implementation of fire plans at a regional level	• Different stakeholders plan and manage fire more collaboratively so that timing and extent of prescribed burning is related to conditions by 2018 • Landscape fire management approaches are extended across Aboriginal land by 2018 • Increased area of land in the Arid Lands is under improved fire regimes leading to less area burnt annually from wildfires
HIGH PRIORITY 1.2 Increase use of spatial fire management tools, knowledge systems, safe burning practices and equipment throughout the Arid Lands	• Further develop northern Australia Fire Information (NAFI) tool with improvements made to applications for users • Deliver training and capacity building for NRM practitioners in the utilisation of fire management tools • Provide more fire management equipment to land managers and support access to country for fire management activities	• Land managers improve capacity to utilise NAFI and other GIS fire planning tools by 2018 • Strategic fire management approaches utilising traditional and contemporary tools are extended across the region by 2018 • Land managers have improved access to equipment and country by 2018
HIGH PRIORITY 1.3 Increase application of fire management techniques that promote biodiversity and ecosystem function and minimise risk to infrastructure and human health across the Arid Lands	• Research the impacts of fire regimes on ecosystem health to develop indicators and ongoing monitoring strategies, and communicate and adapt management approaches • Build capacity of fire managers to measure ecological impacts of fire to improve knowledge base and introduce fire management goals at a finer scale (i.e. specific to ecosystem type) • Support tools and communication products to inform community about fire management • Increase and support the collaboration of fire planning and burning with Traditional Owners, using traditional knowledge in fire management • Continue to strengthen the role of Bushfires NT and particularly the support they give to landholders to prevent and control bushfires to help protect life and property in the NT	• Information is collated, prepared and made available to all land managers about implementing fire regimes that promote ecosystem health by 2018 • Improved fine scale burning occurs based on the ecosystem type, land-use and seasonal conditions by 2018
MEDIUM PRIORITY 1.4 Promote policies and market forces to support collaborative fire management approaches that provide social/cultural benefit in Arid Lands	• Develop and lobby for clear policies that support market based approaches to collaborative fire management • Continue researching opportunities linking fire management with carbon initiatives in the Arid Lands • Increase communication of fire management success to funding bodies	• Offsets are utilised to support collaborative fire management by 2018 • At least one project in the Arid Lands is gaining carbon credits by 2018 • Funding bodies are more aware and supportive of fire management in the Arid Lands by 2018

Objectives

By 2020, fire regimes are more diverse and wildfire extent is lower than the 2000-2010 average

By 2020, fire activity is being planned and monitored utilising GIS and remote sensing across the entire Arid Lands region by all stakeholders

By 2020, fire management is demonstrably based on knowledge of cultural, biodiversity and production values, threats and the best management options

By 2020, policies support long-term fire management in the Arid Lands through economic incentives

Assets Improved

Key Measures of Achievement

- Number of people and organisations involved in collaborative fire management programs
- Trends in fire extent and seasonality in areas with collaborative fire management programs
- Trends in fire extent and severity monitored and reported
- Number of regions planning for and implementing optimum fire regimes
- Number of Traditional Owners involved in fire management
- Economic contribution of fire management activities to regional and remote areas

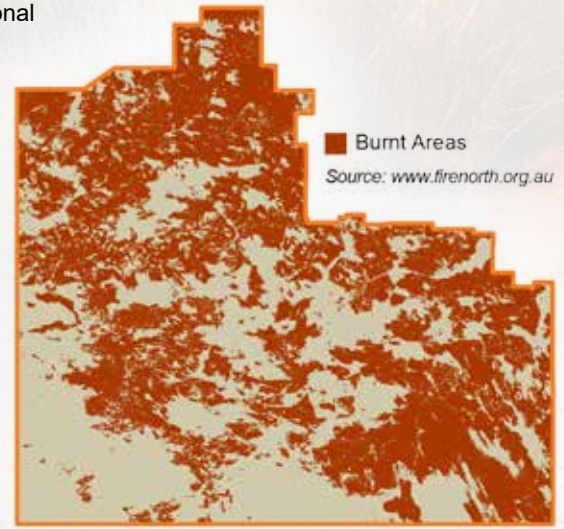
Key Collaborators

Central Land Council, pastoralists, CLMA, researchers, NTG (Bushfires NT), Aust. Govt. (Environment), TNRM, regional shires

> *Fire is an essential component of the Central Australian landscape and has to be used as a management tool consistently*

Fire History for Arid Lands in 2011

This program aims to implement strategies to avoid repition of the extensive fire that occurred in the Arid Lands in 2011. Fire risk is dependent on rainfall and fuel loads and preparing for high risk seasons could avoid this situation recurring.



Spinifex fire

PROGRAM 2

PREVENTING AND MANAGING WEEDS

Background

The overall objective of this program is to manage weeds strategically across the Arid Lands region ensuring that limited resources are prioritised using a risk management approach. The priority weed species in the Arid Lands region are Athel Pine, Cacti, Parkinsonia and Rubber Bush. 'Alert weeds' are species that are not yet naturalised in the Arid Lands region but have high likelihood of spreading and having a high impact, they are Mesquite, Prickly Acacia and Fountain Grass. Buffel Grass is well established and naturalised in many ecosystems in the Arid Lands. Buffel Grass represents a key threatening process for conservation values although it still has value as a pasture species, therefore management objectives differ depending on land use. Buffel Grass reduces native plant diversity, impacts vegetation structure and fire regimes.

Strategies	Potential Activities	Milestones
HIGH PRIORITY Adopt collaborative approaches to weed management in the Arid Lands 2.1	• Implement Athel Pine management plan and continue to monitor effectiveness • Develop and implement action plans for other priority weed species in Arid Lands (Cacti, Parkinsonia and Rubber Bush)	• Ongoing Athel Pine management occurs in key areas • Resources are shared between government agencies and industry bodies to manage priority weeds
VERY HIGH PRIORITY Prevent the introduction of new weeds and the spread of the region's priority weeds 2.2	• Implement NTG Weed Spread Prevention Strategy so that pathways of weed spread are monitored for early detection • Implement Buffel Grass management programs in areas where it is likely to expand its range and at significant high value sites	• New weeds are detected early and eradicated where possible • Each year there is an increase in land managers/community members reporting sightings of priority weeds • An increased number of buffel free sites are monitored and managed by 2018
HIGH PRIORITY Improve adaptive weed management through monitoring, research and utilising data, training and capacity building 2.3	• Identify knowledge gaps and prioritise future research and link to improving the capacity of weed management stakeholders • Trial new weed management techniques and communicate results with land managers • Improve the skills and tools available to record and interpret data on weed distributions and treatment (eg. Garmin Virb, drones, etc.) and standardise data collection where applicable • Create and maintain a NT-wide data portal for all weed records and management effort.	• Research partnerships are strengthened and continue to inform best practice weed management by 2018 • By 2018, aerial mapping of infestations informs control program and finds outlier populations of Athel Pine and other priority weeds • Each year an increasing amount of data is captured, shared, analysed and utilised to inform weed management across different stakeholders
MEDIUM PRIORITY Increase the region's awareness of its priorities and capacity to manage the impacts of weeds 2.4	• Produce and distribute communication materials including field days for all stakeholders • Raise awareness of 'Alert Weeds' as potential high impact weeds should they become established • Ongoing training of land managers in effective control methods and strategic weed management approaches • Communicate weed management success stories to the wider community to encourage support and further activity	• Each year more stakeholders are adopting a 'working together' approach to weed management in the Arid Lands

Objectives

By 2020, the spread of Athel Pine is contained to 2015 levels

By 2020, Cacti, Parkinsonia and Rubber Bush have active weed management implementation programs

By 2020, no new weed species are introduced and existing weeds are not spread to new areas

By 2020, Sites of Conservation Significance or culturally significant sites that are currently buffel-free remain so

By 2020, strategic catchment-based weed management is adopted throughout the region

By 2020, landholders are increasingly responsible and taking more action for weed management

Assets Improved

Key Measures of Achievement

- Number of priority weeds being strategically managed at the catchment scale
- Number of groups/individuals involved in weed spread prevention
- Availability of communication materials for stakeholders
- Extent of utilisation of weed distribution data by natural resource managers

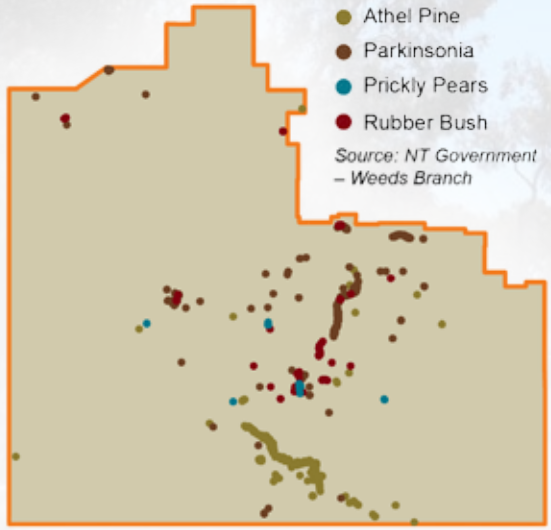
Key Collaborators

NTG (Weeds), TNRM, pastoralists, CLMA, Central Land Council, Aust. Govt. (Environment and Agriculture), landholders, Landcare groups, local government, contractors and other government departments

> "We used to get food like bush tuckers. There were a lot of wild flowers growing. Now they're all gone away because the Buffel Grass has grown on top of them"

Weeds

Distributions of Weeds of National Significance (WoNS) in Arid Lands



Volunteers removing Buffel Grass

PROGRAM 3

REDUCING THE IMPACTS OF FERAL ANIMALS

Background

There is a vast expanse of land in the Arid Lands with significant populations of feral herbivores, particularly camels, horses and donkeys. Managing feral animals is often complex with animals crossing different tenures and with different attitudes and approaches to managing them. To be effective in reducing the impacts of feral animals, integrated and strategic approaches that have clear objectives are necessary. In many cases, there is not a shared goal and approach and generally a lack of coordination to feral animal programs, therefore effort in an NT-wide feral animal management strategy is necessary to move towards a more strategic and coordinated approach. The Australian Feral Camel Management Project (2009-2013) represented one of the few large scale collaborative efforts to control camels at the landscape scale.
It is important to recognise that any gains from this project must be consolidated with ongoing long-term efforts to maintain lower densities around significant target areas. Feral carnivores (foxes and cats) are believed to be a significant threat to arid ecosystems and control programs are complex. Research continues on trialling effective cat control measures and working with land managers to increasingly implement control programs. Feral horses and donkeys are also a significant threat across the region, however opinions on their place in the landscape differ and at this stage the strategy is to work with communities to communicate the threat they pose and possible management plans for these around important areas.

Strategies	Priority Activities	Milestones
VERY HIGH PRIORITY Strengthen regional feral animal management programs through coordinated and collaborative action 3.1	• Develop a feral animal control strategic plan for the NT involving multiple stakeholders and regionally specific agreed priorities • Establish a 'backbone' group to support implementation of landscape feral animal management approaches • Ensure effective collaboration between Fire, Weed and Feral Animal programs • Maintain the advances made by the camel management program through the implementation of the camel ,anagement strategy including cross border and cross tenure collaborative planning	• By 2017, a feral animal strategy for the NT has been developed and is guiding strategic action • By 2018, regional feral animal advisory committees are functioning across the NT • Camels are reduced at key aquatic areas on pastoral properties and Indigenous land (ongoing control program)
HIGH PRIORITY Use common measures and analysis to monitor, evaluate and report on and adapt the feral animal management program 3.2	• Develop field indicators for land managers to quantify the damage and impact of feral herbivores • Establish a data management framework and a NT-wide data portal for all feral animal records and management effort and share through regular reporting to all stakeholders. • Monitor rabbit numbers in the Arid Lands according to seasonal conditions and implement ongoing maintenance as necessary	• By 2018 more consistent and ongoing monitoring programs are being introduced and coordinated across the Arid Lands and feeding into NT-wide feral animal management strategies • Rabbit numbers are regularly monitored and there is no increase in rabbit densities in the Alice Springs rural region by 2018
HIGH PRIORITY Support research and innovation in techniques, training and motivation to control feral animals 3.3	• Research on impact of feral predators on the ecosystem and communication of these results to land managers • Trialling of cat and fox control measures including community programs targeting domestic cats impacting on wildlife and becoming feral • Aboriginal cat tracking skills are utilised and recognised as a useful cat control method with fee for service provided as an employment option in remote areas • Training of Aboriginal ranger groups and land owner involvement in aerial shooting and other culling techniques • Support further investigation of control techniques other than culling • Establish demonstration sites showing the benefits to aquatic ecosystems from horse exclusion and communicate results to landowners	• Consolidate and build interest in and increase motivation to control feral predators across the region by 2017 • Cat and fox control measures are implemented in high value areas with threatened species by 2018 • Each year, reduced number of domestic cats are joining feral animal populations around towns and communities in the Arid Lands • Interest from Aboriginal landowners to control horses around key aquatic areas is increased by 2017 • Horse numbers culled at some selected aquatic areas by 2018
MEDIUM PRIORITY Promote policies, legislation and commercial utilisation that supports objectives in collaborative feral animal control programs 3.4	• Support pilot initiatives that allow for economic development through the commercial utilisation of feral animals and integrate with other control methods	• By 2018 a trial has been completed and evaluated commercially

Objectives

By 2020, feral animal control programs are prioritised and targeted through an NT-wide feral animal strategy that establishes an agreed understanding of the problem, shared measurement and review of actions

By 2020, impacts of camels on arid ecosystems is no greater than 2015 levels

By 2020, monitoring data is being collected from a range of sources consistently and informing strategic action in feral animal management programs

By 2020, the impacts of cats and foxes is reduced at sites of high conservation value

By 2020, the impacts of horses is reduced from some key aquatic sites

By 2020, feral animal control programs are supported through a range of legislation, policies and commercial harvest

Assets Improved

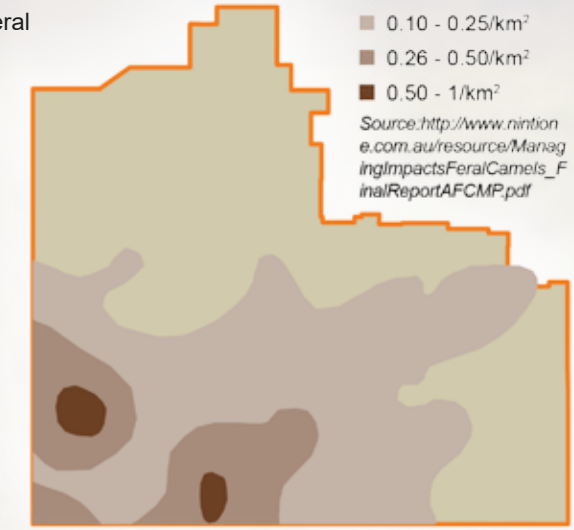
Key Measures of Achievement

- Number of groups/individuals involved in feral animal management programs
- Trends in feral animal distribution as a result of management programs
- Number of landscape scale feral animal management programs
- Availability and utilisation of feral animal distribution data to NRM stakeholders
- Effectiveness of innovative feral animal control approaches

Key Collaborators

NT Govt. (DLRM), Central Land Council, pastoralists, researchers, Aust Govt. (Environment)

"Given the size of the area and how mobile the camels are we really do need to be all working together"



Feral Animals

Estimated camel densities after the National Feral Camel Action Plan in 2013

Camel, Photo: Pat Hodgens

PROGRAM 4

INDUSTRY ADOPTION OF SUSTAINABLE PRACTICES

Background

Much of the Arid Lands is under pastoral lease with some small horticultural production areas. More efficient and sustainable practices have been a major focus of the Landcare movement. Good relations with industry bodies and good intentions of land managers have helped to ensure that primary industries are managed sustainably, efficiently and profitably. The strategies here aim for: continual improvement by delivering best practice industry extension programs building on initiatives such as the Ecosystem Management Understanding program with the pastoral industry; and continuing trials of biochar and other horticultural extension programs encourage innovative ideas to promote sustainable horticulture. Importantly, the Developing the North agenda includes the Arid Lands and any agricultural and mining expansion requires creating partnerships within the NRM community.

Strategies	Priority Activities	Milestones
4.1 MEDIUM PRIORITY Engage with industry to encourage sustainable approaches to 'Developing the North' policies and programs	• Strengthen linkages between NRM managers and researchers and the government agencies and industry bodies responsible for future strategic economic development • Raise awareness of development projects and policies and their potential impacts on environmental and cultural values	• NRM stakeholders have an increased understanding of future strategic development policies by 2018 • Partnerships are increasingly developed between key NRM stakeholders/research institutions and industry bodies and government agencies to ensure best practice in future development.
4.2 MEDIUM PRIORITY Ensure resources are increased for biosecurity support services in line with increased agricultural development	• Implementation of the 2015-2025 NT Biosecurity Strategy, particularly increasing the NRM community's involvement in biosecurity • Develop enhanced surveillance and effective capability to detect and respond to biosecurity emergencies • Build the capacity of Aboriginal ranger groups to undertake biosecurity services	• By 2018, partnerships strengthened between agencies, ranger groups, communities and industry bodies on biosecurity related activities
4.3 HIGH PRIORITY Support best practice grazing management through delivery of regional monitoring programs and promoting practices that encourage both productivity and ecological outcomes	• Develop case studies and demonstration sites showcasing best practice grazing management for biodiversity conservation and production • Facilitate the adoption of new technology in rangelands management and sustainable grazing and encourage pastoralists to conduct their own monitoring to inform grazing practices • Use existing frameworks for developing a unified national rangeland condition assessment tool and implement an annual monitoring program • Develop local management plans and landholder stewardship programs for high value conservation assets • Develop more information on best practices in more intensive cattle production relevant to the NT • Encourage diversification of income streams on pastoral land through alternative activities that support sustainable stocking rates	• Promotion and uptake of sustainable and efficient grazing management tools by 2018 • Link rangelands monitoring and research programs to document and link productivity and biodiversity benefits by 2018 • Each year, more property management plans are developed based on sustainable grazing and NRM principles and implemented on pastoral properties

Continued on next page

Objectives

By 2020, policies and programs for development are better informed by best available science and knowledge to ensure the protection of cultural and natural assets

By 2020, our biosecurity system is integrated and risk-based with strong community involvement that minimises the establishment of exotic pests and diseases

By 2020, best practice sustainable grazing practices are increasingly taken up by the pastoral industry

Assets Improved

Key Measures of Achievement

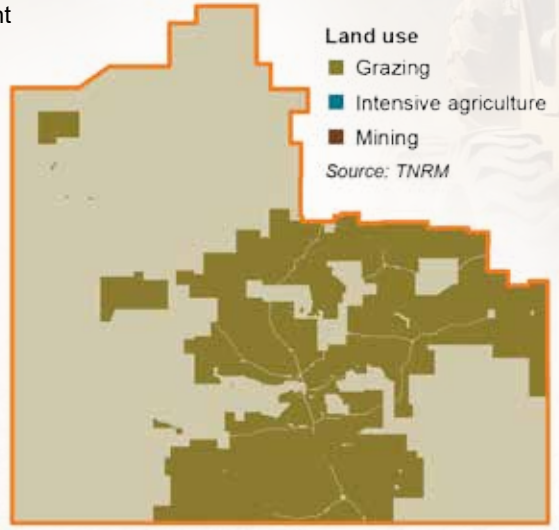
- Number of industry driven extension programs for improving sustainability and profitability developed and implemented
- Response to survey of pastoralists indicating knowledge and adoption of management options
- Level of input from environmental research into 'Developing the North' policies
- Amount of resources dedicated to NRM from industry partnerships
- Level of consideration of climate change in industry development plans
- Systems to involve NRM community in pest and disease detection and eradication in place

Key Collaborators

NT Govt. (DPIF), pastoral industry, researchers, Aust Govt. (Environment), Centrefarm, Indigenous Land Corporation, CLMA, TNRM.

Land Use

Land use map shows the predominant industry in the Arid Lands is cattle grazing



Soil erosion workshop

INDUSTRY ADOPTION OF SUSTAINABLE PRACTICES

Background	Strategies	Priority Activities	Milestones
	MEDIUM PRIORITY Support best practice horticulture and broad scale agriculture through knowledge sharing, adoption of new technology and training and innovation **4.4**	• Conduct a mixture of extension approaches targeting improved horticultural practices – one on one extension, group training, best practice manuals and knowledge sharing and mentoring within the industry • Attract more workers to the horticulture industry and focus on potential Indigenous employment opportunities • Improve access to training especially promoting soil and water management best practice • Increase the use of new and emerging technologies such as the use of drone aircraft, GIS and remote sensing, better land-use planning and soil health plans to improve productivity and sustainability • Trial the use of biochar and other organic farming techniques in a variety of horticultural contexts	• Sustainable practice principles are incorporated into industry strategies and enterprise planning by 2018 • Integrated pest management approaches are utilised in the horticulture industry by 2018 • Horticultural expansion is matched to sustainable water and soil utilisation by 2018
	HIGH PRIORITY Reconcile conflicting management objectives for wild dogs and dingoes **4.5**	• Continue to research the impacts of wild dogs and dingoes on pastoral productivity and biodiversity and engage stakeholders in evidence-based management programs • Prioritise areas where wild dog predation is a priority issue and coordinate efforts in these areas • Identify properties on which dingo populations are being maintained and establish demonstration sites to help measure the impacts	• A strategic management program is developed which includes incentives to maintain dingoes, ongoing monitoring plots, coordinated baiting in high impact areas and communication products by 2018 • Increased understanding and awareness of the role of dingoes in the ecosystem and pastoral production by 2018.
	HIGH PRIORITY Support and promote partnerships between the NRM community and the mining industry regarding mine rehabilitation and offset programs **4.6**	• Establish a working group or advisory committee that includes DME, NT EPA and DLRM, Land Councils and key NGOs such as TNRM to engage with the mining industry to strengthen links and involvement in NRM activity • Encourage the use of the environmental Levy from mining companies to engage NRM stakeholders in legacy mine rehabilitation	• Each year mining offsets are increasingly utilised for NRM programs and activities • Mine sites are increasingly rehabilitated to best NRM practices and standards by 2018.

Objectives

Assets Improved

By 2020, industry driven horticultural extension programs developing understanding of ecosystems and sustainable management are delivered in the Arid Lands

By 2020, dingoes/wild dogs are strategically managed based on understanding of their impact on both pastoral and biodiversity productivity

By 2020, increase the involvement of the mining industry in natural resource management

> "Farmers are natural resource managers. We manage natural resources for economic ends rather than conservation ends but one is no more or less important than the other – preservation is a critical NRM strategy but equally critical is the ongoing learning process around sustainable development"

Dust mitigation seminar

PROGRAM 5

WATER RESOURCES AND SOIL MANAGEMENT

Background

Water resources are essential to the people and ecosystems of the Arid Lands region. Pressure on water resources includes pastoralism, horticulture, mining and domestic usage. It is important that the management and allocation of water resources is equitable for different users but not to the detriment of the important ecosystem function that water has within arid ecosystems. Water resource management must include community consultation and be based upon the best available knowledge. Encouraging stewardship and involvement by all stakeholders will aim to foster a collective interest in sustainably managing water resources in the region. Similarly, soil is an important asset in the Arid Lands that supports NRM industry and ecosystem functions. This program seeks to minimise land degradation and soil loss through improving practices that lessen the impacts of industry and associated infrastructure (roads and fences) on causing soil erosion.

Strategies	Priority Activities	Milestones
HIGH PRIORITY 5.1 Water resource planning and management is undertaken in consultation with multiple stakeholders and underpinned by the best available scientific information	• Involve multiple stakeholders and users representing a range of interests, in water allocation planning in the region • Support research and innovation (including the impacts of climate change) that increase our understanding of water resources • Support water stewardship thorough involving the community in monitoring and in implementing new water monitoring technology and communication materials targeted at behaviour change	• By 2018, water stewardship programs where community is involved in monitoring water health are implemented • By 2018, water resources planning is underpinned by best available knowledge with input and ongoing management of a range of stakeholder and community groups
HIGH PRIORITY 5.2 Increase our knowledge and resources available to understand and manage the impacts on ecosystems and groundwater from mining, pastoral, agricultural and domestic use	• Undertake research to increase our understanding of the impacts of the mining industry on underground aquifers • Continue to research the impacts of domestic usage by pastoral and agricultural industries on water resources • Continue to implement broader water monitoring on both surface and groundwater (including bore meters) to more accurately assess water use • Research and trial water efficiency techniques for pastoral and agricultural industries • Monitor water quality and aquatic ecosystem health to maximise early detection of pollution	• By 2018, our knowledge of the impacts of water use has increased and is informing water resource management decisions • Water efficiency techniques are increasingly utilised by the pastoral and agricultural sectors by 2018.
MEDIUM PRIORITY 5.3 Support training and extension services on sustainable soil management	• Raise awareness of the importance of soil erosion, soil fertility, soil health and soil moisture for primary industries productivity • Collate existing soil information and develop communications materials, particularly targeting contractors on soil conservation, promoting improved soil management practices for roadworks, fence-lines, mining exploration activities and other developments in the landscape • Utilise rangelands remote sensing tools to encourage improved grazing management and enhance production efficiency to minimise soil erosion issues • Continue the requirement for erosion and sediment control plans and adherence for all developments • Land clearing guidelines continue to be reviewed and adapted with new information to deal with potential increased development	• By 2018, awareness and enforcement of legislation for developing roads and other infrastructure is strengthened • By 2018, land managers, industry bodies and contractors conduct improved soil management practices leading to less erosion • By 2018, remote sensing is informing grazing management and minimising soil erosion
MEDIUM PRIORITY 5.4 Identify areas with potential for agricultural development through assessments of soil and water resources	• Immediately undertake research and assessments for areas that are being proposed for new and intensified agricultural development	• By 2018, increased understanding the scope of NRM issues surrounding agricultural development and expansion in the Arid Lands

Objectives

By 2020, water resources that have a moderate to high level of development relative to the water available for development (in consideration of non-consumptive uses) are managed through a water allocation framework which includes monitoring and ensures that cultural, environmental and production values are maintained

By 2020, our knowledge of the impacts of water use by key industrial and domestic users of water resources has increased and a regulatory framework exists to minimise pollution of groundwater

By 2020, soil loss and land degradation are being prevented and, where necessary, addressed

By 2020, areas for agricultural development have been identified with thorough understanding on limitations of soil and water resources

Assets Improved

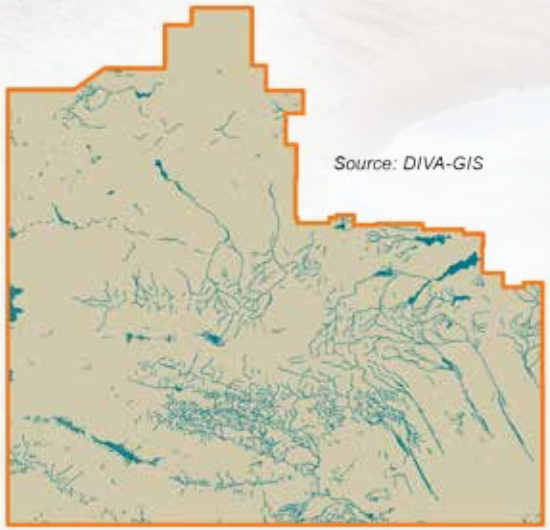
Key Measures of Achievement

- Survey of contractors and land managers about awareness of and adoption of soil management practices
- Number of people/groups involved in water stewardship
- Water allocation plans involve a diverse range of stakeholders
- Water resources have a moderate to high level of development relative to the water available for development (in consideration of non-consumptive uses)
- Number of new sustainable agricultural developments identified based on assessments of soil and water resources

Key Collaborators

NTG (DLRM - Water Resources and Soil), pastoralists, CLMA, researchers, NTG (DPIF), Australian Govt. (Environment and Agriculture), Centrefarm, contractors, horticulturalists, NTG (DME - Mines), mining industry, Central Land Council.

> *If we don't have our soil in check with our Landcare practices there is no point in being here and we want to be able to hand it over to our children in a much better condition than we received it*



Water Resources

Water courses in the Arid Lands

Pat Hodgens conducting water quality testing

PROGRAM 6

NRM BASED ECONOMIC OPPORTUNITIES

Background

NRM based economic opportunities aims to increase the contribution of the conservation economy to the livelihoods and well-being of the people that inhabit the Arid Lands region. This program aims to contribute to supporting people to live on country throughout the Arid Lands region. Opportunities that are particularly relevant to the Arid Lands are: participating in existing and new markets from the harvest of native species, emerging carbon markets, rehabilitation of mine sites and other degraded lands, carrying out environmental offsets, diversification of activities on pastoral lands and creating stronger links with industry in supporting NRM activity. This strategy is mostly about continuing to identify opportunities in the region but must also consider governance, policy and marketing of products to take advantage of emerging opportunities.

Strategies	Priority Activities
MEDIUM PRIORITY 6.1 Develop NRM based economic enterprises based on the harvest of native species	• Continue to identify markets and opportunities • Provide institutional and business support for the development of NRM based economic activities • Simplify systems for permits, monitoring and accreditation • Strengthen ongoing support arrangements for groups/individuals involved in NRM based economic activities.
HIGH PRIORITY 6.2 Develop capacity for fee for service opportunities for Landcare groups, Aboriginal rangers and other NRM groups	• Develop and incorporate business skills into NRM activities • Develop linkages between local groups to business opportunities through websites and other networks • Provide training and business support and mentoring to help establish and manage land and sea management contract businesses • Support Aboriginal enterprises and land managers to tender for potential contract and fee for service opportunities • Enable policies and utilise the mining environmental levy to encourage Indigenous enterprises to tender for mine rehabilitation activities • Support successful Indigenous enterprises to share their stories and to provide mentoring for new enterprises.
MEDIUM PRIORITY 6.3 Support projects and research to develop and participate in national, NT and regional initiatives to develop carbon market programs	• Continued communication of information on carbon market developments to NRM community • Clarify ownership and governance arrangements around carbon stocks • Support the development of methodologies for fire, soil and grazing carbon abatement suitable for rangelands/arid areas • Establish a pilot carbon farming project and replicate successful models throughout the region.
HIGH PRIORITY 6.4 Investigate, progress and communicate emerging primary industry and diversification economic opportunities on Aboriginal and pastoral lands including horticulture, aquaculture and tourism	• Support the research and development of horticultural projects that enable commercial opportunities on Aboriginal and pastoral land • Support projects that increase participation of Aboriginal land owners in remote horticultural and tourism projects • Support emerging and innovative sustainable primary industry activities on pastoral land allowed by the pastoral diversification legislation
MEDIUM PRIORITY 6.5 Investigate and support development opportunities from new environmental technologies and renewables	• Continue trialling biochar and other emerging technologies promoting waste management, soil rehabilitation and carbon opportunities • Support the development of new or existing technologies for renewable energy, carbon abatement and other initiatives that support sustainable industries in the Arid Lands region
MEDIUM PRIORITY 6.6 Link new and emerging opportunities with NRM stakeholders in the NT	• Create new links between industry and corporate bodies and NRM stakeholders particularly looking to deliver new and innovative approaches to NRM • Facilitate opportunities between government and industry and link to the delivery of priorities in this NRM plan • Seek alternative sources of funding for NRM activities through new partnerships with philanthropic organisations and offset arrangements

Milestones	Objectives	Assets Improved
• Most promising products are identified and pursued and markets are developed by 2018 • Business plans, governance arrangements and product marketing for priority ventures are developed by 2018	By 2020, new employment and business opportunities are created based on sustainable harvest of native species	
• New environmental levy is utilised by local NRM groups to rehabilitate legacy mines in the Arid Land region by 2018 • Business mentoring and other support is ongoing to develop emerging Aboriginal land management enterprises	By 2020, ranger groups and other local NRM enterprises are strong and economically viable and supported by a diversity of funding sources and locally based commercial opportunities	
• Link voluntary and other carbon markets to land managers in the Arid Lands by 2017 • Progress opportunities for land managers to gain financial benefit from the developing carbon economy by 2018	By 2020, carbon abatement opportunities are beginning to be taken up in the Arid Lands region	
• By 2018, the horticulture industry is extended across the region on Aboriginal land and land under pastoral lease implementing sustainable practices and increasing local employment • By 2018, there is an increase in other primary industry opportunities on pastoral land in the Arid Lands	By 2020, new employment opportunities are created through diverse primary industries and on different tenures in the Arid Lands	
• By 2018, there are increased numbers of organisations in the 'environmental' sector in the Arid Lands region	By 2020, the renewables and environment sector is contributing more to the Arid Lands economy than in 2015	
• By 2018, there are new partnerships and funding opportunities for NRM stakeholders in the Arid Lands region	By 2020, new opportunities and new partnerships between private sector and NRM stakeholders have been developed	

Key Measures of Achievement

- Number of social and cultural benefits from wild harvesting businesses
- Amount of fee for service contracts carried out by local ranger/NRM groups
- Number of new enterprises on Indigenous and pastoral land in primary industries
- Number of people employed in landscape rehabilitation projects
- Number of people employed in primary industries
- Financial benefit gained from carbon market opportunities
- Number of new industry/corporate partnerships in the NRM sector

Key Collaborators

Centrefarm, Central Land Council, Aboriginal organisations, private industry, NT Govt. (Legacy Mines Unit), NT Govt. (DLRM), pastoralists, researchers, Aust Govt. (Environment), TNRM.

> "It's really, really great for our young to be able to have work opportunities that involve first learning about their country"

PROGRAM 7
MINIMISING ECOLOGICAL FOOTPRINTS OF DEVELOPMENT

Background

The objectives of this program are: to implement measures including environmental planning and management that increase water and energy efficiency and reduce impacts on the environment from residential and industrial development in the Arid Lands; and to build the capacity of local people to undertake environmental management in their own communities. The program also seeks to minimise impacts on natural and cultural assets from recreational activities including tourism, hunting and other activities.

Strategies	Priority Activities	Milestones
MEDIUM PRIORITY 7.1 Minimise the environmental footprint of the major population centres in the Arid Lands	• Support urban sustainability initiatives that promote water and energy efficiency with businesses and other organisations and extend these throughout the Arid Lands • Investigate waste management options in remote towns and communities	• Increased adoption of sustainable practices in towns and communities in the Arid Lands by 2018 • Increased uptake of renewable energy sources such as solar power in the Arid Lands by 2018
HIGH PRIORITY 7.2 Strengthen and consolidate environmental offset arrangements to direct offsets where they are likely to be most effective for NRM in the Arid Lands	• Develop a clear direction to offsets and 'voluntary' offset activities that encourages more investment into NRM • Develop partnerships between the private sector, government and NRM stakeholders to enable the use of offsets to support NRM activities	• Increased alliances between industry bodies and government agencies that promote offsets from development activities to support NRM activities by 2018 • Increased stewardship in NRM and conservation activities from well directed offset funds by 2018
MEDIUM PRIORITY 7.3 Minimise the impact of tourism on the environment through the adoption and promotion of sustainable initiatives	• Develop and support strategies that minimise environmental and cultural impacts of recreational users and visitors to key areas and sites within the Arid Lands • Collaborate with key recreational user groups to manage impacts on key areas	• Management of impacts from tourism on significant environmental and cultural sites by 2018

Objectives

By 2020, towns and communities have improved environmental planning and management in the Arid Lands

By 2020, offsets are well directed and transparent and linked to achieving the prioritised NRM strategies of the Arid Lands

By 2020, there is increased environmental awareness by recreational users in the Arid Lands

Assets Improved

Key Measures of Achievement

- Trends in per capita water and power consumption
- Amount of funds from offsets invested into NRM activities identified in the NRM plan
- Percentage of energy coming from renewable sources
- Public information programs and their uptake
- Number of accredited green tourism programs
- Response to before and after surveys assessing attitudes of recreational users to NRM issues

Key Collaborators

NTG (DLRM), TNRM, Central Land Council, researchers, Aust Govt. (Environment), local government, Arid Lands Environment Centre, landholders.

> "The management of waste in small and remote communities is challenging and many of our communities face barriers when delivering waste management services in small communities"

Cattle at sunset

PROGRAM 8
MANAGING AND PROTECTING KEY NATURAL AND CULTURAL ASSETS

Background

The Arid Lands are vast with many NRM stakeholders having an interest in and responsibility for natural and cultural resource management. The objective of this program is to support the management of key assets in the Arid Lands via a mix of dedicated protected areas including national parks, Indigenous Protected Areas, Territory Conservation Agreements on pastoral land, urban Land for Wildlife and other land management community initiatives. This program also supports Traditional Owners' cultural knowledge systems which are critical in managing culturally significant sites. Also, obtaining good scientific information through research and improving our understanding of climate change on natural assets will assist in protecting significant sites and recovering or managing key species and habitats.

Strategies	Potential Activities	Milestones
8.1 MEDIUM PRIORITY Protect conservation values of Sites of Conservation Significance and other high value areas through collaborative management programs	• Secure resources for planning and management of Sites of Conservation Significance • Identify priority areas for protection • Develop local management plans and landholder stewardship programs • Partner with land managers in priority areas and negotiate voluntary conservation agreements (eg. Territory Conservation Agreements)	• Management plans are developed and implemented for 50% of the SoCs in the Arid Lands by 2018 • Values, threats and management strategies are identified for priority areas by 2018
8.2 HIGH PRIORITY Implement the Action Plan for Priority Threatened Species in the NT (2015-2025) linking on-ground action to the latest knowledge	• Communicate the Action Plan for Priority Threatened Species in the NT (2015-2025) and support its implementation • Link threatened species action in the NT to the National Threatened Species Strategy and implement key priorities relevant to the NT	• Threatened species action is guided by science, practical action and working in partnership by 2018
8.3 MEDIUM PRIORITY Develop adaptation plans to address the impacts of climate change for vulnerable ecosystems in the region	• Undertake research on the likely impacts of climate change on threatened habitats and species in the Arid Lands • Develop management strategies and prioritise actions for vulnerable environmental assets that will be affected by climate change	• Adaptation plans for predicted climate change impacts on vulnerable ecosystems have been developed by 2018 • Awareness of climate change impacts amongst NRM stakeholders and the broader community is increased by 2018
8.4 HIGH PRIORITY Support ongoing mapping and monitoring of rangeland condition in the Arid Lands using remote sensing and field based surveys	• Support and encourage combining monitoring techniques including remote sensing and field-based monitoring and research programs to document the biodiversity benefits of sustainable stock grazing • Support utilisation of remote sensing tools to guide and direct fire management activities (i.e. monitor fuel loads)	• Increased landscape and biodiversity data collection and exchange by 2018 • Rangeland condition assessment tools are developed and utilised by stakeholders by 2019
8.5 HIGH PRIORITY Support best practice management of culturally significant Aboriginal sites and cultural landscapes	• Support and encourage the mapping, documentation and management of culturally significant sites by Traditional Owners • Increase the awareness of industry and government agencies about Aboriginal sacred sites and the processes and mechanisms for their protection in proposed development activities • Ensure that the protection and management of Aboriginal cultural sites is identified and prioritised in fire, weed and feral animal management activities	• Culturally significant sites are increasingly recorded and managed by Traditional Owners by 2018 • Aboriginal ranger groups and Traditional Owners are increasingly supported to visit and carry out cultural site management on all land tenures by 2018 • Increased adoption and awareness of the process for the protection of sacred sites in proposed developments by 2018.

Objectives

By 2020, increase the area under active management (stewardship) for conservation (i.e. weeds, stock and feral animals are managed) and increase the involvement of landholders in stewardship arrangements

By 2020, the approach to threatened species management is more integrated with strong links between research, monitoring and on-ground action showing progress against key indicators in the threatened species action plan

By 2020, our understanding of the impacts of climate change on ecosystem function are informing our management decisions

By 2020, rangeland condition is regularly being monitored and informing land management decisions

By 2020, an increasing number of Traditional Owners and Aboriginal ranger groups are managing culturally significant sites and landscapes

Assets Improved





Key Measures of Achievement

- Number of active management plans being implemented in Sites of Conservation Significance
- Survey of NRM stakeholders on understanding of likely impacts of climate change
- Number of cultural sites actively being managed on all land tenures
- Number of people involved in collecting biodiversity data
- Number of people working on and area under active conservation management
- Level of utilisation of rangeland grazing management tools
- Progress against the threatened species action plan

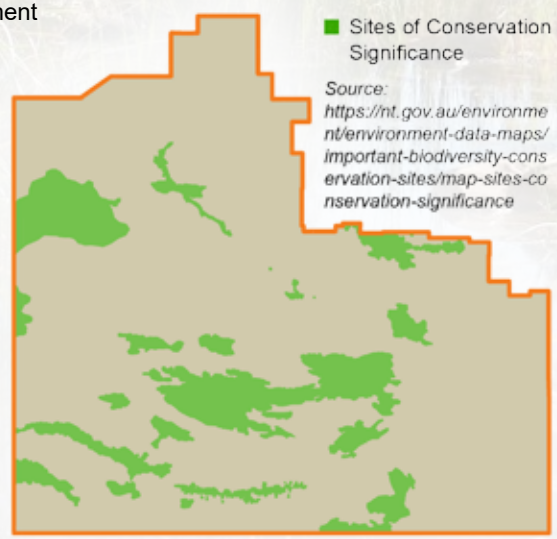
Key Collaborators

NTG (DLRM), Parks and Wildlife, Parks Australia, Central Land Council, pastoralists (CLMA), TNRM, researchers, Aust Govt. (Environment), AAPA, Rangelands Alliance

> "We want a future for our children on our country... our IPA makes us proud... respects our country, our culture and knowledge... so that our children give a future for their children in our ancestors' country"

Sites of Conservation Significance

Sites of Conservation Significance were identified as the most important sites for biodiversity conservation in the NT.



Picton Springs, Arapunya Station

PROGRAM 9
KNOWLEDGE, CAPACITY AND ENGAGEMENT

Background

This program aims to increase knowledge about NRM issues across a broad range of NRM stakeholders in the Arid Lands through both formal and informal training programs and to support strong networks between these stakeholders. It aims to foster a funding environment and policy framework that supports a viable NRM community in the Arid Lands where community groups, volunteers and other land managers are increasingly supported to carry out NRM work utilising the latest scientific knowledge.

Strategies	Priority Activities	Milestones
9.1 MEDIUM PRIORITY Support land managers to record and utilise TEK, scientific research and pastoral knowledge in NRM planning and activities.	• Conduct forums to facilitate knowledge sharing between NRM stakeholders and researchers • Identify knowledge gaps and research priorities in collaboration with key stakeholders • Establish knowledge capture, storage and sharing projects by Traditional Owners and Aboriginal rangers • Develop programs that facilitate community monitoring of key environmental assets (adding to the NT species database) ensuring data collection is relevant, efficient and utilised • Share knowledge through websites, newsletters, fact sheets and other publications.	• Scientific data, TEK and other NRM knowledge systems increasingly inform NRM planning and management in the Arid Lands by 2018 • More meaningful data is being collected and utilised to inform management programs by 2018
9.2 HIGH PRIORITY Strengthen networks and partnerships between NRM stakeholders in the Arid Lands including supporting the development of new partnerships with industry and philanthropic organisations.	• Consolidate and extend landscape level and cross border partnerships through supporting workshops that bring together stakeholders to share knowledge • Support groups that provide specialist support and promotion of NRM activities ('NRM stories') in the Arid Lands (TNRM, Landcare NT, Ten Deserts, Aboriginal ranger groups, CLMA, etc.) • Support collaboration between key technical agencies to provide assistance to local Landcare and other NRM stakeholder groups	• Increased collaboration with NRM stakeholders within the NT Arid Lands and across borders to collectively lobby and work on large landscape issues by 2018 • Ongoing and diversified resources are secured for multi tenure and long-term approaches to NRM issues in the region by 2018.
9.3 MEDIUM PRIORITY Support accredited and informal training in land management and sustainable industry practices in the Arid Lands	• Assess training needs (non-accredited and accredited) for NRM stakeholders and support the delivery of appropriate training where needed particularly supporting skills linked to employment • Assess the efficiency of training and improve where necessary • Introduce stronger mentoring programs in the NRM sector • Support governance and leadership training of locally based NRM groups and establish clearer career pathways in NRM	• Increased training and capacity building of NRM stakeholders in the Arid Lands by 2018 • Capacity building and training activities are evaluated to further improve and target future training and capacity building programs by 2018
9.4 HIGH PRIORITY Ongoing review of NRM outcomes facilitating adaptive management	• Facilitate multi-stakeholder annual reviews of progress against the NRM plan • Support a multi-stakeholder approach to adaptive management to help prioritise funding, resources and effort in areas of highest need	• An annual NRM "report card" document is published by TNRM based on review • Increased numbers of partners join and support the NRM community and resource key strategies identified in the NRM plan

Objectives

By 2020, TNRM Managers are incorporating the best available knowledge, information and data into their management including TEK and community knowledge

By 2020, increased resources and long-term approaches to NRM issues for people managing land in the Arid Lands

By 2020, there is increased and more targeted training in relevant natural resource management skills

By 2020, multi-stakeholder review processes are strengthened in the Arid Lands leading to adaptive management and improved practices and stakeholder cooperation

Assets Improved

Key Measures of Achievement

- Number of accredited and non-accredited training sessions delivered
- Number of graduates of NRM courses
- Number of active Indigenous ranger and pastoral Landcare groups
- Amount of funding provided for NRM in the region
- Number and quality of landscape scale multi-stakeholder workshops in region
- Number and quality of NRM Plan Review and adaptive management processes

Key Collaborators

TNRM, NT Govt. (DLRM), TNRM, Landcare groups, Central Land Council, pastoralists, CLMA, researchers, Aust Govt. (Environment), ALL.

> "As a pastoral Landcare group, it reflects the energy and determination of a small group of land owners, land managers and residents committed to monitoring, maintaining and improving its natural values whilst promoting and overseeing a sensible and considered approach to development"

Central Land Council Ranger workshop

THREATENED SPECIES OF THE ARID LANDS

Threatened Species listings are currently under review and likely to change over the life of this plan. Refer to updated threatened species list at http://www.lrm.nt.gov.au/plants-and-animals/threatened-species/specieslist.

Birds	Nat / NT Status
Australian Painted Snipe	EN / VU
Bar-tailed Godwit	- / VU
Curlew Sandpiper	CE / VU
Gouldian Finch	EN / VU
Great Knot	- / VU
Greater Sand Plover	- / VU
Grey Currawong	- / CE
Grey Falcon	- / VU
Lesser Sand Plover	- / VU
Malleefowl	VU / CE
Masked Owl (northern mainland)	VU / VU
Night Parrot	EN / CE
Plains-wanderer	CE / -
Princess Parrot	VU / VU
Red Goshawk	VU / VU
Red Knot	- / VU
Thick-billed Grasswren (SA Border)	VU / CE
Cycads	**Nat / NT Status**
Armstrong`s Cycad	- / VU
MacDonnell Ranges Cycad	VU / -
Flowering Plants	**Nat / NT Status**
Birds Nest Wattle	VU / -
Bog-Rush	- / VU
Broom Baeckea	- / VU
Caldwells Clubrush	- / EN
Clematis	- / VU
Daisy-Bush	VU / EN
Desert Flannel-flower	VU / VU

Flowering Plants	Nat / NT Status
Dwarf Desert Spike-Rush	VU / VU
George Gill Range Cliff-bush	- / VU
Glory-of-the-Centre	VU / -
Minnie Daisy	VU / VU
Paperbark	- / EN
Red Cabbage Palm	VU / EN
Swamp Twig-Rush	- / EN
Sweet Quandong	- / VU
Tassel Sedge	- / VU
Tjilpi Wattle	VU / VU
Tobermorey Melon	- / VU
Typhonium	- / VU
Undoolya Wattle	VU / VU
Valley Fuschia Bush	VU / -
Waddy Wood	VU / EN
Wrixonia Mintbush	VU / VU

CR - Critically endangered (PE) - Possibly Extinct
EN - Endangered
VU - Vulnerable
DD - Data Deficient

Looking for Bilby tracks in the Tanami Desert

THREATENED SPECIES OF THE ARID LANDS

Mammals	Nat / NT Status
Black-footed Rock-wallaby	VU / -
Brush-tailed Mulgara	VU / VU
Central Rock-rat	EN / EN
Common Brushtail Possum (southern)	- / EN
Crest-tailed Mulgara	EN / VU
Dusky Hopping-mouse	VU / EN
Golden Bandicoot	VU / EN
Greater Bilby	VU / VU
Long-tailed Dunnart	- / VU
Pale Field-rat	- / VU
Plains Mouse	VU / EN
Sandhill Dunnart	EN / -
Southern Marsupial Mole	EN / VU
Reptiles	**Nat / NT Status**
Bronzeback Snake-Lizard	VU / EN
Great Desert Skink	VU / VU
Mertens` Water Monitor	- / VU
Slater`s Egernia	EN / VU
Yellow-spotted Monitor	- / VU

Snails	Nat / NT Status
Bednall's Land Snail	EN / -
Land Snail	EN / EN
Spencer's Land Snail	- / VU
Western MacDonnell's Land Snail	- / VU
Gillen Creek Land Snail	- / VU
Ellery Gorge Land Snail	- / VU
Emiles Land Snail	- / VU
Runutjirbana Land Snail	- / VU
Winnecke Land Snail	- / VU
Watt's Land Snail	- / VU
Invertebrates	**Nat / NT Status**
Desert Sand skipper	EN / -

CR - Critically endangered (PE) - Possibly Extinct
EN - Endangered
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Great Desert Skink

Black-footed Rock-wallaby

SITES OF CONSERVATION SIGNIFICANCE OF THE ARID LANDS

Site name	Significance	World heritage area	Ramsar	% Protected
Andado and Snake Creek lakes	International			0.7
Anmatyerr North	National			-
Beddome Range and Wilyunpa Tablelands	National			-
Cleland Hills and surrounds	National			-
Dulcie Range and surrounds	National			6.3
Elkedra River floodout swamps	National			-
George Gill Range and surrounds	International			48.0
Greater MacDonnell Ranges	International			11.6
Karinga Creek paleodrainage system	International			1.7
Lake Amadeus and Lake Neale	National			-
Lake Lewis and surrounds	National			-
Lake MacKay	International			99.9
Lake Surprise and the Lander River floodout swamps	National			-
Mount Conner and surrounds	National			-
Mount Liebig and surrounds	National			-
Mud Hut Swamp	National			-
Newhaven Lakes	National			77.0
Petermann Ranges and surrounds	National			-
Rodinga Range and adjacent ranges	National			-
South-west Tanami Desert	International			55.3
Uluru and surrounds	International	Uluru-Kata Tjuta National Park		50.1
Waterhouse Range	International			89.9
Wood Duck Swamp	National			-
Davenport and Murchison Ranges	National			11.9

Larapinta Trail, West Macdonnell Ranges

WEEDS OF THE ARID LANDS

Weed lists published are agreed at time of publication but are likely to change over the life of this plan.

Priority Weeds

Species that require priority management attention within the region were determined using rigorous weed risk assessment processes.

Species Name	Common Name	Declared	WONS/KTP
Calotropis procera	Rubber Bush	B/-	-
Cenchrus ciliaris	Buffel Grass	No	KTP
Cylindropuntia sp	Rope cactus sp	B/-	WONS
Opuntia sp	Prickly pears sp	B/-	WONS
Tamarix aphylla	Athel Pine	A/B	WONS
Parkinsonia aculeata	Parkinsonia	B	WONS

'Alert Weeds'

Species not yet fully naturalised in the region, that have the potential to have a high level of impact should it become established, and the likelihood of the species naturalising and spreading is perceived to be high.

Species Name	Common Name	Declared	WONS/KTP
Vachellia nilotica	Prickly acacia	A	WONS
Prosopis pallida	Mesquite	A	WONS
Cenchrus setaceus	Fountain grass	B	-

Other Weeds

Species Name	Common Name	Declared	WONS/KTP
Acanthospermum hispidum	Burr - Star	B	-
Alternanthera pungens	Khaki weed	B	-
Argemone ochroleuca	Mexican poppy	B	-
Carthamus lanatus	Saffron thistle	B	-
Cenchrus echinatus	Mossman river grass	B	-
Datura ferox	Thornapple - Longspine	A	-
Datura inoxia	Thornapple - inoxia	C	-
Datura wrightii	Thornapple - wrightii	C	-
Echium plantagineum	Pattersons curse	A	-
Emex australis	Spiny emex	B	-
Lantana camara	Lantana - common	B	WONS
Ricinus communis	Castor oil plant	B	-
Senna obtusifolia	Senna - Sicklepod	B	-
Senna occidentalis	Senna - Coffee	B	-
Sida sp	Sida sp	B	-
Striga spp	Witchweed spp	C	-
Tribulus sp	Caltrop sp	B	-
Xanthium spinosum	Burr - Bathurst	B	-
Xanthium strumarium	Burr - Noogoora	B	-

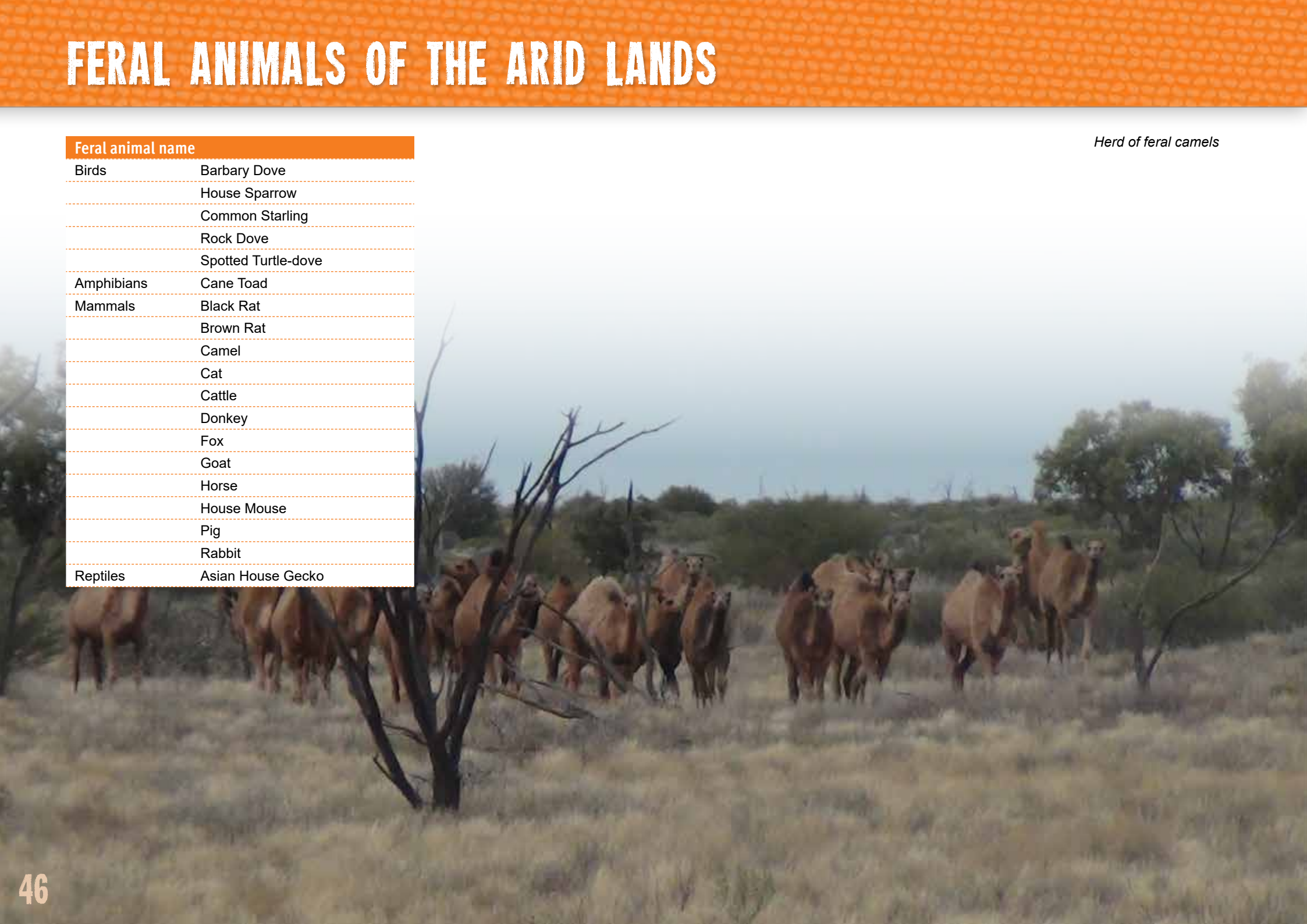
WONS - Weed of National Significance
KTP - Key Threatening Process
Declared weeds - schedule of classees:
A - To be eradicated
B - Growth and spread to be controlled
C - Not to be introduced to the Territory
All Class A and Class B weeds are also considered to be Class C weeds.

Athel Pine removal

Buffel Grass removal

FERAL ANIMALS OF THE ARID LANDS

Feral animal name	
Birds	Barbary Dove
	House Sparrow
	Common Starling
	Rock Dove
	Spotted Turtle-dove
Amphibians	Cane Toad
Mammals	Black Rat
	Brown Rat
	Camel
	Cat
	Cattle
	Donkey
	Fox
	Goat
	Horse
	House Mouse
	Pig
	Rabbit
Reptiles	Asian House Gecko



Herd of feral camels

Territory
Natural Resource
Management