Northern Territory
NATURAL RESOURCE MANAGEMENT PLAN
2016-2020

OVERVIEW

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

This publication is also available at: www.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*
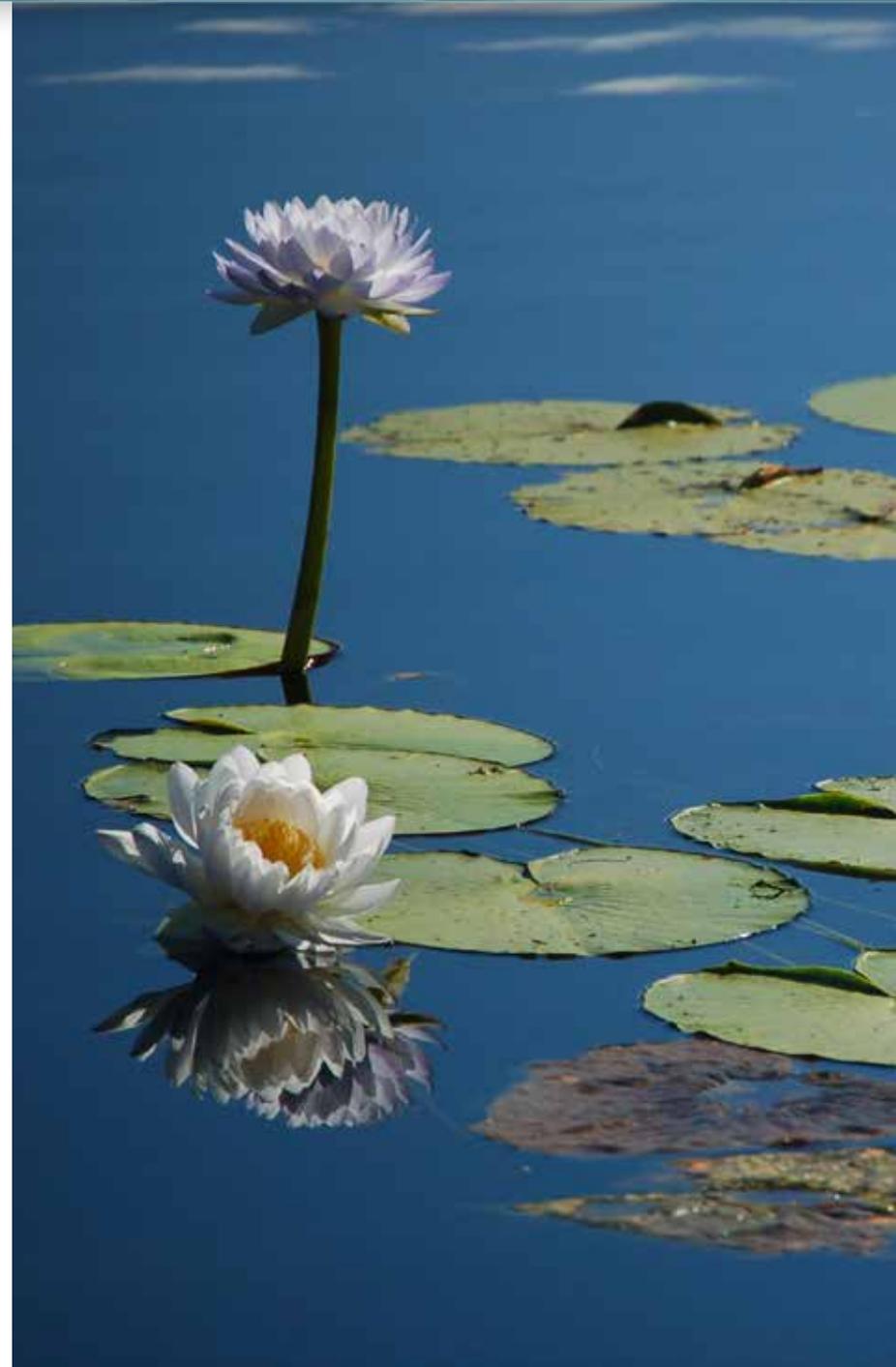
This plan establishes the management direction for the Northern Territory's natural resources for the next five years and beyond. It draws on the 2010-2015 Integrated Natural Resource Management Plan, reflecting on our progress and improving how we prioritise strategies and link our actions to long-term goals.

In recognition that the four regions within the NT face different challenges and opportunities and the need for local decisions, this plan is based around four stand-alone regional NRM plans: Arid Lands, Gulf Savanna, Tablelands and Top End.

This overview plan provides a strategic NT-wide overview of the nine programs outlined in the four regional plans. For each program, the overview describes some of the NT-wide priority strategies, the key areas to monitor and improve our approaches and the level of coordination that occurs across key organisations responsible for implementing actions.

How the NT NRM Plan is structured

Northern Territory
NATURAL RESOURCE
MANAGEMENT PLAN
2016-2020
TOP END REGION

Northern Territory
NATURAL RESOURCE
MANAGEMENT PLAN
2016-2020
GULF SAVANNA REGION

Northern Territory
NATURAL RESOURCE
MANAGEMENT PLAN
2016-2020
ARID LANDS REGION

Northern Territory
NATURAL RESOURCE
MANAGEMENT PLAN
2016-2020
TABLELANDS REGION

SUPPLEMENTARY DOCUMENTS
Assets and Pressures of the Northern Territory

The four regional NRM plans have identified three main classes of attributes to be protected, maintained and enhanced, including natural, cultural and social assets. The pressures or uses on these assets have also been given common classifications across all four plans. These classifications help to link the content across all the regional plans and provide a common language in ongoing review processes.
While regionally specific descriptions, including community driven assessments of condition and trends, have been provided in the documents, further information is provided in the Assets and Pressures of the Northern Territory – Supplementary Information.

ASSETS AND
PRESSURES OF THE
NORTHERN TERRITORY

Carbon in the Northern Territory

TNRM is committed to maximising the potential benefits for natural resources managers and landholders from the emerging carbon economy. Whilst carbon related strategies and actions are identified in the NRM Plans, it is recognised that the carbon economy is dynamic and rapidly evolving. The Carbon in the Northern Territory booklet provides supplementary information on relevant established and emerging carbon opportunities.

CARBON IN THE
NORTHERN TERRITORY
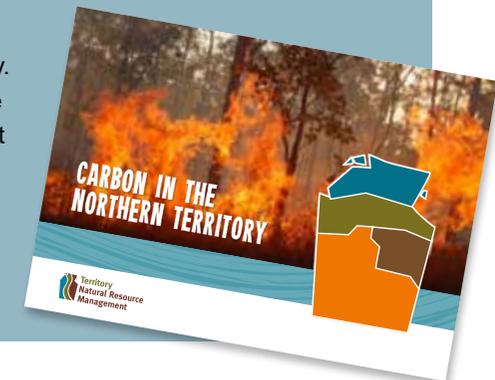
KEY ASSETS AND PRESSURES/USES

ASSETS

Coastal and Marine
Includes mangroves, estuaries, coastal floodplains, intertidal areas, seagrass and coral reef habitat

Freshwater Systems
Includes tropical rivers, wetlands, lakes, swamps, aquifers and aquatic refugia

Healthy Soils
Includes soil fertility, structure, health and productivity

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

People on Country
Includes remote livelihoods of Aboriginal people, pastoralists and others living throughout the region
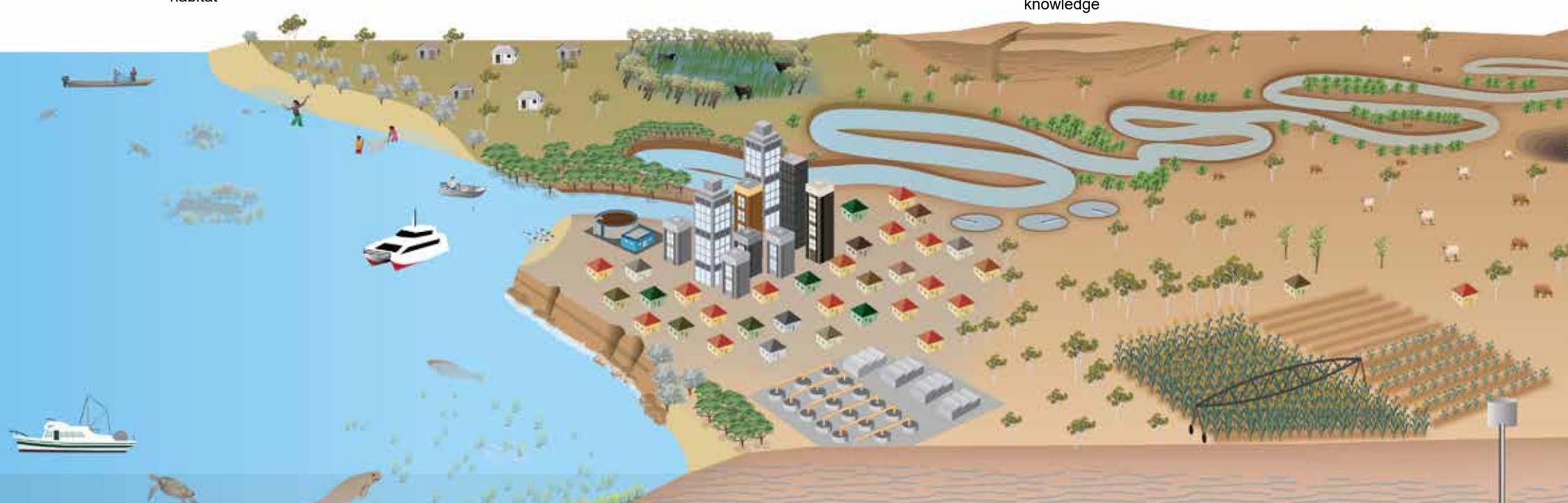
PRESSURES/USES

Pollution
Mining effluent, urban waste water, agriculture (nutrients), garbage and solid waste, atmospheric pollution, and toxic and hazardous substances

Climate Change and Severe Weather
Drought, cyclones/storms, flooding, temperature extremes and long-term climatic changes causing habitat shifting and alteration

Harvesting of Natural Resources
Includes non-sustainable fishing and harvesting of aquatic resources, inappropriate hunting, collecting plants and harvesting timber

Residential and Commercial Development
Urban areas, suburbs, towns, commercial and industrial areas, tourism and recreation sites

Primary Industries
Includes effects of inappropriate pastoralism, horticulture, agriculture, forestry and freshwater and marine aquaculture, and their expansion and intensification when non-sustainable

Ranges

For example, West MacDonnell Ranges, West Arnhem Plateau, Davenport and Murchison Ranges

Grasslands/Rangelands

Includes tropical savanna grasslands, tussock grasses, spinifex grasslands and introduced pasture grasses

Important Sites

Includes Aboriginal sacred sites, heritage places, Sites of Conservation Significance and iconic sites

Biodiversity and Conservation Sites

Key ecosystems, landscapes and habitat
Includes monsoon rainforest, riparian vegetation, mangrove forest and sandsheet heath

Significant plant and animal species
Threatened, endemic or restricted range plant and animal species
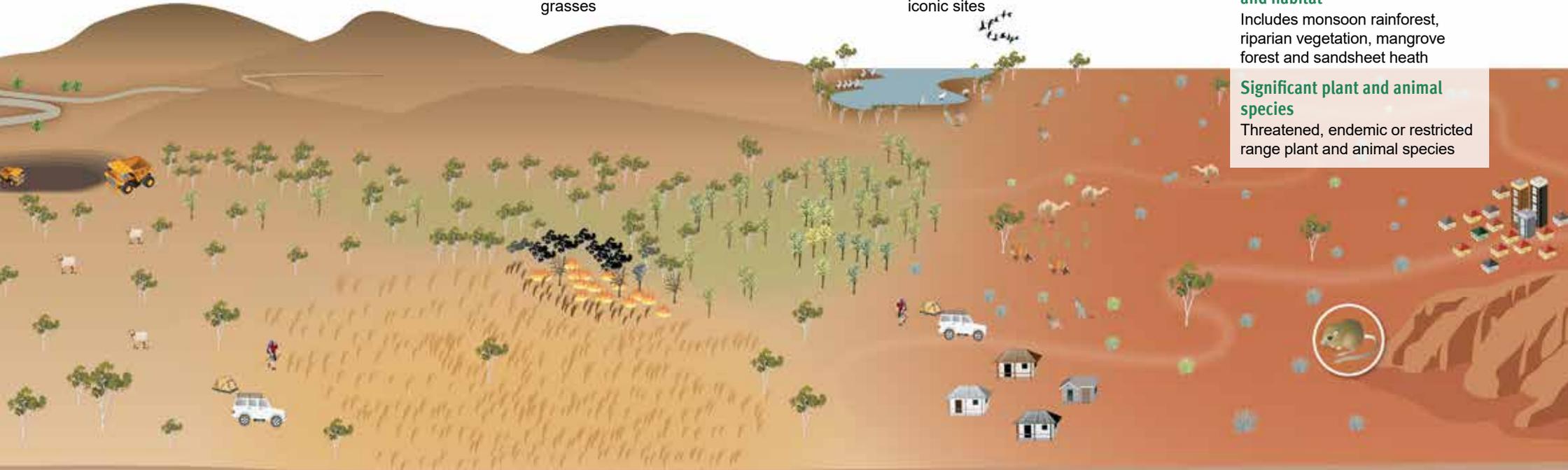
Mining and Energy Production

Includes impacts of oil and gas drilling, mining exploration, quarries, seabed mining, energy production infrastructure, legacy mines and mining operations

Inappropriate Fire

Inappropriate fire management, suppression of or increase in fire frequency

Recreation and Other Activities

Impacts of people in natural environments, including four-wheel driving, camping and other recreation. Includes military training activities

Feral Animals

Includes introduced pest animals such as pigs, Cane Toads, cats, buffaloes, camels, etc

Invasive Plants

Includes weeds and introduced genetic material. Can include over abundant native species

Loss of Knowledge and access

Impacts relating to Aboriginal people not being able to access traditional lands (due to lack of resources and support) as well as loss of technical knowledge in NRM

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NORTHERN TERRITORY PROFILE

LAND

17.5%
of Australia's land mass
1,349,129km²

approximately
50%
Aboriginal land

19% of land is protected areas
251,293km²

more than
10,000km of coastline

85% of coastline is
ABORIGINAL LAND

PEOPLE

244,500 approximately
1% of the Australia's population

30% of NT people are INDIGENOUS

more than **100**
ABORIGINAL LANGUAGES spoken in NT

DARWIN
132,000

KATHERINE
11,000

TENNANT CREEK
3,800

ALICE SPRINGS
28,000

1,579,000 visitors per year

729,000 holiday visitors

ECONOMY

$22.5 billion
Gross State Product
1.3% to Australia's GDP

mining

pastoralism

oil and gas

tourism

defense

Aboriginal customary economy

horticulture

construction

government/ public administration

NATURAL RESOURCES

67 Sites of Conservation Significance

25 on Aboriginal land
24 on pastoral land

189 threatened species

7 feral animals

**17** Weeds of National Significance

CLIMATE CHANGE IN THE NORTHERN TERRITORY
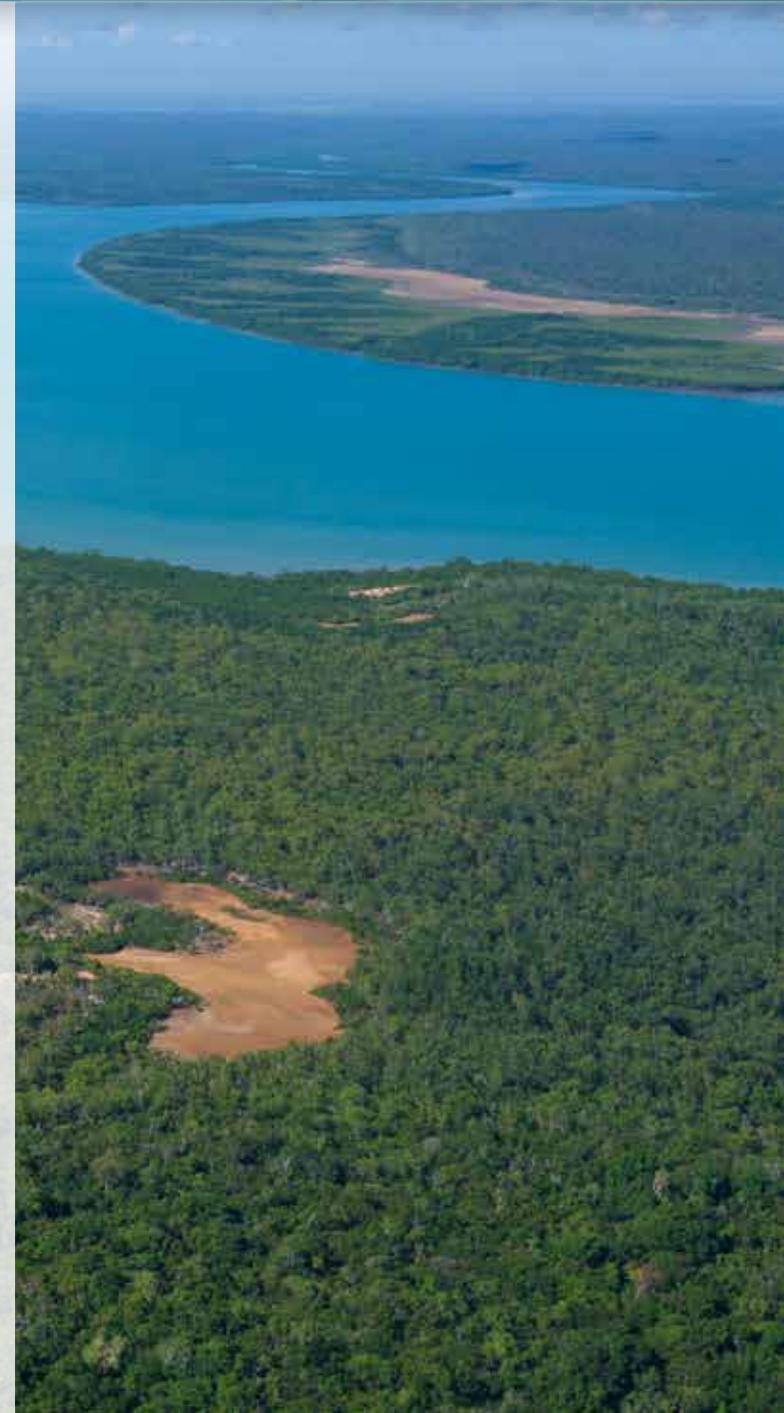
The impacts of climate change will intensify the NRM challenges facing people in the NT. In 2012, the Australian Government established the regional NRM Planning for Climate Change Fund, with the aim of improving the capacity of regional NRM organisations and their stakeholders to plan for climate change.

Updated climate change projections based on regional clusters around Australia were produced by the CSIRO and Bureau of Meteorology. The NT falls within the Monsoonal North and the Rangelands clusters 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

MONSOONAL NORTH

RANGELANDS
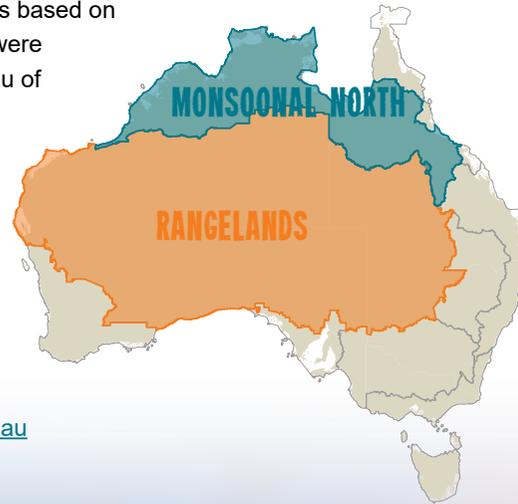
AdaptNRM
Climate Change Adaptation Tools and Resources for NRM

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

MONSOONAL NORTH CLIMATE PREDICTIONS

Average temperatures will continue to increase in all seasons.

More hot days and warm spells.

Changes to rainfall are possible but unclear.

Increased intensity of extreme daily rainfall events.

Mean sea level will continue to rise. Height of extreme sea level events will also increase.

Fewer but more intense tropical cyclones.

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.

CARBON IN THE NORTHERN TERRITORY

Increasing concentrations of greenhouse gasses (GHG) in our atmosphere are threatening both human and ecological systems and the need to reduce global emissions is well recognised. The last century has seen a dramatic increase in GHG levels in our atmosphere with the consequences including rising oceans, a warming planet, species extinction and an increase in extreme weather events such as severe storms, droughts and widespread flooding.

Australia has committed to progressively reducing GHG emissions, leading to policies which enable industry bodies and land managers to generate Australian Carbon Credit Units (ACCUs) which can be sold on the carbon market.

There are a large number of land management activities that are known to alter the amounts of GHG that are either sequestered or emitted, however not all activities are eligible to generate an ACCU. The ability to generate an ACCU through undertaking an activity to increase GHG sequestration or reduce GHG emissions is determined by a set of rules called a project method. The Australian Government has approved a number of methods to generate an ACCU and regularly releases new and improved methods for use. From a natural resources management perspective the relevant methods can be separated into a number of categories.

Traditional burning in Arid Lands

The main GHG sources from natural resources in the NT are:

- Fire in savanna woodlands (over one third of all Territory emissions)

- Livestock (about 17% of emissions, especially methane)

- Fertiliser (nitrous oxide)

- Emissions through vegetation loss due to drought and clearing

- Agriculture and the land sector generate over half of all Territory emissions, a much higher proportion than nationally, and Territory agriculture accounts for around 1.3 % of all Australian GHG emissions

- Opportunities for abatement and incentives for participation within the carbon market differ between regions and areas, with some better suited to generate an ACCU, than others. In the NT, the most common projects being undertaken aim to reduce emissions from fires in the northern savanna.

For more information see the Territory NRM supplmentary guide
CARBON IN THE NORTHERN TERRITORY

Guiding Principles

TNRM supports the positive opportunities that carbon activities provide land managers. We encourage sustainable activities that provide economic and land management benefits while ensuring that negative impacts are avoided. The NRM plan identifies a number of key strategies that link to developing the carbon economy in NRM activities across the Territory. TNRM has developed guiding principles for anyone that would like to implement a carbon project in the NT

1 Projects should achieve **social, environmental and economic benefits** throughout the full project life.

2 Where appropriate projects must include **strong community involvement** and demonstrate **community support**.

3 Projects must support **long-term sustainable land use**.

4 Project design and implementation must take into account the **risks and opportunities** provided by potential future climate scenarios.

5 Projects must **not have adverse** social or environmental impacts.

6 Projects must **not negatively impact** primary production.

7 Projects must **not adversely affect** neighbouring landholders.

Contact Territory NRM to discuss your carbon project ideas.

Registered savanna burning carbon projects in NT as of 17 May 2016
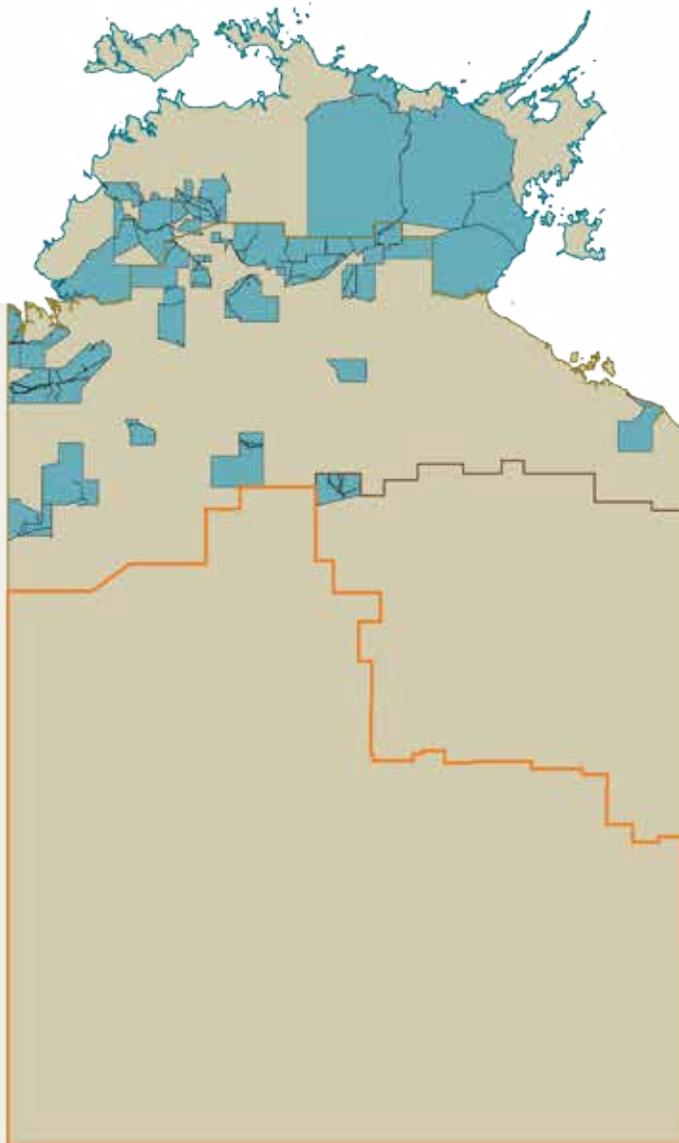
SAVANNA BURNING

Tropical savannas extend across a 1.9 million km^2 area of northern Australia and are influenced by seasonal monsoons. They are complex systems influenced by the interactions of many factors including rainfall, grazing and fire. Consisting of woodland habitat with a grassy understory, their soils are highly weathered, leached and nutrient-poor, and are generally unsuitable for broad-acre agriculture. They are mainly used for livestock grazing, although extensive areas of Indigenous lands and conservation reserves mean the landscape has remained largely intact.

Low intensity fires are an integral part of the savanna nutrient cycle as well as the life cycle of many plants. Fire occurrence is related to seasonal accumulation of organic matter and can be brought about by human or natural causes. GHG emissions from higher intensity late dry season fires are much greater than those from low intensity early dry season fires. Changing land management practices over recent decades has led to increasingly severe fires that release levels of CO_2, methane and nitrous oxide equal to approximately 3% of national GHG emissions and over a third of Territory emissions. The proportion of emissions increases with fire intensity and is influenced by fuel type.

Activities to reduce emissions through managing savanna fires are by far and away the most common projects currently being undertaken in the NT. A number of methods have been developed and refined over the years. The current method for generating ACCU's through a savanna burning project is the Emissions Abatement through Savanna Fire Management method.

Under this method, land managers will need to consider some or all of the following strategies to reduce fire intensity so that less area is burnt by late dry season fires:

- implementing an early dry season fire regime to reduce fuel loads

- reducing the total area of land burnt

- establishing firebreaks or reinforcing natural barriers to contain the spread of severe fires.

Landfill and waste projects (1)

Energy efficiency projects (1)

Savanna burning projects (19)
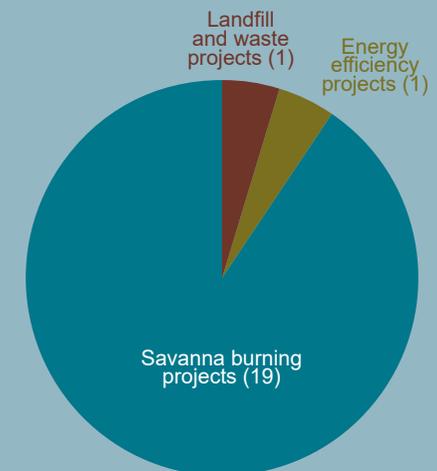
Registered projects are predominantly savanna burning projects

MANAGING FIRE

GOAL
Within 10 years, all regions in the NT have an appropriate fire regime across more than 75% of their area.

KEY ACHIEVEMENTS

- Improved monitoring, reporting and understanding of fire through further refinement and increased utilisation of North Australia Fire Information (NAFI) tools throughout the NT.

- Increased carbon abatement opportunities arising from fire management across high rainfall areas of the Top End.

- Greater collaboration between central Australian ranger groups and improved capacity to manage fire and combine traditional ecological knowledge (TEK) with modern fire management tools.

Spinifex fire

ISSUE
Fire is essential for cultural activities, infrastructure protection, wildfire mitigation and landscape health. Aboriginal people have used fire for thousands of years and as a result, fire is important for maintaining species and habitats. However, changes in land use means that fire is not and cannot be managed as it was in the past.

Fuel loads have decreased in some areas because of grazing by domestic and feral livestock, but increased in areas where exotic grasses have become dominant. Late dry-season fires in the north can burn out hundreds of square kilometres of native vegetation and pasture and in central Australia extensive summer fires burn out the country in years following good rainfall. These large-scale fires can eliminate populations of mammals, reptiles and ground-dwelling birds from vast areas. They can also have a devastating impact on pastoral enterprises. Rarely life threatening in the past, fire hazard is now dangerously high in some areas that have been invaded by introduced grasses, particularly Gamba Grass.

Find out more about fire management strategies in each of the regional plans

NT-WIDE PRIORITIES

- Pursue landscape scale fire management programs through development and implementation of plans that promote a common agenda among landholders across different land tenures

- Implement improved fire management in recognised hotspots such as the western Top End, Southern Arnhem and other key areas

- Utilise spatial fire management tools (e.g. NAFI) and cultural and scientific knowledge systems to evaluate and adapt fire management approaches

- Promote policies and market-based approaches (e.g. carbon credits) promoting fire management approaches that provide social and cultural benefit

MONITORING AND IMPROVING

- More comprehensive analysis, evaluation and planning of fire across the NT will lead to greater collaboration between landowners, managers and agencies

- An increased understanding of the effects of fire regimes in relation to different habitat and ecosystems will lead to improved fire management strategies

- Monitoring the number of carbon credits produced in the NT and number of active carbon abatement (and sequestration) projects will demonstrate achievements in engaging with the carbon economy

COORDINATION

There are some good examples of how coordinated activity has led to improved fire regimes such as the WALFA project in the Top End and the Warlu Committee in the Arid Lands. Building a common agenda among land managers on different land tenures is essential to improving fire management outcomes. Bushfires NT work across the NT and play a key role in coordinating strategic approaches to fire management at the NT-wide scale. However, many other key stakeholders are essential to improving fire management outcomes.

Fire management is also related to weed management and particularly the control of grassy weeds such as Gamba Grass in the Top End and Buffel Grass in the Arid Lands. Promoting understanding among landholders about fire as a land management tool and encouraging more strategic and collaborative approaches so that fire management efforts are more coordinated across landholders is a priority of this NRM plan. Although there are many examples of effective communication networks between stakeholders at a local and regional level, this needs to be improved at a broader scale.

> " We have to find new ways to make this country healthy, so with scientist friends we studied fire in the different seasons. We proved that if we burn in patches and at different times of day we can control the spread and intensity of fires. This makes our soils and plants healthy again. "

Fire at night

Savanna fire

CASE STUDIES

Check out the regional case studies on our website: www.territorynrm.org.au/?

PREVENTING AND MANAGING WEEDS

GOAL

Within 10 years, all regions in the NT have coordinated approaches to weeds resulting in no introductions of new weed species or spread of existing weed populations.

KEY ACHIEVEMENTS

- Development of the NT Government (NTG) weed plan 'Preventing Weed Spread is Everybody's Business'.

- Collaborative partnerships to manage Mimosa pigra on private and Aboriginal land in the Daly River region.

- Increased management of Prickly Acacia in the VRD, as well as the reduction in prickle bush densities in the Barkly Tablelands.

ISSUE

Weeds are an increasing threat to the NT's natural, economic and cultural assets despite considerable time, effort and investment in weed management. Within the NT, 17 weed species are recognised as "Weeds of National Significance" (WoNS). These include Olive Hymenachne, Athel Pine and Bellyache Bush, as well as Mimosa and 'prickle bushes' (Parkinsonia, Prickly Acacia and Mesquite). Gamba Grass has also been classified as a 'key threatening process' to biodiversity conservation. Grassy weeds such as Gamba Grass change the environment by out-competing native plants, increasing fire hazards and preventing native vegetation from growing back after fire, clearing or other disturbances. The cheapest and most effective option is to prevent weeds from becoming established before they cause significant loss to environmental values or agricultural production and not only become expensive, but often impossible, to eradicate. Effective weed management requires good information about identifying weeds and knowing where they occur and the best methods for controlling them. Also, weed management approaches must be coordinated and strategic involving collaboration and support from all landholders in the catchment.

Volunteers removing Buffel grass at Uluṟu-Kata Tjuṯa National Park

Find out about weed prevention and management strategies in each of the regional plans

NT-WIDE PRIORITIES

- Implementation of the NTG weed plan 'Preventing Weed Spread is Everybody's Business' focusing on a collective approach to mitigating weed impacts through spread prevention and strategic control

- Facilitate collaborative approaches to weed management through improved partnerships, information sharing and collaboration from NTG and shire representatives, rangers, pastoralists and researchers

- Secure resources to support innovation and the uptake of new technology to improve approaches to weed detection and control

- Improve monitoring and research capacity including the utilisation of data via the provision of training, communication products and extension services to increase management effectiveness and improve adaptive management approaches

> " Weeds are probably our greatest threat to our environment, we've had some small wins but need to remain vigilant to stay on top of them "

Bellyache Bush

MONITORING AND IMPROVING

- Evaluate the distribution and density of WoNS within the NT

- Assess the number of groups/individuals involved in weed spread prevention

- Determine the availability of communication materials for stakeholders

- Evaluate the extent to which weed distribution data is being utilised by natural resource managers

Parkinsonia

Gamba Grass

COORDINATION

The NTG Weeds Branch coordinates and advises on prevention and management of weeds by promoting effective cost efficient and integrated weed control and facilitating the development of weed management plans. Key stakeholders such as regional pastoral Landcare groups, Aboriginal ranger groups and other major land managers play a critical role in coordinating action related to this program. However, with various funding streams and differing priorities for weed control, the approaches and intended outcomes of weed management are not always shared. Collection of and access to data is important to ensure monitoring and efficient use of resources for key weed issues. There needs to be a shift towards a universally accepted shared measurement of weed management between stakeholders allowing progress to be clearly measured.

CASE STUDIES
Check out the regional case studies on our website: www.territorynrm.org.au/?

REDUCING THE IMPACTS OF FERAL ANIMALS

GOAL

Within 10 years, all regions in the NT have a coordinated and strategic approach to feral animal management programs across more than 75% of their area.

KEY ACHIEVEMENTS

- Community engagement with Aboriginal ranger groups across northern Australia providing fee for service work in quarantine and biosecurity surveillance leading to an increase in capacity for early detection of potential pests.

- Landholders increasingly taking responsibility for and coordinating feral animal control on their land in the Victoria River District.

- Reduced densities of camels at targeted sites to levels now requiring ongoing maintenance.

ISSUE

Feral animals are having a devastating effect on soil, native vegetation and wildlife and are an ongoing cost to NT's agriculture and associated livelihoods. Buffalo, camels, pigs, donkeys, horses, cats, wild dogs and Cane Toads out-compete, eat or poison native animals and domestic livestock, harbour diseases or change the environment through overgrazing and trampling. The introduction and spread of marine pests are also a constant threat to the NT's marine environment and the remote nature of the coastline is also a potential source of introduction of invasive species from neighbouring countries. Feral animals also degrade sites of Aboriginal cultural significance and directly impact on traditional harvest and livelihoods.

Find out about strategies to reduce the impact of feral animals in each of the regional plans

NT-WIDE PRIORITIES

- Develop an NT-wide feral animal management strategy to:
  - » Strengthen regional feral animal management programs through coordinated and collaborative action,
  - » Use common measures and analysis to monitor and evaluate and adapt the feral animal management program.
- Conduct research and promote innovation in techniques, training and motivation to control feral animals finding more effective ways to achieve landscape scale feral animal control
- Strengthen the coordination and delivery of biosecurity surveillance and response to potential pest animals, insects and marine pests

MONITORING AND IMPROVING

- With increased availability and utilisation of feral animal distribution data, stakeholders can more effectively manage feral animals
- Identifying trends in feral animal distribution resulting from the management program will lead to an increased understanding of the effectiveness of management approaches undertaken
- Understanding the number of groups/individuals involved in feral animal management programs and the number of landscape scale feral animal management programs in place

COORDINATION

Feral animal management programs suffer from a lack of coordination. There is no feral animal management strategy for the NT and programs in the past have often been locally driven without a common vision or clear measurements for success, particularly at the broader landscape level. It is recognised that feral animal management would benefit from the development of an NT-wide strategy supported by coordinated, regional, multi-stakeholder groups overseeing progress. There are often different aspirations amongst landholders about what they want to achieve with the control of different feral animals. Priorities, techniques and resources are not always common to all groups. It is often expensive to carry out feral animal management programs particularly at the broader landscape level and it is often unclear what success should look like. Therefore increased coordination is important. The NT Government DLRM and DPIF can play a leading role in coordinating and monitoring NT-wide programs and approaches to feral animal management. Land councils, Aboriginal ranger groups, pastoral Landcare groups, researchers, TNRM and others involved in feral animal control all play an important role in coordinating effort in feral animal management programs.

The feral cat has had a devastating impact on Australian wildlife. It may never be removed from Australia, but will hopefully someday be controlled.

Feral donkey

Feral pig

Feral cat

CASE STUDIES
Check out the regional case studies on our website: www.territorynrm.org.au/?

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INDUSTRY ADOPTION OF SUSTAINABLE PRACTICES

GOAL

Within 10 years, more efficient and sustainable practices around utilisation and management of natural resources are adopted by industry bodies in the NT, ensuring that people's livelihoods and environmental conditions are benefitting from strong economic growth

KEY ACHIEVEMENTS

- The introduction of Environmental Management Systems for the fishing industry that promote sustainable practices.
- The delivery of sustainable grazing extension programs to pastoralists.
- The strengthening and expansion of the NT Environmental Protection Agency into a regulatory body.

ISSUE

The key natural resource management objective for primary industries is to identify where sustainable practices can improve both profitability and environmental health. For livestock production, horticulture and broad scale agriculture, sustainable practices mean: ensuring efficient production or harvesting; avoiding overuse of resources such as land, soil, water or grass; managing fire, weeds and feral animal threats; appropriate use of agricultural chemicals; and minimising and managing waste production. Biosecurity is also vital to the health and development of primary industries in the NT. For commercial fisheries, sustainable practices mean: the efficient harvest of target species; avoiding bycatch or damaging seabed habitats; and minimising and managing waste.

Mining makes a valuable contribution to regional and remote economies by providing jobs and purchasing goods and services. The mining industry aims to operate under principles of ecologically sustainable development, making considerable efforts to restrict impacts to within mine sites and to rehabilitate their mining leases as extraction is completed. However, poor industry frameworks and legislation lead to inappropriate development decisions, as well as deficient operations potentially leading to irreversible environmental decline.

Any expansion of the forestry industry in the NT will require a stronger management and assessment framework.

Feral buffaloes on floodplain

Find out about strategies for industry adoption of sustainable practices in each of the regional plans

NT-WIDE PRIORITIES

- Increase community involvement in biosecurity activities particularly around coastlines and border areas

- Provide forums and opportunities that promote the adoption of best practice in primary industries through monitoring, knowledge sharing, adoption of new technology, training and innovation

- Instigate partnerships between the NRM community and the mining industry regarding mine rehabilitation and offset programs

- Implement adaptation planning for the likely impacts of climate change on industry

MONITORING AND IMPROVING

- Assess the number of industry driven extension programs developed and implemented that improve sustainability and profitability

- Conduct and evaluate follow-up surveys of participants of industry-driven extension programs about the influence of these programs on their practices

- Quantify the level of funding provided for biosecurity extension and support services

- Evaluate the level of alignment between mining offsets and NRM priorities

COORDINATION

Industry bodies in the NT draw upon the good intentions of industry members to ensure primary industries are managed sustainably, efficiently and profitably. The NT Cattlemen's Association, NT Seafood Council and NT Farmers Association have partnered in the past with NRM to deliver programs that promote and encourage sustainable practices within their industry. They play a crucial role in coordinating many of the activities in the program. The increasing role of the NT Environmental Protection Agency also allows for greater coordination regarding the adoption of sustainable practices in industry. However, sustainable practices are not well defined in many primary industries and in some cases there is no shared sustainability agenda. Policies and associated debate around 'Developing the North' are useful for developing a framework around what is considered appropriate and sustainable for future development in the NT. TNRM supports and encourages sustainable practices by industry bodies through training workshops, communication products and innovation to improve practices.

Erosion control workshop

CASE STUDIES
Check out the regional case studies on our website: www.territorynrm.org.au/?

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WATER RESOURCES AND SOIL MANAGEMENT

GOAL

Within 10 years, all regions in the NT have increased knowledge that is being applied to both water resource planning and allocation, and soil management practices.

ISSUE

Compared to other areas within Australia the soils and water resources in the NT have not been subject to the same development pressures. The development of northern Australian industries is the focus of national interest. Of increasing nationwide interest are: the productivity of our pastoral sector, expansion of irrigated agriculture ventures, and the development of new aquaculture ventures and mining, oil and petroleum industries.

The NT already has the highest per capita consumption of water of any of the other states and territories in Australia. The proposed expansion of industries will place unprecedented pressure on both the water and soil resources in the NT.

Sustainable water resource management and allocation needs to address the diverse and complex cultural, ecological and social values associated with water resources in collaboration with multiple stakeholders within the NT. Climate change is also increasingly impacting water and soil resources and an adaptive management approach needs to be adopted. We must also continue to increase our knowledge and understanding of groundwater and the impacts of various uses on water resource dependent ecosystems and associated productivity. We need to continue to develop an equitable process for using water based on need and availability.

KEY ACHIEVEMENTS

- Increased resources to investigate soil and water suitability of potential agricultural expansion areas by the NT Government.
- Extension services for managing soil erosion and promoting best practice in soil conservation.
- Collection and availability of land and water assessment information.
- Changes to the Water Act which require the mining industry to comply with this legislation for water use.

River in the Gulf Savanna region

Find out about strategies for managing water resources in each of the regional plans

NT-WIDE PRIORITIES

- Collate soil information and create communications products on soil conservation that target contractors on soil conservation and provide increased training and extension services regarding sustainable soil management to primary producers throughout the NT

- Consult widely with multiple stakeholders regarding water resource planning and management and ensure these are underpinned by the best available scientific information

- Provide resources and policies to increase our understanding about the impacts of mining, pastoral and domestic use of water on ecosystems and groundwater, through resources and policies to facilitate this

- Identify areas with potential for agricultural development through assessments of soil and water resources

> 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 quality testing

MONITORING AND IMPROVING

- Ongoing surveys of contractors and land managers about their awareness and adoption of soil management practices will determine changes in understanding and behaviours

- Assessing the number of people/groups involved in water stewardship will provide more information regarding the adoption of these practices which can be used to encourage more widespread adoption of stewardship practices throughout the NT.

- Determine progress by quantifying the number of water resources and allocation plans developed and number of people/groups involved in developing the plans to determine progress

Urban Landcare rehabilitation project

COORDINATION

There is a clear role for the NT Government to lead the coordination of water resources policies, planning and allocation. Whilst landowners have a stewardship role to manage water responsibly, the overall coordination comes from the NTG's Water Resources Division. Coordinating the knowledge and interests of researchers, primary producers, Aboriginal Land Councils, local government and the general community is essential for developing community ownership of water resource management plans. Water resources research is a key theme of the National Environmental Science Program (Northern Hub) and it is essential that this research links directly to decision-making for water resources management. Developing a common agenda for water management through establishing ongoing and consistent communication and planning processes is integral to achieving sustainable utilisation of water resources.

The NTG soil division of DLRM and primary producers are mainly responsible for coordinating effort on managing soil resources. Improvements to soil management can be achieved through the utilisation of emerging data collection and soil monitoring tools (including remote sensing and the adoption of new technology and practices).

CASE STUDIES

Check out the regional case studies on our website:
www.territorynrm.org.au/?

NRM BASED ECONOMIC OPPORTUNITIES

GOAL

Within 10 years, the conservation economy and NRM based economic opportunities are supporting rural livelihoods in all regions in the NT.

KEY ACHIEVEMENTS

- Further development of carbon abatement from savanna burning in the Top End supporting livelihoods, culture and improving fire regimes.

- Further development of the Kakadu Plum (*Terminalia ferdinandiana*) industry supporting wild harvest by Indigenous communities.

- Amendments to the *Pastoral Land Act 1992 (NT)* allowing diversification of activities on pastoral properties, thereby opening up opportunities to build enterprise and industry resilience.

ISSUE

Mining, pastoralism and tourism are the most significant sectors providing employment and contributing to the economic wealth and well-being of rural and remote parts of the NT. Opportunities in the conservation economy in the NT include: carbon farming through savanna burning and soil carbon; biosecurity surveillance; rehabilitation of mine sites and other degraded land; bush food and sustainable harvest of wildlife enterprises; removal and monitoring of marine debris; private biodiversity conservation and monitoring. These activities aim to not only benefit the environment, but also have enduring social and cultural benefits to those providing the services. They also offer opportunities for Indigenous people to live and work on country in remote areas where there may be few other job options. These types of opportunities can also assist pastoralists and other primary producers to diversify income streams and bolster the economic viability of their enterprises while enhancing the environmental values of their land.

Good governance, policy, business and marketing skills are required to advance many of these economic opportunities. Conservation economy options should be considered when making decisions about the best use of land and should be incorporated into primary industries strategies and plans for 'Developing the North'.

Find out about strategies for NRM based economic opportunities in each of the regional plans

NT-WIDE PRIORITIES

- Fund supportive activities that enable the development of NRM based economic enterprises based on the harvest of native species

- Develop capacity to enable local NRM groups to further engage with fee for service opportunities

- Support development of carbon methods, collaboration and engagement in national, NT and regional initiatives to develop carbon market programs

- Investigate, progress and communicate opportunities for emerging primary industries and economic diversification on Aboriginal and pastoral lands including horticulture, aquaculture and tourism

- Investigate and support development opportunities from new environmental technologies and renewables

> " *Its very important to look after this country, cause you know we look after country and country look after us. If that country healthy then we know we are healthy. We wanna live on country cause it's our country, its our home, our people our great great grandfather live here for a long time* "

MONITORING AND IMPROVING

- Determine the number of commercial Indigenous wild-harvesting enterprises

- Calculate the number of fee for service contracts carried out by local ranger groups

- Calculate the number of new enterprises on Indigenous and pastoral land in horticulture

- Evaluate the financial benefit gained from carbon market opportunities

Maxie Priest of Corella Creek community and Dr Michael Hammer, fish survey

COORDINATION

This program is generally about supporting people to live on country and to support economically viable remote and rural populations. While there has been some progress in coordinating activities within some aspects of NRM based economic opportunity provision, there is still a need to coordinate development of clear policies and support for rural and remote people. Small scale NRM based enterprises are integral to supporting remote and rural people in the 'Developing the North' economic policies. Commitment to and support for developing enterprises that recognise the NT's unique challenges and opportunities will greatly assist development and progress in this area. Communicating about successful enterprises and building better engagement with these activities is also important. It is important that researchers, industry, government and land owners coordinate to advance the strategies identified in this program. Coordinating bodies can include large Aboriginal Land Councils, carbon brokers that aggregate carbon opportunities, industry representative groups, government technical officers and businesses that seek commercial opportunities in NRM. To increase progress towards the program goal, it is important to strengthen links between practitioners skilled in business and marketing and land managers.

CASE STUDIES

Check out the regional case studies on our website: www.territorynrm.org.au/?

MINIMISING ECOLOGICAL FOOTPRINTS OF DEVELOPMENT

GOAL
Within 10 years, energy and water efficiency have improved to be equal with comparable areas in Australia and offsets are utilised for high priority NRM activities.

KEY ACHIEVEMENTS

- Establishment of water and energy use efficiency programs – Living Water Smart, Smarter Business Solutions (NTG), CoolMob, etc.

- The introduction of an environmental rehabilitation levy on mining companies which contributes to legacy mine rehabilitation as well as the requirement to provide publicly available environmental reports.

- Introduction of compliance and enforcement procedures by the NT EPA based on risk management plans for hazardous substance handling.

ISSUE
The NT is recognised and valued for its relatively intact natural environments. Our water, beaches and air are in a more pristine condition than those of more populous and developed parts of Australia and our landscapes and waterways retain much of their integrity. Nevertheless, the future prosperity of the Territory depends upon continuing economic and infrastructure development, which, if not carefully managed, could result in degraded environmental conditions.

Urban expansion and growth of towns and communities will place more demands on resources and pressure on the natural environment. Pollution risks include: the contamination of water systems with chemicals or heavy metals from mine sites; nutrients from agriculture; and wastewater and pollutant discharges and debris from marine vessels.

Compared with other jurisdictions in Australia, the NT does not have a good record when it comes to energy and water efficiency, with our per person water and energy consumption being the highest in the country.

Minimising the environmental footprint of these developments requires a focus on energy and water use efficiency and minimising pollution and waste. There is clearly scope for improving water efficiency. In cases where approved development cannot avoid causing some environmental degradation, this needs to be offset by an investment in programs to improve environmental conditions elsewhere. This program aims to encourage an increased focus on and understanding between all stakeholders about the opportunities of offsets to fund NRM and conservation activities between all stakeholders.

Rubber bush blocking stock access

Find out about strategies to minimise ecological footprints of development in each of the regional plans

NT-WIDE PRIORITIES

- Promote development approval processes, plans and policies to establish clear strategies for urban and peri-urban development that minimises ecological damage and maximises community involvement

- Assess procedures for current hazardous substance handling and emergency response and improve where necessary

- Develop a clear direction to offset activities that increases investment into priority NRM activities

- Develop and support strategies that minimise environmental and cultural impacts of tourism and recreational users on the environment through collaboration with key recreational user groups

MONITORING AND IMPROVING

- Monitor trends in per capita water and power consumption and better target key areas where efficiencies are most likely to be achieved

- Assess the type and amount of funds from offsets invested into NRM activities

- Determine the percentage of energy deriving from renewable sources and assess the level that policies support the uptake of incentives for renewable energy

- Calculate the number of accredited green tourism programs and level of engagement of recreational user groups in sustainability measures

COORDINATION

Environmental management and development in the NT has suffered from a lack of coordination in the past, however, increasing pressure and demands on natural resources has meant that legislation, planning and policies have been further developed and formalised. There are a number of environmental groups and organisations working on sustainability issues that would benefit from greater coordination between groups. Examples where NGOs, community groups, industry bodies and government agencies collaborate to develop balanced approaches to development are not common in the NT, however some initiatives in response to the 'Developing the North' White Paper have sought to develop a more cohesive collective policy position on sustainable development. Kimberley to Cape, NT Farmers Food Futures and the 'Developing the North' Office have all made efforts to increase coordination around future policy and planning in the NT. The NT Environment Protection Agency is strengthening and formalising policies and frameworks around waste management and pollution control.

> " *Changes in our climate are a serious and present danger for communities in the NT. A number of our communities are already feeling the effects with warming temperatures and more severe weather events.* "
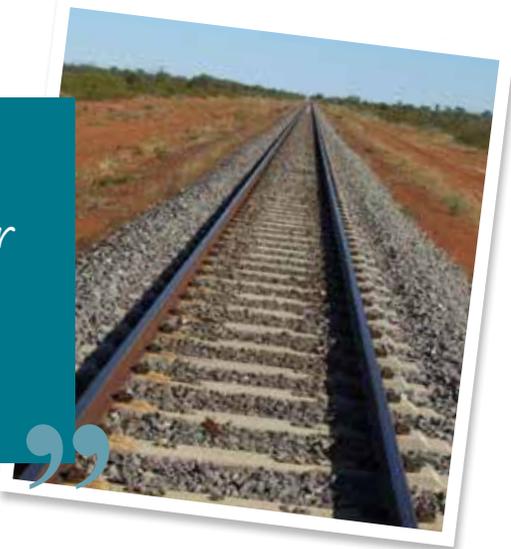
Scott Creek Station

CASE STUDIES

Check out the regional case studies on our website:
www.territorynrm.org.au/?

MANAGING AND PROTECTING KEY NATURAL AND CULTURAL ASSETS

GOAL

Within 10 years, 75% of sites of cultural and natural significance are being managed cooperatively, based on knowledge of values, threats and the best management practices.

KEY ACHIEVEMENTS

- Increased number of Indigenous Protected Areas declared and developed.

- Increased utilisation of traditional ecological knowledge in the management of cultural sites.

- Reduced density and impact of feral herbivores in key aquatic sites in arid areas.

- Increased understanding of small mammal decline.

- Establishment of projects supporting the long-term monitoring of coastal dolphins in Darwin Harbour and the abundance and distribution of dugongs in the NT.

- Increased capacity to manage threats on the Arafura Swamp.

ISSUE

The NT is known for its magnificent natural landscapes and seascapes and deeply significant cultural values. The Arnhem Land Plateau rock art galleries are renowned as the most complex and extensive body of rock art in the world. Our deserts, savannas, woodlands, monsoon forests and wetlands are still largely intact. Despite this, the environmental and cultural assets of the NT are under increasing pressure. Threatening processes that impact on these assets include inappropriate fire regimes, feral animals, climate change, weeds and overgrazing by domestic livestock.

There has been a drastic decline and loss of many of our native species in the NT. The most concerning aspect of this environmental deterioration is the decline of terrestrial mammals. In the NT, we understand that all landholders have an interest in and responsibility for maintaining natural and cultural assets. Therefore, it is essential that landholders are being supported through adequate resources, knowledge and capacity to manage these assets.

One of the key pressures affecting cultural assets is the loss of Aboriginal knowledge and access to ancestral land and waters. This is in part due to a lack of appropriate resources and support for Traditional Owners to be able to access and manage country. Of great concern to Aboriginal people is the potentially negative impact of development activities on sacred sites. Management of cultural sites and landscapes needs to be driven by and address the values and concerns of, the relevant Traditional Owners.

Katherine Gorge

Find out about strategies to manage and protect key natural and cultural assets in each of the regional plans

NT-WIDE PRIORITIES

- Implement the Action Plan for Priority Threatened Species in the NT (2015-2025) linking on-ground action to current knowledge by providing funding and partnerships with land managers

- Identify Sites of Conservation Significance at risk and implement additional conservation efforts supporting management of cultural values

- Facilitate stewardship of high value conservation areas through schemes such as Territory Conservation Agreements and Indigenous Protected Areas

- Develop adaptation plans for the impact of climate change on vulnerable ecosystems

- Support traditional ecological knowledge projects such as mapping, documentation, access and management of Aboriginal culturally significant sites and landscapes

> " 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. "

MONITORING AND IMPROVING

With increased availability and utilisation of biodiversity data, stakeholders can more effectively monitor and understand change in ecosystems. Communication and analysis of where natural values are declining and detection of trends in biodiversity and habitat health will also help target appropriate management actions.

- Assess the number of active management plans being implemented in Sites of Conservation Significance

- Determine the number of people involved in collecting biodiversity data and utilisation of data to influence management activities

- Survey of NRM stakeholders on understanding of likely impacts of climate change on ecosystems

- Calculate number of cultural sites actively managed on all tenures and satisfaction of traditional owners of cultural exchange and opportunities to visit country and actively manage sites and landscapes

Picton Springs, Arapunya Station

COORDINATION

Many stakeholders are carrying out work in this program, however there is scope for improved coordination, strategic direction and adaptive management of these assets. Whilst there is a reasonably common vision to manage natural and cultural assets to maintain healthy ecosystems, halt species declines and maintain cultural connection to country, the steps to achieve this are not always so clear and agreed at the NT level. There is no broad agreement or clarity about which important threats and pressures to focus our efforts on. Also unclear is how we should go about tackling some of the broad landscape-scale issues such as weeds, feral animals and fire in order to protect and maintain natural and cultural values. Better coordination of monitoring techniques, data collection and utilisation of data will lead to improvements in the delivery of this program. This program would benefit from key coordination that could be led by NTG (Flora and Fauna), Land Councils, Parks and Wildlife, researchers, TNRM and pastoral Landcare Groups.

CASE STUDIES

Check out the regional case studies on our website: www.territorynrm.org.au/?

KNOWLEDGE, CAPACITY AND ENGAGEMENT

GOAL

Within 10 years, all regions within the NT have an active group of NRM stakeholders who at least once a year review, analyse and adapt their work.

KEY ACHIEVEMENTS

- Increased investment and greater collaboration on a number of NRM issues across the NT.
- Increase in the number of volunteer Landcare groups in the NT.
- Indigenous ecological projects contributing to inter-generational sharing of knowledge.
- Continued expansion of the Indigenous land and sea management programs.
- Continued support for the regional pastoral Landcare groups.

School food garden project

ISSUE

Natural resource management draws on diverse diverse types of land management knowledge, including scientific, Indigenous and community-based knowledge.

The major threat to Indigenous knowledge is that it will be lost if not actively used. Various factors can prevent the transfer of knowledge including lack of support and appropriate funding for outstation living and back to country trips. Because of the size of the Territory and the limited resources available, community action is fundamental to NRM. Valuing and utilising all forms of community knowledge is a direct way of empowering communities and engaging them more actively in NRM.

Capacity for NRM also depends on there being healthy communities and industries to provide a capable workforce with knowledge, skills, resources and motivation. The challenges in the NT include a small population base, great distances, lack of infrastructure and resources and climatic extremes. There are also issues in building and maintaining capacity because of stop-start funding, short-term projects and high turnover of personnel. Pastoral landcare groups have been central to assisting pastoralists to undertake conservation planning and management and provide access to information and networks. These groups operate under precarious funding arrangements. Overall capacity for NRM in the NT is limited by available funds as the NT receives a small proportion (relative to land managed) of the nation's investment in natural resource management.

Approaches to NRM must recognise the interconnectedness of land, sea, coasts, freshwater systems, their biodiversity, their people and associated land uses. Working across tenures, across issues, jurisdictions and across different organisations is essential to success in tackling NRM issues. This program aims to build linkages and partnerships between the different sectors managing across the environment.

Find out about strategies for knowledge, capacity and engagements in each of the regional plans

NT-WIDE PRIORITIES

- Develop greater landscape and regional level direction to integrate and collaborate NRM activities and to strengthen networks and partnerships through regional forums and joint plans of action

- Secure ongoing and diversified resources supporting long-term and multi-tenure approaches aiming to strengthen Landcare and NRM networks promoting community and industry responsibility of NRM issues

- Support land managers to record and utilise TEK, scientific research and pastoral knowledge in NRM planning and activities through various knowledge exchange activities

- Conduct an ongoing review of NRM outcomes facilitating more rigorous assessment of NRM priorities leading to greater adaptive management in NRM and publish annual report card type documents based on multi-stakeholder review processes

MONITORING AND IMPROVING

- Number of landscape-scale multi-stakeholder workshops and impact of these on regional collaboration and partnerships in NRM

- Amount, diversification and duration of funding for NRM should be securing more long-term approaches to tackle long-term NRM issues

- Secured ongoing funding and participation levels in Aboriginal ranger and pastoral Landcare groups leading to permanent and sustainable structures tackling long-term landscape-scale NRM issues

- Number of stakeholders and level of engagement in NRM adaptive management and review workshops including researchers, decision-makers, land owners and land managers

COORDINATION

It is recognised that in NRM there is a need to increase coordination and active review of progress against broad landscape-scale and NT-wide targets. Whilst achievements are being made at the project scale or at the local scale it is rarely assessed through a holistic landscape approach. The NT suffers from a lack of shared measurement systems to adequately assess whether progress is being made and to actively adapt and reprioritise activities. Too often, the agenda is driven by external factors such as national funding priorities or other policies affecting our approach to NRM. TNRM as the regional body can play a vital role as a backbone organisation to support the NRM community to improve how collective impact can be achieved at the regional and NT-wide scale. Adopting this NRM plan, along with engaging in ongoing review and adaptation will be vital to achieving a more coordinated approach to NRM in the Territory.

> " For the survival of this new generation of farmers, the future lies in taking the old farm and the old operating procedures and implementing new technology and innovations to make farms more profitable. "

Prickly Acacia control in Victoria River District

Water quality testing

CASE STUDIES

Check out the regional case studies on our website: www.territorynrm.org.au/?

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The approach (Open Standards) that has been adopted to manage the NRM plan guides stakeholders to monitor and adapt their initiatives.

There are three aspects of the NT NRM plan that help us know if we are being effective:

- Is the plan following good processes?

- Is progress being made on the ground? Capturing, analysing and considering data on implementation, effectiveness and impact

- Is the plan active? Commitment to regular meetings to consider results and adapt

Throughout the life of this plan it is important to know if the agreed strategies are being delivered effectively and whether the objectives are being reached.

The Open Standards planning framework has a strong focus on adaptive management. This means the plan is clear about measures of success, regularly evaluates how well the plan is working in achieving those measures and adapts the plan over the next five years as needed. Regular review will ensure that the plan is amended and updated as required so that work stays on track to achieve our agreed vision.

Every year TNRM will coordinate a regional review to look at what we achieved, or didn't achieve and why. At the end of the five years covered by this plan, TNRM will coordinate a comprehensive review so that NRM stakeholders in the Territory can fine tune the next iteration of the NT NRM Plan.

This ongoing collaboration and review process will assist in better allocating resources to priority actions that will have the most impact to the NT.

Indicators of Success

Ecological, social and cultural indicators are used to measure the plan's success and monitoring of these will include both qualitative and quantitative measurements.

A participatory approach to monitoring is favoured where the NRM community is involved in capturing and sharing learning from the monitoring of this plan. The ability to monitor this plan relies on the availability of NRM knowledge and technical skills, the use of expert advisory panels and employment of program specific staff, facilitators and coordinators to bring together stakeholders regularly.

1 Conceptualise
- Develop initial team
- Define scope, vision, targets
- Identify critical threats
- Complete situation analysis

2 Plan actions and monitoring
- Develop goals, strategies, assumptions and objectives
- Develop monitoring plan
- Develop operational plan

3 Implement actions and monitoring
- Develop work plan and timeline
- Develop and refine budget
- Implement plans

4 Analyse, use, adapt
- Prepare data for analysis
- Analyse results
- Adapt strategic plan

5 Capture and share learning
- Document learning
- Share learning
- Create learning environment

The NRM plan for the NT shows the work that we all need to do to meet the needs of the people and natural resources of the NT. It is important that the work we do has an impact on the issues we are trying to address.

Many of the NRM issues we face are complex and they happen over large areas and long times. Often, many organisations and individuals working on these issues have different opinions, incomplete or contradictory knowledge, are interdependent and are characterised by cross-organisational boundaries and responsibilities.

We need to work together to have a real and meaningful impact, or a collective impact. 'Collective impact' is an approach to working together on complex social and environmental issues that has emerged in the last few years as an effective way for people and organisations to make significant change.

Collective impact occurs when a group of actors from different sectors commit to a common agenda for solving complex social or environmental problems and is a structured approach to problem solving that involves:

Common agenda	• Common understanding of the problem • Shared vision for change
Shared measurement	• Collecting data and measuring results • Focus on performance management • Shared accountability
Mutually reinforcing activities	• Differentiated approaches • Coordination through joint plan of action
Continuous communication	• Consistent and open communication • Focus on building trust
Backbone support	• Separate organisation/s with staff • Resources and skills to convene and coordinate participating organisations

There are specific issues we can focus on as a community where we can improve the outcomes, take advantage of changes and innovations and respond to the need to act together to create change. Collective impact can help bring together elements of the system that are disconnected and fragmented by helping to build bridges between information silos.

In developing the NRM plan for the NT we have already begun to nurture the appropriate conditions for delivering collective impact through the regional and stakeholder workshops by developing a common agenda and identifying indicators for shared measurement. Implementing the plan will need continued focus on each of these. Specific projects in the plan will use this approach to support their implementation and review.

The Open Standards and collective impact planning tools are complementary:

• Open Standards helps provide specific content for impact, which provides specific information for the five conditions, as well as a number of supporting tools to keep us moving

• Collective impact moves the NRM plan 'off the shelf' to implementation and outcomes

SPATIAL INFORMATION FOR NATURAL RESOURCE MANAGEMENT IN THE NT

Spatial information and Geographic Information Systems (GIS) underpin natural resource management. By visualising features at the landscape scale and overlaying different data sets, land managers have the capability to determine changes to the distribution of features over time. Examples of NRM-related spatial information can include (amongst others) point locations of species distribution, boundaries (known as polygons) of features such as vegetation types and soils classes, as well as remotely sensed data such as satellite imagery and aerial photography.

With the advent of web-mapping applications and freely available (open source) geospatial software, spatial information is accessible to a variety of users. A number of different sources are available to supply NT land managers with spatially-based information to inform their decisions.

Google Earth PRO

Google Earth displays satellite images of varying resolution of the Earth. The 'Pro' version is now available free of charge; in addition to the imagery and functionality of Google Earth, this advanced version allows users to measure distances and areas, print high resolution maps and input a range of spatial data.
www.google.com.au/earth

NT NRM Infonet

NT NRM Infonet provides users with general information about natural resources for any parcel of land in the NT. Users can draw in a boundary, or select a region from a drop-down list to produce general NRM reports containing species lists, soil, fire and vegetation maps and management guidelines for their region of interest. Users across northern Australia can also use the site to measure or quantify the fire management for their area, with fire information coming from the NAFI website.
www.infonet.org.au

NAFI

The northern Australian Fire Information tool is a web-mapping application displaying maps of fire activity. The fire data is based on information from satellites, such as hotspots (locations of recent fires) and fire scars (maps of recently burnt country). Users can upload their own information such as flight-lines and download burnt area mapping and hotspots for viewing in conjunction with other spatial information in Google Earth or in a GIS.
www.firenorth.org.au

NR Maps NT

NR Maps NT is the NT Government's web mapping application to access, interrogate and map the NT's natural resource information. Users can display, select and query data layers sourced from a range of government agencies, create a map (pdf) to print or save and download certain data layers held by the Department of Land Resource Management.
http://nrmaps.nt.gov.au

Elders planning for country
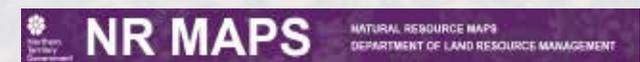
Atlas of Living Australia

This web-mapping application provides free, online access to a vast repository of information about Australia's biodiversity. It also features a range of open-source mapping and analysis tools, which allow users to explore and analyse information.
http://www.ala.org.au/

Find Environmental Data

"FED" is the Australian Government's geospatial portal providing information on the Department of Environment's spatial data. Users can type in keywords and browse from a list of available datasets, some of which are available for download.
http://www.environment.gov.au/fed/catalog/main/home.page

Using Spatial Information and Online Tools for NRM

The Northern Land Council (NLC) has been using spatial information and online tools to assist with management of some of the Aboriginal Land Trust (ALT) areas. Property boundaries have been added to the Infonet site for reporting purposes. In September 2015, a consultant was engaged to conduct a biodiversity survey on the Menngen ALT, in the Victoria River District. A survey of this property was undertaken to determine baseline values of the area for on-going monitoring and to provide rangers with training in fauna survey techniques.

Using the ALT boundaries in the preset areas on Infonet, NAFI data via the fire reporting tool were used to select survey sites of varying fire history, with a particular focus on 'long' unburnt.

The 'general NRM report' was used in the site selection process to identify target habitat types, based on the species lists which identified target species in the area.

The survey yielded 11 native mammal species, 22 reptile species and four frog species. Two threatened species were recorded (Mertens' Water Monitor and the Gouldian Finch), as well as a number of first-time records for that property.

MENNGEN ALT Fire History

29
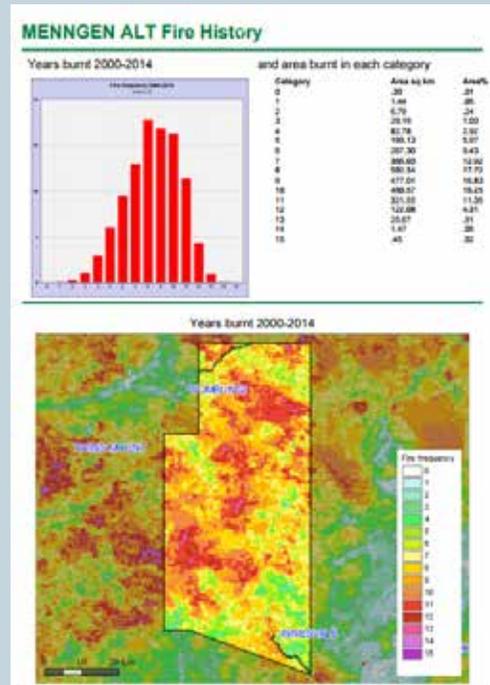
FUTURE TRENDS

Future trends set the context for possible future scenarios in the NT.
Some of these trends are summarised here and have implications for NRM planning.

Developing North Australia

- Northern Australia is close to the fast growing international markets for beef in Asia, so gradual intensification of the beef sector is expected

- Increasing development in the mining industry requires improved regulation to ensure minimal impacts on ecosystems

- Expansion of the oil and gas industry in the NT is likely and will need to be planned with minimal impact on natural resources in mind

- Potential horticultural expansion in areas with suitable water and soil would benefit from a parallel investment in farmer capacity and support services such as biosecurity

- Tourism is regionally significant and developing the Territory's tourism potential relies on healthy ecosystems and unique landscapes

Future Socio-Economic Drivers

- Development of remote areas to ensure economic benefits of major projects benefit the host regions and communities

- Supporting diverse and strong Indigenous culture and particularly continued engagement and expansion of land and sea management programs

- Significant population growth in Greater Darwin region will lead to more intensive urban and peri-urban land and water resource use

Climate Change

- Climate change will add more pressure on ecosystems, natural resources, industry and peoples' livelihoods

- By 2030, the annually averaged warming across all emission scenarios is projected to be around 0.5 to 1.4 °C above the climate of 1986 – 2005 in the NT

- The influence of rainfall in the NT is harder to predict, but an increase in extremes is expected (more dry days and more very wet days)

- There will be fewer but more intense tropical cyclones

- More information on regional climate projections can be found at www.climatechangeinaustralia.gov.au

Population

- High rates of population turnover in Northern Territory with high rates of growth linked closely to major construction projects

- Currently there are an estimated 231,000 people in the NT

- 30% of the population is Indigenous

- Significant population growth is expected – 360,000 people in the NT by 2041

- Higher growth expected in the Greater Darwin area

- The NT has a younger population than the national average, however, the proportion of the population over 65 is likely to increase by 2041