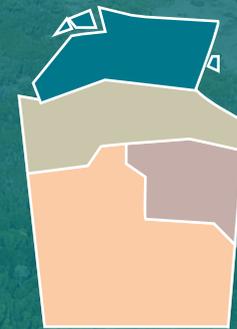




Top End Region

Northern Territory  
**NATURAL  
RESOURCE  
MANAGEMENT  
PLAN**  
2021-2025



# 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](mailto:info@territorynrm.org.au)

## Acknowledgements

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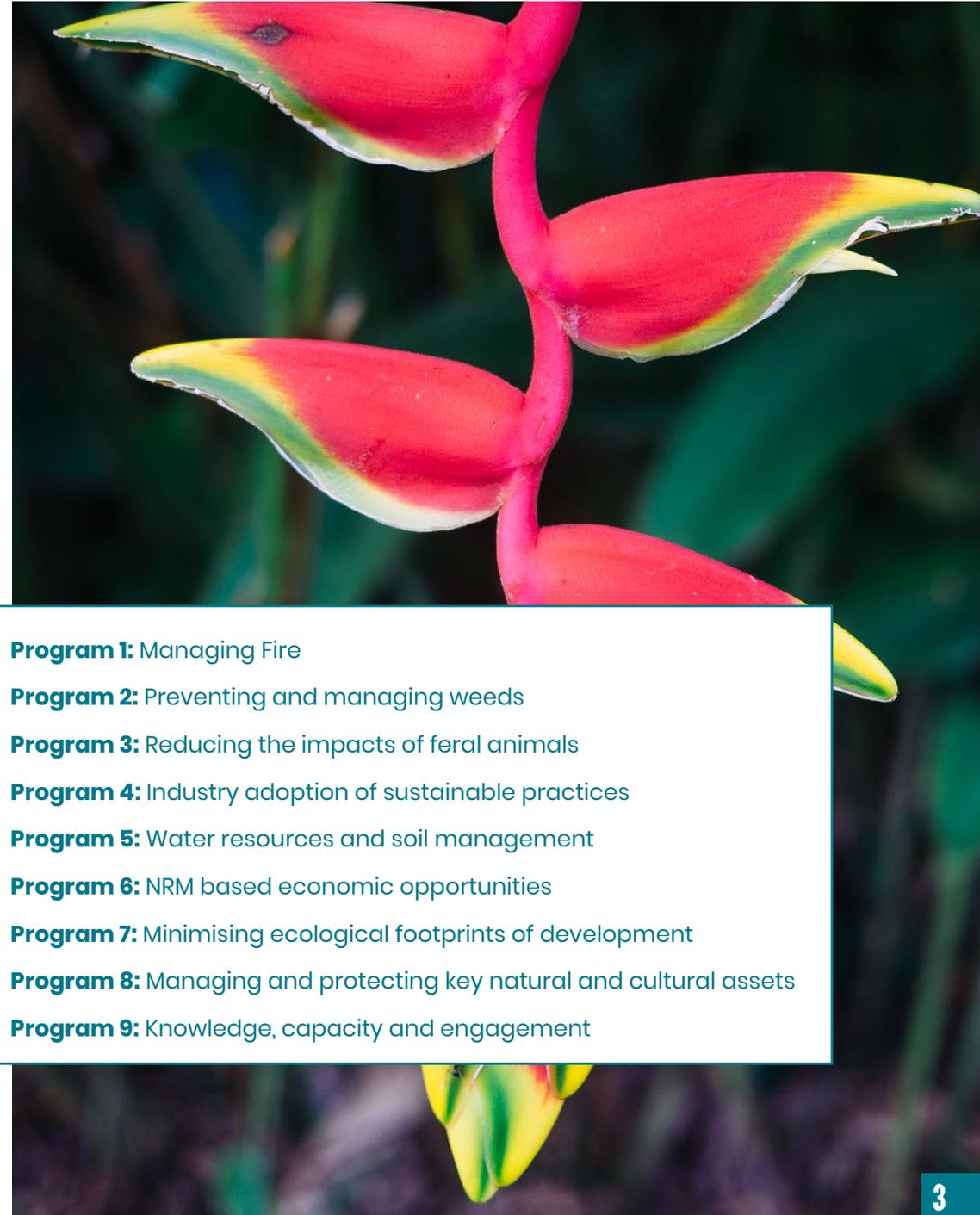
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# Foreword

The Northern Territory NRM plan provides an overarching five year strategy for maintaining and enhancing the condition of our land and water resources, the productivity of our soils and the health of our natural habitats and biodiversity. It has been drafted following extensive consultation to capture community priorities across the Territory and is underpinned by the latest science.

By structuring the plan into four regions we reflect the diversity of the Territory landscapes and give a stronger voice to our regional stakeholders. This is a plan for all Territorians.

The plan builds on upon the legacy of previous Northern Territory NRM plans and the lessons learned from their implementation. It learns from the past but also looks to the future, recognising the newly emerging challenges and opportunities that this new decade brings. As the Territory enters an exciting period of growth and investment, this plan provides an effective framework for engaging new partners into NRM, coordinating action and tracking and adaptively managing our progress towards high level objectives.

With this new plan, Territory NRM aims to strengthen regional leadership and coordination in plan implementation. We will bring together and facilitate diverse regional stakeholders to adaptively manage implementation and find the approaches that work best for them.

As Chair I look forward to playing my part in supporting in this collaborative effort. Working together, we aim to ensure that the health of the Territory's natural resources will underpin its future prosperity and the social and economic wellbeing of all Territorians.



**Alastair Shields**

Chair of Territory Natural Resource Management



# Introduction

The *Northern Territory Natural Resource Management Plan (2021-2025) Top End Region* (the Top End regional plan) provides a framework for maintaining and enhancing the health and productivity of land, water, soils, terrestrial and marine habitats and biodiversity across the region. While preparation of this plan was coordinated by Territory Natural Resource Management, it is not a plan for Territory Natural Resource Management, it is a plan for the whole Top End NRM community.

This plan has been developed drawing upon the latest available scientific evidence and expert technical knowledge of the natural, social and cultural assets of the region. It further integrates the interests, priorities and goals of a diversity of stakeholders and interest groups from across the Top End, including governments, industry groups, Aboriginal landowners, communities, researchers and conservationists. The plan therefore highlights opportunities for strategic collaboration and partnerships between stakeholders working towards shared goals. By identifying regional NRM priorities and formulating strategies for achieving these, the Top End regional NRM plan also constitutes a prospectus for investment.

This Top End regional plan is one of four regional plans that make up the Northern Territory NRM plan. It builds directly on the structure, outcomes and the lessons learned from implementation of the previous plan, the *Natural Resource Management Plan (2016-2020) Top End Region*, and the legacy of NRM planning for the Top End since 2005. Each successive plan has refined strategies to best address changing biophysical conditions, a changing policy environment and evolving community expectations across the Top End. Accordingly, in 2021, this Top End regional plan supports and carries forward the good work of NRM stakeholders over many years.

In a fast-changing world, this plan also looks to the Future. Program strategies have been developed anticipating NRM opportunities and challenges that may emerge across the Top End during the period 2021-2025.



## Our Vision

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

# The Top End Region

The Top End region covers 13% (176,500 km<sup>2</sup>) of the NT's land area, the coastal waters account for about 84% (64,500 km<sup>2</sup>) of coastal regions within the NT and the vast majority of the coastal zone and land is Aboriginal freehold title. Approximately 70% of the Territory population resides in the Top End, Darwin as the main administrative and commercial centre of the Territory has a population of around 157,000 (2020, including city of Palmerston).

Located 12 degrees south of the equator, Darwin is often described as Australia's gateway to South-East Asia. With one eye on the land and another on the sea, Darwin has become the business hub for a range of resource-based industries that are rapidly expanding across the region. The surrounding Arafura and Timor seas are dotted with coastal islands, including the Tiwi Islands, Croker Island, Wessel Islands and Groote Eylandt.

The Top End is characterised by extensive mangrove-lined coasts, wetlands and floodplains. The sandstone plateau of western Arnhem Land supports an unusually diverse biota, including many endemic plant and animal species. The Top End region contains many important breeding sites for marine turtles and colonial seabirds and roosting and feeding sites for migratory shorebirds in the area as well as numerous isolated islands which provide important refuge from processes that threaten mainland areas. National parks and reserves in the Top End region include the internationally-renowned Kakadu National Park which is a World Heritage-listed and Ramsar site. Furthermore, there are some Indigenous Protected Areas (IPAs) that cover vast areas of the Top End region.

The climate is tropical monsoonal with a dry and wet season. The wet season is also known as the cyclone season in the Top End. Aboriginal people recognise many seasons in the Top End. For example, Kakadu's Aboriginal owners identify six different seasons.

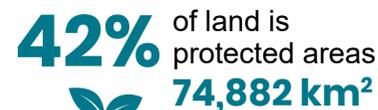
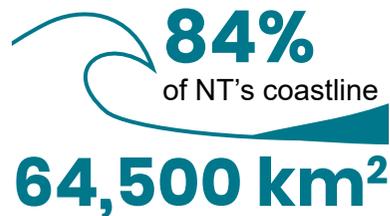
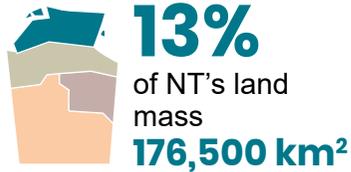
There are 27 'Sites of Conservation Significance', almost all of which also have an international classification. A total of 124 species considered threatened according to either the Environment Protection and Biodiversity Conservation Act 1999, the Territory Parks and Wildlife Conservation Act 1976, or both. There are nine Weeds of National Significance (WoNS) and established feral animal species include seven exotic insects, 12 mammals, one bird, one reptile and one cane toad.

Aboriginal culture in the region dates back 50,000 to 60,000 years. The richness of Aboriginal cultures in the Top End is demonstrated by the diversity of Aboriginal languages in the area. Aboriginal languages remain the primary language for many Aboriginal people in the Top End and a vast body of in-depth traditional ecological and cultural knowledge drives ceremonial and cultural practices that continue today. Both the stunning landscapes and Aboriginal culture of the region are major drawcards for both domestic and international visitors. The area 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. However, the environmental and cultural values of the region have declined significantly over many years and a number of species are under increasing pressure from threats such as wildfires and feral animals. These values underpin the livelihoods of people living in the region.

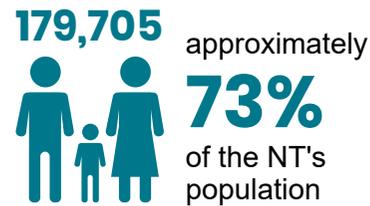


# Top End Regional Profile

## Land



## People



## MAJOR ABORIGINAL COMMUNITIES

- 
- ⦿ Nguu
  - ⦿ Gunbalanya
  - ⦿ Maningrida
  - ⦿ Mililingimbi
  - ⦿ Galiwin'ku
  - ⦿ Gapuwiyak
  - ⦿ Yirrkala
  - ⦿ Umbakumba
  - ⦿ Angurugu/Umbakumba
  - ⦿ Ramingining
  - ⦿ Ngukurr
  - ⦿ Numbulwar

## Economy

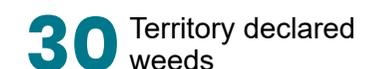
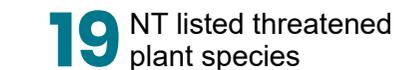
**\$22 billion**

Gross Regional Product

**83%** of NTs Gross State Product



## Natural resources



# Social and economic status

Owing to its proportionally large population and role of Darwin as a service centre for a broad range of industries including the resources sector, defence, agriculture, fisheries tourism and public administration, the Top End region has the largest share of the Northern Territory economy, with Darwin's Gross Regional Product estimated at \$9.3 billion, or 35% of the Northern Territory's Gross State Product. Darwin has long been seen as playing a significant role in the development of northern Australia due to its proximity to Asia. The Port of Darwin is also the largest outlet for Australia's live cattle export trade into South-East Asia and looks set to become more important in the export of resources extracted elsewhere in the Territory.

Since the last Top End regional plan was produced, implementation of the 'Developing the North' agenda has driven the expansion of investments in the north and stimulated an ambitious development program. Following economic disruptions associated with the COVID-19 pandemic, a Territory Economic Reconstruction Commission was established in 2020 and defined another ambitious prospectus for growth. The Northern Territory is positioning itself to be a key player in Australia's post-COVID-19 economic rebound, given its ready access to Asian markets, its strengthening resources sector and the growing global demand for agricultural and food products.

While vibrant economic growth is forecast for greater Darwin, residents in many other areas of the Top End have historically experienced more limited opportunities to participate in growth and share in wealth.

The Australian Bureau of Statistics (ABS) classifies over 50% of the Top End region as 'very remote', because of the vast distances people need to travel in order to access essential services and infrastructure. Travel along the region's unsealed roads becomes very difficult or impossible during the wet season and consequently some areas and communities within the Top End may be cut off for weeks or even months each year.

Traditional use of natural resources, (such as hunting, fishing and harvesting of edible plants) remains particularly important in remote areas of the Top End where communities may have limited access to groceries and other consumables.

Likewise in remote parts of the Top End, land management has become increasingly significant to community wellbeing, because it offers one of few opportunities for paid work and because it provides an avenue for undertaking the important cultural responsibility of 'caring for country'.

Many Aboriginal people living in remote areas of the Territory are at the forefront of natural resource management. However, as with other goods and services, the costs and resources required to support and deliver NRM activities in remote areas are higher than elsewhere. Top End planning must therefore take account of how these costs influence the social resilience of Top End communities and their capacity for NRM.



## Social indicators

The participatory planning process adopted in 2016 highlighted the role of 'people' in natural resource management and the capacity of individuals and groups to implement activities and to coordinate and work together with other individuals and groups.

The 2021-2025 Top End regional plan retains 'Community Knowledge' and 'People on Country' as key NRM assets. Without motivated and capable people, the programs and strategies set out in this plan could not be achieved. Accordingly, the plan places heavy emphasis upon building and supporting social capacity in natural resource management. Through implementing successive NRM plans, there is now an improved understanding of the elements that enable social capacity for natural resource management in the Top End:

- Opportunities to learn new skills and share knowledge
- The recognition, generational transfer and appropriate use of Traditional Ecological Knowledge
- Capacity for 'two-way learning' and working productively across cultures
- Meaningful participation and a sense of ownership in NRM planning
- Strong working relationships and active networks across the region
- Ability to plan and coordinate strategically, and manage adaptively
- Effective communication to reach all audiences
- Overcoming resource, logistical and economic barriers to participation.

Each of these elements are recurrent themes throughout the programs of this plan and will contribute to how success in implementation is measured.

# Land tenure

The Top End is dominated by Aboriginal land and seas protected areas (including Indigenous Protected Areas), Leasehold and some Crown land. Large areas of Aboriginal land are managed as protected areas and these form the majority of the conservation estate.

## Aboriginal land

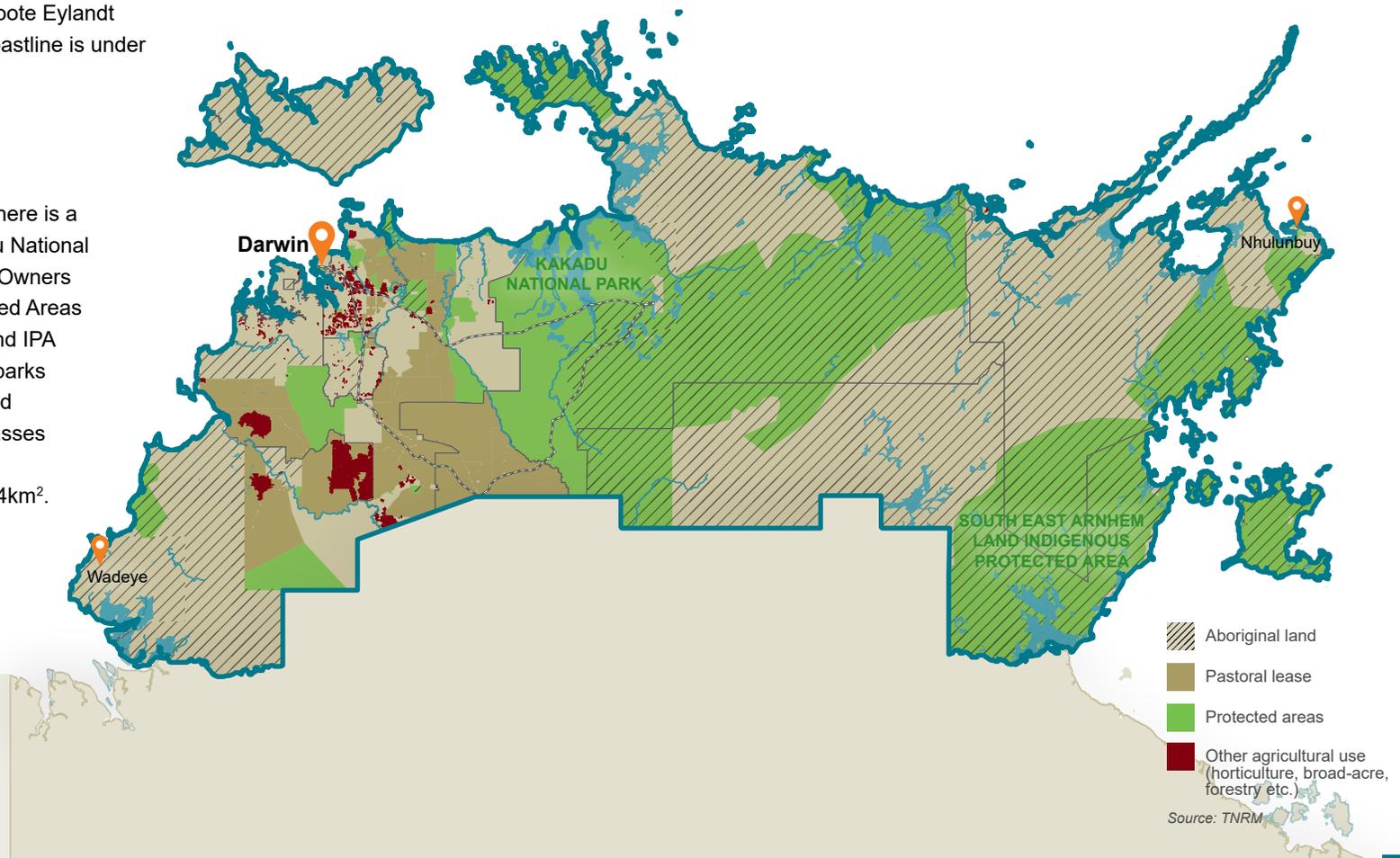
The Top End is unique in Australia in that 70% of the region is under Aboriginal freehold title, including Arnhem Land, Groote Eylandt and the Tiwi Islands. The majority of the Top End coastline is under Aboriginal ownership.

## Protected areas

Protected areas encompass 43% of the Top End. There is a mix of the type of protected areas, including Kakadu National Park, which is jointly managed between Traditional Owners and the Australian Government, Indigenous Protected Areas (IPA), with the largest being South East Arnhem Land IPA at nearly 20,000km<sup>2</sup>, and a number of government parks and reserves managed under the Territory Parks and Wildlife Conservation Act. The region also encompasses Wongalara, a non-government protected area established over a pastoral lease which covers 1924km<sup>2</sup>.

## Crown land and private land

There are also significant amounts of Crown land, private residential land, pastoral leases and horticultural blocks in the area around Darwin.

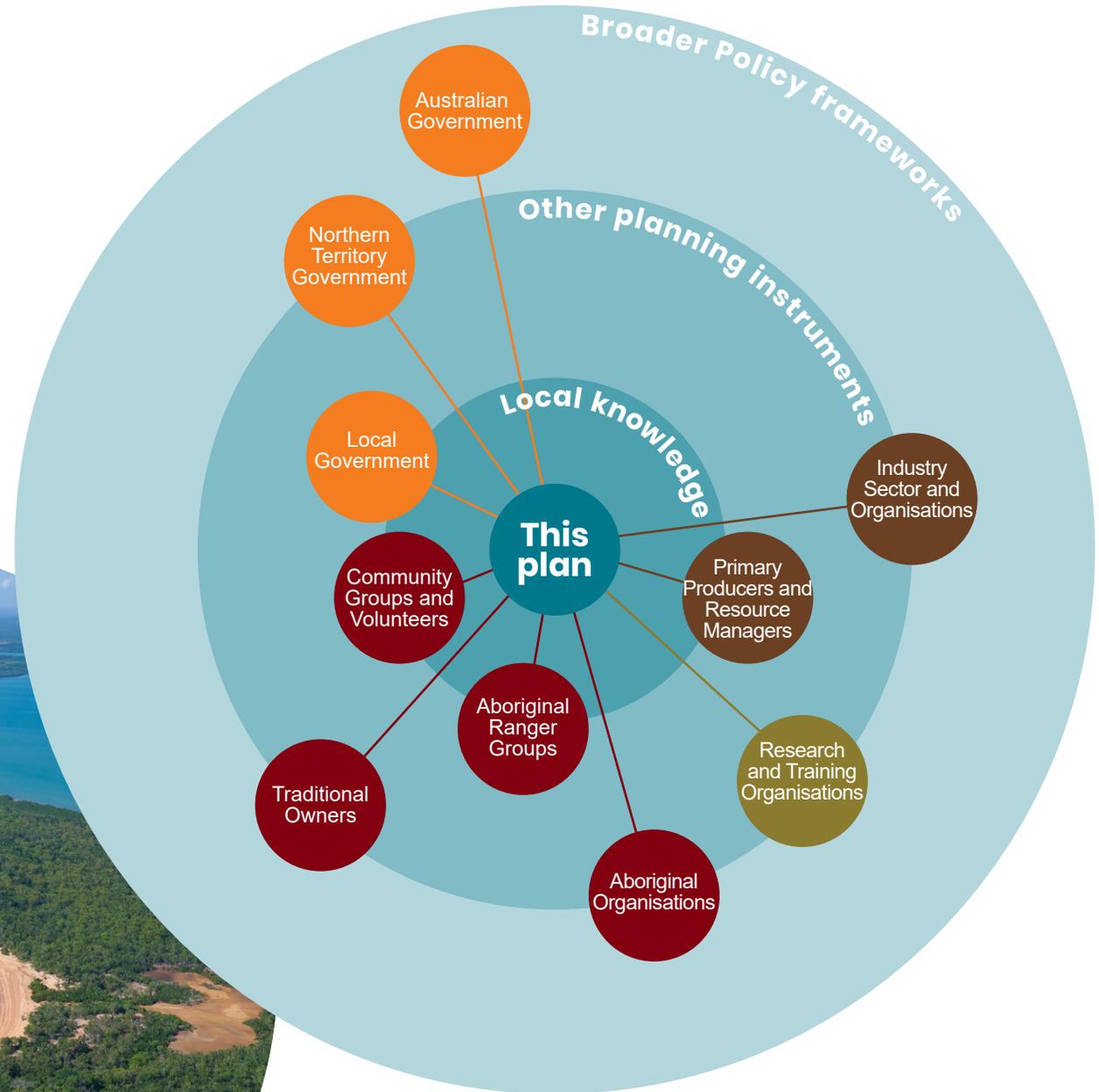


# Where does the Top End regional plan fit in?

The Top End regional NRM plan is one of four regional plans that combine to form the broader Northern Territory Natural Resource Management Plan (2021-2025). It is a non-statutory plan, but it has been developed with reference to broader policy frameworks, Australian Government, Northern Territory Government and local planning initiatives, and local knowledge. The plan aims to provide an overarching framework that integrates this diversity of approaches and instruments into a single coherent agenda for action.

This integrated approach provides a platform to both strengthen existing partnerships and highlight potential new partnerships to underpin NRM collaborations. It recognises that to strategically manage the water, land, soils and biodiversity of the Top End, planning and management action must be inclusive of all stakeholders. The planning process during 2020 and 2021 went through multiple stages to most effectively capture the current and future priorities of all stakeholders.

The Top End regional plan is not only for the Territory Natural Resource Management organisation, rather it is a plan for the whole natural resource management community.



# How did we develop the Top End regional plan?

In 2015 and 2016 the 'Open Standards for the Practice of Conservation' were adopted as a basis for NRM planning. The 'Open Standards' are an internationally recognised planning framework and represent leading practice in participatory planning and adaptive management. Planning for the Top End in 2016 established a framework for ongoing monitoring, review and updating of the plan by stakeholders and transformed the plan into a 'live' document. Through reviewing and revising the Top End regional plan in 2018 and again in 2020, most stakeholders reported that the structure of the 2016-2020 plan remained relevant to their needs.

Consequently, in 2021 we are carrying forward the structure and logical framework established by the 2016 planning process. We are updating, reviewing and refining this to meet the evolving NRM environment of the 2020s. This not only ensures continuity and consistency in programming, but will also enable us to review and track progress in achieving strategic objectives beyond the life of a single planning period.

The development of this plan involved multiple steps, planning workshops, collation and review of relevant data and documentary evidence, community consultations and receipt of written submissions.

The planning approach focuses upon the identified assets of the region and the pressures that act upon them. The 'Theory of Change' (planning logic) suggests that improved management of the pressures acting on assets will promote more sustainable, natural social and economic systems.

The natural, social and cultural assets referenced in this plan were identified by the NRM stakeholders of the Top End through a series of workshops and planning sessions during the development of the 2016-2020 plan. Top End stakeholders feel this asset structure remains relevant in 2020.

Collectively, the 9 assets identified through the planning process provide Top End stakeholders with resources for their daily lives (such as the air they breathe and the water they drink), and underpin key industries such as pastoralism, crop agriculture and tourism. Natural and cultural assets also support the important customary economy that sustains Aboriginal people and provides for their cultural and spiritual wellbeing.

## 1 Review of the 2016–2020 plan

Top End stakeholder groups were individually consulted to assess progress made towards plan implementation, and then attended a technical review meeting convened in Darwin where progress towards implementation and achievement of objectives was assessed.

## 2 Literature and data review plan

An extensive review of published and grey data, publications, research reports and policy documents produced since 2016 was conducted to update asset and pressures descriptions and highlight trends of change.

## 3 Technical working-group planning

Key technical stakeholders were brought together in a planning meeting to discuss and identify current and emerging Top End NRM priorities and the strategies required to address them.

## 4 Individual expert consultations

Following up on the planning meeting select thematic experts were consulted individually for more detailed input to develop the program of strategy activities and interim targets.

## 5 Consultation Draft

A Top End Consultation Draft document was prepared and posted for public comment and submissions. Community presentations and consultation sessions were convened in Batchelor, Darwin, Palmerston and Arnhem Land.

## 6 Final Draft

Community feedback and stakeholder submissions on the Top End Consultation Draft and planning priorities were collated and drawn upon to produce the final draft of the Top End regional plan.

The strategies and major objectives identified to protect the assets identified for the Top End NRM Plan 2016-2020 were organised into nine programs. These were:

- Managing fire
- Preventing and managing weeds
- Reducing the impacts of feral animals
- Industry adoption of sustainable practices
- Water resources and soil management
- NRM based economic opportunities
- Minimising the ecological footprints of development
- Managing and protecting key natural and cultural assets
- Knowledge capacity and engagement

In developing the 2021-2025 Top End regional plan, this structure has been carried forward.

# Key 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



## Coastal and Marine

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



## Freshwater Systems

The Top End's freshwater aquatic habitats include rivers, wetlands, lakes, swamps, underground aquifers and their associated values, functions and ecosystem services



## Healthy Soils

Includes soil fertility, structure, health and productivity



## Grasslands/Rangelands

Includes the dominant Eucalypt woodlands and open woodlands with an understorey of perennial and annual grasses



## Cultural Landscapes and Sites

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



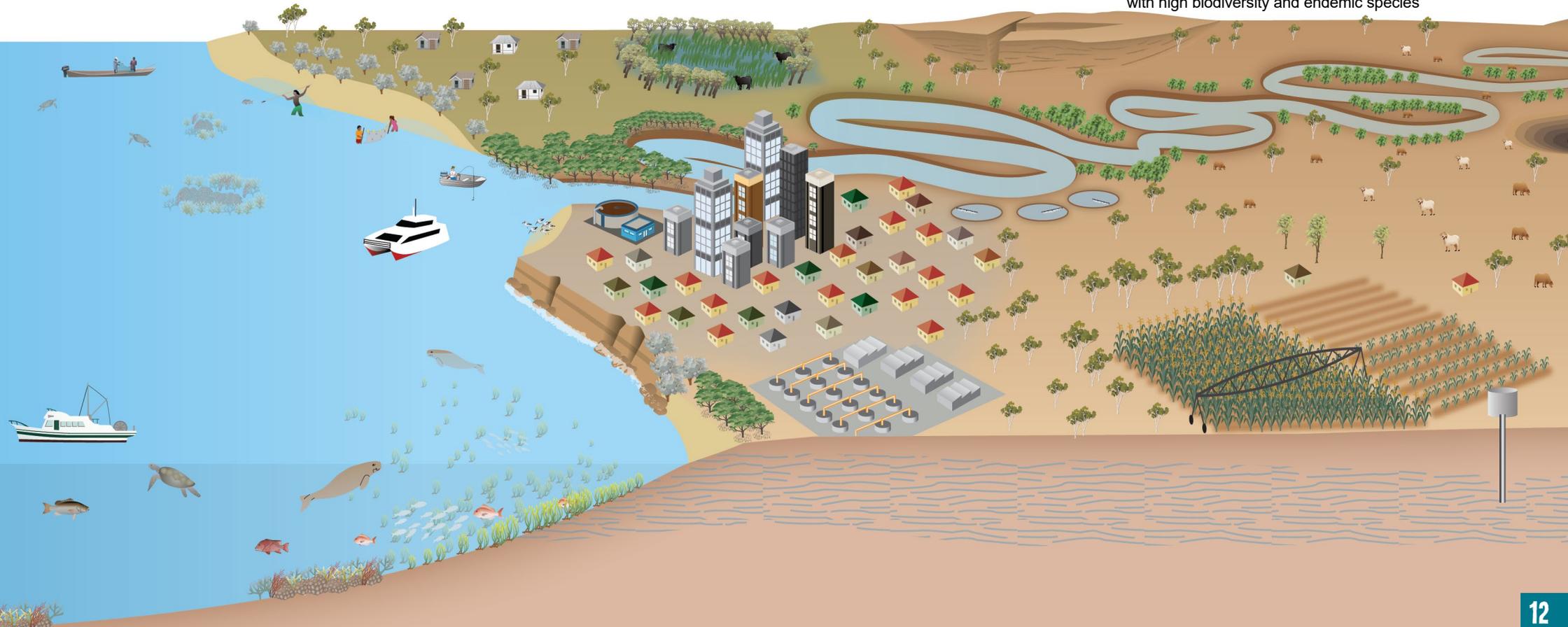
## Biodiversity and Conservation Sites

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



## Ranges

All ranges including sandstone escarpments, plateaus, cliffs and gorges, notably the Arnhem Land escarpment and Tabletop Plateau are often associated with high biodiversity and endemic species



# Assets and pressures descriptions

In describing assets and the pressures that act upon them, there are two qualitative assessments for trends in condition over the last five years (2016-2021).

## Community opinion

This is a subjective collective assessment elicited at community consultation meetings and based upon personal observations or other evidence. As a measure it reflects the community's perception of what is happening to natural assets and the success of NRM.

## Review of secondary data

We reviewed academic papers, data sets, technical reports and policy documents published over the last five years and pertaining to the respective asset in the region, noting implications for asset condition. As a caveat, due to delays in publication, some reviewed documents are based upon data collected prior to 2016.

### Over past five years (2016-2021)

Overall, positive trend of change in asset condition



No clear trends of change in asset condition



Overall, negative trend of change in asset condition



Insufficient evidence



# Assets and pressures descriptions



## Coastal and marine

**Goal:** By 2030 the condition of the coastal and marine environment is improved



Coastal and marine

| 2016      |       | 2021 trend                 |                         |
|-----------|-------|----------------------------|-------------------------|
| Condition | Trend | Literature/<br>data review | Community<br>perception |
| Fair      | —     | —                          | ↓                       |

### Indicators for condition

- Number of coastal and marine Sites of Conservation Significance being managed
- Number of Aboriginal ranger groups actively managing coastal and marine areas
- Number of active management plans covering sustainable use of coastal and marine resources
- Catchment, estuarine and coastal water quality
- Fish stocks
- Turtle and dugong numbers

The Top End region contains the majority of coastal waters and islands within the Northern Territory including vast tracts of mangrove forest, estuaries, coastal floodplains, intertidal areas, seagrass and coral reef habitats. These ecosystems are amongst the world's most intact marine and coastal environments and have extremely high cultural, environmental and commercial value. There are over 22 internationally significant coastal and marine sites listed in the region. They have a very high diversity of species and provide critical habitat to some of the world's most threatened marine animals including fish, whales and turtles. Many species, such as dugongs, turtles and dolphins, which have declined elsewhere, both in Australia and internationally, are found in the region.

The intact coral reefs, sea-grass meadows and mangroves are also recognised as hot spots for biodiversity, and they provide critical feeding or nursery areas for many species. The extensive mangrove forests are the largest in Australia and support an enormous range of species.

The beaches of the region provide critical habitat for nesting seabirds and six species of sea turtles. The mudflats support millions of migratory waders, while the coastal floodplains and wetlands support large congregations of waterbirds, notably magpie geese. Estuarine systems are home to saltwater crocodiles, three species of threatened sawfish and two species of threatened river sharks.

The region includes Darwin Harbour and vast, remote coastal areas of Arnhem Land. Significant islands in the area include the Tiwi Islands, Croker Island, Wessel Islands and Groote Eylandt. Of the Territory's coast, 85% is Aboriginal freehold title and 'sea country' is a vital part of cultural, spiritual and economic livelihoods. The coastal and marine environments are major attractions for both Territorians and tourists. Key industries in the Northern Territory such as tourism, recreational and commercial fisheries and Aboriginal livelihoods depend upon the maintenance of productive and healthy marine environments.



## Coastal and marine

### Pressures and uses



#### Problem and pest species

Marine pests are a constant threat to the marine environment. These can be carried in ballast water which is discharged at seaports or on the hulls of ships and boats. The long and remote coastline makes surveillance for marine pests challenging.



#### Climate change and severe weather

Severe weather increases pressure on coastal habitats. Sea level rise threatens freshwater wetlands in Kadadu National Park, the Arafura Swamp and other Top End floodplains. Increasing ocean temperatures and acidification further degrades marine ecosystems through coral bleaching.



#### Residential and commercial development

Urban and industrial developments place pressure on coastal areas through clearance of native vegetation and changes to environmental flows, through associated water use and the disposal of sewage and wastewater.



#### Mining and energy production

The impacts of mining include vegetation clearance and, in some cases, drainage diversions to enable resources to be accessed. Discharged water from mining operations can have a significant impact, with the potential for toxins to accumulate in sediments.



#### Primary industries

Agriculture, aquaculture, and horticulture can pollute the marine environment with silt loads, run off nutrients and toxins.



#### Pollution

Marine debris and discarded nets are a significant issue, especially around Arnhem Land. It results in the deaths of many marine species.



#### Harvest of natural resources

Poor fisheries management can result in habitat destruction and by-catch of non-target species. Illegal fishing and poaching impacts on some economically important species.



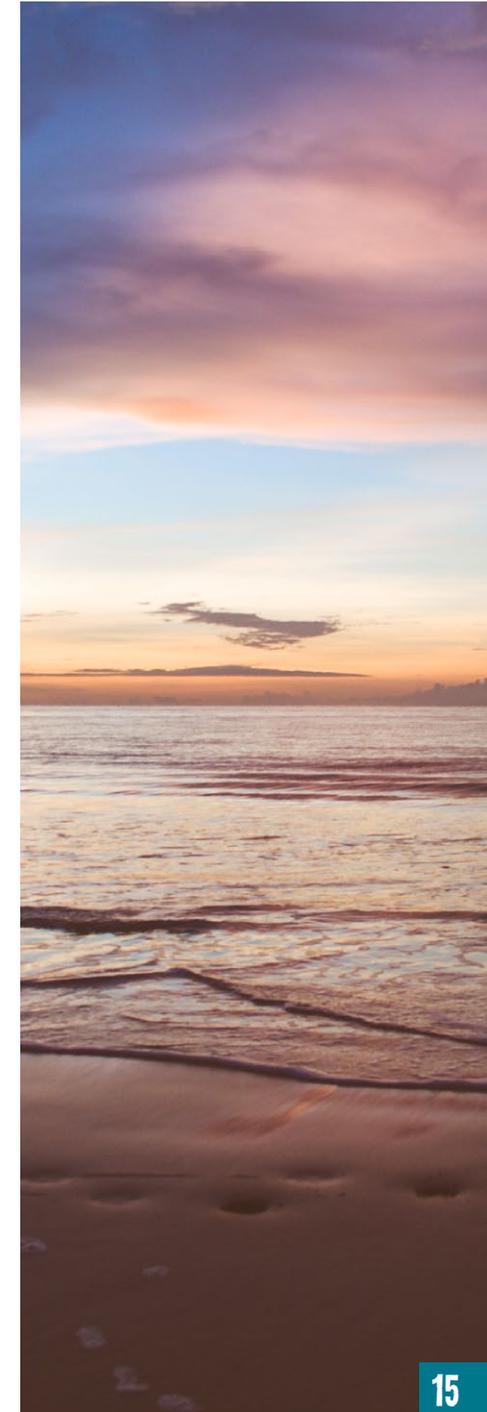
#### Tourism and recreation

Coastal areas can be polluted by recreational visitors' litter and waste and beach nesting sites degraded by vehicle movements. Visitors can also spread terrestrial and aquatic weeds into coastal areas.



#### Feral animals

Pigs can predate on seabird and turtle nests and, together with buffalo can degrade coastal ecosystems. Some islands remain free from feral animals and remain important refuges for native species, but, with hundreds of small islands and no port quarantine, this is challenging.



# Assets and pressures descriptions

## Freshwater systems

**Goal:** By 2030 the condition of freshwater systems in the Top End has been maintained



| Condition | 2016  | 2021 trend                 |                         |
|-----------|-------|----------------------------|-------------------------|
|           | Trend | Literature/<br>data review | Community<br>perception |
| Good      | ↓     | ↓                          | ↓                       |

### Indicators for condition

- River discharge and flooding
- Density and diversity of birds using wetlands for nesting and breeding
- Commercial catches of barramundi and prawns
- Presence of indicator species, e.g. freshwater turtles
- Distribution and density of floodplain and riparian weeds
- Water quality
- Water table depth and groundwater recharge

The Top End's freshwater aquatic habitats include rivers, wetlands, lakes, swamps, underground aquifers, aquatic *refugia* and their associated values, functions, and ecosystem services. They support high levels of species diversity including plants, fish and aquatic invertebrates, many of which are found nowhere else. Freshwater systems in the Top End have not been subjected to the same development pressures in other parts of Australia. Many wetlands are internationally significant. Kakadu National Park is listed both as a World Heritage area and Ramsar site. The Arafura Swamp is also recognised for its waterbird aggregations. The region sustains some of the largest areas of intact river systems in Australia.

Rivers and riparian zones have a fundamental role in the functioning of ecosystems. Four rivers in the Top End are of international significance. Aboriginal people value freshwater systems for their livelihoods, for their cultural and spiritual significance and to support economic development. Major regional industries including agriculture, mining, Aboriginal enterprises, fishing and tourism are dependent on healthy and available water sources. However, there is an increasing focus on the development of northern Australia's water resources because of the view that northern Australia has an abundance.

The focus on development is putting increased pressure on the Top End's precious freshwater systems.

## Freshwater systems

### Pressures and uses



#### Feral animals

Introduced animals such as pigs, buffalo, horses and cattle degrade wetlands and riparian zones, increasing nutrients and turbidity. This includes buffalo trampling contributing to saltwater intrusion of freshwater coastal wetland and noxious fish species invading Top End waterways. The Cane toad also impacts aquatic systems.



#### Weeds

Riparian areas and wetlands are subject to invasion by exotic weeds. These include mimosa, olive hymenachne, gamba grass, para grass, rubber vine and candlebush.



#### Climate change and severe weather

Climate change and severe weather can make some coastal wetlands vulnerable to saltwater intrusion. Protracted drought will lead to depletion of aquifers and environmental flows, while flooding damages waterways and habitats through erosion.



#### Inappropriate fire

Fires can disturb and degrade riparian habitats by increasing erosion and the flow of sediments when followed by intense rainfall. Many wetlands plants are fire sensitive and fire can lead to the establishment of weeds.



#### Residential and commercial development

In urban areas, water quality can be affected by wastewater, sewage and catchment flow modifications. Development also places additional demand on water resources.



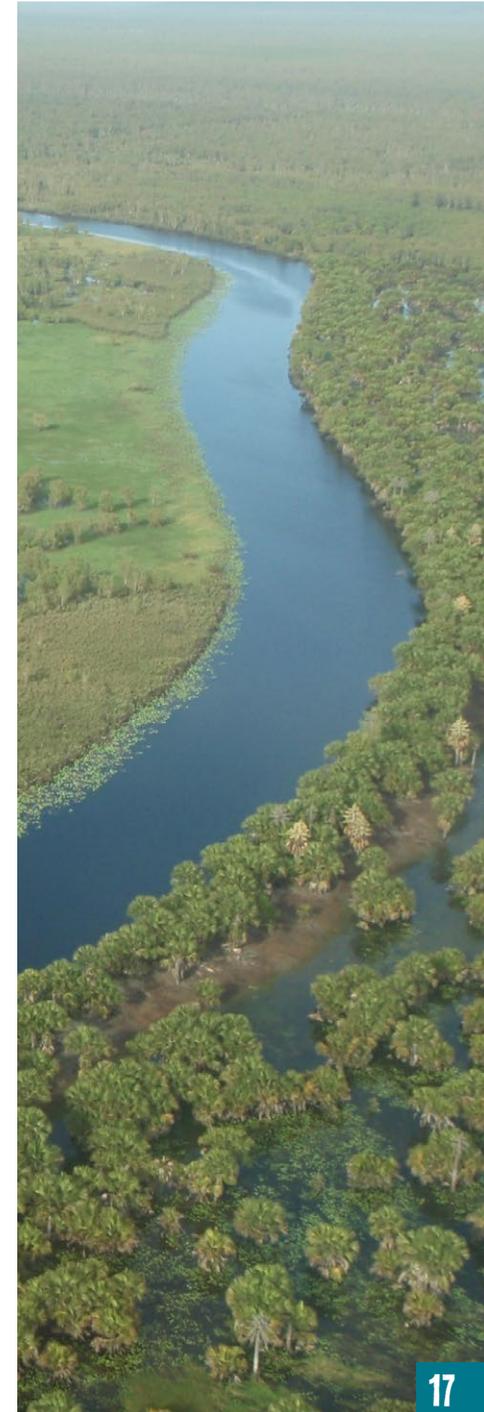
#### Mining and energy production

In addition to water extraction and the discharge of contaminants, extractive industries may include hydraulic fracturing, which has raised concerns about groundwater contamination. Legacy mines are also sources of contaminants.



#### Primary industries

Rivers and wetlands are sensitive to surface and groundwater extraction for agricultural use. Agricultural can add nutrients to water and land clearing can impact on water catchment function.



# Assets and pressures descriptions

## Grasslands/ Rangelands

**Goal:** By 2030 the condition of grasslands and rangelands are stabilised with no further decline in flora and fauna species associated with these habitats

### Indicators for condition

- Condition of native pastures, notably perennial grass cover
- Fire extent, intensity, patchiness
- Extent of long-unburnt areas
- Condition of flora and fauna in savanna areas
- Presence/ absence and density of weed species
- Sustainable stocking rate on pastoral lands

The Top End is part of the world's largest intact tropical savanna. It is dominated by Eucalyptus woodlands with an understorey of perennial and annual grasses. The Top End's vast savannas have not been intensively developed and still retain large areas of natural habitat. The tropical savannas in the Top End are home to a diverse array of plants, mammals, birds, reptiles and amphibians. Tens of thousands of different types of invertebrates are also found here. A large proportion of these species are found nowhere else in the world. Termite mounds are a recognisable feature in the scenery of the tropical savannas. There is a very long history of fire management by Aboriginal people and most species are adapted to periodic burning.

In some areas, Top End grasslands and floodplains constitute important grazing resources and support a profitable industry of finishing stock bound for export.



Grasslands/  
Rangelands

| Condition | 2016  |                            | 2021 trend              |  |
|-----------|-------|----------------------------|-------------------------|--|
|           | Trend | Literature/<br>data review | Community<br>perception |  |
| Fair      | —     | —                          | ↓                       |  |

### Pressures and uses



#### Inappropriate fire

Changes in fire regimes seriously threaten many habitats and species in savanna landscapes, including granivorous birds such as the Gouldian finch and partridge pigeon, and mammals such as the northern quoll and brush-tailed phascogale. The spread of invasive grassy weeds is fuelling hotter fires.



#### Weeds

Introduced grasses such as gamba and mission grass create high fuel loads and promote hot, late season fires. They are fire resilient and can replace native vegetation to transform landscapes.

# Assets and pressures descriptions



**Goal:** By 2030 the condition of the ranges in the Top End are stabilised with no further decline of flora and fauna associated with these habitats



| 2016      |       | 2021 trend                 |                         |
|-----------|-------|----------------------------|-------------------------|
| Condition | Trend | Literature/<br>data review | Community<br>perception |
| Fair      | ↓     | ↓                          | ↓                       |

## Indicators for condition

- Number of ranges identified as sites of conservation significance being managed for conservation
- Number of Aboriginal ranger groups managing sites in the ranges
- Fire frequency and intensity across ranges
- Number of priority sites within ranges remaining unburnt long term.
- Area of the ranges remaining unburnt
- Presence and abundance of native mammals
- Proportion of native tree cover

The ranges of the Top End include spectacular sandstone escarpments, plateaus, cliffs and gorges that attract visitors from all over the world who come to see the dramatic vistas and landscapes and the significant Aboriginal rock art of the region. The Arnhem Land Plateau (the Plateau) is recognised as being internationally significant for both its natural and cultural values. It is widely regarded as ‘the crown jewel of NT biodiversity’ and provides habitat for over 30 threatened species. The rugged nature of the plateau and its gullies and gorges provide refuge for moisture-loving and fire sensitive plants and animals. The primary ecological community of the Plateau is the endangered Arnhem Plateau Sandstone Shrubland Complex. The Plateau also supports a high proportion of rainforest including almost all of the distinctive rainforest, including associations dominated by the endemic tree *Allosyncarpia ternata*.

The rock art galleries of the Plateau have been described as “one of the world’s supreme art galleries” and are renowned as the most extensive and complex body of rock art in the world. The art describes the history of human civilisation in Australia and the earliest paintings are dated from over 50,000 years ago. Most of the Plateau is included in protected areas through Kakadu and Nitmiluk national parks and the Warddeken Indigenous Protected Area. Other significant range areas include the Tabletop Plateau in Litchfield National Park, featuring gorges and waterfalls that attracts hundreds of thousands of tourists annually.

## Pressures and uses



### Inappropriate fire

Fire is the most significant threat to unique ranges habitats. On the Arnhem Land Plateau, late season intense fires have reduced the extent of rainforest patches and are a key threat to the health of the highlands .



### Feral animals

Buffalo can have disruptive impacts on sensitive highlands vegetation and rainforest patches. Cats predate on many small mammals, especially after fire removes cover.



### Weeds

Some weeds species are now establishing in the highlands of the Top End.



### Lack of access and resources

The region’s sparse population and lack of ready access into the upper ranges are significant impediments to their management. Management incurs high logistical costs and difficulties.

## Healthy soils

**Goal:** By 2030 soil condition and structure is maintained in horticultural areas and supports the biodiversity values of the Top End

### Indicators for condition

- Adoption of best practice in agricultural industries
- Sediment load in watercourses
- Integrated land use plans that address land degradation
- Proportion of ground cover maintained and soil stability
- Productivity and health of soils on farms

Healthy soils in the Top End refers to the fertility, structure, health and productivity of the soils for maintaining biodiversity and vital habitats and for commercial uses such as horticulture and pastoralism. In general, most soils in the Top End are relatively shallow, weathered and have low fertility. Due to the intense tropical storms and extreme weather, erosion is a typical feature of the landscape in the Top End with severe erosion risk existing on slopes of greater than 1.5%. Erosion affects the production and environmental values of the plants and animal species they support. There are some areas of the Top End region that support horticulture such as the arable land in the Douglas Daly region and areas in the Greater Darwin region. Management practices to maintain and improve soil condition are well understood. Retention of vegetation cover, ground cover and crop residues are management techniques that help reduce the risk of wind and water erosion, lower greenhouse gas emissions and improve water use efficiency. Control of feral animals to reduce total grazing pressure and prevent erosion is important across the region.



| 2016      |                                                                                     | 2021 trend                                                                          |                                                                                     |
|-----------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Condition | Trend                                                                               | Literature/<br>data review                                                          | Community<br>perception                                                             |
| Good      |  |  |  |

### Pressures and uses



#### Feral animals

Buffalo and pigs can contribute to erosion and sedimentation of waterways.



#### Residential and commercial development

Construction of housing, roads and infrastructure can lead to poor drainage, waterlogging and erosion.



#### Primary industries

Poor management of soils can result in salinity, loss of organic matter, changing of soil chemistry and compaction. It can also be contaminated with toxic chemicals or over-treatment with fertilisers.



#### Climate change and severe weather

Drought impacts on soil moisture, windstorms and flooding can remove soil through erosion.

# Assets and pressures descriptions

## Biodiversity and conservation sites

**Goal:** By 2030 diverse populations of threatened species are maintained and Sites of Conservation Significance are maintained in good condition



Biodiversity and conservation sites

| Condition | 2021 trend |                            |                         |
|-----------|------------|----------------------------|-------------------------|
|           | Trend      | Literature/<br>data review | Community<br>perception |
| Fair      | ↓          | ↓                          | ↓                       |

### Indicators for condition

- Conservation status of threatened species
- Number of threatened species for which conservation measures are being implemented
- Diversity and abundance of native species and habitat health at monitoring sites
- Number of Aboriginal ranger groups actively managing sites for their conservation values
- Fire seasonality, extent and areas left unburnt
- Proportion of sites of conservation significance conservation sites infested with priority weeds
- Proportion of sites of conservation significance seriously impacted by feral animals

The Top End is renowned for its extensive natural environments, with abundant biodiversity and key conservation sites. Low levels of vegetation clearance and development have largely protected the Top End from the biodiversity loss that has occurred in other parts of Australia. The Top End provides habitat for the Territory's unique biodiversity as well as refuges for healthy populations of many species that have disappeared or are threatened elsewhere in Australia. For example, the islands are home to several endemic plants and provide predator-free environments for otherwise threatened mammals.

The Top End region has 27 Sites of Conservation Significance encompassing islands, coastal wetlands, Darwin Harbour and the Arnhem Plateau. Of these, 26 sites are of international significance. These sites include one World Heritage Area and two Ramsar sites. Five vegetation communities in the Top End are recognised as sensitive and in need of protection by the NT Government. In 2021 the Top End has 58 threatened plant species (17 listed both nationally and in the NT, three only nationally-listed and 38 only NT-listed) and 66 threatened animal species (40 listed both nationally and in the NT, 11 only nationally-listed and 15 only NT-listed). Threatened species include the bare-rumped sheath-tailed bat, speartooth shark, northern quoll and golden-backed tree-rat. Key marine species in the region include the heart urchin, narrow sawfish, flatback turtle, brown booby and Australian snubfin dolphin. Iconic species include barramundi, turtles, dugongs and dolphins. Six of the seven species of marine turtles found in the world are located in the Top End.

## Biodiversity and conservation sites

### Pressures and uses



#### Inappropriate fire

Altered fire regimes are a key threatening process that change Top End landscapes and detrimentally impact on populations of small mammals, granivorous birds and fire-sensitive plants. Shifting fire regime have driven loss of habitat, structural diversity and decline in biodiversity values.



#### Feral animals

Feral animals have significant impacts on native plants, habitats and animal species. Pigs disturb habitats, contribute to erosion and loss of water quality, spread weeds and predate on other species. Feral cat predation is driving the decline of many small mammals in the Top End, while cane toad toxicity has led to a decline in some native predators.



#### Weeds

Invasive plants have the potential to transform entire habitats and so pose a primary threat to biodiversity. Gamba grass, para grass, olive hymenachne and mission grass have been listed as key threat to biodiversity under the Environment Protection and Biodiversity Conservation Act 1999 (Cth).



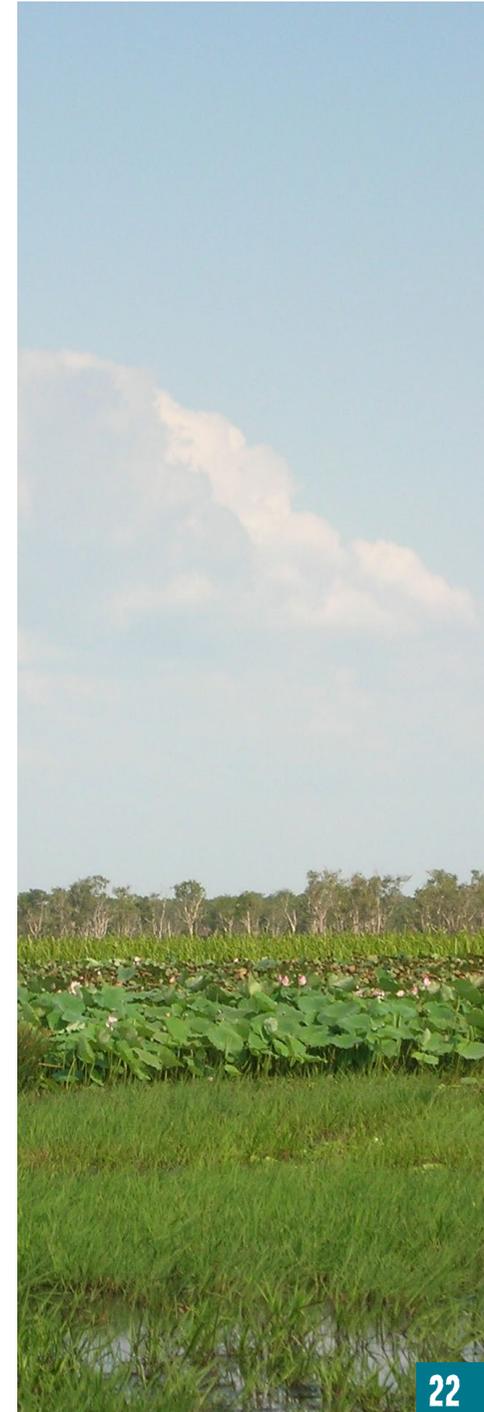
#### Climate change and severe weather

Temperature increases, sea level rise, increased cyclone frequency and more regular and intense bushfires will adversely impact on Top End biodiversity.



#### Lack of knowledge

Knowledge of ecological processes, biodiversity and its interactions with various threatening processes remains incomplete in the Top End. Further research is required to understand the causes of biodiversity decline and monitor conservation efforts to understand whether these are effective. Any loss of Traditional Ecological Knowledge also weakens capacity to manage landscapes sustainably.



# Assets and pressures descriptions



## Community knowledge

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



Community knowledge

| Condition | 2016  | 2021 trend              |                      |
|-----------|-------|-------------------------|----------------------|
|           | Trend | Literature/ data review | Community perception |
| Fair      | ↓     | ↓                       | —                    |

### Indicators for condition

- Number of Traditional Ecological Knowledge projects and culturally-appropriate storage
- Number of opportunities for intergenerational transfer of knowledge
- Number of agricultural knowledge-sharing and extension initiatives
- Number of properties/ land trusts with property/ NRM plans
- Number of community NRM knowledge sharing events and participation
- Extent of utilisation of traditional and scientific knowledges in NRM

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

Aboriginal people possess a wealth of knowledge about the Top End and their management practices have shaped the Top End for many thousands of years. This knowledge has been handed down through generations and today is contributing to the 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 pass on their knowledge to younger generations through supporting on Country visits and other innovative ways to record knowledge. Collaborative projects between Western scientists and Aboriginal people to document traditional knowledge are also of vital importance. Today, Aboriginal ranger groups are increasingly incorporating new technology and modern approaches into their management of Country.

The scientific community and community groups also hold a wealth of invaluable expertise and on-ground understanding vital to carrying out NRM work. 'two-way learning' and knowledge exchange partnerships have formed a basis for highly successful NRM initiatives in the Top End.

### Pressures and uses



#### Loss of knowledge and lack of access

Traditional Ecological Knowledge is constantly reaffirmed by continuously being on Country. Reduced access to rugged and remote country affects Traditional Owners capacity to manage cultural and natural landscapes. Likewise, without opportunities for intergenerational transfer of knowledge, Traditional Ecological Knowledge can be weakened and lost. Similarly, knowledge from Western knowledge systems can be lost or degraded by the turnover, transition or retirement of knowledge holders.



#### Lack of capacity and resources

Lack of funding for research, lack of support for visits on Country and lack of opportunity for recording and sharing knowledge can impact community knowledge. Likewise changing in the status of funding for Landcare and other similar organisations will impact how NRM knowledge is held in the community.

# Assets and pressures descriptions



## People on Country

**Goal:** By 2030 the number of people living in the Top End region has been maintained or increased with well-established viable remote communities gaining livelihoods through the sustainable use of natural resources

### Indicators for condition

- Number of people living outside of urban areas across the Top End
- Economic status and wellbeing of communities and outstations
- Level of funding for Aboriginal ranger programs
- Number of Aboriginal ranger groups engaged in cultural and natural resource management
- Number of young people entering agriculture or NRM related industries

Natural resources require people to manage them and so the people and communities actively managing land in remote areas constitute a key asset. In the Top End, these groups include Aboriginal landowners, pastoralists, farmers, fishers and others within broader NRM networks. In recent decades there has been growing 'urban drift' around much of Australia and the world, resulting in the depopulation of some remote areas.

Outside of greater Darwin in the Top End, Aboriginal peoples are in the majority and continue to hold customary obligations to care for their land and sea country. A broad range of socio-economic benefits, as well as conservation outcomes, are attributed to Aboriginal people living on and caring for Country. There are over 24 Aboriginal land and sea ranger groups in the Top End, many of which have been operating successfully for many years. These ranger groups provide paid employment for many Aboriginal people as well as training opportunities and future employment paths for younger generations.

Likewise agricultural industries must attract and retain young people to manage agricultural landscapes sustainably.



People on country

| Condition | 2016  | 2021 trend                 |                         |
|-----------|-------|----------------------------|-------------------------|
|           | Trend | Literature/<br>data review | Community<br>perception |
| Fair      | ↓     | ↑                          | ↑                       |

### Pressures and uses



#### Loss of knowledge and lack of access

Traditional Ecological Knowledge is constantly reaffirmed by continuously being on Country. Reduced access to rugged and remote country affects capacity to manage cultural and natural landscapes. Likewise, without opportunities for intergenerational transfer of knowledge, Traditional Ecological Knowledge can be weakened and lost. Similarly, knowledge from Western knowledge systems can be lost or degraded by the turnover, transition or retirement of knowledge holders.



#### Climate change and severe weather

Extreme weather and climate change will put additional pressure on communities living and working remotely. In the Top End, rising sea levels, increasing fire intensities and protracted drought or flooding can threaten remote livelihoods.

# Assets and pressures descriptions



## Cultural landscapes and sites

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



Cultural landscapes and sites

|                               | 2016      |       | 2021 trend                 |                         |
|-------------------------------|-----------|-------|----------------------------|-------------------------|
|                               | Condition | Trend | Literature/<br>data review | Community<br>perception |
| Cultural landscapes and sites | Good      | —     | —                          | ↓                       |

### Indicators for condition

- Programs supporting the intergenerational transfer of knowledge
- Number of sites recorded and listed under legislation
- Condition of sacred sites
- Resources available to TOs and indigenous groups to manage sacred sites
- Access and logistical support to visit and live on country
- Strength and use of Aboriginal languages

The whole landscape of the Top End region has cultural significance for Aboriginal people in the area. 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 Top End as identifiable geographic forms. 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 be ceremonial grounds, rock art galleries or pigment deposits used for cultural practices. The cultural values of the Top End region are internationally recognised, such as the Arnhem Land Plateau rock art galleries that are renowned as the most complex and extensive body of rock art in the world. Kakadu National Park is also internationally recognised as a World Heritage-listed site 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. They include places within the landscape such as hills, rocks, waterholes, trees, plains, lakes and other natural features. Sacred sites are connected with creation stories and may have significance to several clan groups across vast areas. They provide special meaning to the natural landscape. Custodians of sacred sites are responsible for protecting and maintaining them. Aboriginal sacred sites are protected and recognised as an integral part of the Territory's and Australia's cultural heritage through the Northern Territory Aboriginal Sacred Sites Act 1989. The Top End communities are also incredibly linguistically diverse. Language is inextricably linked to Aboriginal cultural landscapes and these languages hold a wealth of tradition reflected in strong environmental and cultural values.



## Cultural landscapes and sites

### Pressures and uses



#### Loss of knowledge and lack of access

Restoration of cultural landscapes and protection of cultural sites requires custodians to be sufficiently resourced to do so. Access to custodial land and sea can be difficult in remote areas and in the wet season when roads are cut off.



#### Recreation and other activities

Sites are threatened by human disturbance due to tourism and other recreational activities. Unrestricted access to some sites breaches customary law and can result in the sites being degraded. Aboriginal people are also concerned about overfishing of coastal waters impacting on customary fishing and damage to sacred sites due to illegal access.



#### Feral animals

Feral animals such as pigs and buffalo can degrade springs and waterholes and sacred sites. However, some introduced animals have become culturally significant to Aboriginal people and so it is important to consult prior to implementing control programs.



#### Mining and energy production

Mining activities and oil and gas developments can directly impact on sites of cultural significance.



#### Inappropriate fire

Disruption of Aboriginal fire management has degraded cultural landscapes. Inappropriate fires fuelled by gamba grass can threaten sites such as rock art galleries.



#### Residential and Commercial development

Development has put pressure on cultural sites and landscapes. In some cases, development has been superimposed over cultural landscapes. Development has also affected water quality and other natural values related to sacred sites.



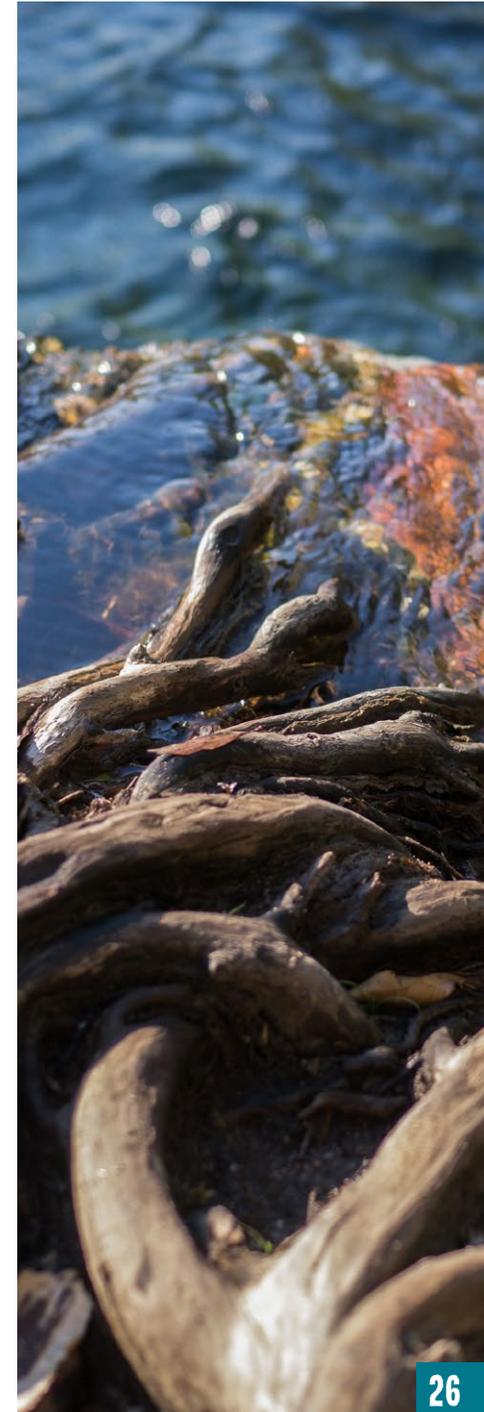
#### Climate change and severe weather

Increased temperatures and sea level rise, together with more severe fire, can directly affect sites or my increase difficulty of access.



#### Weeds

Weeds can prevent access to culturally important sites and some grassy weeds can transform the nature of cultural landscapes and sites.



# Overview of asset condition and trends

Available data suggests that there has been little overall improvement in NRM asset condition since 2016 and some key areas of decline.

While the coastal and marine environment has been subject to additional loss of habitat and increasing quantities of marine waste, several key fisheries were assessed as sustainable in 2020, and there has been no significant decline in key marine indicator species. Freshwater resources, particularly around Darwin, have come under additional pressures from high demand and contamination, accentuated by poor recharge during the wet seasons of 2018-2019. Evidence suggests losses of terrestrial biodiversity continues across Top End savannas, with fire a key driver of habitat change and invasive weeds such as gamba grass accentuating this processes. Feral cats have particular impact on small mammal populations. While there is evidence for enhanced management now changing fire regimes at a landscape scale across Arnhem Land, this has not yet begun reversing the losses to biodiversity, especially in highly fire sensitive areas such as the Arnhem Land Plateau and other Top End Ranges.

While there is evidence indicating continuing damage and disturbance to sacred sites and cultural landscapes across the Top End, there have also been some positive indications of improved management in some areas. Likewise, loss of important knowledge from the Top End NRM community has been to some extent offset by gains in other types of knowledge

On a positive note, available data seems to suggest a strengthening of people working on country, with newly established IPAs and security of funding for ranger groups, as well as the success associated with the growth of savanna burning and the possibility of new compliance/ surveillance powers under the NT legislation. There was also a recorded increase in the number of people working within agriculture, forestry and fisheries sectors in the Top End.

It is noteworthy that Top End community perspectives and observations are generally more pessimistic about resource conditions and trends than available evidence would suggest. However, given the general paucity of data it is possible that community observations provide a more accurate and reliable measure.

|                                                                                                                           | 2016      |       | 2021 trend                 |                         |
|---------------------------------------------------------------------------------------------------------------------------|-----------|-------|----------------------------|-------------------------|
|                                                                                                                           | Condition | Trend | Literature/<br>data review | Community<br>perception |
|  Coastal and marine                     | Fair      | —     | —                          | ↓                       |
|  Freshwater systems                     | Good      | ↓     | ↓                          | ↓                       |
|  Grasslands/<br>Rangelands              | Fair      | —     | —                          | ↓                       |
|  Ranges                                 | Fair      | ↓     | ↓                          | ↓                       |
|  Healthy soils                          | Good      | —     | —                          | —                       |
|  Biodiversity and<br>conservation sites | Fair      | ↓     | ↓                          | ↓                       |
|  Community<br>knowledge                | Fair      | ↓     | ↓                          | —                       |
|  People on country                    | Fair      | ↓     | ↑                          | ↑                       |
|  Cultural<br>landscapes and<br>sites  | Good      | —     | —                          | ↓                       |

# Emerging issues for the Top End region

The Northern Territory Natural Resource Management Plan (2021-2025) Top End Region (the Top End regional plan) has been updated with respect to the prevailing resource conditions, trends and priorities that were identified within the region in 2021, but planning must also anticipate any issues (challenges or opportunities) looking likely to emerge during the implementation period.

For this reason, stakeholders at Top End regional planning workshops were invited to define and discuss major issues that seemed likely to emerge and impact upon the natural resources management agenda during the following five years. In the following section, the potential emerging priorities are listed along with how they have been addressed in the plan.

## Climate change impacts

All Top End communities have already been touched by the impacts of climate change and weather extremes during the last five years. These activities include record temperatures, cyclones, drought, seasonal water shortages, intensified bushfires and increasing saltwater intrusion of coastal areas. There is an expectation that these impacts will intensify in coming years.

### Strategy 2025 Objective

- | Strategy | 2025 Objective                                                                                                                                                                                                 |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1      | Land managers have an increased understanding of the interaction of fire with cultural, biodiversity and production values, and improved risk-management of climatic and other dynamic threats.                |
| 4.8      | Industry-targeted climate adaptation plans have been completed with strategies for natural resource-based industries to cope with increased climate variability and extremes.                                  |
| 5.2      | Increase our knowledge of and resources available to understand and manage the impacts from all consumptive uses, including mining, pastoral, agricultural and domestic, on surface and groundwater resources. |
| 8.5      | Develop and implement a strategic plan to address preventable saltwater intrusion into coastal areas of high conservation priority.                                                                            |
| 8.6      | The management of Top End ecosystems is informed by knowledge of climate change processes and impacts                                                                                                          |

## Funding and resource constraints

There has been a perceived decline in public programs and extension services that previously engaged the community in NRM or supported NRM related activities across the Top End. Some believe that growing fiscal pressures in the Northern Territory Government and a refocusing of goals by the Australian Government will critically impact regional NRM capacity.

### Strategy 2025 Objective

- |     |                                                                                                                                                                              |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.4 | An enabling environment incentivises and promotes an integrated approach to fire management across tenures and land uses.                                                    |
| 3.4 | An enabling environment incentivises and promotes an integrated approach to feral animal control that, where appropriate, includes commercial harvest.                       |
| 4.6 | Minerals and resources industries are contributing to the protection of prioritised habitats and sites of conservation value.                                                |
| 6.2 | Ranger groups and other local NRM enterprises remain strong and economically viable, supported by a diversity of funding sources and locally-based commercial opportunities. |
| 7.3 | A transparent NT Offsets Framework directs offsets to deliver net positive benefit to natural values in the Top End.                                                         |
| 9.1 | There are increased resources and long-term approaches to NRM issues for people managing land.                                                                               |

# Emerging issues for the Top End region

## Spread of weeds

Many in the Top End community believe that weeds management will become increasingly problematic, Gamba grass and other grassy weeds threaten to spread beyond current containment lines into Arnhem Land and, in combination with the impacts of a changing climate, are increasing threats to life and property in the Darwin rural area. The proliferation of other weeds in the region may outstrip the capacity and resources available to manage them.

| Strategy | 2025 Objective                                                                                                                                                      |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.1      | Management of 'priority' weeds is planned and implemented at a landscape scale, engaging stakeholders and land managers from across diverse tenures.                |
| 2.2      | A risk-based approach to new weed incursions is based on the best available knowledge and enables timely and appropriate responses.                                 |
| 2.3      | Best practice, including new innovative tools, is adopted throughout the region and delivers improved evidenced-based weed management across the Top End            |
| 2.4      | An improved common understanding of weed threats, impacts and management options drives collaborations managing the impact of weeds from local to landscape scales. |

## Development pressures

Ambitious development agendas for the Top End will be implemented in the next few years. These include major investment in defence infrastructure, major resources and energy projects, Top End land releases and the development of Middle Arm and Darwin Harbour, collectively valued at billions of dollars. Many see these developments threatening the natural values of the region.

| Strategy | 2025 Objective                                                                                                                                                         |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.1      | Policies and programs for development in the Top End are informed by the best available science and knowledge to ensure the protection of cultural and natural assets. |
| 4.6      | Minerals and resources industries are contributing to the protection of prioritised habitats and sites of conservation value.                                          |
| 5.2      | An enhanced-knowledge base and empirical data support science-based planning and increased water use efficiency and sustainability across major industries and uses.   |
| 6.6      | New opportunities and partnerships between the private sector and NRM stakeholders have been developed.                                                                |
| 7.3      | A transparent NT Offsets Framework directs offsets to deliver net positive benefit to natural values in the Top End.                                                   |

# Emerging issues for the Top End region

## Water demand

Poor wet seasons during 2018-2020 led to declining groundwater levels in the Darwin area and the threat of a changing climate exacerbates the threat of future water insecurity. Furthermore, many believe that the ambitious development agenda for the region and external expectations that the Top End has abundant water resources will, in coming years, accelerate over-allocation and depletion of freshwater assets.

| Strategy | 2025 Objective                                                                                                                                                                                                                  |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.1      | Ground and surface water resources are managed with input from all stakeholders through catchment water allocation plans which include monitoring and ensures that cultural, environmental and production values are respected. |
| 5.2      | An enhanced-knowledge base and empirical data support science-based planning and increased water use efficiency and sustainability across major industries and uses.                                                            |
| 5.5      | Key aquatic systems and their associated cultural values of both surface and ground waters are recognised and protected.                                                                                                        |

## Pandemics

In 2020-2021, restrictions and strategies to manage the risk of COVID-19 spreading in the Top End resulted in disruption to NRM activities and required considerable innovation on the part of land managers to continue providing land management services. In a globalised world, the potential for future pandemics and biosecurity risks should be factored into natural resource management planning.

| Strategy | 2025 Objective                                                                       |
|----------|--------------------------------------------------------------------------------------|
| 9.1      | Increased resources and long-term approaches to NRM issues for people managing land. |



# How to read the plan

## Overview

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

## Program 5: Water resources and soil management

After two years of drought-like conditions, there is an increased awareness of the limitations of water and soil resources among the NRM community in the Top End. This awareness has come just as an ambitious development agenda opens the way to expanding irrigated agriculture and developing new mining and resources sector projects. As such, water allocation has become a contentious issue in

some rural areas around Darwin. Similarly, many are aware of the increasing pressures upon fragile soil resources across the monsoonal Top End, arising from unsustainable farming practices, grazing pressure, and uncontrolled wildfires.

The objective of this program is to increase sustainability in soil and water management through improving the understanding of resource limitations and opportunities

to increase water use efficiency. The program aims to strengthen collaboration in water resource management and build stakeholder capacity through effective communications and extension.

The program will also promote robust land capacity studies and assessments to better understand land capability prior to future agricultural developments.

**2025 Objective**

Ground and surface water resources are managed with input from all stakeholders through catchment water allocation plans which include monitoring and ensure that cultural, environmental and production values are respected.

**Strategy**

**VERY HIGH PRIORITY**

5.1 Water resource planning and management is undertaken in collaboration with a diverse range of stakeholders based on an equitable and transparent process.

**Key activities**

5.1.1 Identify and quantify competing demands for water resources and the impacts of different activities on water resources

5.1.2 Involve key stakeholders, and users representing a range of interests, in water allocation planning in the region

5.1.3 Support water stewardship through communications materials that engage behavioural change and involve the community in planning and implementing new water monitoring strategies

5.1.4 Support research and innovation, including the impacts of climate change, that increase our understanding of water resources

**2023 Interim target**

The principle of community participation in water resources planning and allocation is well established.

**Assets improved**

## 2025 Objective

This is a statement of the desired outcome of the strategy, intended to reduce pressures and improve asset condition. The success of the strategy will be evaluated against these objectives.

## Strategy

This the management approach to the defined objective.

## Priority Activities

These activities should, if implemented, advance and deliver the strategy.

## Interim Target

This is an interim milestone expected to be achieved within two years as the strategy is progressed towards its final objective.

## Assets Improved

These are the assets that will be positively impacted or improved through each strategy. Most strategies will positively impact multiple assets. Each identified asset has a goal and delivering this plan also works towards achievement of asset goals.

## Key Measures of Achievement

These are the things measured to indicate whether strategies are being successfully implemented within the program. They indicate activity and actions as well as impact and outcome.

## Key Collaborators

This is a listing of the key groups and organisations who will be involved in implementing the program strategies.

## Priority Locations

These are the main geographic areas within the region identified as foci for action. In some cases justifications for the selection are given in brackets.

## Relevant Territory Plans/ Strategies

These are relevant regional plans and strategy documents that align with some aspects of the program. In many cases they have been used to inform the development of the program and may provide greater detail regarding targets and activities.

## Relevant National Plans/ Strategies

These are high level Australian Government strategies that have provided strategic direction and can provide national context to regional planning initiatives.

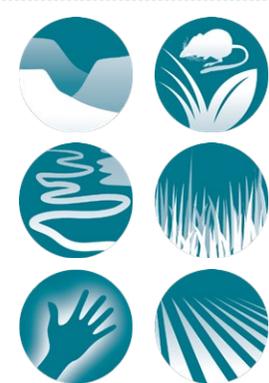
# Program 1: Managing Fire

Fire is the primary tool for managing Top End natural resources at the landscape scale.

In 2021, there is much more information about how fire interacts with other threats across the landscape, including facilitating the establishment of some weeds and intensifying the impacts of feral predators. In 2019 and 2020, the extended Dry seasons and reduced rainfall lead to an increase of destructive and unplanned fires.

The Top End NRM community has worked to successfully modify fire regimes and is continually learning how to better protect and enhance our natural assets and values through fire management. This includes being able to manage fire at a finer scale and acquiring the right tools to be able to do so.

The overall objective of this program is to build the capacity of land managers to manage fire more effectively through the best available knowledge and tools. This work will include applying the knowledge of leading practices more widely and continuing to engage stakeholders through sub regional cross-tenure collaborative planning and implementation.

| 2025 Objective                                                                                                                                                                                  | Strategy                                                                                                                                                                                                                                         | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2023 Interim target                                                                                                                             | Assets improved                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Land managers have an increased understanding of the interaction of fire with cultural, biodiversity and production values. and improved risk-management of climatic and other dynamic threats. | <p><b>VERY HIGH PRIORITY</b></p> <p><b>1.1</b> Increase application of fire management techniques that promote biodiversity and ecosystem function and minimise risk to cultural assets, infrastructure and human health across the Top End.</p> | <p><b>1.1.1</b> Research the impacts of fire regimes on ecosystem health, developing indicators, with ongoing monitoring and communications to inform management</p> <p><b>1.1.2</b> Build capacity of fire managers to measure ecological impacts of fire to improve the knowledge base and introduce fire management goals at a finer scale (i.e. specific to ecosystem type)</p> <p><b>1.1.3</b> Support the development of tools and communication products to inform communities about fire management</p> <p><b>1.1.4</b> Increase and support the collaboration of fire planning and burning with Traditional Owners and using traditional knowledge in fire management</p> <p><b>1.1.5</b> Continue to strengthen the role of Bushfires NT and particularly the support they give to landholders to help protect life and property in the Top End</p> | Fire management decisions are being made at a finer scale with greater sensitivity to seasonal conditions, land types and other considerations. |  |

# Program 1: Managing Fire

| 2025 Objective                                                                                                                                                                                                                             | Strategy                                                                                                                                                           | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2023 Interim target                                                                                                             | Assets improved                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| There is increased data, knowledge, planning systems other resources taken up and being used by fire managers.                                                                                                                             | <b>HIGH PRIORITY</b><br><b>1.2</b> Increase use of spatial fire management tools, knowledge systems, safe burning practices and equipment throughout the Top End.  | <b>1.2.1</b> Deliver training and capacity building for NRM practitioners in the utilisation of fire management tools such as NAFI and other GIS fire planning tools.<br><b>1.2.2</b> Provide more firefighting equipment and training to land managers and support access to country for fire management activities<br><b>1.2.3</b> Enhance fire spatial tools to improve fire monitoring particularly across Arnhem Land                                                                                   | Fire managers have an improved understanding of the range of technological, data and institutional resources available to them. |  <br> <br>  |
| Increased collective planning between land managers reduces the proportion of unplanned fires across Top End landscapes, reduces catastrophic wildfires and promotes heterogenous patchy burns that leave key areas of vegetation unburnt. | <b>VERY HIGH PRIORITY</b><br><b>1.3</b> Collaborative approaches to strategic fire management are extended across the Top End region.                              | <b>1.3.1</b> Strengthen multi-stakeholder regional fire management working groups and establish new ones where necessary to manage cross tenure fire management and planning<br><b>1.3.2</b> Focus on heavily burnt areas such as the Western Top End, and integrate with gamba grass control programs<br><b>1.3.3</b> Conduct annual reviews of fire plan implementation at a regional level<br><b>1.3.4</b> Facilitate and broker long-term strategic approaches to fire management in the Western Top End | Fire management is increasingly being planned across neighbouring properties.                                                   |  <br>                                                                                                                                                                             |
| An enabling environment incentivises and promotes an integrated approach to fire management across tenures and land uses.                                                                                                                  | <b>HIGH PRIORITY</b><br><b>1.4</b> Promote policies and market forces that support collaborative fire management providing social/cultural benefit in the Top End. | <b>1.4.1</b> Develop and lobby for adoption of clear policies that support market-based approaches (i.e. emissions offsets and carbon credits) to collaborative fire management<br><b>1.4.2</b> Increase communication of fire management success to funding bodies<br><b>1.4.3</b> Use fire management as a tool to maintain and support access to and cultural connection to Country                                                                                                                       | There is greater awareness of the potential economic, social and cultural benefits of effective fire management.                |                                                                                                                                                                                                                                                                                                                                                     |

# Program 1: Managing Fire

## Key Measures of Achievement

- Trends in fire extent and seasonality
- Trends in fire extent and severity
- Fire impacts on high value natural and cultural sites within the landscape
- Number of multi-stakeholder initiatives to plan and implement fire management strategically across tenures
- Number of Traditional Owners involved in fire management
- Number of areas of high value vegetation, habitats and cultural sites remaining unburnt through successive fire seasons
- Trends in land managers' knowledge, capacity and resources to manage fire

## Key Collaborators

- Arnhem Land Fire Abatement program
- Aboriginal ranger groups
- Pastoralists
- DEPWS (Bushfires NT)
- DEPWS (Parks and Wildlife)
- DEPWS (Fauna and Flora)
- Northern Land Council
- Traditional Owners
- Darwin Centre for Bushfires Research
- Regional shires
- DEPWS (Weeds)
- Department of Defence
- Parks Australia
- Indigenous Carbon Industry Network
- Researchers

## Priority Locations

- Arnhem Land Plateau and Eastern Arnhem land (EPBC listing, Sandstone heath, springs, rainforest pockets)
- Sandstone ranges (Sandstone shrublands, springs, rainforest)
- Kakadu (World Heritage Area)
- ALFA Fire projects area (Emissions abatement)
- Darwin Rural Area (Fire risk reduction, Howard sand Plains)
- Western Top End (Open woodlands riparian corridors and rainforest pockets)
- Litchfield Park and Finnis floodplain (Biodiversity, tourism and production values)
- Other floodplains including Arafura, Liverpool and Blythe (Fires becoming more intense from grassy weeds)

## Relevant Territory Plans/Strategies

- Vernon Arafura Bushfires Management Plan (DENR 2018)
- Arnhem Regional Bushfire Management Plan (DENR 2018)
- Fire management Plan (Kakadu National Park 2007)

## Relevant National Plans/Strategies

- National Bushfire Management Policy Statement for Forests and Rangelands (COAG 2014)



It is cool burning, encouraged for grass and plants to be reborn again and so that the animals would be much happier to come and feed on the burnt ground as well, especially kangaroos



# Program 2: Preventing and managing weeds

In recent years, community knowledge of and concern about 'priority' weeds in the Top End has grown. For example, in 2020, gamba grass was elevated to an election issue following concerns about the potential impact of intensified fires on lives and property in Darwin's rural area. As a result, a new Gamba Management Plan was introduced in 2020 and a 'Gamba Army' deployed. Elsewhere, successful savanna fire emissions abatement projects are threatened by the potential for gamba grass infestation of project areas that are required to remain gamba-free.

Looking forward, this program aims to build on localised successes in containing the spread of Top End 'priority' weeds including gamba grass, mimosa, bellyache bush and other Weeds of National Significance (WoNS). It will also include actions that strengthen surveillance for, and responses to, 'alert' weeds, including pond apple cabomba and water hyacinth.

The program aligns with the Draft Darwin Regional Weeds Strategy 2021-2026 and promotes 'adaptive management' through improving knowledge about leading practices and raising awareness among land managers of appropriate weed management tools and techniques. The program also encourages strategic collaborations across tenures to coordinate efforts at the landscape scale and prioritises raising public awareness about weeds, their impacts and how they are spread through the landscape.

| 2025 Objective                                                                                                                                       | Strategy                                                                                                                                              | Key activities                                                                                                                                                                                             | 2023 Interim target                                                                              | Assets improved                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management of 'priority' weeds is planned and implemented at a landscape scale, engaging stakeholders and land managers from across diverse tenures. | <b>HIGH PRIORITY</b><br>2.1 Collaborative approaches for strategic control of high priority established weed species are extended across the Top End. | 2.1.1 Strengthen the regional approach to weed management through improved partnerships between NTG, Shires, ranger groups, pastoral properties and researchers                                            | The Darwin Regional Weeds Advisory Committee meets regularly and functions effectively.          |     |
|                                                                                                                                                      |                                                                                                                                                       | 2.1.2 Promote the Darwin Regional Weeds Advisory Committee encouraging collaboration between multiple stakeholders and monitoring management effectiveness                                                 |                                                                                                  |                                                                                                                                                                           |
|                                                                                                                                                      |                                                                                                                                                       | 2.1.3 Undertake aerial mapping of infestations to inform control program and detect outlier populations of highest priority invasive weeds (gamba and mimosa)                                              | The Gamba Management Plan 2020-2030 is implemented and gamba is being reduced in priority areas. |   |
|                                                                                                                                                      |                                                                                                                                                       | 2.1.4 Support Aboriginal Rangers and Traditional Owners to undertake surveys to detect new infestations of significant weeds                                                                               |                                                                                                  |                                                                                                                                                                           |
|                                                                                                                                                      |                                                                                                                                                       | 2.1.5 Coordinate weeds control measures strategically, implementing catchment-based approaches and engaging partnerships across tenures as set out in the Draft Darwin Regional Weeds Strategy (2021-2026) |                                                                                                  |                                                                                                                                                                           |

# Program 2: Preventing and managing weeds

| 2025 Objective                                                                                                                                                      | Strategy                                                                                                                                      | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2023 Interim target                                                                                                                       | Assets improved                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| A risk-based approach to new weed incursions is based upon the best available knowledge and enables timely and appropriate responses.                               | <b>VERY HIGH PRIORITY</b><br>2.2 Prevent the introduction and establishment of new weeds.                                                     | <p>2.2.1 Monitor pathways of weeds spread consistent with the Draft Darwin Regional Weeds Strategy (2021-2026) and statutory management plans to achieve early detection and containment</p> <p>2.2.2 Evaluate, prioritise and respond appropriately to new weed incursions in the region, particularly highly invasive 'alert' weeds that are potentially suitable for Top End conditions</p> <p>2.2.3 Review, analyse and learn the lessons of the Siam weed response</p>                                                                                     | Stakeholder and community awareness of potential new weed threats has been heightened.                                                    |                                                                                                                                                                                  |
| Best practice, including new innovative tools, are adopted throughout the region and deliver improved evidenced-based weed management across the Top End.           | <b>HIGH PRIORITY</b><br>2.3 Improve adaptive weed management through monitoring, research and utilising data, training and capacity building. | <p>2.3.1 Identify knowledge gaps, prioritise future research and link to improving the capacity of weed management stakeholders</p> <p>2.3.2 Trial new weed management techniques and communicate results with land managers</p> <p>2.3.3 Deliver training to develop skills and tools to record and interpret weed distributions and treatment, utilising a common assessment methodology that allows sharing of data (Weedmate NT)</p> <p>2.3.4 Implement adaptive management principles to inform the continual improvement of weed management practices</p> | Land managers in 'priority' weed areas have been engaged and their needs for adaptive weeds management assessed.                          |        |
| An improved common understanding of weed threats, impacts and management options drives collaborations managing the impact of weeds from local to landscape scales. | <b>HIGH PRIORITY</b><br>2.4 Increase regional public awareness of weeds, their impacts and how to reduce these.                               | <p>2.4.1 Implement education and awareness programs on weed ID, control and strategic weed management approaches for land managers, contractors and community members in the region</p> <p>2.4.2 Raise awareness of "alert" weeds as potential high impact weeds should they become established</p> <p>2.4.3 Communicate weed management success stories to the wider community to encourage support and further activity</p> <p>2.4.4 Raise awareness and prioritisation of non-declared environmental weeds</p>                                               | Critical messages have been disseminated through appropriate media to raise public awareness about key 'priority' weeds and 'alert' weeds |                                                                                                                                                                                                                                                                                                                                                                                                                                       |

# Program 2: Preventing and managing weeds

## Key Measures of Achievement

- Regular meetings and successful function of the Darwin Regional Weeds Advisory Committee
- Progress towards implementation of the Gamba Management Plan (2020-2030)
- Level of community weeds awareness and action to prevent weed spread (community surveys)
- Success in engaging land managers into collaborative weeds management (Program participation)
- Number of weeds being strategically managed at the catchment scale
- Areas surveyed and treated for 'priority' weeds
- Rapid identification and effective responses to any newly introduced weeds species

## Key Collaborators

- DEPWS (Weeds)
- Northern Land Council
- Aboriginal ranger groups
- DEPWS (Bushfires NT)
- DEPWS (Parks and Wildlife)
- Territory NRM
- Pastoralists
- Parks Australia
- Department of Defence
- Contractors
- Researchers
- Pastoral Landcare groups
- NT Cattlemen's Association
- NT Farmers
- Private landholders

## Priority Locations

- Rivers including Daly, Mary, Goyder (Gamba Grass, Mimosa, Olive Hymenachne)
- Coastal floodplains and estuaries including Alligator, Finnis, Adelaide River (Mimosa, Salvinia, Olive Hymenachne, Para grass)
- Kakadu and Cobourg, World Heritage Area and Ramsar sites (Gamba Grass, Mimosa, Olive Hymenachne)
- Arnhem Land Sandstone Plateau (Gamba Grass, Mission Grass, Grader Grass)
- Howard Sand Plains (humidicola)
- Arnhem Land (Gamba Grass, Mission Grass, Grader Grass, Chinee Apple, Bellyache Bush)
- Arafura Swamp Wetlands (Mimosa, Olive Hymenachne para grass)
- Gove Peninsula North-East Arnhem Land (Mission Grass, Gamba Grass, hyptis, caltrop, Coffee bush)
- Islands (refugia from weeds)
- Coomalie/Litchfield and Darwin rural area (Gamba Grass, Mission Grass, humidicola)
- Finnis Reynolds Catchment, Litchfield Park and Western Top End (Gamba Grass, Mission Grass, Mimosa, Siam)

## Relevant Territory Plans/Strategies

- Draft Darwin Regional Weeds Strategy 2021-2026, (DEPWS 2021)
- Weed Management Plan for Gamba Grass (DEPWS, 2020)
- Integrated Weed Management Plan 2021-2026 (Litchfield Council 2020)
- Weed Management Plan for Grader Grass (DLRM 2016)
- Weed Management Plan for Neem (DLRM 2015)
- Weed Management plan for Bellyache Bush (DENR 2018)
- Weed management plan for Mimosa (DENR 2018)
- Weed Management Plan for Mesquite (DENR 2020)
- Weeds management Plan for Chinee Apple (DEPWS 2021)

## Relevant National Plans/Strategies

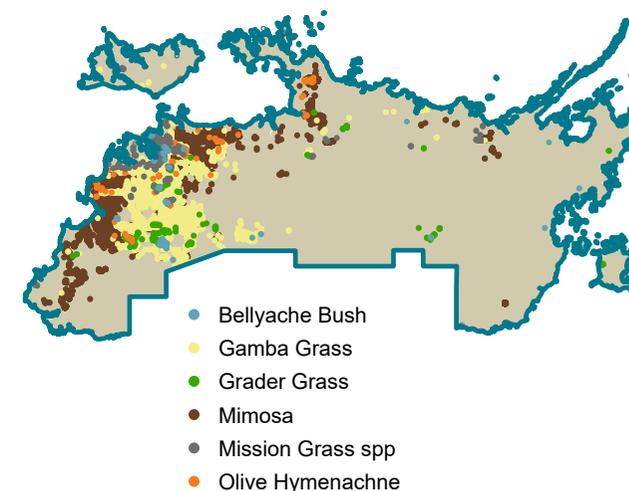
- Australian Weeds Strategy 2017-2027 (DAWR 2017)

It is a simple grass, Gamba Grass, that may pose the greatest threat to the integrity of the northern savannas, we need to tackle the problem now before it gets much, much worse



## Weeds

Distributions of some priority weed species for the Top End.



Source: Data from NT Government – Weeds Branch

# Program 3: Reducing the impacts of feral animals

Feral animals continue to have a significant impact on both the ecological health of Top End landscapes and on its economic productivity. Feral animals often intensify the impacts of other pressures such as wildfires and weeds, accelerating the degradation of disturbed landscapes. These disturbances deprive small mammals of food and shelter, and exposes them to feral cat predation.

Feral buffaloes and pigs degrade ground cover and expose soils to erosion, particularly around valuable freshwater systems and coastal plains. This destruction accentuates the impacts of climatic extremes and spread weeds. In 2019 there were an estimated 160,000 buffalo across the Top End and this population is rising. Consequently, the primary objective for this program is to develop an effective Top End feral animal strategy to reduce the impact at a landscape scale.

Actions of the program include raising awareness about feral animal damage and supporting the development of leading practices for their control and management. The adoption of coordinated approaches to feral animal management through collaborative planning and the sharing of knowledge and data is key to making the program work. Furthermore, the program will ensure land managers have accurate information to make decisions about the economic opportunities arising from feral herbivore harvest.

| 2025 Objective                                                                                                                                                                                                                                             | Strategy                                                                                                                             | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2023 Interim target                                                                                        | Assets improved                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Feral animal control programs are prioritised and targeted through risk-based approaches set out in a Top End feral animal strategy that establishes an agreed understanding of the problem, and shared recognition of key values that require protection. | <b>VERY HIGH PRIORITY</b><br>3.1 Strengthen regional feral management programs through coordinated and collaborative action.         | <p><b>3.1.1</b> Develop a Top End feral animal strategy that establishes a risk-based approach to the prioritisation and management of feral animal impacts</p> <p><b>3.1.2</b> Establish a multi-stakeholder group to support implementation of landscape scale feral animal management</p> <p><b>3.1.3</b> Plan and undertake regional meetings with key stakeholders leading to effective collaboration between Fire, Weed and Feral programs</p> | Work is underway to produce a regional ferals strategy, with support from a regional ferals working group. |     |
| A suite of measures are developed to assess the impact of feral animal control inputs, including measures of cost-benefit which trigger action.                                                                                                            | <b>HIGH PRIORITY</b><br>3.2 Use common measures and analysis to monitor, evaluate, report on and adapt the feral management program. | <p><b>3.2.1</b> Develop field indicators that can be readily used by land managers to quantify the damage and impact of feral herbivores</p> <p><b>3.2.2</b> Establish a data management framework and share results through regular reporting to all stakeholders</p>                                                                                                                                                                               | Key feral animal impact indicators have been developed and disseminated to stakeholders.                   |                                                                                                                                                                          |

# Program 3: Reducing the impacts of feral animals

| 2025 Objective                                                                                                                                         | Strategy                                                                                                                                                                                                 | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2023 Interim target                                                                                                                                                  | Assets improved                                                                       |
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| Feral animal management actions are, where appropriate, planned and implemented utilising the latest innovations and techniques.                       | <p><b>HIGH PRIORITY</b></p> <p><b>3.3</b> Support research and innovation in techniques, training and motivation to control feral animals.</p>                                                           | <p><b>3.3.1</b> Trial feral cat control techniques and assess for effectiveness and for practical application in savanna ecosystems</p> <p><b>3.3.2</b> Continue ongoing cat management and eradication on high value offshore islands</p> <p><b>3.3.3</b> Research and trial new pig control methods (e.g. Hoggone) and support coordination and strategic approaches (e.g. National Feral Pig Action Plan) in high value and vulnerable ecosystems</p> <p><b>3.3.4</b> Establish demonstration sites showing the impacts of feral herbivores on key ecosystems aiming to motivate landholders to increase effort</p> <p><b>3.3.5</b> Support Traditional Owners and Aboriginal Rangers in early detection measures, including new technology, to keep offshore islands cane toad free</p> | New feral management technologies and approaches appropriate to piloting in the Top End have been identified.                                                        |    |
| An enabling environment incentivises and promotes an integrated approach to feral animal control that, where appropriate, includes commercial harvest. | <p><b>MEDIUM PRIORITY</b></p> <p><b>3.4</b> Promote policies and legislation to enable commercial utilisation that is consistent with the objectives of collaborative feral animal control programs.</p> | <p><b>3.4.1</b> Consult stakeholders and explore the potential role of feral animal harvest within broader programs of control, including both economic viability and environmental outcomes</p> <p><b>3.4.2</b> Prepare communications materials and ensure all stakeholders have accurate information with regard to the true economic value of feral animals to better inform decision making</p> <p><b>3.4.3</b> 3.4.3. Improve and streamline communication and understanding between land managers and the holders and administrators of Section 19 Land Use Agreements</p>                                                                                                                                                                                                           | Clear information has been collated and provided to Landowners about the viability of commercial harvest and the potential impact of this on feral animal pressures. |    |
| Collaborative biosecurity programs continue to reduce likelihood of new pest animals and diseases becoming established in the Top End.                 | <p><b>HIGH PRIORITY</b></p> <p><b>3.5</b> Strengthen the coordination and delivery of biosecurity surveillance and risk-based responses to potential pest animals, insects and marine pests.</p>         | <p><b>3.5.1</b> Coordinate development and dissemination of communication materials on biosecurity in northern Australia</p> <p><b>3.5.2</b> Strengthen coordination between Territory and Federal programs to build the NRM community's capacity to detect new and emerging pests</p> <p><b>3.5.3</b> Increase awareness of the link between economic livelihoods and biosecurity to promote engagement in biosecurity measures</p> <p><b>3.5.4</b> Maintain communication and awareness to prevent cane toads from reaching offshore islands</p>                                                                                                                                                                                                                                          | Appropriate materials, approaches, and targeted communications are effectively raising awareness of biosecurity.                                                     |  |

# Program 3: Reducing the impacts of feral animals

## Key Measures of Achievement

- Production and implementation of a Top End feral animals strategy
- Establishment and regular meetings of a Top End feral animal management working group
- Trends in feral animal distribution and densities
- Stakeholder awareness and use of feral animal impact indicators
- Results from trials of new feral animal control techniques
- Trends in income from feral species harvest, relative to feral impact indices from the same area
- Extent of land subject to strategic evidenced-based feral animal control

## Key Collaborators

- DEPWS (Fauna and Flora)
- DEPWS (Parks and Wildlife)
- Northern Land Council
- Aboriginal ranger groups
- Pastoralists
- Parks Australia
- Territory NRM
- Traditional Owners
- Australian Quarantine Inspection Service
- DITT (Biosecurity)
- DAWE
- Department of Health
- Researchers
- DITT (Livestock industries)
- NT Buffalo Industry Council

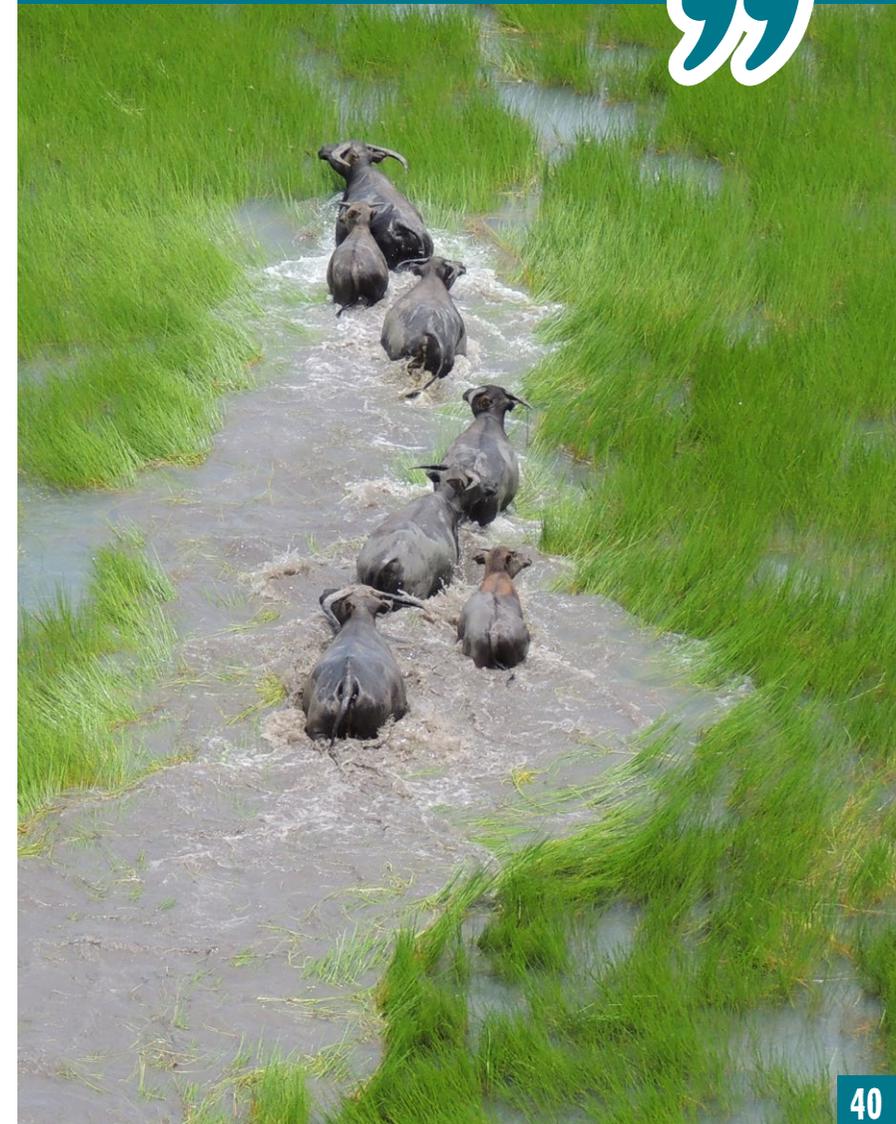
## Priority Locations

- Kakadu, floodplains and uplands (Buffalo, horses, pigs, Cats)
- Arnhem Land (Buffalo, horses pigs, cats)
- Arafura Swamp (Buffalo, pigs)
- Litchfield Park, Western Top End, Finnis flood plains (Pigs)
- Sandstone Plateau (Feral cats, Buffalo)
- Islands (Cane Toads, Cats)

## Relevant National Plans/ Strategies

- Australian Pest Animal Control Strategy 2017-2027 (DAWR 2017)
- National Wild Dog Action plan (DAWR 2017)
- Draft National Feral Pig Action Plan (Australian Pork 2021)

Can't camp on the floodplains because there is no clean water left because of the buffalo. People are driving to get water from the tap



# Program 4: Industry adoption of sustainable practices

Entering the 2020s, the Top End region is poised for considerable growth as the agriculture and resources sectors look likely to spearhead Australia's global economic resurgence. In the primary industries, beef is fetching strong prices as producers restock following drought and there is increased demand for horticultural products. Demand for fisheries products remains strong and Top End aquaculture shows future growth potential.

With the Developing the North agenda now firmly on track, there is an opportunity to productively engage across industry sectors to ensure that this development follows a sustainable pathway and secures the prosperity and wellbeing of Territorians into the future.

This program will support primary industries to identify and apply leading practices to enhance sustainability and resilience. It will also create opportunities for the resources and other industries to engage more effectively in natural resource management and so build social license.

The program also encourages the NRM community to engage with the wider community to strengthen biosecurity surveillance as a way to protect primary industries and support climate resilience for rural communities and industries.

This program envisages Top End industries as essential partners in the future management of our natural resources and key to maintaining healthy landscapes.

| 2025 Objective                                                                                                                                                         | Strategy                                                                                                                                              | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2023 Interim target                                                                                                                                             | Assets improved                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Policies and programs for development in the Top End are informed by the best available science and knowledge to ensure the protection of cultural and natural assets. | <b>HIGH PRIORITY</b><br><b>4.1</b> Engage with industry to encourage sustainable approaches to Developing the North policies and programs.            | <b>4.1.1</b> Strengthen linkages between NRM managers, researchers and the government agencies and industry bodies responsible for future strategic economic development in the Top End<br><b>4.1.2</b> Ensure that relevant and timely empirical data is channelled to inform large scale development planning decisions and that improved policy and planning tools are in place                                                                                                                                           | Appropriate mechanisms and protocols for sharing data between NRM specialists, researchers and development decision makers have been identified and are in use. |   |
| The biosecurity system is integrated and risk-based with strong community involvement that minimises the establishment of exotic pests and diseases.                   | <b>MEDIUM PRIORITY</b><br><b>4.2</b> Ensure resources are increased for biosecurity support services in line with increased agricultural development. | <b>4.2.1</b> Implementation of the both the 2015-2025 NT Biosecurity Strategy and the Commonwealth 2030 Strategy, particularly with respect to increasing the NRM community's involvement in biosecurity<br><b>4.2.2</b> Develop enhanced surveillance and effective capability to detect and respond to biosecurity emergencies<br><b>4.2.3</b> Strengthen community and industry capacity to risk-manage biosecurity threats by raising awareness and supporting the development of washdown facilities, where appropriate | NRM stakeholders have the capacity to play an increased role in delivering biosecurity outcomes.                                                                |  |

# Program 4: Industry adoption of sustainable practices

| 2025 Objective                                                                                             | Strategy                                                                                                                                                                                    | Key activities                                                                                                                                                                                                    | 2023 Interim target                                                                                                          | Assets improved                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| Sustainable grazing practices are implemented through the increased knowledge and skills of land managers. | <b>HIGH PRIORITY</b><br>4.3 Support best practice grazing management through delivery of regional monitoring programs and practices that promote both productivity and ecological outcomes. | 4.3.1 Develop case studies and demonstration sites showcasing best practice grazing management for biodiversity conservation and production                                                                       | Improved access to new technologies, data and training has increased the number of producers adopting leading practices.     |  <br> <br> |
|                                                                                                            |                                                                                                                                                                                             | 4.3.2 Facilitate the adoption of new technology in rangelands management and sustainable grazing and encourage pastoralists to conduct their own monitoring to inform grazing practices                           |                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                            |                                                                                                                                                                                             | 4.3.3 Draw upon national tools, benchmarks and frameworks where applicable to the Top End to assist in standardising rangelands condition assessments and monitoring programs                                     |                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                            |                                                                                                                                                                                             | 4.3.4 Develop local management plans and landholder stewardship programs for high value conservation assets                                                                                                       |                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                            |                                                                                                                                                                                             | 4.3.5 Develop more information on leading practices for more efficient cattle production relevant to the Top End                                                                                                  |                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                            |                                                                                                                                                                                             | 4.3.6 Encourage diversification of income streams on pastoral land through alternative activities that support sustainable stocking rates                                                                         |                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Understanding of ecosystems and sustainable management enhances agricultural production in the Top End.    | <b>HIGH PRIORITY</b><br>4.4 Support leading practice horticulture and broad scale agriculture through knowledge sharing, adoption of new technology and training and innovation.            | 4.4.1 Quantify the damage to crops by magpie geese to develop a balanced management approach                                                                                                                      | Improved access to new technologies, knowledge and resources has increased the number of farmers adopting leading practices. |                                                                                                                                                                                                                                                                     |
|                                                                                                            |                                                                                                                                                                                             | 4.4.2 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 |                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                            |                                                                                                                                                                                             | 4.4.3 Attract more workers to the horticulture industry and focus on potential Aboriginal employment opportunities                                                                                                |                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                            |                                                                                                                                                                                             | 4.4.4 Improve access to training especially promoting soil and water management best practice                                                                                                                     |                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                            |                                                                                                                                                                                             | 4.4.5 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      |                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                            |                                                                                                                                                                                             | 4.4.6 Trial the use of biochar and other organic farming techniques in a variety of horticultural contexts                                                                                                        |                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |

# Program 4: Industry adoption of sustainable practices

| 2025 Objective                                                                                                                   | Strategy                                                                                                                                                             | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2023 Interim target                                                                                                                     | Assets improved                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Evidence-based and adaptive management approaches engage all stakeholders to achieve ecologically sustainable Top End fisheries. | <b>HIGH PRIORITY</b><br>4.5 Support ecologically sustainable fisheries management through monitoring and improved technology.                                        | <p>4.5.1 Develop and improve current fisheries data collection and systems by commercial, amateur fishing groups and Aboriginal people</p> <p>4.5.2 Consolidate and implement environmental management systems for the commercial fishing industry</p> <p>4.5.3 Facilitate stakeholder groups to collaborate on important fisheries related NRM activities</p>                                                                                                                                                                  | Leading practice data collection and fisheries management systems have been identified.                                                 |                                                                                                                                                                           |
| Minerals and resources industries are contributing to the protection of prioritised habitats and sites of conservation value.    | <b>MEDIUM PRIORITY</b><br>4.6 Support and promote partnerships between the NRM community and resources industries regarding mine rehabilitation and offset programs. | <p>4.6.1 Establish a working group or advisory committee that includes DITT, NT EPA, and DEPWS, Land Councils and key NGOs such as TNRM to engage with the mining industry to strengthen links and involvement in NRM activity</p> <p>4.6.2 Encourage the use of the environmental levy from mining companies to engage NRM stakeholders in legacy mine rehabilitation</p> <p>4.6.3 Support and encourage minerals and resources industries and other developers to explore voluntary offsets in their development planning</p> | A working group liaising between NRM stakeholders and the minerals and resources industries has been established.                       |     |
| The plantation forest industry has adopted and implemented best practice guidelines that underpin its sustainability.            | <b>MEDIUM PRIORITY</b><br>4.7 Develop and implement a forestry management and assessment framework.                                                                  | <p>4.7.1 Develop a framework for plantation forestry operations in the NT to help understand water use impacts and resource use efficiencies</p> <p>4.7.2 Progress adoption of best practice through an industry code of practice that encourages self-regulation with clear links to government regulations pertaining to land clearing and other forestry specific legislation, policy and planning frameworks</p> <p>4.7.3 Support interested forestry operators to achieve international sustainability certification</p>   | Best practice guidelines for forestry operations in the Top End have been disseminated and operators are being supported to adopt them. |                                                                                    |

# Program 4: Industry adoption of sustainable practices

| 2025 Objective                                                                                                                                                                | Strategy                                                                                                                             | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2023 Interim target                                                                | Assets improved                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Industry targeted climate adaptation plans have been completed with strategies for natural resource-based industries to cope with increased climate variability and extremes. | <b>HIGH PRIORITY</b><br>4.8 Carry out adaptation planning to build resilience to the likely impacts of climate change upon industry. | <p>4.8.1 Consult to develop strategies for industry and communities to better adapt and build resilience to climate change</p> <p>4.8.2 Encourage governments and other stakeholders to develop strategies to adapt to climate change especially in Developing the North considerations</p> <p>4.8.3 Seek and explore potential solutions through the Future Drought Fund's Drought Resilience Adoption and Innovation Hub</p> <p>4.8.4 Engage with and regionally deliver Commonwealth programs that support adaptation and resilience to climate change (e.g. FDF and NRRRA)</p> <p>4.8.5 Encourage and identify pathways that enable industries to reduce emissions consistent with Northern Territory targets</p> | Industries and communities are supported to undertake climate adaptation planning. |  |

## Key Measures of Achievement

- Level of input from environmental knowledge holders into major projects decision-making, planning and approvals
- Number of industry extension programs driving increased sustainability and resilience
- Number of producers transitioning to more sustainable practices following participation in extension programs
- Industries implementation of leading practice in biosecurity
- Level of investments directed into NRM through industry partnerships
- Level of consideration of climate change and resilience issues in industry development plans

## Key Collaborators

- NT Cattlemen's Association
- NT Farmers Association
- DITT (Livestock Industries)
- DITT (Plant Industries)
- Seafood Council NT
- DITT (Fisheries)
- Forestry Industry Association NT
- Minerals Council NT
- Territory NRM
- Pastoralists
- Horticulturalists
- DEPWS (Rangelands)
- Regional Development Australia NT

## Priority Locations

- Douglas Daly (pastoral, crop agriculture, forestry)
- Coastal and Marine (commercial and amateur fisheries)
- Gunn Point (Development)
- Top End coastline, rangelands and woodlands (biosecurity surveillance)
- Greater Darwin area (Horticulture industry)
- Batchelor and Jabiru (Rum Jungle and Ranger Mines)
- Wildman River (Land release)
- Pastoral properties (Land clearing)

## Relevant Territory Plans/ Strategies

- Northern Territory Business Innovation Strategy (DITT 2021)
- The Territory Critical Minerals Plan (DPIR 2020)
- Northern Territory Biosecurity Strategy 2016-2026 (DPIF 2016)
- Plant Industries Strategic Plan 2018-2028 (NT Farmers 2018)
- Crocodile Industry Strategic Plan 2015-21 (CFA 2015)
- Northern Territory Seafood Council Strategic Plan 2018-2023 (NTSC2018)
- Aquaculture policy framework (DITT 2019)
- Recreational Fishing development Plan 2012-2022 (DPIR 2012)

- Northern Territory Fisheries Harvest Strategy Policy (DPIR 2016)
- NT Plant Industries Workforce Development Plan (2020-2025)
- Draft Space Strategy 2021-2025

## Relevant Territory Plans/ Strategies

- Buffalo Program: Strategic R&D plan 2021-2025 (Agrifutures 2021)
- Australian Beef Sustainability Framework (MLA 2017)
- Delivering Ag2030 (DAWE 2020)
- Developing Northern Australia (ONA 2021)
- Biosecurity 2030 (DAWE 2021)

# Program 5: Water resources and soil management

After two years of drought-like conditions, there is an increased awareness of the limitations of water and soil resources among the NRM community in the Top End. This awareness has come just as an ambitious development agenda opens the way to expanding irrigated agriculture and developing new mining and resources sector projects. As such, water allocation has become a contentious issue in

some rural areas around Darwin. Similarly, many are aware of the increasing pressures upon fragile soil resources across the monsoonal Top End, arising from unsustainable farming practices, grazing pressure, and uncontrolled wildfires.

The objective of this program is to increase sustainability in soil and water management through improving the understanding of resource limitations and opportunities

to increase water use efficiency. The program aims to strengthen collaboration in water resource management and build stakeholder capacity through effective communications and extension.

The program will also promote robust land capacity studies and assessments to better understand land capability prior to future agricultural developments.

| 2025 Objective                                                                                                                                                                                                                 | Strategy                                                                                                                                                                                                                                                      | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2023 Interim target                                                                                      | Assets improved                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ground and surface water resources are managed with input from all stakeholders through catchment water allocation plans which include monitoring and ensure that cultural, environmental and production values are respected. | <b>VERY HIGH PRIORITY</b><br>5.1 Water resource planning and management is undertaken in collaboration with a diverse range of stakeholders based on an equitable and transparent process.                                                                    | <p>5.1.1 Identify and quantify competing demands for water resources and the impacts of different activities on water resources</p> <p>5.1.2 Involve key stakeholders, and users representing a range of interests, in water allocation planning in the region</p> <p>5.1.3 Support water stewardship through communications materials that engage behavioural change and involve the community in planning and implementing new water monitoring strategies</p> <p>5.1.4 Support research and innovation, including the impacts of climate change, that increase our understanding of water resources</p> | The principle of community participation in water resources planning and allocation is well established. |      |
| An enhanced-knowledge base and empirical data support science-based planning and increased water use efficiency and sustainability across major industries and uses.                                                           | <b>HIGH PRIORITY</b><br>5.2 Increase our knowledge of and resources available to understand and manage the impacts from all consumptive uses, including extractive industries, pastoral, agricultural and domestic use, on surface and groundwater resources. | <p>5.2.1 Continue to research the impacts of water extraction on water resources, including use for domestic, pastoral, mining and agricultural activities</p> <p>5.2.2 Continue to implement more broad water use monitoring on both surface and groundwater (including bore meters) to more accurately assess water use impacts</p> <p>5.2.3 Research and trial water efficiency techniques for pastoral and agricultural industries</p> <p>5.2.4 Monitor water quality and aquatic ecosystem health to maximise chances of early detection of pollution or other impacts</p>                            | Systematic monitoring tracks water consumption in key industries.                                        |                                                                                 |

# Program 5: Water resources and soil management

| 2025 Objective                                                                                                             | Strategy                                                                                                                                                   | Key activities                                                                                                                                                                                 | 2023 Interim target                                                                                                                                            | Assets improved                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Soil loss and land degradation are being prevented and, where soil function is degraded, addressed.                        | <b>HIGH PRIORITY</b><br>5.3 Support training and extension services on sustainable soil management.                                                        | 5.3.1 Raise the awareness of the importance of soil erosion, soil fertility, soil health and soil moisture for primary industries productivity                                                 | There is a regular program of capacity building and awareness raising events to improve soil management practices in the Top End.                              |  <br>       |
|                                                                                                                            |                                                                                                                                                            | 5.3.2 Collate existing soil information and develop communications materials particularly targeting contractors promoting improved soil management practices for developments in the landscape |                                                                                                                                                                |                                                                                                                                                                                                                                                                      |
|                                                                                                                            |                                                                                                                                                            | 5.3.3 Utilise rangelands remote sensing tools to encourage improved grazing management and enhance production efficiency to minimise soil erosion issues                                       |                                                                                                                                                                |                                                                                                                                                                                                                                                                      |
|                                                                                                                            |                                                                                                                                                            | 5.3.4 Continue the requirement for erosion and sediment control plans and their implementation for all developments                                                                            |                                                                                                                                                                |                                                                                                                                                                                                                                                                      |
|                                                                                                                            |                                                                                                                                                            | 5.3.5 Review and adapt land clearing guidelines with new information to deal with potential increased development in northern Australia                                                        |                                                                                                                                                                |                                                                                                                                                                                                                                                                      |
|                                                                                                                            |                                                                                                                                                            | 5.3.6 Develop Acid Sulfate Soil Management guidelines to identify and manage areas at risk                                                                                                     |                                                                                                                                                                |                                                                                                                                                                                                                                                                      |
| The development of agricultural land is guided by a thorough understanding of the limitations of soil and water resources. | <b>MEDIUM PRIORITY</b><br>5.4 Continue to identify areas with potential for agricultural development through assessments of soil and water resources.      | 5.4.1 Continue research and assessments for areas that are being proposed for new and intensified agricultural development (e.g. Mapping the Future)                                           | There is an improved, empirically based understanding of the long term sustainability of natural resources under different land use and development scenarios. |  <br>      |
|                                                                                                                            |                                                                                                                                                            | 5.4.2 Link physical assessments of soil and water resources with crop suitability, land tenure and market considerations in developing new agricultural zones                                  |                                                                                                                                                                |                                                                                                                                                                                                                                                                      |
|                                                                                                                            |                                                                                                                                                            | 5.4.3 Conduct transparent and collaborative risk analyses across all resources and consumptive uses, including resources highlighted for new development and those supporting existing demand  |                                                                                                                                                                |                                                                                                                                                                                                                                                                      |
| Key aquatic systems and the associated cultural values of both surface and ground waters are recognised and protected.     | <b>HIGH PRIORITY</b><br>5.5 Preserve and maintain the health quality and flow regimes of water resources, aquatic systems and habitats across the Top End. | 5.5.1 Identify and promote leading practice in sustainable management for catchments, riparian corridors, wetlands, waterholes and urban water channels.                                       | Relevant leading practices for the protection and sustainable management of freshwater systems have been identified.                                           |  <br> |
|                                                                                                                            |                                                                                                                                                            | 5.5.2 Identify and apply standardised metrics for monitoring the health and ecosystem functions of Top End wetlands                                                                            |                                                                                                                                                                |                                                                                                                                                                                                                                                                      |

# Program 5: Water resources and soil management

## Key Measures of Achievement

- Number of stakeholders contributing to water allocation planning
- Number of individuals and businesses involved in water stewardship
- Scope and relevance of the evidence base informing water resources decision-making
- Proportion of participants in soil health extension programs adopting leading practices
- Proportion of new and existing agricultural development sites that have been subject to robust land capability studies
- Number of aquatic systems and waterways subject to regular monitoring for health, flow regime and water quality

## Key Collaborators

- DEPWS (Water resources)
- Environment Protection Authority
- DEPWS (Fauna and Flora)
- Researchers
- Aboriginal groups
- Landcare groups
- Amateur Fishermen's Association NT
- DITT (Mines)
- NT Farmers Association
- Northern Land Council
- Environment Centre NT
- DEPWS (Parks and Wildlife)
- Parks Australia
- Minerals Council of Australia NT

## Priority Locations

- Douglas Daly (Ooloo Dolostone Water allocation plan, agricultural development, soil management)
- Darwin rural region (Howard water allocation plan, irrigated horticulture, soil management and residential bores)
- Wildman River (agricultural land release)
- Daly River (environmental flows and water quality)
- Adelaide River (planning offshore water storage)
- Darwin River (water storage and environmental flows)
- Darwin harbour (water quality report cards)

## Relevant Territory Plans/Strategies

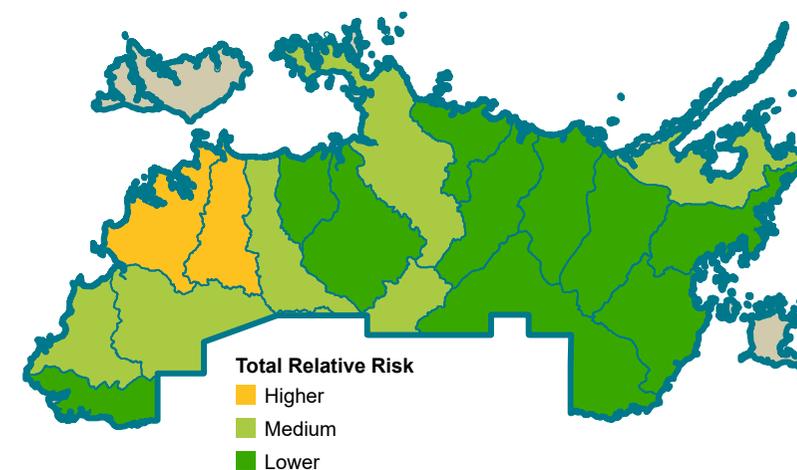
- Ooloo Dolostone Aquifer Water Allocation Plan 2019-2029 (DENR 2019)
- Berry Springs Water Allocation Plan 2016-2026 (DENR 2016)
- Northern Territory Strategic Water Plan; Directions Paper (DEPWS 2021)

## Relevant National Plans/Strategies

- Charter National Water Quality Management Strategy (WQA 2018)
- National Soil Research Development and Extension Strategy (Commonwealth of Australia 2014)

## Total Relative Risk and Vulnerabilities of River Catchments

(Flow regime, water quality, riparian vegetation, biodiversity)



Source: <https://terranova.org.au/repository/monsoonal-north-nrm-collection/northern-australian-aquatic-assess-geodatabase-v2.0/close-et-al-2015-vulnerability-and-risk-assessment.pdf>

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



# Program 6: NRM based economic opportunities

Savanna fire projects remain the outstanding success in developing NRM-based economic opportunities, closely followed by growth in the number of groups and communities benefiting from NRM-related fee-for-service arrangements. These types of economic opportunities form important pathways to self-determination for those living on country throughout the region.

In 2021, however, the landscape of the conservation economy is set to transform with the introduction of the New

Territory Offsets Framework and an associated increase in demand for land management skills and services. Steps are now being taken to engage Aboriginal land managers in the ongoing maintenance and rehabilitation of legacy mine sites. Similarly, some groups are building skills to assume new biosecurity and compliance roles.

There is also strong renewed interest in the carbon economy from across land tenures through diversifying operations on both pastoral and Aboriginal lands.

In recognition of these factors, the program focuses on identifying new potential opportunities, assessing their viability and then providing land managers with appropriate knowledge and tools to develop them. The program also recognises the growing potential for renewable energy projects and the emergence of genuine opportunities within a conservation economy. Key to this will be building the capacity of land managers to operate as businesses.

## 2025 Objective

New employment and business opportunities are created based on sustainable harvest of native species.

## Strategy

### MEDIUM PRIORITY

**6.1** Support the expansion of, and share local knowledge about, NRM based economic enterprises based on the harvest of native species, while recognising the intellectual property of Aboriginal people.

## Key activities

- 6.1.1** Continue to identify markets and opportunities
- 6.1.2** Provide institutional and business support for the development of NRM based economic activities
- 6.1.3** Simplify systems for permits, monitoring and accreditation
- 6.1.4** Offer support for formal recognition of Aboriginal intellectual property, where this is culturally appropriate and requested

## 2023 Interim target

Potential native harvest products and their commercial feasibility is known.

## Assets improved



# Program 6: NRM based economic opportunities

| 2025 Objective                                                                                                                                                                      | Strategy                                                                                                                                                               | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2023 Interim target                                                                                        | Assets improved                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>Ranger groups and other local NRM enterprises remain strong and economically viable, supported by a diversity of funding sources and locally-based commercial opportunities.</p> | <p><b>MEDIUM PRIORITY</b></p> <p><b>6.2</b> Develop capacity for fee-for-service opportunities for local NRM groups.</p>                                               | <p><b>6.2.1</b> Support Aboriginal enterprises and land managers to tender for potential contract and fee-for-service opportunities</p> <p><b>6.2.2</b> Develop opportunities for NRM services providers to more effectively connect with resources sector, agricultural and other industry sector groups</p> <p><b>6.2.3</b> Provide training, business support and mentoring to help establish and manage land and sea management contract businesses</p> <p><b>6.2.4</b> Promote use of the environmental levy from mining companies as a mechanism supporting Aboriginal enterprises to tender for mine rehabilitation activities</p> <p><b>6.2.5</b> Implement the NT Offsets Framework to engage Aboriginal enterprises in the provision of key land management services at high value priority areas and habitats</p> <p><b>6.2.6</b> Develop and incorporate business skills into NRM activities</p> <p><b>6.2.7</b> Support successful Aboriginal enterprises to share their stories and to provide mentoring for new enterprises</p> | <p>Aboriginal enterprises engaging in fee-for-service have received basic business training/mentoring.</p> |   |
| <p>NRM stakeholders have increased their participation in carbon market programs.</p>                                                                                               | <p><b>HIGH PRIORITY</b></p> <p><b>6.3</b> Support projects and research to develop and increase participation in national, NT and regional carbon market programs.</p> | <p><b>6.3.1</b> Continue communication of information to the NRM community on on carbon market developments and opportunities</p> <p><b>6.3.2</b> Clarify ownership and governance arrangements around carbon stocks</p> <p><b>6.3.3</b> Support the involvement of land sector carbon projects, including blue carbon opportunities</p> <p><b>6.3.4</b> Support and promote participation in savanna burning for carbon abatement and sequestration in the Top End region</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>Carbon market opportunities relevant to the Top End have been clearly communicated to stakeholders.</p> |  |

# Program 6: NRM based economic opportunities

| 2025 Objective                                                                                                                 | Strategy                                                                                                                                                                                                                   | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2023 Interim target                                                                              | Assets improved                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| New employment opportunities have been created through diverse primary industries and across different tenures in the Top End. | <b>MEDIUM PRIORITY</b><br><b>6.4</b> Investigate, progress and communicate emerging primary industries and diversification opportunities on Aboriginal and pastoral lands including horticulture, aquaculture and tourism. | <p><b>6.4.1</b> Support the research and development of horticultural projects that enable commercial opportunities on Aboriginal and pastoral land</p> <p><b>6.4.2</b> Support projects that increase participation of Aboriginal land owners in remote horticultural and tourism</p> <p><b>6.4.3</b> Support emerging and innovative sustainable primary industry activities on pastoral land allowed by the Pastoral Land Legislation Amendment Bill 2017 (NT)</p> <p><b>6.4.4</b> Assist Aboriginal Territorians to develop business opportunities from Aboriginal water reserves</p> | Opportunities for economic diversification on pastoral and Aboriginal lands have been increased. |     |
| The renewables and environment sector is contributing more to income the Top End economy than in 2020                          | <b>HIGH PRIORITY</b><br><b>6.5</b> Investigate and support development opportunities from new environmental technologies and renewables.                                                                                   | <p><b>6.5.1</b> Continue trialling biochar and other emerging technologies, promoting waste management, soil rehabilitation and carbon opportunities</p> <p><b>6.5.2</b> Support the development of new or existing technology for renewable energy, carbon abatement and other initiatives that support sustainable industry</p>                                                                                                                                                                                                                                                         | The Top End is on track to achieve the Northern Territory 2050 net zero emissions target.        |     |
| New opportunities and new partnerships between the private sector and NRM stakeholders have been developed.                    | <b>MEDIUM PRIORITY</b><br><b>6.6</b> Link new and emerging opportunities to NRM stakeholders in the Top End.                                                                                                               | <p><b>6.6.1</b> Create new links between industry, corporate bodies and NRM stakeholders particularly looking to deliver new and innovative approaches to NRM</p> <p><b>6.6.2</b> Facilitate opportunities between governments and industry and link to the delivery of priorities in this NRM plan.</p> <p><b>6.6.3</b> Seek alternative sources of funding for NRM activities through new partnerships with philanthropic organisations and Offset arrangements</p>                                                                                                                     | An investment portfolio describing partnership opportunities supporting Top End NRM is developed |   |

# Program 6: NRM based economic opportunities

## Key Measures of Achievement

- Number of Aboriginal enterprises wild harvesting for commercial use
- Value of fee-for-service work conducted by regional ranger groups and number of participants
- Number of new sustainable nature-based industries established on Aboriginal and pastoral land in the Top End
- Value of revenue from sales to carbon markets
- Number of new industry partnerships with the NRM sector
- The aggregate contribution of the environmental services sector to the Top End economy

## Key Collaborators

- Northern Land Council
- Aboriginal ranger groups
- DITT (Business innovation)
- DAWE (Emissions Reduction Fund)
- Territory NRM
- Aboriginal Business Development Program
- NT Cattlemen's Association
- NT Farmers Association
- Environment Centre NT
- DEPWS (Aboriginal Ranger Grants)
- Batchelor Institute
- Researchers
- DEPWS (Fauna and Flora)
- Regional Development Australia NT

We want the resources to be able to take our children on country, to look after them out there through telling them their history, the way their ancestors lived in traditional times, all of the flora and fauna that sustains them, all of the animals that they lived on that are now extinct, so that they understand their history and culture



## Priority Locations

- South Goulburn Island (Rock Oysters)
- Kakadu (Tourism, fee-for-service)
- Arnhem Land (Kakadu plum crocodile eggs, fee-for-service work, savanna fire projects, buffalo mustering, biodiversity offsets)
- Western Top End (Kakadu Plum, fee-for-service work, biosecurity savanna fire projects)
- Douglas Daly (tourism, horticulture, agricultural diversification)
- Groote Eylandt (fee-for-service, fisheries biosecurity surveillance)
- Jabiru (Ranger mine rehabilitation works)
- Batchelor (Rum Jungle rehabilitation)
- Tiwi islands (forestry, tourism)

## Relevant Territory Plans/Strategies

- Aboriginal Land and Sea Action Plan (DCM 2019)
- Northern Territory Aboriginal Tourism Strategy 2020-2030 (Tourism NT 2020)
- Management Program for the Kakadu Plum 2019-2023 (DENR 2019)
- Northern Territory Tourism Industry Strategy 2030 (Tourism NT)
- Aboriginal Carbon Industry Strategy (DENR 2019)
- Northern Territory Renewable Energy Implementation Plan 2018-2020 (NTG 2019)
- Darwin Energy Strategy Implementation Plan (Marsden Jacob 2017)
- Northern Territory Renewable Hydrogen Strategy (DTBI 2020)

## Relevant National Plans/Strategies

- National Indigenous Land and Sea Strategy (ILSC 2019)
- Indigenous Business Sector Strategy 2018-2028 (NIAA 2018)
- Australian Renewable Energy Funding and Investment Plan 2021-2024 (ARENA 2021)



# Program 7: Minimising ecological footprints of development

Australia's National Strategy for Ecologically Sustainable Development (ESD) defines ESD as 'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'.

The Top End region is home to about 70% of the Territory's population and so is under the greatest pressure from urban and industrial development. Since 2016, the population of

Darwin has grown by 18,000, bringing additional residential estates and commercial developments across the Darwin, Palmerston and rural areas and associated ecological stresses.

This program aims to address the ecological impact of Territorians by supporting measures to introduce leading practices in design, planning and construction of infrastructure for future residential and industrial

developments. It will raise community awareness about the principles of ecologically sustainable development and promote evidence-based management of toxic waste, pollutants and other contaminants that are at risk of discharge into the environment.

Furthermore, the program will promote enhanced cooperation with recreational users and visitors to reduce pressures on natural resources.

| 2025 Objective                                                                                                       | Strategy                                                                                                                                                                                              | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2023 Interim target                                                                                       | Assets improved                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The development of urban and regional centres adheres to the principles of ecologically sustainable development.     | <b>HIGH PRIORITY</b><br>7.1 Minimise the environmental footprint of urban, periurban and regional development in the Top End.                                                                         | <p>7.1.1 Support urban Landcare groups to raise community involvement in urban ecosystem rehabilitation projects and peri-urban stewardship arrangements in the Greater Darwin area</p> <p>7.1.2 Lobby for and promote development approval processes and policies that adhere to best practice principles for ecologically sustainable development</p> <p>7.1.3 Increase coordination of environment groups to provide a more effective alternative voice to development and planning proposals</p>       | All development in the Top End is assessed against the principles of ecologically sustainable development |  <br> |
| The cumulative impact of environmental pollutants in the Top End is known and within acceptable levels.              | <b>MEDIUM PRIORITY</b><br>7.2 Determine and establish acceptable standards for industrial and domestic contaminants, pollutants and agricultural discharge and regulate for these across the Top End. | <p>7.2.1 Support continued assessment of the independent report card for Darwin Harbour</p> <p>7.2.2 Develop reporting mechanisms for key areas at risk from mine site pollution</p> <p>7.2.3 Establish regional waste facilities capable of storing and handling toxic substances</p> <p>7.2.4 Promote a culture of disclosure and compliance among industry</p> <p>7.2.5 Undertake a review to assess adequacy of current legislative instruments and develop policy requiring cumulative assessment</p> | Acceptable levels for cumulative pollutants have been established for the Top End.                        |                                                                                        |
| A transparent NT Offsets Framework directs offsets to deliver net positive benefit to natural values in the Top End. | <b>HIGH PRIORITY</b><br>7.3 Strengthen and consolidate environmental offset arrangements in application of the NT Offsets Framework.                                                                  | <p>7.3.1 Develop a clear direction to offsets and 'voluntary' offset activities that encourages more investment in NRM</p> <p>7.3.2 Develop partnerships between the private sector, governments and NRM stakeholders to enable the use of offsets to achieve net environmental benefits</p>                                                                                                                                                                                                               | The NT Offsets Framework is finalised and is being implemented                                            |                                                                                      |

# Program 7: Minimising ecological footprints of development

| 2025 Objective                                                                                                                                                               | Strategy                                                                                                                                                         | Key activities                                                                                                                                                                                                                                                                             | 2023 Interim target                                                                                                    | Assets improved                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Impacts from the recreational use of natural resources and visitors to the Top End are minimised by improved public awareness and risk-based management of vulnerable sites. | <p><b>MEDIUM PRIORITY</b></p> <p><b>7.4</b> Minimise the impact of tourism on the environment through the adoption and promotion of sustainable initiatives.</p> | <p><b>7.4.1</b> Develop and support strategies that minimise environmental and cultural impacts of recreational users and visitors to key areas and sites within the Top End</p> <p><b>7.4.2</b> Collaborate with key recreational user groups to manage impacts on key priority areas</p> | Strategies that minimise the impact of tourism and recreational users on key areas in the Top End have been developed. |   |

## Key Measures of Achievement

- Assessment of environmental planning in urban developments
- Number of active urban Landcare groups
- Trends in per capita power and water consumption
- Proportion of energy generated from sustainable sources
- Number of active urban Landcare groups
- Assessment of waste and pollution management
- Number of collaboratively developed strategies to reduce visitor and recreational impact at key sites
- Value of investment in NRM arising from the NT Offsets Framework

## Key Collaborators

- Environment Protection Authority
- Landcare NT
- Environment Centre NT
- DEPWS (Fauna and Flora)
- Researchers
- Darwin City Council
- Palmerston City Council
- Litchfield Shire
- Northern Land Council
- DITT (Tourism NT)

## Priority Locations

- Darwin Harbour (report cards, water quality and impacts of middle arm development)
- Darwin regional (urbanisation and municipal development)
- Douglas Daly (agricultural intensification, discharge of herbicides and fertilisers)
- Arnhem Land (opportunities for offsetting, impacts of recreational use)
- Howard Sand Sheets (impact of extractive industries and recreational use)
- Kakadu and Litchfield park, Finnis flood plains (impacts of recreational use)
- Rum Jungle and Ranger Uranium Mine (rehabilitation)

## Relevant Territory Plans/Strategies

- Darwin Harbour Strategy 2020-2025 (DHAC 2020)
- Darwin Regional Land Use plan 2015
- Climate Emergency Strategy 2020-2030 (City of Darwin 2020)
- Waste Management Strategy for the Northern Territory 2015-2022 (NTEPA 2015)
- Statement of Intent 2020-2022 (NTEPA 2020)
- Implementation Plan: Stormwater Strategy for the Darwin Harbour (NTEPA 2014)
- Ecologically Sustainable Development in the NT (NTEPA 2010)
- Rum Jungle Rehabilitation Plan (DITT 2021)
- West Arnhem Council Environmental Management and Operational Plan (2007)
- 2030 Greening Darwin Strategy (City of Darwin 2020)
- Northern Territory Compact Urban Growth Policy (NTPS 2020)

## Relevant National Plans/Strategies

- National Waste Policy Action Plan (ALGA 2019)
- Australian Renewable Energy Funding and Investment Plan 2021-2024 (ARENA 2021)

# Program 8: Managing and protecting key natural and cultural assets

The Top End is home to a large number of sites considered to be of high conservation value. These include a number of properties within national park boundaries, two Ramsar-listed wetlands, a World Heritage listed area in Kakadu National Park, and 27 identified Sites of Conservation Significance which encompass islands, coastal wetlands, floodplains and the Arnhem Land Sandstone Plateau. Many individual sites, together with the broader landscape they are situated within, carry deep cultural significance for the traditional custodians of the land. In 2021, plans and strategies for landscape management recognise the importance of this knowledge

and explicitly work with local Aboriginal groups to lead the management and protection of natural and cultural assets.

The objective of this program is to strengthen partnerships between landholders across all tenures to better maintain key natural and cultural assets. The actions to achieve this include improving knowledge informing regional conservation priorities and communicating leading management practices. In particular, land managers who are outside of the conservation estate to enter into formal conservation/ stewardship arrangements.

Another focus of the program is reinvigorating threatened species management, by using evidence-based management to improve the understanding of the pressures and threats and linking to National Threatened Species initiatives. Recognising the potential impacts of climate change across Top End landscapes, the program commits to gathering the information required to write strategies that will mitigate these impacts.

| 2025 Objective                                                                                                                               | Strategy                                                                                                                              | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2023 Interim target                                                                                             | Assets improved                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Sites identified as priority conservation areas are subject to agreed adaptive management processes with regular review by key stakeholders. | <p><b>MEDIUM PRIORITY</b></p> <p><b>8.1</b> Develop and implement management programs for high priority areas across the Top End.</p> | <p><b>8.1.1</b> Update knowledge, identify values of, and establish priorities for the protection of high priority areas to achieve specified conservation goals</p> <p><b>8.1.2</b> Plan for the future adaptive management of these sites, utilising collaborative planning approaches and consultations across stakeholders and tenures</p> <p><b>8.1.3</b> Raise public awareness of areas with high natural values and the processes which threaten them, through targeted communication, particularly where threats occur outside of protected areas</p> <p><b>8.1.4</b> Build regional collaboration and governance to develop and implement management programs over high priority areas</p> | Knowledge of high priority areas has been updated and sites requiring management programs have been identified. |  |

# Program 8: Managing and protecting key natural and cultural assets

| 2025 Objective                                                                                                                                                                                                  | Strategy                                                                                                                                                                                          | Key activities                                                                                                                                                                                                                                                                                                                                                                                  | 2023 Interim target                                                                                                                                                                                                    | Assets improved                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Threatened species management is integrated with strong links between research, monitoring and on-ground action showing progress against key indicators in Threatened Species Action Plans.                     | <b>HIGH PRIORITY</b><br>8.2 Implement Threatened Species Action Plans in the Top End by guiding on-ground action with the latest knowledge                                                        | 8.2.1 Communicate the Action Plans for managing threatened species in the Top End and support their implementation<br>8.2.2 Link threatened species action in the Top End to the National Threatened Species Strategy and implement key priorities relevant to the region                                                                                                                       | Foundational research and monitoring in support of priority Threatened Species Action Plans is underway.                                                                                                               | <br><br>                                                                                        |
| An increase in the total area of land under conservation management outside of the Top End parks estate.<br><br>All Indigenous Protected Areas in the Top End have management plans in place or in preparation. | <b>HIGH PRIORITY</b><br>8.3 Facilitate stewardship of high priority conservation areas through schemes such as Territory Conservation Agreements and Indigenous Protected Areas.                  | 8.3.1 Support private land owners and pastoral lease holders to develop conservation agreements (stewardship) over high priority areas<br>8.3.2 Support Traditional Owners and Aboriginal Ranger groups to develop and implement Indigenous Protected Area management plans<br>8.3.3 Increase awareness and stewardship of important conservation sites and cultural heritage within the region | Targeted case studies have been developed to highlight the importance of, and promote the benefits of, conservation on private land.<br><br>Planning will be underway across the Top End for those IPAs without plans. | <br><br><br> |
| Knowledge of key marine species and habitats has improved and is informing development decisions.                                                                                                               | <b>MEDIUM PRIORITY</b><br>8.4 Continue and extend marine habitat and key species mapping to inform planning, management and monitoring consistent with the 2019-2029 Coastal and Marine Strategy. | 8.4.1 Identify key threats to coastal and marine environments<br>8.4.2 Communicate marine habitat and key marine species information<br>8.4.3 Create a framework for assessing and minimising the impact of mining and development on coastal and marine environments                                                                                                                           | Key strategies of the NT Coastal and Marine Strategy have been implemented and milestones met.                                                                                                                         | <br><br>                                                                                  |

# Program 8: Managing and protecting key natural and cultural assets

| 2025 Objective                                                                                                                  | Strategy                                                                                                                                                                           | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2023 Interim target                                                                                                              | Assets improved                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Saltwater intrusion threats to high priority areas have been identified, along with prioritised strategies for addressing them. | <p><b>HIGH PRIORITY</b></p> <p><b>8.5</b> Develop and implement a strategic plan to address and mitigate saltwater intrusion into coastal areas of high conservation priority.</p> | <p><b>8.5.1</b> Continue research and monitoring of changes, processes and rates of saltwater intrusion focusing on hotspots across the Top End coastline (such as Arafura Swamp, Mary River and Finnis Floodplains)</p> <p><b>8.5.2</b> Work with coastal Aboriginal communities to develop strategies to address saltwater intrusion in high-risk areas</p>                                                                                                                                                                             | Priority areas at risk from saltwater intrusion have been identified.                                                            |                                                                                                                                                                             |
| The management of Top End ecosystems is informed by knowledge of climate change processes and impacts.                          | <p><b>HIGH PRIORITY</b></p> <p><b>8.6</b> Establish monitoring to inform adaptation planning for the impacts of climate change on vulnerable ecosystems in the Top End.</p>        | <p><b>8.6.1</b> Monitor and develop models to identify impacts of climate change on threatened habitats/species communities in the Top End</p> <p><b>8.6.2</b> Develop management strategies and prioritise action on vulnerable assets most likely to be impacted by climate change</p>                                                                                                                                                                                                                                                  | Appropriate monitoring approaches and techniques have been identified.                                                           |       |
| Aboriginal land managers and Traditional Owners are central to the management of culturally significant sites and landscapes.   | <p><b>HIGH PRIORITY</b></p> <p><b>8.7</b> Support best practice management of culturally significant Aboriginal sites and landscapes.</p>                                          | <p><b>8.7.1</b> Support the mapping, documentation and management of culturally significant sites by Traditional Owners</p> <p><b>8.7.2</b> Negotiate access to cultural sites on non-Aboriginal land tenure</p> <p><b>8.7.3</b> Increase the awareness of industry and government agencies about Aboriginal sacred sites and the processes and mechanisms for their protection in development</p> <p><b>8.7.4</b> Encourage the development of enterprises for Aboriginal Ranger groups to carry out cultural heritage contract work</p> | Traditional Owners are adequately supported and resourced to continue the mapping and recording of culturally significant sites. |                                                                                                                                                                                                                                                            |

# Program 8: Managing and protecting key natural and cultural assets

## Key Measures of Achievement

- Number of high priority conservation sites under active management
- Progress made against Threatened Species Action Plans
- Number of cultural sites being actively managed by Aboriginal groups across all land tenures
- Number of people contributing to the collection of biodiversity data
- Progress made implementing the NT Coastal and Marine Strategy
- Identification and communication of appropriate strategies to build resilience to saltwater intrusion
- Level of consideration of climate change in conservation management planning

## Key Collaborators

- DEPWS (Parks and Wildlife)
- Parks Australia
- Aboriginal ranger groups
- DEPWS (Fauna and Flora)
- Northern Land Council
- Pastoral land holders
- Aboriginal Areas Protection Authority
- Researchers
- Territory NRM
- Environment Centre NT
- DITT (Fisheries)

## Priority Locations

- Kakadu (World Heritage Area, Ramsar, Threatened species and EPBC listed community, cultural sites)
- Cobourg (Ramsar, Threatened species)
- Litchfield Park and Finnis flood plains (high biodiversity and productive values)
- Adelaide River Flood plains (high biodiversity and productive values)
- Douglas Daly (rainforest vegetation, riparian habitats subject to pressure)
- Arnhem Land (upland heath, springs, rainforest pockets, floodplains, Threatened species, cultural sites)
- Arafura Swamp (freshwater wetlands, open woodlands, rainforest pockets, cultural sites)
- Islands (intact native biodiversity and reduced impact of invasive species, Threatened species)
- Gove peninsula and east Arnhem land, (cultural sites)
- Sandstone Plateau (EPBC Listed ecological community, cultural sites)
- Sites of Conservation Significance (biodiversity values)

## Relevant Territory Plans/Strategies

- Draft NT Parks Masterplan (2022-52)
- Aboriginal Areas Protection Authority Strategic plan 2017-2021
- Kakadu Management Plan 2016--2026
- Cobourg Marine Park Plan of Management
- Dhimurru IPA Sea Country Management Plan 2013-2015
- Wardekken IPA Plan of Management 2016-2020
- Anindilyakwa IPA Plan of Management 2016
- Djelk Healthy Country Plan 2015-2025
- Arafura Swamp Healthy Country Plan
- South East Arnhem Land Indigenous Protected Area Plan of Management 2016-2021
- Mary River Joint Management Plan
- Adelaide River Conservation Reserves Joint Management Plans
- Northern Territory Coastal and Marine Management Strategy 2019-2029
- Groote Archipelago Threatened Species management Plan 2019-2028 (DEPWS 2019)

## Relevant National Plans/Strategies

- Threatened Species Strategy 2021-2031
- Australia's Strategy for Nature 2019-2030

A projected sea level rise of 30cm could potentially cause the loss of 80 per cent of the area of freshwater wetlands in Kakadu



# Program 9: Knowledge, capacity and engagement

Effective natural resource management requires capable and knowledgeable land managers with access to the necessary tools and resources to achieve the required outcomes. This program is designed to support Top End land managers and other stakeholders to most effectively address the natural resource management challenges and opportunities of 2021.

Activities of the program include opportunities to foster new partnerships and build the potential for effective collective

action. In particular, the program will seek additional resources to support land management groups. This includes having access to the most relevant and up-to-date information and data through building capacity for capturing, storing, accessing and sharing information and data within the NRM community.

The program recognises the need for formal training and skills development within the NRM community and includes

actions to identify priority needs and create opportunities for land managers to achieve skills development, including strengthening governance.

Critically, Territory Natural Resource Management will continue to engage across the whole NRM community to support delivery of these activities and ensure that implementation is adaptively managed.

| 2025 Objective                                                                       | Strategy                                                                                                                                                                                                                                                                                | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2023 Interim target                                                                                         | Assets improved                                                                                                                                                         |
|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Increased resources and long-term approaches to NRM issues for people managing land. | <p><b>HIGH PRIORITY</b></p> <p><b>9.1</b> Strengthen networks and partnerships between NRM stakeholders, including supporting the development of new partnerships with industry and philanthropic organisations and promoting community and industry responsibility for NRM issues.</p> | <p><b>9.1.1</b> Consolidate and extend landscape level and cross-border partnerships through supporting workshops that bring together stakeholders and share knowledge</p> <p><b>9.1.2</b> Seek alternative sources of funding for NRM activities through new partnerships with philanthropic organisations and Offset arrangements</p> <p><b>9.1.3</b> Develop and build the capacity of Landcare Coordinators, volunteers, and Aboriginal Ranger groups</p> <p><b>9.1.4</b> Support collaboration between key technical agencies to encourage their support for actions of Landcare groups</p> <p><b>9.1.5</b> Promote good 'stories' from NRM to increase the profile of NRM in the community</p> <p><b>9.1.6</b> Promote the uptake of online communications platforms and other technologies that can enhance communications and coordination between land managers at a distance</p> | There is an increase in the number of successful partnerships supporting NRM activities across the Top End. |   |

# Program 9: Knowledge, capacity and engagement

| 2025 Objective                                                                                                                                                                                     | Strategy                                                                                                                                                                                      | Key activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2023 Interim target                                                                                                  | Assets improved                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Territory Natural Resource Managers are incorporating the best available knowledge, information and data into their management including traditional ecological knowledge and community knowledge. | <p><b>MEDIUM PRIORITY</b></p> <p><b>9.2</b> Support land managers to record, utilise and share scientific research, TEK and pastoral knowledge in NRM planning and management activities.</p> | <p><b>9.2.1</b> Conduct forums to facilitate knowledge sharing between NRM stakeholders and researchers, including cross-cultural knowledges where appropriate</p> <p><b>9.2.2</b> Identify knowledge gaps and research priorities in collaboration with key stakeholders</p> <p><b>9.2.3</b> Establish knowledge capture, storage and sharing projects by Traditional Owners and Aboriginal Rangers</p> <p><b>9.2.4</b> Develop programs that facilitate community monitoring of key environmental assets (adding to the NT species database) ensuring data collection is relevant, efficient and utilised</p> <p><b>9.2.5</b> Share knowledge through websites, newsletters, fact sheets and other publications</p>                       | Regular forums and events communicate the latest technical knowledge between knowledge holders and NRM stakeholders. |  |
| Increased and more targeted training in relevant natural resource management skills.                                                                                                               | <p><b>MEDIUM PRIORITY</b></p> <p><b>9.3</b> Support accredited and informal training in land management and sustainable industry practices.</p>                                               | <p><b>9.3.1</b> Assess training needs (accredited and non-accredited) for NRM stakeholders and support the delivery of appropriate training where needed particularly supporting skills linked to employment in NRM</p> <p><b>9.3.2</b> Assess the efficiency of training and improve where necessary</p> <p><b>9.3.3</b> Introduce stronger mentoring programs in the NRM sector</p> <p><b>9.3.4</b> Deliver training and support for sustainable grazing practices</p> <p><b>9.3.5</b> Support governance and leadership training of locally-based NRM groups and establish clearer career pathways in NRM</p> <p><b>9.3.6</b> Promote strong links between Aboriginal Ranger groups and schools through Learning on Country programs</p> | The number of available training courses and opportunities to build NRM skills has increased in the Top End.         |  |

# Program 9: Knowledge, capacity and engagement

| 2025 Objective                                                                                                    | Strategy                                                                                     | Key activities                                                                                                                                                                                                                                                  | 2023 Interim target                                                                       | Assets improved                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Multi-stakeholder review processes in the Top End inform adaptive management, improved practices and cooperation. | <b>HIGH PRIORITY</b><br>9.4 Ongoing review of NRM outcomes facilitating adaptive management. | <p>9.4.1 Stakeholders gather annually to review outcomes and progress against objectives in the NRM plan</p> <p>9.4.2 Support a multi-stakeholder approach to adaptive management to help prioritise funding, resources and effort in areas of highest need</p> | The first review of the 2021-2025 NRM plan is completed and the plan revised accordingly. |   |

## Key Measures of Achievement

- Number of accredited and non-accredited training sessions delivered
- Number of active Aboriginal Ranger and Landcare groups
- Amount of funding available to NRM in the Top End
- Number and quality of forums, conferences and knowledge sharing events
- Number of people engaged in the NRM plan review and quality of that engagement

## Key Collaborators

- Landcare NT
- Northern Land Council
- Territory NRM
- Environment Centre NT
- Landcare groups
- Researchers
- Batchelor Institute
- Private training providers
- NT Cattlemen’s Association
- NT Farmers Association

## Priority Locations

- Darwin regional (Landcare groups, horticultural producers)
- Kakadu (Ranger groups)
- West Arnhem Land (Ranger groups and Learning on Country)
- East Arnhem Land (Ranger groups and Learning on Country)
- Western Top End (Ranger groups)
- Douglas Daly (Pastoral and agricultural land managers)

## Relevant Territory Plans/ Strategies

- Landcare NT strategic plan
- Northern Territory NRM plan 2021-2025

To get a better understanding of how to use the land is using two toolbox. We call it two toolbox, and our two toolbox is knowledge that we use – Bininj knowledge, which is our knowledge and western knowledge from Balanda knowledge, and bring that knowledge together to manage this land



# Taking this Plan Forward

This plan was collaboratively developed to build upon the current momentum in collaborative NRM and address emerging natural resource management opportunities and challenges (2021-2025). The planning process has represented another stage in the ongoing collaboration between regional NRM partners.

Implementing this plan, reviewing progress and then adaptively managing it will require strong regional coordination.

Follow regional NRM plan implementation status online on the Regional NRM plan dashboard



**Plan**



**Implement**

**Progress review**



**Plan review**



**Progress review**



**Final Plan review**

**2021**

Top End stakeholders and communities were engaged through a series of planning workshops and consultations in Darwin and elsewhere to develop NRM priority Objectives and strategies

**2021-2025**

Coordination and support for implementation of priority actions and strategies in the plan. Monitoring and tracking activities and outcomes

**2022**

Regional stakeholder meeting to assess coordination and progress in implementing the plan, highlighting any gaps or barriers to progress

**2023**

Regional stakeholder consultations and workshops to assess progress towards plan objectives and adaptively manage implementation of the plan

**2024**

Regional stakeholder meeting to assess coordination and progress in implementing the plan, highlighting any gaps or barriers to progress

**2025**

Regional stakeholder consultations and workshops to assess overall progress, impact and outcomes achieved through the plan.

# Threatened plant species of the Top End

Sources: [www.environment.gov.au/cgi-bin/sprat/public/sprat.pl](http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl),  
[nt.gov.au/environment/native-plants/threatened-plants](http://nt.gov.au/environment/native-plants/threatened-plants)

| Plant            | Scientific name / Common name                                       | EPBC Act Status | NT Conservation Status |
|------------------|---------------------------------------------------------------------|-----------------|------------------------|
| Annonaceae       | <i>Mitrella tiwiensis</i>                                           | VU              | VU                     |
| Annonaceae       | <i>Xylopia monosperma</i><br>(was <i>X. sp. Melville Island</i> )   | EN              | EN                     |
| Apocynaceae      | <i>Hoya australis subsp. oramicola</i>                              | VU              | VU                     |
| Aracea           | <i>Typhonium jonesii</i>                                            | EN              | EN                     |
| Aracea           | <i>Typhonium mirabile</i>                                           | EN              | EN                     |
| Aracea           | <i>Typhonium taylori</i>                                            | EN              | EN                     |
| Araceae          | <i>Typhonium praetermissum</i>                                      | -               | VU                     |
| Arecaceae        | <i>Ptychosperma macarthurii</i> / Darwin palm                       | -               | EN                     |
| Burmanniaceae    | <i>Burmannia sp. Bathurst Island</i>                                | EN              | EN                     |
| Cleomaceae       | <i>Cleome insolata</i>                                              | -               | VU                     |
| Clusiaceae       | <i>Garcinia warrenii</i>                                            | -               | EN                     |
| Cycadaceae       | <i>Cycas armstrongii</i>                                            | -               | VU                     |
| Cyperaceae       | <i>Eleocharis retroflexa</i>                                        | VU              | -                      |
| Cyperaceae       | <i>Mapania macrocephala</i>                                         | -               | VU                     |
| Dilleniaceae     | <i>Hibbertia brennanii</i>                                          | -               | VU                     |
| Dilleniaceae     | <i>Hibbertia pancerea</i>                                           | -               | VU                     |
| Dilleniaceae     | <i>Hibbertia sp. South Magela</i>                                   | -               | VU                     |
| Dilleniaceae     | <i>Hibbertia tricornis</i>                                          | -               | VU                     |
| Dryopteridaceae  | <i>Bolbitis quoyana</i>                                             | -               | VU                     |
| Elaeocarpaceae   | <i>Elaeocarpus miegei</i>                                           | -               | CE                     |
| Erythroxylaceae  | <i>Erythroxylum sp. Cholmondely Creek</i>                           | -               | EN                     |
| Fabaceae         | <i>Acacia equisetifolia</i><br>(was <i>A. sp. Graveside Gorge</i> ) | CE              | CE                     |
| Fabaceae         | <i>Acacia praetermissa</i>                                          | VU              | VU                     |
| Fabaceae         | <i>Intsia bijuga</i>                                                | -               | CE                     |
| Fabaceae         | <i>Jacksonia divisa</i>                                             | VU              | VU                     |
| Gleicheniaceae   | <i>Sticherus flabellatus var compactus</i>                          | -               | VU                     |
| Goodeniaceae     | <i>Goodenia quadrifida</i>                                          | VU              | -                      |
| Hernandiaceae    | <i>Hernandia nymphaeifolia</i>                                      | -               | VU                     |
| Hymenophyllaceae | <i>Cephalomanes obscurum</i>                                        | -               | EN                     |
| Lauraceae        | <i>Endiandra limnophila</i>                                         | -               | VU                     |

| Plant            | Scientific name / Common name                                               | EPBC Act Status | NT Conservation Status |
|------------------|-----------------------------------------------------------------------------|-----------------|------------------------|
| Lauraceae        | <i>xylopia monosperma</i><br>(was <i>X. sp. Melville Island</i> )           | -               | EN                     |
| Lentibulariaceae | <i>Utricularia dunstaniae</i>                                               | -               | VU                     |
| Lentibulariaceae | <i>Utricularia singeriana</i>                                               | -               | VU                     |
| Malvaceae        | <i>Helicteres macrothrix</i><br>( <i>H. sp. Glenluckie Creek</i> )          | EN              | EN                     |
| Malvaceae        | <i>Hibiscus brennanii</i>                                                   | VU              | VU                     |
| Malvaceae        | <i>Schoutenia ovata</i>                                                     | -               | EN                     |
| Marattiaceae     | <i>Angiopteris evecta</i>                                                   | -               | VU                     |
| Melastomataceae  | <i>Pternandra coerulescens</i>                                              | -               | VU                     |
| Myrtaceae        | <i>Lithomyrtus linariifolia</i>                                             | -               | VU                     |
| Orchidaceae      | <i>Calochilus caeruleus</i>                                                 | -               | VU                     |
| Orchidaceae      | <i>Crepidium marsupichila</i><br>(was <i>Malaxis marsupichila</i> )         | -               | VU                     |
| Orchidaceae      | <i>Dienia montana</i> (was <i>Malaxis latifolia</i> )                       | -               | VU                     |
| Orchidaceae      | <i>Habenaria rumphii</i>                                                    | -               | EN                     |
| Orchidaceae      | <i>Luisia corrugata</i> (was <i>L. teretifolia</i> )                        | -               | VU                     |
| Orchidaceae      | <i>Thrixspermum congestum</i>                                               | -               | VU                     |
| Orchidaceae      | <i>Zeuxine oblonga</i>                                                      | -               | VU                     |
| Pandanaceae      | <i>Freycinetia excelsa</i>                                                  | -               | VU                     |
| Pandanaceae      | <i>Freycinetia percostata</i>                                               | -               | VU                     |
| Pontederiaceae   | <i>Monochoria hastata</i>                                                   | -               | VU                     |
| Rubiaceae        | <i>Tarennoidea wallichii</i>                                                | -               | EN                     |
| Rutaceae         | <i>Boronia quadrilata</i>                                                   | VU              | VU                     |
| Rutaceae         | <i>Boronia viridiflora</i>                                                  | VU              | VU                     |
| Rutaceae         | <i>Clausena excavata</i> (was <i>C. sp. Tipperary</i> )                     | CE              | EN                     |
| Santalaceae      | <i>Dendromyza reinwardtiana</i>                                             | -               | VU                     |
| Santalaceae      | <i>Santalum acuminatum</i>                                                  | -               | VU                     |
| Sapindaceae      | <i>Atalaya brevialata</i>                                                   | CE              | -                      |
| Sapindaceae      | <i>Mischocarpus stipitatus</i><br>(was <i>Toechima sp. East Alligator</i> ) | EN              | EN                     |
| Stylidiaceae     | <i>Stylidium ensatum</i>                                                    | EN              | EN                     |

CE - Critically endangered

EN - Endangered

VU - Vulnerable

# Threatened animal species of the Top End

Sources: [www.nt.gov.au/environment/animals/threatened-animals](http://www.nt.gov.au/environment/animals/threatened-animals)  
[www.environment.gov.au/cgi-bin/sprat/public/sprat.pl](http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl)

| Scientific name                                     | Common name                         | EPBC Act Status | NT Conservation status |
|-----------------------------------------------------|-------------------------------------|-----------------|------------------------|
| <b>Amphibians</b>                                   |                                     |                 |                        |
| <i>Uperoleia daviesae</i>                           | Howard springs toadlet              | -               | VU                     |
| <b>Birds</b>                                        |                                     |                 |                        |
| <i>Calidris canutus</i>                             | Red knot                            | EN              | VU                     |
| <i>Calidris ferruginea</i>                          | Curlew sandpiper                    | CE              | VU                     |
| <i>Calidris tenuirostris</i>                        | Great knot                          | CE              | VU                     |
| <i>Charadrius leschenaultii</i>                     | Greater sand plover                 | VU              | VU                     |
| <i>Charadrius mongolus</i>                          | Lesser sand plover                  | EN              | VU                     |
| <i>Epthianura crocea tunneyi</i>                    | Yellow chat (Alligator Rivers)      | EN              | EN                     |
| <i>Erythrotriorchis radiatus</i>                    | Red goshawk                         | VU              | VU                     |
| <i>Erythrura gouldiae</i>                           | Gouldian finch                      | EN              | VU                     |
| <i>Falco hypoleucos</i>                             | Grey falcon                         | VU              | VU                     |
| <i>Falcunculus frontatus whitei</i>                 | Northern/crested shrike-tit         | VU              | -                      |
| <i>Geophaps smithii</i>                             | Partridge pidgeon                   | VU              | VU                     |
| <i>Limnodromus semipalmatus</i>                     | Asian dowitcher                     | -               | VU                     |
| <i>Limosa lapponica</i>                             | Bar-tailed godwit                   | -               | VU                     |
| <i>Melanodryas cucullata melvillensis</i>           | Hooded robin (Tiwi Islands)         | CE              | CE                     |
| <i>Mirafrja javanica melvillensis</i>               | Horsfield's bushlark (Tiwi Islands) | VU              | VU                     |
| <i>Numenius madagascariensis</i>                    | Eastern curlew                      | CE              | VU                     |
| <i>Rostratula australis</i>                         | Australian painted snipe            | EN              | VU                     |
| <i>Tyto novaehollandiae kimberli</i>                | Masked owl (mainland Top End)       | VU              | VU                     |
| <i>Tyto novaehollandiae melvillensis</i>            | Masked owl (Tiwi Islands)           | EN              | EN                     |
| <b>Fish</b>                                         |                                     |                 |                        |
| <i>Carcharias taurus</i><br>(east coast population) | Grey nurse shark                    | CE              | -                      |
| <i>Carcharias taurus</i><br>(west coast population) | Grey nurse shark                    | VU              | -                      |
| <i>Glyphis garricki</i>                             | Northern river shark                | EN              | EN                     |
| <i>Glyphis glyphis</i>                              | Speartooth shark                    | CE              | VU                     |
| <i>Pingalla lorentzi</i>                            | Lorentz grunter                     | -               | VU                     |
| <i>Pristis clavata</i>                              | Dwarf sawfish                       | VU              | VU                     |
| <i>Pristis microdon</i>                             | Freshwater                          | VU              | VU                     |
| <i>Pristis zijsron</i>                              | Green sawfish                       | VU              | VU                     |
| <i>Rhincodon typus</i>                              | Whale shark                         | VU              | -                      |

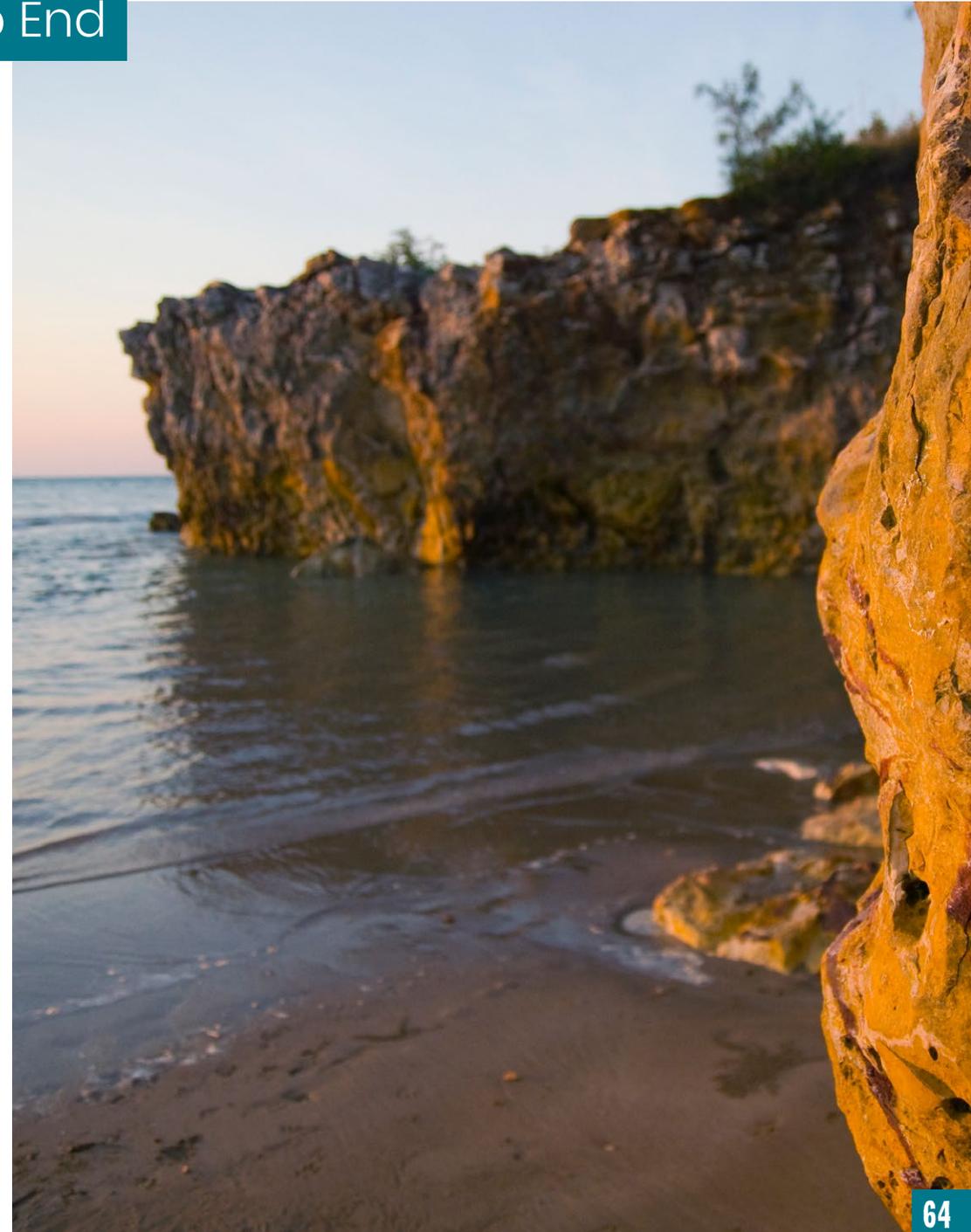
| Scientific name                                           | Common name                                        | EPBC Act Status | NT Conservation status |
|-----------------------------------------------------------|----------------------------------------------------|-----------------|------------------------|
| <b>Invertebrates</b>                                      |                                                    |                 |                        |
| <i>Amphidromus cognatus</i>                               | Cognate land snail                                 | -               | VU                     |
| <i>Attacus wardi</i>                                      | Atlas moth                                         | -               | VU                     |
| <i>Euploea alcathoe enastri</i>                           | Gove Crow Butterfly                                | EN              | -                      |
| <i>Ogyrisiphis doddi</i>                                  | Dodd's azure butterfly                             | -               | EN                     |
| <i>Trochomorpha melvillensis</i>                          | Land snail                                         | -               | VU                     |
| <b>Mammals</b>                                            |                                                    |                 |                        |
| <i>Antechinus bellus</i>                                  | Fawn Antechinus                                    | VU              | EN                     |
| <i>Balaenoptera musculus</i>                              | Blue whale                                         | EN              | -                      |
| <i>Conilurus penicillatus</i>                             | Brush-tailed rabbit-rat                            | VU              | EN                     |
| <i>Dasyurus hallucatus</i>                                | Northern quoll                                     | EN              | CE                     |
| <i>Hipposideros inornatus</i>                             | Arnhem leaf-nosed bat                              | EN              | VU                     |
| <i>Hipposideros stenotis</i>                              | Northern leaf-nosed bat                            | -               | VU                     |
| <i>Isodon auratus</i>                                     | Golden-bandicoot                                   | VU              | EN                     |
| <i>Macroderma gigas</i>                                   | Ghost bat                                          | VU              | -                      |
| <i>Megaptera novaeangliae</i>                             | Humpback whale                                     | VU              | -                      |
| <i>Mesembriomys gouldii</i>                               | Black-footed tree-rat                              | EN              | VU                     |
| <i>Mesembriomys macrurus</i>                              | Golden-backed tree-rat                             | -               | CE                     |
| <i>Notomys aquilo</i>                                     | Northern hopping-mouse                             | EN              | VU                     |
| <i>Petrogale concinna</i><br>(sub sp. canescens) Top End  | Nabarlek                                           | EN              | VU                     |
| <i>Petrogale concinna</i><br>(sub sp. concinna) Vic River | Nabarlek                                           | CE              | VU                     |
| <i>Phascogale pirata</i>                                  | Northern brush-tailed phascogale                   | VU              | EN                     |
| <i>Rattus tunneyi</i>                                     | Pale field-rat                                     | -               | VU                     |
| <i>Saccolaimus saccolaimus</i>                            | Bare-rumped sheath-tailed bat                      | VU              | -                      |
| <i>Sminthopsis butleri</i>                                | Butler's dunnart                                   | VU              | VU                     |
| <i>Xeromys myoides</i>                                    | False water rat                                    | VU              | -                      |
| <i>Zyomys maini</i>                                       | Arnhem rock-rat                                    | VU              | VU                     |
| <b>Reptiles</b>                                           |                                                    |                 |                        |
| <i>Lucasium occultum</i>                                  | Yellow-snouted gecko                               | EN              | VU                     |
| <i>Acanthophis hawkei</i>                                 | Plains death adder                                 | VU              | VU                     |
| <i>Bellatorias obiri</i>                                  | Arnhem land skink - (previously Arnhemland Egrnia) | EN              | EN                     |

CE - Critically endangered    EN - Endangered    VU - Vulnerable

# Threatened animal species of the Top End

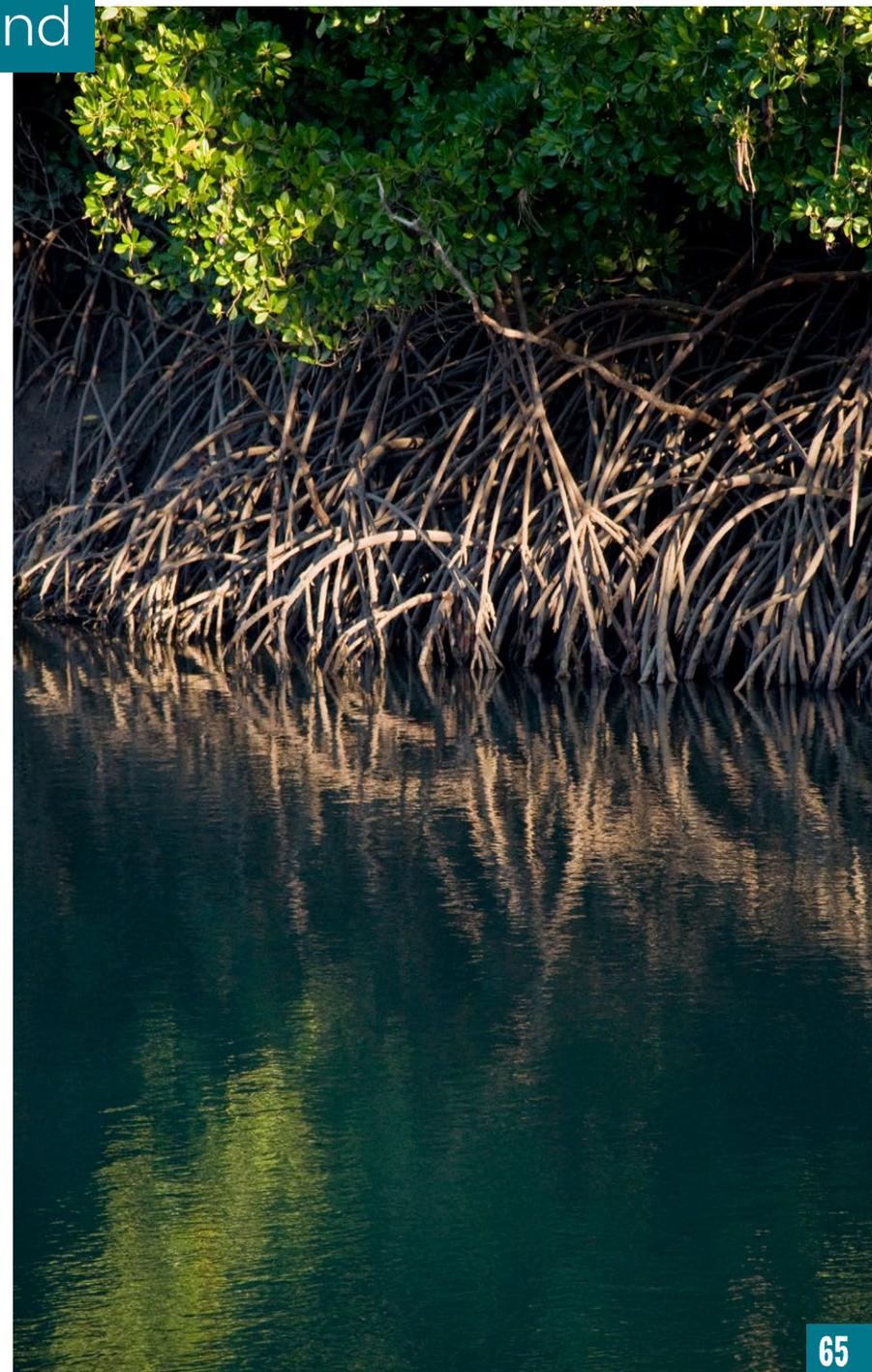
| Scientific name                   | Common name                                                 | EPBC Act Status | NT Conservation status |
|-----------------------------------|-------------------------------------------------------------|-----------------|------------------------|
| <i>Caretta caretta</i>            | Loggerhead turtle                                           | EN              | VU                     |
| <i>Chelonia mydas</i>             | Green turtle                                                | VU              | -                      |
| <i>Cryptoblepharus gurrumul</i>   | Arafura snake-eyed skink                                    | EN              | EN                     |
| <i>Ctenotus rimacola camptris</i> | Victoria River District blacksoil ctenotus (Keep River/Ord) | -               | VU                     |
| <i>Dermochelys coriacea</i>       | Leatherback turtle                                          | EN              | CE                     |
| <i>Eretmochelys imbricata</i>     | Hawksbill turtle                                            | VU              | VU                     |
| <i>Lepidochelys olivacea</i>      | Olive ridley                                                | EN              | VU                     |
| <i>Morelia oenpelliensis</i>      | Oenpelli python                                             | -               | VU                     |
| <i>Natator depressus</i>          | Flatback turtle                                             | VU              | -                      |
| <i>Varanus mertensi</i>           | Merten's water monitor                                      | -               | VU                     |
| <i>Varanus mitchelli</i>          | Mitchell's water monitor                                    | -               | VU                     |

Sources: [www.environment.gov.au/cgi-bin/sprat/public/sprat.pl](http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl),  
[nt.gov.au/environment/native-plants/threatened-plants](http://nt.gov.au/environment/native-plants/threatened-plants)



# Sites of conservation significance in the Top End

| Site name                                         | Significance  | World heritage area  | Ramsar            | % Protected |
|---------------------------------------------------|---------------|----------------------|-------------------|-------------|
| Adelaide River coastal floodplain                 | International | -                    | -                 | 24.9        |
| Alligator Rivers coastal floodplains              | International | Kakadu National Park | Kakadu            | 60.5        |
| Anson Bay and associated coastal floodplains      | International |                      |                   | -           |
| Arafura Swamp                                     | International |                      |                   | -           |
| Blue Mud Bay and associated coastal floodplains   | International |                      |                   | 27.4        |
| Boucaut Bay and associated coastal floodplains    | International |                      |                   | 87.0        |
| Buckingham Bay and associated coastal floodplains | International |                      |                   | -           |
| Castlereagh Bay and associated islands            | International |                      |                   | 2.2         |
| Chambers Bay                                      | International |                      |                   | 37.9        |
| Cobourg Peninsula                                 | International |                      | Cobourg Peninsula | 36.6        |
| Croker Island group                               | International |                      |                   | --          |
| Daly River middle reaches                         | National      |                      |                   | 50.3        |
| Darwin Harbour                                    | International |                      |                   | 2.9         |
| Elcho Island group                                | International |                      |                   | -           |
| Finniss River coastal floodplain                  | International |                      |                   | -           |
| Fog Bay                                           | International |                      |                   | -           |
| Gove Peninsula and north-east Arnhem coast        | International |                      |                   | 40.3        |
| Groote Eylandt group                              | International |                      |                   | 36.2        |
| Howard sand plains                                | International |                      |                   | 4.2         |
| Hyland Bay and associated coastal floodplains     | International |                      |                   | 28.6        |
| Maningrida coastal habitats                       | International |                      |                   | 68.6        |
| Mary River coastal floodplain                     | International |                      |                   | 28.9        |
| Shoal Bay                                         | International |                      |                   | 36.9        |
| Tiwi Islands                                      | International |                      |                   | -           |
| Wessel and English Company island groups          | International |                      |                   | -           |
| Limmen Bight and associated coastal floodplains   | International |                      |                   | 10.9        |
| Western Arnhem Plateau                            | International |                      |                   | 79.3        |



# Weeds of the Top End

Source: [nt.gov.au/environment/weeds](http://nt.gov.au/environment/weeds)

**Category 1 - Priority weeds for eradication - widely considered feasible to eradicated v high risk and isolated/restricted distributions**

| Scientific Name                           | Common Name    | Declared NT | WoNS |
|-------------------------------------------|----------------|-------------|------|
| <i>Annona glabra</i>                      | Pond apple     | A           | Yes  |
| <i>Cabomba caroliniana</i>                | Cabomba        | A           | Yes  |
| <i>Chromolaena odorata</i>                | Siam weed      | C           | -    |
| <i>Cryptostegia grandiflora</i>           | Rubber vine    | A           | Yes  |
| <i>Eichhornia crassipes</i>               | Water hyacinth | A           | Yes  |
| <i>Neptunia oleroides, Neptunia plena</i> | Water mimosa   | A           | -    |
| <i>Sagittaria platyphylla</i>             | Sagittaria     | A           | Yes  |

**Category 2 - Priority Weeds for strategic control - high impact on land managers, economic/environmental values - typically have statutory weed management plan**

| Scientific Name                      | Common Name              | Declared NT | WoNS |
|--------------------------------------|--------------------------|-------------|------|
| <i>Andropogon gayanus</i>            | Gamba grass              | A/B (zoned) | Yes  |
| <i>Cenchrus polystachios</i>         | Mission grass, perennial | B           | -    |
| <i>Cryptostegia madagascariensis</i> | Rubber vine, ornamental  | A           | -    |
| <i>Hymenachne amplexicaulis</i>      | Olive hymenachne         | B           | Yes  |
| <i>Jatropha gossypifolia</i>         | Bellyache bush           | A/B (zoned) | Yes  |
| <i>Mimosa pigra</i>                  | Mimosa                   | A/B (zoned) | Yes  |
| <i>Parkinsonia aculeata</i>          | Parkinsonia              | B           | Yes  |
| <i>Salvinia molesta</i>              | Salvinia                 | B           | Yes  |

**Category 3 - Weeds of Concern - have been identified by stakeholders as posing a threat, but no Territory plans or strategies for control**

| Scientific Name                               | Common Name           | Declared NT  | WoNS |
|-----------------------------------------------|-----------------------|--------------|------|
| <i>Themeda quadrivalvis</i>                   | Grader grass          | B            | -    |
| <i>Cenchrus pedicellatus</i>                  | Mission grass, annual | Not declared | -    |
| <i>Hyparrhenia rufa</i>                       | Thatch grass          | A            | -    |
| <i>Lantana camara</i>                         | Lantana               | B            | Yes  |
| <i>Leucaena leucocephala</i>                  | Coffee bush           | Not declared | -    |
| <i>Sporobolus natensis and S. pyramidalis</i> | Giant rats tail grass | Not declared | -    |

**Category 4 - Hygiene and biosecurity weeds - low risk, but local impacts so important for landowners to control these species**

| Scientific Name                                      | Common Name         | Declared NT | WoNS |
|------------------------------------------------------|---------------------|-------------|------|
| <i>Cenchrus echinatus</i>                            | Mossman River grass | B           | -    |
| <i>Hyptis suaveolens</i>                             | Hyptis              | B           | -    |
| <i>Senna alata</i>                                   | Candle bush         | B           | -    |
| <i>Senna obtusifolia</i>                             | Sicklepod           | B           | -    |
| <i>Senna occidentalis</i>                            | Coffee senna        | B           | -    |
| <i>Sida acuta, Sida cordifolia, Sida rhombifolia</i> | Sida                | B           | -    |
| <i>Stachytarpheta spp.</i>                           | Snakeweed           | B           | -    |
| <i>Xanthium strumarium</i>                           | Noogoora burr       | B           | -    |

**Category 5 - Alert weeds for eradication on detection - potential to have a high level of impact should it become established**

| Scientific Name                    | Common Name                   | Declared NT | WoNS |
|------------------------------------|-------------------------------|-------------|------|
| <i>Alternanthera philoxeroides</i> | Alligator weed                | A           | Yes  |
| <i>Limnium laevigatum</i>          | Amazon frogbit                | C           | -    |
| <i>Limnocharis flava</i>           | Limnocharis (Yellow Burrhead) | C           | -    |
| <i>Parthenium hysterophorus</i>    | Parthenium weed               | A           | Yes  |

WONS - Weed of National Significance

Class A - Eradicate

Class B - Control

Class C - Prevent entry (Note: All Class A and Class B weeds are also considered to be Class C weeds.)

# Feral animals of the Top End

| Category             | Animal                 |
|----------------------|------------------------|
| Amphibians           | Cane toads             |
| Birds                | Barbary dove           |
|                      | Common Starling        |
|                      | Eurasian Tree Sparrow  |
|                      | Rock Dove              |
|                      | House sparrow          |
| Invertebrates        | Big-headed ants        |
|                      | Common Honeybee        |
|                      | Ghost Ant              |
|                      | Ginger Ant             |
|                      | Singapore Ant          |
|                      | Tropical Fire Ant      |
|                      | Yellow Crazy Ant       |
| Exotic invertebrates |                        |
| Mammals              | Banteng                |
|                      | Brown rat              |
|                      | Feral buffalo          |
|                      | Feral camel            |
|                      | Feral cattle           |
|                      | Feral donkey           |
|                      | Feral fox              |
|                      | Feral pig              |
|                      | Feral rabbit           |
|                      | House mouse            |
|                      | Rusa deer              |
|                      | Sambar deer            |
| Wild dog             |                        |
| Reptiles             | Asian House Gecko      |
|                      | Flower-pot Blind Snake |

Source: [nt.gov.au/environment/animals/feral-animals](https://nt.gov.au/environment/animals/feral-animals)











