

Draft Biodiversity Offsets Technical Guidelines

Northern Territory Offsets Framework

Document title	Biodiversity Offsets Technical Guidelines
Contact details	Department of Environment, Parks and Water Security
Approved by	Not approved – under development
Date approved	Not approved – under development
Document review	As needed
TRM number	XXX

Version	Date	Author	Changes made
0.1	29 September 2022	Environment Policy	DRAFT for approval to consult

Acronyms	Full form
NT	Northern Territory

Contents

1. Purpose of the Technical Guidelines.....	4
2. Habitats	4
3. Management of priority threats.....	4
3.1. Priority threats	4
3.2. Management thresholds	4
3.3. Threat management costs	5
4. Habitat condition.....	5
4.1. Habitat condition levels	6
4.2. Suitable habitat condition for offsets.....	6
4.3. Potential improvement in habitat condition through threat management	7
5. Preferred locations for offsets	8
6. Offset delivery timeframes	8
7. Offsets calculator	9
7.1. Minimum scale	9
7.1.1. Key metrics	9
7.1.2. Minimum offset area.....	10
7.2. Minimum investment.....	10
7.2.1. Key metrics	10
7.2.2. Indicative minimum offset investment.....	10
8. Offset calculation scenario.....	11
Schedule 1. Biomes, broad habitats and priority threats.....	12
Schedule 2. Priority threat benchmarks	27
Schedule 3. Indicative habitat condition characteristics for selected habitats.....	38

1. Purpose of the Technical Guidelines

The Biodiversity Offsets Technical Guidelines (the Guidelines) provide additional information to assist in the interpretation and application of the Biodiversity Offsets Policy (the Policy) in the Territory.

This guidance draws on scientific literature and elicitation of expert knowledge relating to biodiversity and land management in the Northern Territory, as well as the application of offsets frameworks elsewhere in Australia. It is anticipated that the guidelines will be reviewed and revised as additional relevant data and information becomes available, and with experience of the application of offsets under the Policy.

2. Habitats

The Policy adopts a habitat-focused approach to biodiversity offsets, and requires offsets to be applied within the same broad habitat type as the impact that is being offset. For the purpose of this Policy, broad habitat types occurring within the Northern Territory within three biomes (arid south NT, monsoonal north NT, estuarine and marine) have been defined through expert elicitation and these are described in **Schedule 1**.

For the initial application of the Policy, it is considered that habitats need only be defined at this broad scale, which is relevant to the distribution pattern of many biodiversity values in the NT and the landscape scale approach to managing key threats. Future revisions of the Policy may consider describing some habitats at finer resolution, where this is relevant to effective management of offsets and consistent environmental mapping is available.

3. Management of priority threats

3.1. Priority threats

The Policy envisages that offset activities will primarily involve the management of priority threats, which are relevant to the habitat(s) in which the offset is located, and the biodiversity values which have been impacted. An indicative list of priority threatening processes within each broad habitat type has been developed through reference to published literature and expert elicitation, and these are described in **Schedule 1**. For most habitats, key threats are one or more of inappropriate fire regimes, weeds and feral animals (which may include ungulates, pigs and predators). More detail on threats for specific habitats and locations (e.g. relevant weed species) is available through reference to the literature, regional natural resource management plans or advice from DEPWS or land management organisations.

3.2. Management thresholds

For offsets under this Policy, management of priority threats has the goal of improving habitat condition, ultimately to the point where 'good' habitat condition is restored and can be maintained. This will only be effective if threats are managed sufficiently well to allow sustained recovery of habitat condition. Indicative thresholds for effective threat management within different biomes have been developed and these are described in **Schedule 2**. Biodiversity offset plans should describe how these thresholds will be achieved, or provide robust justification for alternative threat reduction targets.

The priority threats that are the focus for offset activities under this Policy generally occur across broad landscapes. In most cases, effective reduction in threats also requires management to be applied at a

landscape scale. **Schedule 2** also provides guidance as to the minimum area over which different types of threat management can practically be applied, noting that practical management areas will also be strongly influenced by location-specific factors, and these should be taken into account in the development of biodiversity offset plans.

It is noted that while thresholds for priority threats are presented for each threat individually, the Policy strongly encourages an integrated approach to threat management within the offset area. Research and experience demonstrate that landscape scale threats have interactive effects and that it is important to recognise key interactions and integrate threat management for the most effective outcomes. Indeed, management of a single threat may be ineffective in improving habitat condition and restoring biodiversity values even if the desired threat management threshold is achieved. Biodiversity offset plans should recognise the potential interactive effects of threats in the offset area and seek to manage multiple threats where this is necessary to achieve significant improvement in habitat condition.

3.3. Threat management costs

<A consultancy will review current landscape scale threat management practices in the NT and provided cost estimates for a range of activities. These values will inform the indicative investment level set by the calculator. These values are not intended to be prescriptive, but are indicative of the appropriate level of investment in an offset, for the benefit of both proponents and decision makers assessing a proposed biodiversity offset plan>

4. Habitat condition

‘Habitat condition’ is a key concept for the Policy, as the objective of most offsets will be to deliver an improvement in habitat condition within the offset area, in order to contribute to the general target of a net gain in the ecological condition of natural habitats in the Territory.

The concept of habitat condition is widely used in different contexts, such as in the BioCondition framework applied in Queensland¹, pastoral land condition rating schemes², and some approaches to ‘healthy country’ planning. For the purposes of the Policy, habitat condition is defined as a measure of the current capacity of an ecosystem to support the suite of species expected to occur there, and associated ecological processes.

¹ www.qld.gov.au/environment/plants-animals/biodiversity/biocondition

² For example, nt.gov.au/industry/agriculture/farm-management/managing-pastoral-land

4.1. Habitat condition levels

Habitat condition falls along a continuum between the worst possible and the best possible. For the purposes of the Policy, 'good' condition habitat is considered to satisfy all of the following:

- Vegetation structure and composition is within expected natural ranges for the habitat.
- Diversity and abundance of keystone fauna is within expected natural ranges for the habitat.
- The habitat can sustain relevant threatened species in the long term.
- Ecosystem processes are functioning within expected natural ranges.
- There are no priority threats at levels of severity that will result in declines in the above.

'Poor condition' habitat will exhibit most or all of the following characteristics:


- Vegetation structure and composition is substantially different to the expected natural ranges for the habitat.
- Absence of many keystone flora and fauna.
- The habitat cannot sustain relevant threatened species.
- Many ecosystem processes are not functioning or functioning poorly.
- Multiple priority threats at levels of severity that will prevent any improvement or result in further declines in the above descriptors.

Indicative descriptions of the characteristics of selected habitats at different levels of habitat condition are provided in **Schedule 3**. These should be used as a guide for proponents when determining suitable locations for offsets, and developing suitable indicators to describe the initial condition of the offset area.

4.2. Suitable habitat condition for offsets

The Policy recognises that areas at either end of this habitat condition continuum are not suitable for offsets (Figure 1). Areas at the lower end of poor condition are considered to be ecologically compromised, meaning such areas cannot recover to the required condition without active rehabilitation actions, even if threats are managed effectively. Within the Territory context, active rehabilitation would not generally be a cost-effective offset, compared to natural recovery following threat reduction in areas of moderate condition. Conversely areas in good condition offer little scope for improvement in habitat condition through management of threats. Offsets should therefore target areas in moderate condition, or areas at the higher end of poor condition.

Figure 1: Habitat condition continuum and suitability for offsets

Habitat condition	Suitability of an area for offsets
Poor	<u>Unsuitable for offsets</u> – The area is ecologically compromised and threat management is unlikely to result in good condition in the future without other active rehabilitation actions
	<u>Suitable for offsets</u> – Good condition is achievable in the long term via threat management and natural regeneration and minimal active rehabilitation
Moderate	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px;">Potential ecological gains per \$</div> <div style="text-align: center;">  </div> <div style="border: 1px solid black; padding: 5px;">Achievability of good condition in the long term</div> </div>
Good	<u>Unsuitable for offsets</u> – Good condition is the offset objective. Locating offsets in areas of good condition could be considered an averted loss style approach

4.3. Potential improvement in habitat condition through threat management

Offsets under the Policy will generally aim to improve the condition of habitats in the offset area along a trajectory from poor or moderate toward good condition, through the management of key threats. However, there are likely to be limits to the proportional improvement that can be achieved in habitat condition through such management and within the period of the offset.

This was tested through expert elicitation based on scenarios of threat management programs in selected habitats at different levels of condition, that were effectively implemented over a set period (15 years). The elicitation suggested that threat management could result in a 15-20% improvement in habitat condition in habitats in the monsoon biome and 10-15% improvement in an arid biome habitat³. The degree of potential recovery was consistent across different monsoon biome habitats that were tested. The lower potential recovery in arid biomes was at least partly linked to a view that recovery occurs more slowly (so that greater recovery may occur over a timeframe longer than 15 years).

³ This is on a habitat condition continuum from 0 to 100%. Respondents considered above 85-90% to represent 'good' condition and below 10-20% to represent 'ecologically compromised' habitat.

These elicitation results are comparable in some studies in other Australian states, and the quantum of improvement likely to be considered achievable in application of the Commonwealth Government's offset calculator. These values are used to inform the compensation ratio in the offset calculator (Section 7).

5. Preferred locations for offsets

In accordance with the Policy, offsets programs must be located within the same biome (as outlined in Schedule 1. Biomes, broad habitats and priority threats) as the impact, within the same broad habitat type (or a habitat that supports the same biodiversity value subject to the impact), and in areas within that habitat type that also contain any finer-scale habitat features known to be essential for the value required to be offset.

In addition to the above, it may be desirable to use the following criteria to determine the most effective location for offsets, and offset plans should demonstrate how these criteria have been considered:

- within the same Indigenous estate as the impact
- where the condition and/or management of adjacent areas is likely to facilitate recovery of habitat condition and biodiversity values within the offset area (e.g. adjacent to areas already managed to reduce relevant threats)
- in areas identified as a priority for conservation management in published strategies or plans (e.g. Healthy Country Plans).

Offsets **should not** be located where there are factors that prevent or reduce the likelihood of offset objectives being achieved, such as areas:

- subject to significant development pressure or with a high likelihood of change to more intensive land use within the period of the offset
- with a high likelihood that climate change will significantly negatively impact habitat condition or the suitability of the offset area for values being offset (e.g. via sea level rise) within the period of the offset
- where the condition and/or management of adjacent areas is inimical to the recovery of habitat condition and biodiversity values within the offset area (e.g. where the offset area would be a remnant patch within a highly fragmented landscape).

6. Offset delivery timeframes

Offsets under the Policy generally aim to improve habitat condition through the management of key threats. Due to the nature of the threats, it is likely that effective management must be implemented over a significant time period before threat levels are reduced below the target threshold (this is referred to as the 'improvement phase' in the Policy). There is also likely to be a significant lag between the reduction of threats and a recovery of ecological processes and biodiversity values, reflected by an improvement in habitat condition. It is essential that threat management is continued while this recovery occurs, in what is referred to as the 'maintenance phase'. The investment required for threat management may be lower during this phase (for example maintaining a low density of feral animals may require significantly less effort than the initial reduction from high to low density).

The Policy requires that ecological gains in habitat condition should occur as close in time as possible to the impact for direct habitat management activities. Further, that threats must be managed to the required

levels as quickly as is feasible, followed by maintenance of those levels for at least the period of the offset. Expert elicitation from ecologists and land management practitioners suggests that the minimum time in which the required improvement in habitat condition is likely to occur is 15 years in the monsoonal biomes. The situation is more complex in the arid biomes as recovery may depend on seasonal conditions (such as rainfall events) that occur at decadal time-scales, but may take at least 25 years. These time periods are used as the default settings for the initial application of the Policy, and are reflected in the offset calculator.

The periods within the total offset delivery timeframe that will constitute an improvement phase and a maintenance phase will depend on the nature and severity of the threats in the offset area and a range of factors influencing the effectiveness of threat management activities. It is anticipated that the improvement phase may be at least 10 years in monsoonal biomes and at least 15 years in arid biomes. Where there is a reduced investment in threat management during a maintenance phase, this should be supported by evidence from monitoring of threat levels and ecological recovery.

7. Offsets calculator

The offset calculator provides a precautionary, risk-based approach to ensure an offset program is of a sufficient spatial scale and level of investment to achieve ecological gains (improvement in habitat condition) that will compensate for the loss (residual impact) from the project requiring the offset in accordance with the requirement of the Policy. Consistent with the NT Offset Principles and the Policy, the calculator is simple and transparent, and does not require complex or contestable data inputs.

The following key concepts are used in the calculator:

- Compensation requires at least the same quantity of gain as the quantity of loss, measured using the same unit of measurement.
- The loss that is being offset is considered to be of habitat in the best possible condition.
- An additional gain of 20% is required to support the overall target of net gain.
- An additional gain of 10% is required to address the risk of lower than expected gains.
- If the same offset area is being used to offset more than one value, the 10% gain to compensate for risk applies to each value.
- Offset investment should continue for the life of the project or the set minimum offset period for the relevant biome, whichever is the longest.

7.1. Minimum scale

7.1.1. Key metrics

- Ecological units – common unit to measure losses and gains. 1 ecological unit = 1 hectare (ha) at best possible habitat condition (100%).

Total potential loss - the total number of ecological units lost as a result of the significant residual impact(s) which requires biodiversity offsets.

- For the purposes of the Policy, 100% loss is assumed for each hectare removed or impacted. For example, 1000 hectares impacted would equate to a total potential loss of 1000 ecological units.

Potential gain - the number of potential ecological units that will be gained by direct habitat management measures.

As described in Section 4.3, the potential gain that can be achieved through effective threat management is:

- 20% for habitats in the monsoonal biome
- 15% for habitats in the arid biome.

7.1.2. Minimum offset area

The minimum offset area can be calculated as:

$$\text{Total loss/potential gain} \times \text{net gain requirement} \times \text{risk requirement}$$

The application of this formula is illustrated in the example scenario below, for an offsets in the monsoonal biome.

7.2. Minimum investment

7.2.1. Key metrics

Capacity building costs - up front dollar costs of building threat management capacity to the required levels.

Annual threat reduction costs - dollar cost per hectare, per year of implementing activities to reduce threats to the required benchmarks.

Annual threat maintenance costs - dollar cost per hectare, per year of implementing activities to maintain threats at the required benchmarks.

Annual monitoring costs - set at 15% of the threat management costs.

Offset period - set at a minimum of:

- 15 years for monsoonal north
- 20 years for arid zone.

Threat maintenance period - will vary between offsets but the following values are used as indicative for the number of years required to maintain threats at the required benchmarks. Either:

- 10 years for monsoonal biome, or
- 15 years for arid biome.

7.2.2. Indicative minimum offset investment

- (minimum offset area x threat reduction cost/ha x threat reduction period) + (minimum offset area x threat maintenance cost/ha x threat maintenance period) + monitoring cost

8. Offset calculation scenario

Scenario to help explain offset calculator workings:

An offset is required due to a significant residual impact from the removal of 1000ha of eucalypt woodland in the monsoonal biome, which is habitat for two listed threatened species (two values). The project has a 10 year life span.

Calculation of minimum offset area:

Total potential loss (1000) / potential gain (0.2) x net gain requirement (1.2) X risk requirement (1.2) = Minimum offset area (7200ha)

Calculation of minimum total investment:

1. Threat reduction (10 years)

(min offset area 7200 x threat reduction cost/ha \$10* x threat reduction period 10) = minimum threat reduction investment \$720,000

2. Threat maintenance (5 years)

(min offset area 7200 x threat maintenance cost/ha \$7.5* x threat maintenance period 5) = minimum threat maintenance investment \$270,000

3. Monitoring

(Threat reduction investment \$720,000 + threat maintenance investment \$270,000) x 0.15 = minimum threat monitoring investment \$148,500

4. Minimum total investment (over 15 years)

Threat reduction \$720,000 + threat maintenance \$270,000 + monitoring \$148,500 = minimum total investment \$1,138,500

* costs/ha examples only

Schedule 1. Biomes, broad habitats and priority threats

To support the target-based, habitat-focused approach established under the Policy, the Territory has been classified according to broadly defined landscape-scale units with consistent biogeographical features. These habitats, developed based on existing environmental regionalisations and consultation with relevant experts, guide where offsets should be located in the landscape, and what threats should be targeted in an offset program. **Table 1** describes the three biomes of the Territory and includes links to broad habitats and priority threats that occur within each.

Table 1: Territory biomes

Biome	Description	Broad habitats and priority threats
Monsoonal north biome	<p>Terrestrial and aquatic habitats above the 600 mm isohyet, and /or those within the boundaries of the:</p> <ul style="list-style-type: none"> Northern Land Council Anindilyakwa Land Council Tiwi Land Council <p>Excludes habitats with high influence of tidal or marine waters</p>	Table 2
Arid south terrestrial biome	<p>Terrestrial and aquatic habitats below the 600 mm isohyet, and/or those within the boundaries of the Central Land Council</p>	Table 3
Estuarine and marine biome	<p>Includes habitats with high influence of tidal or marine waters</p>	Table 4

Table 2: Territory habitat types and priority threats in the monsoonal north biome

Habitats	Distinguishing features	Alignment with NVIS MVG	Spatial delineation rules	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Threats requiring other management actions
Rainforests and dry scrub	•	•	•		
Wet rainforests	<ul style="list-style-type: none"> Typically associated with areas of permanent moisture availability, such as permanent creeks and springs. May be up to 30 metres tall. 	Major Vegetation Group 1. Rainforests and Vine Thickets Major Vegetation Sub-group 2. Tropical or sub-tropical rainforest	MVSG	<ul style="list-style-type: none"> Inappropriate fire regimes Feral ungulates 	Water management
Rainforests (other)	<ul style="list-style-type: none"> Supports a different suite of values to the wet rainforests, such as dry scrub and vine thickets. In general, shorter than wet rainforests and usually 5 to 10 metres in height. May still be dependent on groundwater in some cases Often found in areas of the landscape where moisture collects and protected from fire. 	Major Vegetation Group 1. Rainforests and Vine Thickets Major Vegetation Sub-group 62. Dry rainforest or vine thickets	MVSG	<ul style="list-style-type: none"> Inappropriate fire regimes Feral ungulates Weeds 	Water management
Forests and woodlands	•	•	•		
Tall lowland Eucalypt forests and woodlands in the coastal far-north	<ul style="list-style-type: none"> Eucalypts are the dominant canopy species. Occurs in areas of higher rainfall such as Tiwi and Arnhem regions. Taller and greater productivity than other Top End Eucalypt habitats. 	Major Vegetation Group 3. Eucalypt Open Forests Major Vegetation Sub-group 4. Eucalyptus open forests with a shrubby understorey 5. Eucalyptus open forests with a grassy understorey Major Vegetation Group 5. Eucalypt Woodlands Major Vegetation Sub-group 8. Eucalyptus woodlands with a shrubby understorey 9. Eucalyptus woodlands with a tussock grass understorey 10. Eucalyptus woodlands with a hummock grass understorey	Intersection of: <ul style="list-style-type: none"> MVSGs areas of > XXXXmm annual rainfall 	<ul style="list-style-type: none"> Inappropriate fire regimes Feral ungulates Grassy weeds 	
Top End lowland Eucalypt woodlands on various substrates	<ul style="list-style-type: none"> Eucalypts are the dominant canopy species. Occurs on a range of different substrates. Includes Eucalypt dominated savannah. 	Major Vegetation Group 5. Eucalypt Woodlands Major Vegetation Sub-group 8. Eucalyptus woodlands with a shrubby understorey 9. Eucalyptus woodlands with a tussock grass understorey	Intersection of: <ul style="list-style-type: none"> MVSGs areas above 1000mm and below XXXXmm annual rainfall 		

Habitats	Distinguishing features	Alignment with NVIS MVG	Spatial delineation rules	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Threats requiring other management actions
	<ul style="list-style-type: none"> In general, occurs in lower lying areas >1000mm annual rainfall. <p>Excludes Tall eucalypt forests and woodlands in the coastal far-north.</p>	<p>10. Eucalyptus woodlands with a hummock grass understorey</p> <p>Major Vegetation Group 11. Eucalypt Open Woodlands Major Vegetation Sub-group 18. Eucalyptus low open woodlands with hummock grass 19. Eucalyptus low open woodlands with tussock grass 47. Eucalyptus open woodlands with shrubby understorey 53. Eucalyptus low open woodlands with a shrubby understorey</p>			
Top End Eucalypt woodlands on plateaus, hills and ranges	<ul style="list-style-type: none"> Eucalypts are the dominant canopy species. In general, occurs in areas >1000mm annual rainfall. 	<p>Major Vegetation Group 11. Eucalypt Open Woodlands Major Vegetation Sub-group 18. Eucalyptus low open woodlands with hummock grass 19. Eucalyptus low open woodlands with tussock grass 47. Eucalyptus open woodlands with shrubby understorey 53. Eucalyptus low open woodlands with a shrubby understorey</p> <p>Major Vegetation Group 12. Tropical Eucalypt Woodlands/Grasslands Major Vegetation Sub-group 7. Tropical Eucalyptus forest and woodlands with a tall annual grassy understorey</p>	<p>Intersection of:</p> <ul style="list-style-type: none"> MVSGs areas above 1000mm and below XXXXmm annual rainfall elevated land forms 		
Eucalypt open woodlands	<ul style="list-style-type: none"> Eucalypts are the dominant canopy species. In general, in areas <1000mm annual rainfall. Includes Eucalypt dominated savannah. Particularly occurs on heavier textured soils. Provides for key differentiation of woodland habitats in the gulf regions. 	<p>Major Vegetation Group 11. Eucalypt Open Woodlands Major Vegetation Sub-group 18. Eucalyptus low open woodlands with hummock grass 19. Eucalyptus low open woodlands with tussock grass 47. Eucalyptus open woodlands with shrubby understorey 53. Eucalyptus low open woodlands with a shrubby understorey</p> <p>Major Vegetation Group 12. Tropical Eucalypt Woodlands/Grasslands Major Vegetation Sub-group</p>	<p>Intersection of:</p> <ul style="list-style-type: none"> MVSGs areas above 600mm and below 1000mm annual rainfall 		

Habitats	Distinguishing features	Alignment with NVIS MVG	Spatial delineation rules	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Threats requiring other management actions
		7. Tropical Eucalyptus forest and woodlands with a tall annual grassy understorey			
Non-Eucalypt open woodlands	<ul style="list-style-type: none"> • Dominant canopy species other than Eucalypts • Includes non-Eucalypt dominated savannah. • In general, occurs in areas <1000mm annual rainfall. • Provides for key differentiation of woodland habitats in the gulf regions. 	Major Vegetation Group 10. Other Forests and Woodlands Major Vegetation Sub-group 11. Tropical mixed spp forests and woodlands	Intersection of: <ul style="list-style-type: none"> • MVSGs • areas above 600mm and below 1000mm annual rainfall 		
Shrublands					
Top End lowland shrublands	<ul style="list-style-type: none"> • Generally dominated by Grevillea, Pteridifolia,, Banksia, Verticordia, Callitris, Calytrix, Acacia and Melaleuca. • Generally occurs within 200km of the coastline. • Includes sandsheet heath communities. • Excludes Kakadu, Nitmiluk and Pine Creek regions. • May be associated with ephemeral wetlands. 	Major Vegetation Group 16. Acacia Shrublands Major Vegetation Sub-group 23. Acacia (+/- low) open woodlands and shrublands with hummock grass 24. Acacia (+/- low) open woodlands and shrublands +/- tussock grass 25. Acacia (+/- low) open woodlands and sparse shrublands with a shrubby understorey Major Vegetation Group 17. Other Shrublands Major Vegetation Sub-group 32. Other shrublands	Intersection of: <ul style="list-style-type: none"> • MVSGs • areas above 1000mm annual rainfall 	<ul style="list-style-type: none"> • Inappropriate fire regimes • Feral ungulates • Grassy weeds 	Water management
Top End shrublands on plateaus, hills and ranges	<ul style="list-style-type: none"> • Generally dominated by Callitris, Calytrix, Allosyncarpia, Pandanus etc. • Includes nationally threatened sandstone heath community. 	Major Vegetation Group 16. Acacia Shrublands Major Vegetation Sub-group 23. Acacia (+/- low) open woodlands and shrublands with hummock grass 24. Acacia (+/- low) open woodlands and shrublands +/- tussock grass 25. Acacia (+/- low) open woodlands and sparse shrublands with a shrubby understorey Major Vegetation Group 17. Other Shrublands Major Vegetation Sub-group 32. Other shrublands Major Vegetation Group 13. Acacia Open Woodlands	Intersection of: <ul style="list-style-type: none"> • MVSGs • areas above 1000mm annual rainfall • elevated land forms 	<ul style="list-style-type: none"> • Inappropriate fire regimes • Feral ungulates • Grassy weeds 	

Habitats	Distinguishing features	Alignment with NVIS MVG	Spatial delineation rules	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Threats requiring other management actions
		Major Vegetation Sub-group 14. Other Acacia forests and woodlands			
Grasslands	•	•	•		
Monsoonal tussock grasslands	<ul style="list-style-type: none"> • Prolific in Gulf Savanna regions. • Includes Mitchell grass (<i>Astrebla</i>), Blue grass (<i>Dicanthium</i>) and tall bunch grass (<i>Vitiveria</i> syn: <i>Chrysopogon</i>) grasslands. 	Major Vegetation Group 19. Tussock Grasslands Major Vegetation Sub-group 34. Mitchell grass (<i>Astrebla</i>) tussock grasslands 35. Blue grass (<i>Dicanthium</i>) and tall bunch grass (<i>Vitiveria</i> syn: <i>Chrysopogon</i>) tussock grasslands, 37. Other tussock grasslands Major Vegetation Group 21. Other Grasslands, Herblands, Sedgeland and Rushlands Major Vegetation Sub-group 41. Saline or brackish sedgeland or grasslands 64. Other grasslands	Intersection of: <ul style="list-style-type: none"> • MVSGs • areas above 600mm annual rainfall 	<ul style="list-style-type: none"> • Inappropriate fire regimes • Feral ungulates • Grassy weeds 	
Hummock grasslands on plateaus, hills and ranges	<ul style="list-style-type: none"> • Dominated by <i>Triodia</i> sp. • Often contains sparse <i>Acacia</i>, <i>Corymbia</i> and <i>Eucalyptus</i>. • Typically on stoney substrates. 	Major Vegetation Group 20. Hummock Grasslands Major Vegetation Sub-group 33. Hummock grasslands	Intersection of: <ul style="list-style-type: none"> • MVSGs • areas above 600mm annual rainfall • elevated land forms 	Inappropriate fire regimes Feral ungulates	
Riparian and wetland habitats					
Riparian habitat	<ul style="list-style-type: none"> • In general, includes freshwater-dependant systems dominated by: <ul style="list-style-type: none"> ○ Melaleuca in the Top End and areas of high rainfall ○ Eucalypt in areas of lower rainfall ○ Species other than Melaleuca or Eucalypt in some cases. • Includes the terrestrial habitat between and fringing the high bank of watercourses. 	Major Vegetation Group 9. Melaleuca Forests and Woodlands Major Vegetation Sub-group 15. Melaleuca open forests and woodlands Major Vegetation Group 3. Eucalypt Open Forests Major Vegetation Sub-group 4. Eucalyptus open forests with a shrubby understorey 5. Eucalyptus open forests with a grassy understorey	Intersection of: <ul style="list-style-type: none"> • MVSGs • areas above 600mm annual rainfall • within: <ul style="list-style-type: none"> ○ XXm stream orders 1 and 2 ○ XXm stream orders 3 and 4 	<ul style="list-style-type: none"> • Feral ungulates • Grassy weeds 	

Habitats	Distinguishing features	Alignment with NVIS MVG	Spatial delineation rules	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Threats requiring other management actions
		<p>Major Vegetation Group 5. Eucalypt Woodlands Major Vegetation Sub-group 8. Eucalyptus woodlands with a shrubby understorey 9. Eucalyptus woodlands with a tussock grass understorey</p> <p>Major Vegetation Group 11. Eucalypt Open Woodlands Major Vegetation Sub-group 19. Eucalyptus low open woodlands with tussock grass 47. Eucalyptus open woodlands with shrubby understorey 53. Eucalyptus low open woodlands with a shrubby understorey</p> <p>Major Vegetation Group 10. Other Forests and Woodlands Major Vegetation Sub-group 11. Tropical mixed spp forests and woodlands</p>	<ul style="list-style-type: none"> ○ XXm stream orders 5+ 		
Floodplains	Includes but not limited to floodouts of monsoonal riverine systems.	<p>Major Vegetation Group 19. Tussock Grasslands Major Vegetation Sub-group 37. Other tussock grasslands</p> <p>Major Vegetation Group 21. Other Grasslands, Herblands, Sedgelands and Rushlands Major Vegetation Sub-group 41. Saline or brackish sedgelands or grasslands 63. Sedgelands, rushes or reeds</p> <p>Major Vegetation Group 22. Chenopod Shrublands, Samphire Shrublands and Forblands Major Vegetation Sub-group 39. Mixed chenopod, samphire +/- forbs</p>	<p>Intersection of:</p> <ul style="list-style-type: none"> • MVSGs • Top End floodplain mapping 	<ul style="list-style-type: none"> • Weeds (grassy and aquatic) • Feral ungulates 	Sea level rise

Habitats	Distinguishing features	Alignment with NVIS MVG	Spatial delineation rules	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Threats requiring other management actions
Persistent wetlands	<ul style="list-style-type: none"> Includes permanent and semi-permanent (i.e. seasonal) wetlands. Represents a subcategory of groundwater dependant ecosystems in some cases. May be associated with springs. May include swamps with trees or shrubs (e.g. forested with melaleuca, coolabah, or blue-bush). May be associated with floodplains. 	<p>Major Vegetation Group 19. Tussock Grasslands Major Vegetation Sub-group 37. Other tussock grasslands</p> <p>Major Vegetation Group 21. Other Grasslands, Herblands, Sedgelands and Rushlands Major Vegetation Sub-group 41. Saline or brackish sedgelands or grasslands 63. Sedgelands, rushes or reeds</p> <p>Major Vegetation Group 22. Chenopod Shrublands, Samphire Shrublands and Forblands Major Vegetation Sub-group 39. Mixed chenopod, samphire +/- forbs</p> <p>Major Vegetation Group 24. Inland aquatic - freshwater, salt lakes, lagoons (open water)</p>	<p>Intersection of:</p> <ul style="list-style-type: none"> MVSGs areas above 600mm annual rainfall Wetland mapping 	<ul style="list-style-type: none"> Weeds (aquatic and grassy) Feral ungulates 	<ul style="list-style-type: none"> Sea level rise Saltwater intrusion
Ephemeral wetlands	<ul style="list-style-type: none"> Wetlands that exist only for a short period of time (i.e. they are not persistent). May include swamps with trees or shrubs (e.g. forested with melaleuca, coolabah). May include closed/isolated systems fed by local run-off etc. e.g. Sturt Plateau wetlands May be associated with sandsheet heath communities. May be associated with floodplains. 	<p>Major Vegetation Group 19. Tussock Grasslands Major Vegetation Sub-group 37. Other tussock grasslands</p> <p>Major Vegetation Group 21. Other Grasslands, Herblands, Sedgelands and Rushlands Major Vegetation Sub-group 41. Saline or brackish sedgelands or grasslands 63. Sedgelands, rushes or reeds</p> <p>Major Vegetation Group 22. Chenopod Shrublands, Samphire Shrublands and Forblands Major Vegetation Sub-group 39. Mixed chenopod, samphire +/- forbs</p>	<p>Intersection of:</p> <ul style="list-style-type: none"> MVSGs areas above 600mm annual rainfall Wetland mapping 	<ul style="list-style-type: none"> Weeds (aquatic and grassy) Feral ungulates 	

Habitats	Distinguishing features	Alignment with NVIS MVG	Spatial delineation rules	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Threats requiring other management actions
Aquatic habitats					
Large lowland aquatic riverine systems	<ul style="list-style-type: none"> Lowland perennial rivers. Permanent riverine channels and large refuge pools (e.g. Billabongs and waterholes) within river systems or floodplains. Excludes estuarine features, which are captured in the marine and estuarine biome. 	Major Vegetation Group 24. Inland aquatic - freshwater, salt lakes, lagoons (open water)	Intersection of: <ul style="list-style-type: none"> watercourse mapping (stream order 3+) areas above 600mm annual rainfall areas below XXm elevation 	<ul style="list-style-type: none"> Feral ungulates Weeds (aquatic and grassy) 	<ul style="list-style-type: none"> Water extraction Loss of surface flow
Small lowland aquatic systems and features	<ul style="list-style-type: none"> Lowland perennial streams. Lowland seasonally flowing streams. Lowland springs and small waterholes. 	Major Vegetation Group 24. Inland aquatic - freshwater, salt lakes, lagoons (open water)	Intersection of: <ul style="list-style-type: none"> watercourse (stream order 1 or 2) and spring mapping areas above 600mm annual rainfall areas below XXm elevation 		
Upland aquatic systems and features	<ul style="list-style-type: none"> Upland streams Upland waterholes, springs, gorges, rockpools. 	Major Vegetation Group 24. Inland aquatic - freshwater, salt lakes, lagoons (open water)	Intersection of: <ul style="list-style-type: none"> watercourse and spring mapping areas above 600mm annual rainfall areas above XXm elevation 	<ul style="list-style-type: none"> Feral ungulates Weeds (grassy and herbs) 	<ul style="list-style-type: none"> Water extraction Loss of surface flow
Subterranean hyporheic zone and aquifers	<ul style="list-style-type: none"> Aquifers include perched aquifers, karst aquifers and deeper aquifers. May be associated with rainforests, wetlands, springs and other less obvious terrestrial habitats. 	Various terrestrial expressions	Intersection of: <ul style="list-style-type: none"> Aquifer mapping areas above 600mm annual rainfall 	<ul style="list-style-type: none"> Use the priority threats for the relevant surface habitat, where they relate to the integrity of surface sediments/potential erosion (and may relate to quality/availability of water recharging aquifers) 	<ul style="list-style-type: none"> Water extraction

Table 3: Territory habitat types and priority threats in the arid south biome

Habitat type	Description	Alignment with NVIS MVG	Potential spatial delineation rules for indicative mapping	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Priority threats requiring other management actions (e.g. research, education, other policy levers)
Woodlands					
Eucalypt open woodlands	<ul style="list-style-type: none"> Generally associated with riparian habitat. Dominated by Eucalypt sp. Occurs on a variety of substrates from sands to clays Occurs on flats, hills and slopes of mountains Understorey varied, and includes a shrubby and/or tussock and hummock grass layer 	Major Vegetation Group 11. Eucalypt Open Woodlands Major Vegetation Sub-group 18. Eucalyptus low open woodlands with hummock grass 19. Eucalyptus low open woodlands with tussock grass 53. Eucalyptus low open woodlands with a shrubby understorey	Intersection of: <ul style="list-style-type: none"> MVSGs areas <600mm annual rainfall areas <800m elevation 	<ul style="list-style-type: none"> Inappropriate fire regimes Grassy weeds Feral ungulates 	
Non-eucalypt open woodlands	<ul style="list-style-type: none"> Includes Ironwood and Whitewood dominated communities. Occurs on flats, hills and slopes of mountains 	Major Vegetation Group 13. Acacia Open Woodlands Major Vegetation Sub-group 14. Other Acacia forests and woodlands Major Vegetation Group 10. Other Forests and Woodlands Major Vegetation Sub-group 16. Other forests and woodlands	Intersection of: <ul style="list-style-type: none"> MVSGs areas <600mm annual rainfall 	<ul style="list-style-type: none"> Inappropriate fire regimes Grassy weeds Feral ungulates 	
Shrublands					
Shrublands on ranges and mountains	<ul style="list-style-type: none"> Generally dominated by continuum of mallee eucalypt shrublands, non-eucalypt shrublands, and spinifex hummock shrublands Excludes mulga dominated shrublands. Soils skeletal sands derived from sandstones, quartzites, dolomite, and granites. 		Intersection of: <ul style="list-style-type: none"> MVSGs areas <600mm annual rainfall areas >800m elevation 	<ul style="list-style-type: none"> Inappropriate fire regimes Grassy weeds Cats 	<ul style="list-style-type: none"> Changes temperature and rainfall (climate change) Knowledge deficiency
Mulga shrublands	<ul style="list-style-type: none"> Dominated by Mulga species Soils chiefly sandy loams Occurs on flats, slopes and hills Sheet flow common with flats populations 	Major Vegetation Group 16. Acacia Shrublands Major Vegetation Sub-group 20. Mulga (Acacia aneura) woodlands +/- tussock grass +/- forbs 45. Mulga (Acacia aneura) open woodlands and sparse shrublands +/- tussock grass 15. Mulga (Acacia aneura) woodlands and shrublands with hummock grass 52. Mulga (Acacia aneura) open woodlands and sparse shrublands with hummock grass	Intersection of: <ul style="list-style-type: none"> MVSGs areas <600mm annual rainfall areas <800m elevation 	<ul style="list-style-type: none"> Inappropriate fire regimes Grassy weeds Feral ungulates 	

Habitat type	Description	Alignment with NVIS MVG	Potential spatial delineation rules for indicative mapping	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Priority threats requiring other management actions (e.g. research, education, other policy levers)
Non-Mulga Acacia shrublands on flats, slopes and hills	<ul style="list-style-type: none"> Includes witchetty communities. Excludes mulga dominated shrublands. 	Major Vegetation Group 16. Acacia Shrublands Major Vegetation Sub-group 21. Other Acacia tall open shrublands and [tall] shrublands 22. Acacia (+/- low) open woodlands and shrublands with chenopods 23. Acacia (+/- low) open woodlands and shrublands with hummock grass 24. Acacia (+/- low) open woodlands and shrublands +/- tussock grass 25. Acacia (+/- low) open woodlands and sparse shrublands with a shrubby understorey	Intersection of: <ul style="list-style-type: none"> MVSGs areas <600mm annual rainfall areas <800m elevation 	<ul style="list-style-type: none"> Inappropriate fire regimes Grassy weeds Feral ungulates 	
Grasslands and plains					
Tussock grasslands	Includes tussock grasslands in arid regions. Mitchell grass (<i>Astrebla</i>) and Blue grass (<i>Dicanthium</i>) grasslands are contained the north terrestrial biome.	Major Vegetation Group 19. Tussock Grasslands Major Vegetation Sub-group 37. Other tussock grasslands, Mitchell and Blue grass included in northern biome	Intersection of: <ul style="list-style-type: none"> MVSGs areas <600mm annual rainfall 	<ul style="list-style-type: none"> Feral ungulates Grassy weeds 	
Hummock grasslands on dunefields and sand plains (Simpson type)	<ul style="list-style-type: none"> Dominated by <i>Triodia</i> Should not be burned. 	Major Vegetation Group 20. Hummock Grasslands Major Vegetation Sub-group 33. Hummock grasslands Major Vegetation Group 16. Acacia Shrublands Major Vegetation Sub-group 23. Acacia (+/- low) open woodlands and shrublands with hummock grass	Intersection of: <ul style="list-style-type: none"> MVSGs Simpson Desert region 	<ul style="list-style-type: none"> Feral ungulates Inappropriate fire regimes 	<ul style="list-style-type: none"> Loss of surface water
Hummock grasslands on dunefields and sand plains (Tanami type)	<ul style="list-style-type: none"> Dominated by <i>Triodia</i> sp. Can be burned. 	Major Vegetation Group 20. Hummock Grasslands Major Vegetation Sub-group 33. Hummock grasslands Major Vegetation Group 16. Acacia Shrublands Major Vegetation Sub-group 23. Acacia (+/- low) open woodlands and shrublands with hummock grass	Intersection of: <ul style="list-style-type: none"> MVSGs Tanami Desert region 	<ul style="list-style-type: none"> Inappropriate fire regimes Feral predators Feral ungulates 	<ul style="list-style-type: none"> Loss of surface water

Habitat type	Description	Alignment with NVIS MVG	Potential spatial delineation rules for indicative mapping	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Priority threats requiring other management actions (e.g. research, education, other policy levers)
Hummock grasslands on dunefields and sand plains (Western Deserts type)	<ul style="list-style-type: none"> Dominated by Triodia sp. A major and distinctive chunk of South West NT. Can be burned infrequently. 	<p>Major Vegetation Group 20. Hummock Grasslands Major Vegetation Sub-group 33. Hummock grasslands</p> <p>Major Vegetation Group 16. Acacia Shrublands Major Vegetation Sub-group 23. Acacia (+/- low) open woodlands and shrublands with hummock grass</p>	<p>Intersection of:</p> <ul style="list-style-type: none"> MVSGs Great Sandy Desert region 	<ul style="list-style-type: none"> Inappropriate fire regimes Feral predators Feral ungulates 	<ul style="list-style-type: none"> Loss of surface water
Stoney plains	<ul style="list-style-type: none"> Ephemeral grasslands/herbfields and chenopod shrubland. In continuum with Tussock grasslands. 	<p>NVIS Fact sheet MVG 22 – Chenopod shrublands, samphire shrublands and forblands NVIS Fact sheet MVG 19 – Tussock grasslands</p>	<p>Intersection of:</p> <ul style="list-style-type: none"> MVSGs areas <600mm annual rainfall 	<ul style="list-style-type: none"> Feral ungulates 	
Riparian and wetland habitats					
Riparian habitat	<ul style="list-style-type: none"> Generally includes Eucalypt open woodlands Includes the terrestrial habitat between and fringing the high bank of watercourses. 	<p>Major Vegetation Group 5. Eucalypt Woodlands Major Vegetation Sub-group 8. Eucalyptus woodlands with a shrubby understorey 9. Eucalyptus woodlands with a tussock grass understorey</p> <p>Major Vegetation Group 11. Eucalypt Open Woodlands Major Vegetation Sub-group 19. Eucalyptus low open woodlands with tussock grass 47. Eucalyptus open woodlands with shrubby understorey 53. Eucalyptus low open woodlands with a shrubby understorey</p>	<p>Intersection of:</p> <ul style="list-style-type: none"> MVSGs areas below 600mm annual rainfall within: <ul style="list-style-type: none"> XXm stream orders 1 and 2 XXm stream orders 3 and 4 XXm stream orders 5+ 	<ul style="list-style-type: none"> Grassy weeds Feral ungulates 	<ul style="list-style-type: none"> Changes in temp and rainfall (climate change) Water quality
Floodplains, swamps and claypans	<ul style="list-style-type: none"> Includes floodouts, which occur at a river terminus and are areas where floodwaters spill across adjacent alluvial surfaces. May interact in some cases with ground-water. May be associated with floodouts of arid rivers and streams 	<p>Major Vegetation Group 19. Tussock Grasslands Major Vegetation Sub-group 37. Other tussock grasslands</p> <p>Major Vegetation Group 21. Other Grasslands, Herblands, Sedgeland and Rushlands Major Vegetation Sub-group</p>	<p>Intersection of:</p> <ul style="list-style-type: none"> MVSGs areas below 600mm annual rainfall Wetland mapping 	<ul style="list-style-type: none"> Grassy weeds Feral ungulates 	<ul style="list-style-type: none"> Changes in temp and rainfall (climate change) Water quality

Habitat type	Description	Alignment with NVIS MVG	Potential spatial delineation rules for indicative mapping	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Priority threats requiring other management actions (e.g. research, education, other policy levers)
		41. Saline or brackish sedgeland or grasslands 63. Sedgeland, rushes or reeds Major Vegetation Group 22. Chenopod Shrublands, Samphire Shrublands and Forblands Major Vegetation Sub-group 39. Mixed chenopod, samphire +/- forbs Major Vegetation Group 27. Naturally bare - sand, rock, claypan, mudflat Major Vegetation Sub-group 42. Naturally bare, sand, rock, claypan, mudflat			
Aquatic habitats					
Aquatic riverine systems	<ul style="list-style-type: none"> River and streams channels and associated permanent or semi-permanent waterholes. 	Major Vegetation Group 24. Inland aquatic - freshwater, salt lakes, lagoons (open water) 21. Other Grasslands, Herblands, Sedgeland and Rushlands	Intersection of: <ul style="list-style-type: none"> watercourse mapping areas below 600mm annual rainfall 	<ul style="list-style-type: none"> Grassy weeds Feral ungulates 	<ul style="list-style-type: none"> Changes in temp and rainfall (climate change) Water quality
Large isolated aquatic systems	<ul style="list-style-type: none"> Lakes and large waterholes. Includes large gnamma/rock holes. May include playa/salt lakes. May interact in some cases with ground-water. 	Major Vegetation Group 24. Inland aquatic - freshwater, salt lakes, lagoons (open water) 21. Other Grasslands, Herblands, Sedgeland and Rushlands	Intersection of: <ul style="list-style-type: none"> watercourse and spring mapping areas below 600mm annual rainfall size factor 	<ul style="list-style-type: none"> Grassy weeds Feral ungulates 	<ul style="list-style-type: none"> Changes in temp and rainfall (climate change) Water quality
Small isolated aquatic systems	<ul style="list-style-type: none"> Springs, seepages and small waterholes Springs and seepages represent small groundwater dependant surface waters. Small waterholes include small gnamma/rock holes. May include playa/salt lakes 	Major Vegetation Group 24. Inland aquatic - freshwater, salt lakes, lagoons (open water) 21. Other Grasslands, Herblands, Sedgeland and Rushlands	Intersection of: <ul style="list-style-type: none"> watercourse and spring mapping areas below 600mm annual rainfall size factor 	<ul style="list-style-type: none"> Grassy weeds Feral ungulates 	<ul style="list-style-type: none"> Changes in temp and rainfall (climate change) Water quality
Subterranean hyporheic zone and aquifers	<ul style="list-style-type: none"> Includes perched aquifers and deeper aquifers. 	Various terrestrial expressions	Intersection of: <ul style="list-style-type: none"> Aquifer mapping 	<ul style="list-style-type: none"> Use the priority threats for the relevant surface habitat, where they relate to the 	<ul style="list-style-type: none"> Water extraction Development

Habitat type	Description	Alignment with NVIS MVG	Potential spatial delineation rules for indicative mapping	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Priority threats requiring other management actions (e.g. research, education, other policy levers)
	<ul style="list-style-type: none"> May be associated with wetlands, springs and other less obvious terrestrial habitats. 		<ul style="list-style-type: none"> areas below 600mm annual rainfall 	integrity of surface sediments (and may relate to quality/availability of water recharging aquifers)	

Table 4: Territory habitat types and priority threats in the estuarine and marine biome

Habitat type	Description	Alignment with NVIS MVG	Potential spatial delineation rules for indicative mapping	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Priority threats requiring other management actions (e.g. research, education, other policy levers)
Mangroves	Includes mangrove habitats seaward to hinterland zone.	Major Vegetation Group 23. Mangroves	1:100 000 mangrove mapping for the Territory	<ul style="list-style-type: none"> Pigs 	<ul style="list-style-type: none"> Sea level variability/dieback Sediment regimes
Samphire wetlands		Major Vegetation Group 22. Chenopod Shrublands, Samphire Shrublands and Forblands	Intersection of: <ul style="list-style-type: none"> MVG Within XXkm of coastlines and estuaries 		<ul style="list-style-type: none"> Sea level rise Knowledge deficiency (e.g. water mouse)
Coastal dunes	<ul style="list-style-type: none"> Includes dry scrubs and low vegetation growing on dune systems. May include woodland and grassland components 	Major Vegetation Group 1. Rainforests and Vine Thickets Major Vegetation Sub-group 62. Dry rainforest or vine thickets	Intersection of: <ul style="list-style-type: none"> MVSG buffer around relevant landscape class information from the 1:250 000 landsystem mapping 	<ul style="list-style-type: none"> Feral ungulates (pigs/buff, degradation/trampling) 	<ul style="list-style-type: none"> Sea level rise Changes in temp Human exploitation Sediment regimes
Beaches and intertidal sandflats	Intertidal components particularly important as shorebird habitat.	Major Vegetation Group 27. Naturally bare - sand, rock, claypan, mudflat Major Vegetation Sub-group 42. Naturally bare, sand, rock, claypan, mudflat			<ul style="list-style-type: none"> Sea level rise Changes in temp Human exploitation Sediment regimes
Rocky shores and coastlines		NA			<ul style="list-style-type: none"> Sea level rise Changes in temp

Habitat type	Description	Alignment with NVIS MVG	Potential spatial delineation rules for indicative mapping	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Priority threats requiring other management actions (e.g. research, education, other policy levers)
					<ul style="list-style-type: none"> • Human exploitation • Sediment regimes
Estuarine rivers and bays	<ul style="list-style-type: none"> • Includes intertidal and submerged soft sediments (e.g. mudflats), seagrass, gravel beds, oyster reefs and coral reefs. • Intertidal components particularly important as shorebird habitat. 	NA			<ul style="list-style-type: none"> • Sea level rise (habitat type change) • Bycatch (and consumption) • Water quality and availability/changes in environmental flows • Bycatch • Human over-exploitation • Poorly known species/data deficiency
Nearshore marine	<ul style="list-style-type: none"> • Marine areas within coastal influence (e.g. runoff) • Captures macrotidal habitats outside of estuarine rivers and bays. • Includes habitats like Darwin Harbour. • May extend to the edge of the Territory's jurisdictional boundary, 3 nautical miles from the coastline. 	NA	Unsure		<ul style="list-style-type: none"> • Bycatch (e.g. Barra commercial fisheries) • Human over-exploitation • Knowledge deficiency
Offshore marine	<p>Includes:</p> <ul style="list-style-type: none"> • Marine areas without coastal influence (e.g. runoff) • In general, begins at the edge of the Territory's jurisdictional boundary, 3 nautical miles from the coastline. • Includes: <ul style="list-style-type: none"> ○ wide and shallow continental shelf ○ soft sediment basins ○ narrow canyons 	NA	Unsure		<ul style="list-style-type: none"> • Bycatch (various fisheries, cumulative impacts) • Knowledge deficiencies • Human intrusion (ship strike, noise, marine seismic)

Habitat type	Description	Alignment with NVIS MVG	Potential spatial delineation rules for indicative mapping	Priority threats suitable for integrated threat management via 'habitat-based' offsets	Priority threats requiring other management actions (e.g. research, education, other policy levers)
	<ul style="list-style-type: none"> ○ swift turbid water channelling between smaller isolated islands (e.g. Wessel Islands) ○ rocky shoals and coral reefs. 				

Schedule 2. Priority threat benchmarks

Under the Policy, offset programs are required to manage priority transformative threats to the habitat and landscape (except where priority threats to habitat are not well known or able to be directly managed, for example many habitats in the marine environment).

Minimum area and investment requirements for offsets will be based on the expected gains in habitat condition per hectare that can be produced by managing priority threats in the area.

Benchmarks for priority threats have been set to:

1. Establish default aims for the required threat management activities. In offset proposals, proponents will need to demonstrate how they will achieve these benchmarks, or justify why alternative benchmarks are appropriate and will still achieve the required offset objectives (e.g. facilitating good condition habitat over the required amount of area).
2. Conceptualise and predict what kind of gains in habitat condition are possible when priority threats are managed towards these benchmarks.

Table 2 describes high level default benchmarks that could be used to inform threat management in terrestrial and some aquatic habitats, based on internal consultation with a range of experts. Priority threats:

- are based on internal and external consultation over 2021
- are restricted to threats capable of transforming a habitat
- are restricted to threats conducive to being managed by direct land management activities, and
- exclude threats that may require other forms of management (e.g. other policy levers, research, or education).

Table 2. Priority threat benchmarks

Threats (as specified in previous advice)	Biome	Habitats where the threat was identified as a priority transformative threat (see Biomes, habitats and priority threats document)	Management benchmarks and minimum areas
Fire			
Inappropriate fire regimes	Monsoonal North	<p><u>Rainforest habitats</u></p> <ul style="list-style-type: none"> • Wet rainforests • Rainforests (other) <p><u>Forest and woodland habitats</u></p> <ul style="list-style-type: none"> • Tall lowland Eucalypt forests and woodlands in the coastal far-north • Top End lowland Eucalypt woodlands on various substrates • Top End Eucalypt woodlands on plateaus, hills and ranges • Eucalypt open woodlands • Non-Eucalypt open woodlands <p><u>Shrubland habitats</u></p> <ul style="list-style-type: none"> • Top End lowland shrublands • Top End shrublands on plateaus, hills and ranges 	<p>Management benchmark:</p> <p><u>Rainforest habitats</u></p> <p><5% Burnt/Year</p> <p>>50% Unburnt > 10 Years</p> <p><u>Forest and woodland habitats</u></p> <p>>50% Burnt in the Early Dry Season (EDS)</p> <p><10% Burnt in the Late Dry Season (LDS)</p> <p>>15% Unburnt > 3 Years</p> <p><u>Shrubland habitats</u></p> <p><20% Burnt/Year</p> <p>>10% Unburnt > 5 Years</p> <p>Minimum practical management area</p> <ul style="list-style-type: none"> • 1000 km²

Threats (as specified in previous advice)	Biome	Habitats where the threat was identified as a priority transformative threat (see Biomes, habitats and priority threats document)	Management benchmarks and minimum areas
		<u>Grassland habitats</u> <ul style="list-style-type: none"> • Tussock grasslands • Hummock grasslands on plateaus, hills and ranges 	
	Arid South	<u>Woodland habitats</u> <ul style="list-style-type: none"> • Eucalypt open woodlands • Non-eucalypt open woodlands <u>Shrubland habitats</u> <ul style="list-style-type: none"> • Shrublands on ranges and mountains • Mulga shrublands • Non-Mulga Acacia shrublands on flats, slopes and hills <u>Grassland habitats</u> <ul style="list-style-type: none"> • Tussock grasslands • Hummock grasslands on dunefields and sand plains (Western Deserts type) • Hummock grasslands on dunefields and sand plains (Tanami type) 	Management benchmark: <u>Woodland habitats</u> 25% Minimum practical management area <ul style="list-style-type: none"> • 1000 km²

Threats (as specified in previous advice)	Biome	Habitats where the threat was identified as a priority transformative threat (see Biomes, habitats and priority threats document)	Management benchmarks and minimum areas
Feral animals			
Feral ungulates	Monsoonal North	<p><u>Rainforest habitats</u></p> <ul style="list-style-type: none"> • Wet rainforests • Rainforests (other) <p><u>Forest and woodland habitats</u></p> <ul style="list-style-type: none"> • Tall lowland Eucalypt forests and woodlands in the coastal far-north • Top End lowland Eucalypt woodlands on various substrates • Top End Eucalypt woodlands on plateaus, hills and ranges • Eucalypt open woodlands • Non-Eucalypt open woodlands <p><u>Shrubland habitats</u></p> <ul style="list-style-type: none"> • Top End lowland shrublands • Top End shrublands on plateaus, hills and ranges <p><u>Grassland habitats</u></p>	<p>Management benchmark in island situations:</p> <p>Eradication (which may mean reducing the population to such a level over time that local extinction occurs naturally, not necessarily seeking to actively eradicate every individual).</p> <p>Management benchmark in all other situations:</p> <p>Control to the below or better densities:</p> <ul style="list-style-type: none"> • Pigs: 1 per km² • Larger feral ungulates, including buffalo, horses, donkey or feral cattle (combined or separate): 0.5 per km² <p>Note – cost effectiveness of management drastically decreases once density gets below 0.2 per km².</p> <p>Minimum practical management area</p> <ul style="list-style-type: none"> • 1000 km², or smaller in island situations.

Threats (as specified in previous advice)	Biome	Habitats where the threat was identified as a priority transformative threat (see Biomes, habitats and priority threats document)	Management benchmarks and minimum areas
		<ul style="list-style-type: none"> • Monsoonal tussock grasslands • Hummock grasslands on plateaus, hills and ranges <p><u>Riparian and wetland habitats</u></p> <ul style="list-style-type: none"> • Riparian habitat • Floodplains • Persistent wetlands • Ephemeral wetlands <p><u>Aquatic habitats</u></p> <ul style="list-style-type: none"> • Large lowland aquatic riverine systems • Small lowland aquatic systems and features • Upland aquatic systems and features <p><u>Estuarine/marine habitats</u></p> <ul style="list-style-type: none"> • Coastal dunes • Mangroves. 	

Threats (as specified in previous advice)	Biome	Habitats where the threat was identified as a priority transformative threat (see Biomes, habitats and priority threats document)	Management benchmarks and minimum areas
	Arid South	<p><u>Woodland habitats</u></p> <ul style="list-style-type: none"> • Eucalypt open woodlands • Non-eucalypt open woodlands <p><u>Shrubland habitats</u></p> <ul style="list-style-type: none"> • Shrublands on ranges and mountains • Mulga shrublands • Non-mulga shrublands on lowlands and hills <p><u>Grassland/plain habitats</u></p> <ul style="list-style-type: none"> • Tussock grasslands • Hummock grasslands on dunefields and sand plains (Simpson type) • Hummock grasslands on dunefields and sand plains (Western Deserts type) • Hummock grasslands on dunefields and sand plains (Tanami type) • Stoney plains 	<p>Management benchmark in island situations:</p> <ul style="list-style-type: none"> • Eradication (which may mean reducing the population to such a level over time that local extinction occurs naturally, not necessarily seeking to actively eradicate every individual). <p>Management benchmark in all other situations:</p> <p>Control to the below or better densities:</p> <ul style="list-style-type: none"> • Larger feral ungulates, including camel, horses, donkey or feral cattle (combined or separate): 0.5 per km² <p>Note – cost effectiveness of management drastically decreases once density gets below 0.2 per km².</p> <p>Minimum practical management area</p> <ul style="list-style-type: none"> • 1000 km², or smaller in island situations.

Threats (as specified in previous advice)	Biome	Habitats where the threat was identified as a priority transformative threat (see Biomes, habitats and priority threats document)	Management benchmarks and minimum areas
		<p><u>Riparian and wetland habitats</u></p> <ul style="list-style-type: none"> • Riparian habitat • Floodplains, swamps and claypans <p><u>Aquatic habitats</u></p> <ul style="list-style-type: none"> • Aquatic riverine systems • Large isolated aquatic systems • Small isolated aquatic systems 	
Feral predators (Cats and foxes)	Arid South	<ul style="list-style-type: none"> • Shrublands on ranges and mountains • Hummock grasslands on dunefields and sand plains (Western Deserts type) • Hummock grasslands on dunefields and sand plains (Tanami type) 	<p>Management benchmark in island situations:</p> <ul style="list-style-type: none"> • Eradication (which may mean reducing the population to such a level over time that local extinction occurs naturally, not necessarily seeking to actively eradicate every individual). <p>Management benchmark in all other situations:</p> <p>Control to the below densities:</p> <ul style="list-style-type: none"> • Cats: <0.05 per km² (in dry years) to <0.3 per km² (wet years). <p>Minimum practical management area</p> <ul style="list-style-type: none"> • 80 km², or smaller in island situations.

Threats (as specified in previous advice)	Biome	Habitats where the threat was identified as a priority transformative threat (see Biomes, habitats and priority threats document)	Management benchmarks and minimum areas
Weeds			
Weeds (general)	Monsoonal North	Rainforests (other)	Management benchmark for declared weeds in a zone A area:
Monsoonal grassy weeds (primarily Gamba, Mission or both)	Monsoonal North	<p><u>Forest and woodland habitats</u></p> <ul style="list-style-type: none"> • Tall lowland Eucalypt forests and woodlands in the coastal far-north • Top End lowland Eucalypt woodlands on various substrates • Top End Eucalypt woodlands on plateaus, hills and ranges • Eucalypt open woodlands • Non-Eucalypt open woodlands <p><u>Shrubland habitats</u></p> <ul style="list-style-type: none"> • Top End lowland shrublands • Top End shrublands on plateaus, hills and ranges <p><u>Grassland habitats</u></p> <ul style="list-style-type: none"> • Monsoonal tussock grasslands 	<p>• Eradication, to align with legislative weed management requirements.</p> <p>Management benchmark in island situations (for declared weeds in a zone B area or for species that are not declared):</p> <ul style="list-style-type: none"> • Eradication (which may mean reducing the infestation to such a level over time that local extinction occurs naturally, not necessarily seeking to actively eradicate every plant). <p>Management benchmark in all other situations:</p> <p>No more than low level weed impacts, and no weed impacts at more than 5% of the area.</p> <p>Minimum practical management area</p> <ul style="list-style-type: none"> • 1000 km², or smaller in island situations.

Threats (as specified in previous advice)	Biome	Habitats where the threat was identified as a priority transformative threat (see Biomes, habitats and priority threats document)	Management benchmarks and minimum areas
		<p><u>Riparian and wetland habitats</u></p> <ul style="list-style-type: none"> • Riparian habitat • Floodplains • Persistent wetlands • Ephemeral wetlands <p><u>Aquatic habitats</u></p> <ul style="list-style-type: none"> • Large lowland aquatic riverine systems • Small lowland aquatic systems and features • Upland aquatic systems and features 	
Arid grassy weeds (primarily Buffel Grass)	Arid South	<p><u>Woodland habitats</u></p> <ul style="list-style-type: none"> • Eucalypt open woodlands • Non-eucalypt open woodlands <p><u>Shrubland habitats</u></p> <ul style="list-style-type: none"> • Mulga shrublands • Non-mulga shrublands on flats, slopes and hills 	

Threats (as specified in previous advice)	Biome	Habitats where the threat was identified as a priority transformative threat (see Biomes, habitats and priority threats document)	Management benchmarks and minimum areas
		<p><u>Grassland habitats</u></p> <ul style="list-style-type: none"> • Tussock grasslands <p><u>Riparian and wetland habitats</u></p> <ul style="list-style-type: none"> • Riparian habitat • Floodplains, swamps and claypans <p><u>Aquatic habitats</u></p> <ul style="list-style-type: none"> • Large lowland aquatic riverine systems • Large isolated aquatic systems • Small isolated aquatic systems 	
Aquatic weeds	Monsoonal North	<p><u>Riparian and wetland habitats</u></p> <ul style="list-style-type: none"> • Floodplains • Persistent wetlands • Ephemeral wetlands <p><u>Aquatic habitats</u></p> <ul style="list-style-type: none"> • Large lowland aquatic riverine systems 	Less clear than previous threats. Likely requires more case-by-case consideration about whether eradication is possible (considering that aquatic habitats are generally more isolated/closed systems from a management perspective than terrestrial habitats).

Threats (as specified in previous advice)	Biome	Habitats where the threat was identified as a priority transformative threat (see Biomes, habitats and priority threats document)	Management benchmarks and minimum areas
		<ul style="list-style-type: none"> • Small lowland aquatic systems and features 	

Schedule 3. Indicative habitat condition characteristics for selected habitats

Table 1: Top End lowland Eucalypt woodlands on various substrates (monsoonal biome)

Condition	Vegetation structure and composition			Priority threats			Other condition notes
	Ground layer	Mid-storey	Upper-storey	Fire regimes	Grassy weeds	Feral ungulates	
Good	High diversity of native annual and perennial herbs. AND Dominated (more than 50% biomass) by native perennial tussock grasses.	High diversity of woody fruiting shrubs/small trees in the mid-storey. AND High abundance of mature fire tolerant individuals as well as healthy recruitment.	More than 5 stems per hectare with DBH greater than 40 cm. OR More than 20 stems per hectare with DBH greater than 30 cm. AND Healthy recruitment is occurring.	Fire regimes maintain vegetation structure and support ecological health and function. There is low levels of tree death, and coarse woody debris occurs at most sites. At least 20% of the area is unburnt for at least 3 years, and there are some areas unburnt for more than 10 years.	Grassy weeds may be present at very low levels, but impacts are 'effectively' absent.	Large feral ungulates and pigs may be present at very low levels, but impacts are 'effectively' absent.	There is moderate richness and abundance of native mammals at a site level, and high at landscape level. AND The area is able to support a variety of threatened species.
Moderate	Moderate diversity of native annual and perennial herbs. AND Dominated (more than 50% biomass) by native perennial tussock grasses. Annual sorghum present and dominant in some plots.	Moderate diversity of woody fruiting shrubs/small trees in the mid-storey. AND Moderate abundance of mature fire tolerant individuals as well as moderate recruitment.	More than 5 stems per hectare with DBH greater than 40 cm. OR More than 20 stems per hectare with DBH greater than 30 cm. AND Some recruitment is occurring.	Fire regimes have some impact on vegetation structure, resulting in some tree death and removing coarse woody debris from some areas. 10 to 20% of areas unburnt for more than 3 years but no long unburnt areas.	Grassy weeds are present across ~10% of the area but at low density in the majority of plots in this area.	Large feral ungulates and pigs are at low to moderate levels of density (e.g. collectively ~2 animals per km ²).	There is low richness and abundance of native mammals at a site level, but moderate at landscape level. AND The area is able to support some threatened species.
Poor	Low diversity of native annual and perennial herbs. AND Dominated (more than 50% biomass) by annual sorghum and exotic grasses dominant in some plots	Scattered mature fire tolerant mid-story woody shrubs/small trees. AND Some recruitment.	Less than 1 stem per hectare with DBH greater than 40 cm. AND Less than 6 stems per hectare with DBH greater than 30 cm.	Fire regimes have clear impacts on vegetation structure, resulting in moderate levels of tree death, removing coarse woody debris from most areas, and leaving <10% of areas unburnt for more than 3 years.	Grassy weeds are present across ~30% of the area and at high density at some plots in this area.	Large feral ungulates and pigs are at moderate to high levels of density (e.g. collectively ~5 animals per km ²).	There is low richness and abundance of native mammals at a site level, and landscape level. AND The area is not able to support threatened species in current condition.
Ecologically compromised	Very low diversity of native annual and perennial herbs. AND Heavily dominated by annual sorghum and exotic grasses.	No mature fire tolerant mid-story woody shrubs/small trees. AND No recruitment.	No trees over 30 cm DBH. AND Very little recruitment occurring.	Fire regimes are severe impacts on vegetation structure, resulting in high levels of tree death, removing coarse woody debris all plots and no area unburnt for more than 3 years.	Grassy weeds are present across more than 50% of the area and at high density at many plots.	Large feral ungulates and pigs are at high levels of density (e.g. collectively >10 animals per km ²).	There is very low richness and abundance of native mammals at a site level, and landscape level. AND The area is not able to support threatened species.

Table 2: Top End Eucalypt woodlands on plateaus, hills and ranges (monsoonal biome)

Condition	Vegetation structure and composition			Priority threats			Other condition notes
	Ground layer	Mid-storey	Upper-storey	Fire regimes	Grassy weeds	Feral ungulates	
Good	High diversity of native annual and perennial herbs. AND Dominated (more than 50% biomass) by mix of native perennial hummock and tussock grasses (more hummock on rises and tussock in gullies).	High diversity of woody fruiting shrubs/small trees in the mid-storey. AND High abundance of mature fire tolerant individuals as well as healthy recruitment.	More than 5 stems per hectare with DBH greater than 30 cm. OR More than 20 stems per hectare with DBH greater than 20 cm. AND Healthy recruitment is occurring.	Fire regimes maintain vegetation structure and support ecological health and function. There is low levels of tree death, and coarse woody debris occurs at most sites At least 20% of the area is remaining unburnt for at least 3 years, and there are some small areas remaining unburnt for more than 10 years.	Grassy weeds may be present at very low levels, but impacts are 'effectively' absent.	Large feral ungulates and pigs may be present at very low levels, but impacts are 'effectively' absent.	There is moderate richness and abundance of native mammals at a site level, and high at landscape level. AND The area is able to support a variety of threatened species.
Moderate	Moderate diversity of native annual and perennial herbs. AND Dominated by (more than 50% biomass) mix of native perennial hummock and tussock grasses (more hummock on rises and tussock in gullies). Annual sorghum present and dominant in some plots.	Moderate diversity of woody fruiting shrubs/small trees in the mid-storey. AND Moderate abundance of mature fire tolerant individuals as well as moderate recruitment.	More than 3 stems per hectare with DBH greater than 30 cm. OR More than 20 stems per hectare with DBH greater than 20 cm. AND Some recruitment is occurring.	Fire regimes have some impact on vegetation structure, resulting in some tree death, removing coarse woody debris from some areas, and leaving ~10 to 20% of areas unburnt for more than 3 years.	Grassy weeds are present across ~10% of the area and low density at the majority of plots in this area.	Large feral ungulates and pigs are at low to moderate levels of density (e.g. collectively ~2 animals per km ²).	There is low richness and abundance of native mammals at a site level, but moderate at landscape level. AND The area is able to support some threatened species.
Poor	Low diversity of native annual and perennial herbs. AND Dominated (more than 50% biomass) by annual sorghum with some exotic grasses.	Some mature fire tolerant mid-storey woody shrubs/small trees. AND Some recruitment.	Less than 1 stem per hectare with DBH greater than 30 cm. AND Less than 6 stems per hectare with DBH greater than 20 cm.	Fire regimes have clear impacts on vegetation structure, resulting in moderate levels of tree death, removing coarse woody debris from most areas, and leaving <10% of areas unburnt for more than 3 years.	Grassy weeds are present across ~30% of the area and at high density at some plots in this area.	Large feral ungulates and pigs are at moderate to high levels of density (e.g. collectively ~5 animals per km ²).	There is low richness and abundance of native mammals at a site level, and landscape level. AND The area is not able to support threatened species in current condition.
Ecologically compromised	Very low diversity of native annual and perennial herbs. AND Heavily dominated by annual sorghum and exotic grasses.	No mature fire tolerant mid-storey woody shrubs/small trees. AND No recruitment.	No large trees. AND Very little recruitment occurring.	Fire regimes are having severe impacts on vegetation structure, resulting in high levels of tree death, removing coarse woody debris at all plots and no area unburnt for more than 3 years.	Grassy weeds are present across more than 50% of the area and at high density at many plots.	Large feral ungulates and pigs are at high levels of density (e.g. collectively >10 animals per km ²).	There is low richness and abundance of native mammals at a site level, and landscape level. AND The area is not able to support threatened species.

Table 3: Floodplains (monsoonal biome)

Condition	Vegetation structure and composition			Priority threats	
	Ground layer	Mid/upper storey	Aquatic column	Weeds	Feral ungulates
Good	High diversity of native herbs, sedges and grasses. AND Effectively no exotic grasses.	Old growth melaleuca components present. AND Effectively no woody weeds.	Hydrology and biota is unaffected by excessive native vegetation cover or aquatic weeds.	Grassy, woody and aquatic weeds may be present at very low levels, but impacts are 'effectively' absent.	Large feral ungulates and pigs may be present at very low levels, but impacts are 'effectively' absent.
Moderate	Moderate diversity of native herbs, sedges and grasses. AND Effectively no exotic grasses.	Fewer than expected old growth melaleuca components present. AND Effectively no woody weeds.	Hydrology and biota is slightly impacted by excessive native vegetation cover or aquatic weeds	Grassy, woody and aquatic weeds are present across ~10% of the area and low density at the majority of plots in this area.	Large feral ungulates and pigs are at low to moderate levels of density (e.g. collectively ~2 animals per km ²).
Poor	Moderate diversity of native herbs, sedges and grasses. AND Weeds functionally present.	Very few old growth melaleuca components. Some dieback occurring. AND Some woody weeds encroaching.	Hydrology and biota is moderately impacted by excessive native vegetation cover or aquatic weeds	Grassy, woody and aquatic weeds are present across ~30% of the area and at high density at some plots in this area.	Large feral ungulates and pigs are at moderate to high levels of density (e.g. collectively ~5 animals per km ²).
Ecologically compromised reference site	Low diversity of native herbs, sedges and grasses AND Significant weed presence.	Effectively no old growth components, besides some dead trunks. OR >25% of woody vegetation exotic species	Hydrology and biota is transformed by aquatic weeds.	Grassy, woody and aquatic weeds are present across >50% of the area, at high density at many plots.	Large feral ungulates and pigs are at high levels of density (e.g. collectively >10 animals per km ²).

Note: Fire plays a role in this habitat but it was not identified as a priority threat in this habitat. It can be assumed that good condition areas are subject to appropriate fire regimes and compromised areas are subject to inappropriate regimes

Table 4: Tanami hummock grasslands (arid biome)

Condition	Vegetation structure and composition			Priority threats		
	Ground layer	Mid-storey	Upper-storey	Fire regimes	Feral ungulates	Feral predators
Good	30-40% ground cover at > 25% of plots across the landscape.	Very low cover of single-aged 'fire encouraged' acacia shrubs.	Healthy occurrence of mature trees. Very few mature trees in mallee form, meaning many hollows are available.	25-50% of area burnt within 2 years, with burn timing late Springs/Early summer. 25-50% of area 'long' unburnt (> 10 years since fire) with moderately dense spinifex cover and mature canopy. Minimum of 3 fire ages. Spatial configuration of fire history – long and recently burnt areas are present within all four quarters of the management area	Camels are estimated at <0.5 animals per km ² .	Feral predators may be present in very low densities but impacts are effectively absent.
Moderate	>30% ground cover at >25% of plots across the landscape.	Low cover of single-aged 'fire encouraged' acacia shrubs.	Small proportion of mature trees in mallee form due to repeated burning.	25-75% of the area recently burnt 10-25% at least 10 years long unburnt at any point in time Long unburnt patches present within 2 or more quarters of the area.	Camels are estimated at around 2 animals per km ² .	Cats are estimated at around 0.3 animals per km ² in wet years. Fox numbers are unknown but there is track evidence indicating low fox occupancy.
Poor	30-40% ground cover at <10% of plots across the landscape.	Moderate cover of single-aged 'fire encouraged' acacia shrubs.	Moderate proportion of mature trees in mallee form due to repeated burning.	>75% of study area is one fire age. <10% with at least 10 years long unburnt at any point in time Long unburnt patches are present within at most one quarter of study area.	Camels are estimated at around 3 animals per km ² .	Cats are estimated at around 0.3-0.5 animals per km ² in wet years. Fox numbers are unknown but there is track evidence indicating moderate fox occupancy.
Ecologically compromised	<5% ground cover at majority of plots across the landscape.	Very high cover of single-aged 'fire encouraged' acacia shrubs.	Any remaining mature trees in mallee form due to repeated burning (meaning no tree hollows available).	100% of the area is recently burnt (<2 years' time since fire) No long unburnt patches.	Camels are estimated at around 5 animals per km ² .	Cats are estimated at >0.5 animals per km ² in wet years. Fox numbers are unknown but there is track evidence indicating high fox occupancy.

