Tanami Gas Pipeline Annual Rehabilitation Monitoring Report 2023

Australian Gas Infrastructure Group

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Template 2.8.1

Contents

List of Figures

List of Tables

Abbreviations

Abbreviation	Description
AGIG	Australian Gas Infrastructure Group
BoM	Bureau of Meteorology
DD	Data Deficient
ELA	Eco Logical Australia
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ha	hectare
IBRA	Interim Biogeographic Regionalisation for Australia
INFRA	Infraspecific
IUCN	International Union for the Conservation of Nature
km	kilometre
m	metre
mm	millimetre
MNES	Matters of National Environmental Significance
NT	Northern Territory
RoW	Right of Way
TNP	Tanami Newmont Gas Pipeline
TPWCA	Northern Territory *Parks and Wildlife Conservation Act 2006*
WoNS	Weeds of National Significance

Executive Summary

Eco Logical Australia was commissioned by Australian Gas Infrastructure Group in 2023 to undertake vegetation rehabilitation monitoring along the Tanami Newmont Gas Pipeline, a 440-kilometre pipeline connecting the existing Amadeus Gas Pipeline to the Granites and Dead Bullock Soak mines. Assessment of botanical values was undertaken in view of minimum standards outlined in the flora and vegetation rehabilitation completion criteria, as specified in the approved Australian Gas Infrastructure Group *Tanami Newmont Gas Pipeline Rehabilitation Plan*, prepared by Eco Logical Australia in 2018.

A total of seventeen vegetation monitoring sites, each comprising an impact (rehabilitation) quadrat and an adjacent control quadrat (34 quadrats in total), were surveyed from 25 to 30 May 2023. Vegetation monitoring sites were consistent with the 2022 monitoring surveys, including the site 17 rehabilitation quadrat, which was moved in 2022 as the previously established quadrat had been cleared. Vegetation monitoring sites were initially chosen to ensure appropriate spatial distance and replication of sites within each of the rehabilitation zones identified and outlined in the *Tanami Newmont Gas Pipeline Rehabilitation Plan*, namely' native vegetation zone', 'MNES habitat zone (Dwarf Desert Spike-rush habitat)', 'MNES habitat zone (Greater Bilby and Great Desert Skink habitat)', 'MNES habitat zone (Night Parrot habitat)' and 'MNES habitat zone (Princess Parrot habitat)'.

No Threatened flora listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* were recorded during the field survey. One flora species listed as Data Deficient (DD) under the Northern Territory *Parks and Wildlife Conservation Act 2006* and one species listed as Infraspecific (INFRA) were recorded, namely *Sida* sp. excedentifolia (J.L. Egan 1925) (DD) and *Tephrosia brachyodon* (INFRA). *Sida* sp. excedentifolia (J.L. Egan 1925) (DD) was recorded within five quadrats (three rehabilitation and two control) and *Tephrosia brachyodon* (INFRA) was recorded within two quadrats (one rehabilitation and one control).

A total of five introduced (weed) species were recorded within the vegetation monitoring sites, namely **Cenchrus ciliaris*, **Citrullus colocynthis*, **Cynodon dactylon*, **Eragrostis minor* and **Eragrostis trichophora*. Of these, none are listed as Declared Weeds or Weeds of National Significance (WoNS) in the Northern Territory. **C. ciliaris* was recorded in three rehabilitation quadrats (2A at 0.05% cover; 7A at 0.05% cover; and 8A at 2% cover) and two control quadrats (1B at 0.05% cover; and 8B at 2% cover). Weed control in these areas to reduce current **Cenchrus ciliaris* (Buffel grass) cover and mitigate further spread should be considered (particularly in creekline/low-lying environments).

The native vegetation zone satisfied all four completion criteria; these being: native perennial flora species density (Control: 0.17 ± 0.03; Rehabilitation 0.20 ± 0.08), native perennial flora species richness (Control: 16.17 ± 2.93; Rehabilitation: 11.17 ± 1.7), native perennial flora species foliage cover (Control: 40.98 ± 6.44; Rehabilitation: 22.26 ± 4.94) and weed foliage cover (Control: 0.00 ± 0.00; Rehabilitation: 0.00 ± 0.00).

The MNES habitat zone (Dwarf Desert Spike-rush), satisfied three of the four completion criteria these being: native perennial flora species density (Control: 0.08 ± 0.03; Rehabilitation 0.07 ± 0.03), native perennial flora species foliage cover (Control: 23.46 ± 6.44; Rehabilitation: 17.70 ± 11.68) and weed foliage cover (Control: 0.43 ± 0.39; Rehabilitation: 0.40 ± 0.89). Native perennial flora species richness

failed to meet the minimum requirement outlined in the completion criteria, achieving 63.5% of the control value (Control: 17.00 ± 2.85; Rehabilitation: 10.80 ± 3.43).

The MNES habitat zone (Greater Bilby and Great Desert Skink habitat and Night Parrot habitat) satisfied three of the four completion criteria; these being: native perennial flora species density (Control: 0.16 ± 0.03; Rehabilitation 0.20 ± 0.07), native perennial flora species richness (Control: 16.50 ± 3.08; Rehabilitation: 16.83 ± 3.18) and native perennial flora species foliage cover (Control: 40.85 ± 7.70; Rehabilitation: 39.95 ± 7.99). Weed foliage cover failed to meet the minimum requirement outlined in the completion criteria, with **C. ciliaris* being recorded in two rehabilitation quadrats (Control: 0.00 ± 0.00; Rehabilitation: 0.02 ± 0.01).

The MNES habitat zone (Princess Parrot habitat) satisfied two of the four completion criteria; these being: native perennial flora species richness (Control: 15.80 ± 3.79; Rehabilitation 14.00 ± 4.55) and weed foliage cover (Control: 0.03 ± 0.03; Rehabilitation: 0.01 ± 0.01). Native perennial flora species density failed to meet the minimum requirement outlined in the completion criteria, achieving 68.3% of the control values (Control: 0.13 ± 0.03; Rehabilitation: 0.09 ± 0.04). Native perennial flora species foliage cover also failed to meet the minimum requirement outlined in the completion criteria, achieving 48.3% of the control values (Control: 42.94 ± 10.68; Rehabilitation: 20.74 ± 10.57).

Significant erosion was observed in 2022 and again in 2023 within rehabilitation quadrat 6A. Heavy rainfall preceding the 2022 survey, followed by high early season (Dec/Jan) rainfall in 2023 increased waterflow in the minor creekline, resulting in expansion of the channel bed and undercutting of the creek bank. Minor sheet and pedestal erosion were observed within rehabilitation quadrat 10A in 2022 and again in 2023. Early intervention is recommended to stabilise and recontour the landform in both areas.

Corymbia opaca was recorded within rehabilitation monitoring quadrats 4A (1 plant, 0.01% cover, 0.15 m tall) and 11A (1 plant, 0.5% cover, 2.2 m tall). Early intervention to remove this individual, and any other individuals within the vicinity, is recommended to avoid establishment of these large, deep-rooted trees above the natural gas pipeline.

1. Introduction

1.1. Project background

Australian Gas Infrastructure Group (AGIG) completed construction of the Tanami Newmont Gas Pipeline (TNP), a 440-kilometre (km) pipeline connecting the existing Amadeus Gas Pipeline to the Granites and Dead Bullock Soak mines to transport natural gas to displace the use of diesel fuel at the two mines. The TNP passes through Aboriginal Freehold, Pastoral Land and Crown Land tenures.

Temporary disturbance of a 25 metre (m) Right of Way (RoW) was required to construct the TNP as well as four construction camps, access tracks and a temporary water storage during construction. The total area impacted covered 1,161 hectares (ha) of native vegetation.

Majority of the alignment, excluding permanent facilities and 26 ha of required access tracks, has been rehabilitated post-construction and allowed to return to native vegetation. Effective rehabilitation will manage potential impacts from:

- Long-term loss of flora and vegetation communities;
- Soil disturbance and soil compaction;
- Introduction and/or spread of weed species;
- Long-term disturbance, fragmentation and loss of flora and fauna habitat (including for MNES); and
- Landform instability (reducing the potential for erosion and sedimentation of surrounding water bodies).

1.2. Objectives

Eco Logical Australia (ELA) was engaged by AGIG to undertake a fourth consecutive year of annual rehabilitation monitoring at 17 vegetation monitoring sites along the TNP (**Figure 1-1**), each of which comprises an impact (rehabilitation) and an adjacent control quadrat (34 quadrats in total). Vegetation monitoring sites, established by ELA in 2020, were established to ensure appropriate spatial distance and replication of sites within each of the rehabilitation zones identified and outlined in the approved *Tanami Newmont Gas Pipeline Rehabilitation Plan* (ELA 2018a).

The purpose of this report is to assess progression of rehabilitation towards achievement of approved completion criteria to provide a comparison of results between 2020, 2021, 2022 and 2023, and to identify where contingency actions need to be implemented to manage any risks to rehabilitation outcomes.

1.3. Legislative context

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's key piece of environmental legislation. The EPBC Act enables the Australian Government to join with the states and territories in providing a truly national scheme of environment and heritage protection and biodiversity conservation. The EPBC Act focuses Australian Government interests on the protection of Matters of National Environmental Significance (MNES), with the states and territories having responsibility for matters of state and local significance.

The Northern Territory *Parks and Wildlife Conservation Act 2006* (TPWCA) is the primary legislative framework for managing the protection and conservation of biodiversity in the Northern Territory. The TPWCA legislative framework includes mechanisms for the classification and management of wildlife; classification and control of feral animals; permitting requirements to take wildlife and; designation and management of protected lands. The TPWCA determines the conservation status of flora and fauna species utilising an analogous classification system and criteria to that developed by the International Union for the Conservation of Nature (IUCN).

Classification categories for flora listed under the Commonwealth EPBC Act and the Northern Territory TPWCA are listed in **Appendix A**.

1.4. Completion criteria

AGIG are ultimately responsible for the successful rehabilitation of the construction RoW to meet approved completion criteria, as outlined in the AGIG *Tanami Newmont Gas Pipeline Rehabilitation Plan* (ELA 2018a; **Table 1.1**).

Table 1.1: Rehabilitation completion criteria (ELA 2018a)

Aspect	Native vegetation rehabilitation zone completion criteria	MNES habitat rehabilitation zone completion criteria
Native flora species density (plants per m^2)	Perennial native flora species diversity is equal to or greater than 50% of that of the adjacent control area.	Perennial native flora species density is equal to or greater than 70% of that of the adjacent control area and reflects the Dwarf Desert Spike-rush habitat rehabilitation zone requirements (watercourse/riparian vegetation).
Native flora species richness (per quadrat)	Perennial native flora species richness is equal to or greater than 50% of that of the adjacent control area and reflects the species composition present in the pre-disturbed habitat type. Note that within 4 m either side of the pipeline, the completion criteria will only apply to ground cover species and not to tree species, which are not suitable to grow in close proximity to the pipeline. Tree species will be allowed to recover outside of the 8 m corridor.	Perennial native flora species richness is equal to or greater than 70% of that of the adjacent control area and reflects the species composition present in the pre-disturbed habitat type. Note that within 4 m either side of the pipeline, the completion criteria will only apply to ground cover species and not to tree species, which are not suitable to grow in close proximity to the pipeline. Tree species will be allowed to recover outside of the 8 m corridor.
Native flora species foliage cover (%)	Percentage of foliage cover of perennial native flora species indigenous to each vegetation community is equal to or greater than 50% of that of the adjacent control area and reflects the pre-disturbed habitat type. Note that within 4 m either side of the pipeline, the completion criteria will only apply to ground cover species and not to tree species, which are not suitable to grow	Percentage of foliage cover of perennial native flora species indigenous to each vegetation community is equal to or greater than 70% of that of the adjacent control area and reflects the pre-disturbed habitat type. Note that within 4 m either side of the pipeline, the completion criteria will only apply to ground cover species and not to tree species, which are not suitable to grow in close proximity to the

Aspect	Native vegetation rehabilitation zone completion criteria	MNES habitat rehabilitation zone completion criteria
	in close proximity to the pipeline. Tree species will be allowed to recover outside of the 8 m corridor.	pipeline. Tree species will be allowed to recover outside of the 8 m corridor.
Weed foliage cover (%)	Percentage of foliage cover of Declared species under the Weeds Management Act, Weeds of National Significance (WONS) and Buffel grass (**Cenchrus ciliaris*) is not greater than that of the adjacent control area at 12 months, 24 months and 36 months.	Percentage of foliage cover of Declared species under the Weeds Management Act, Weeds of National Significance (WONS) and Buffel grass (**Cenchrus ciliaris*) is not greater than that of the adjacent control area at 12 months, 24 months and 36 months.

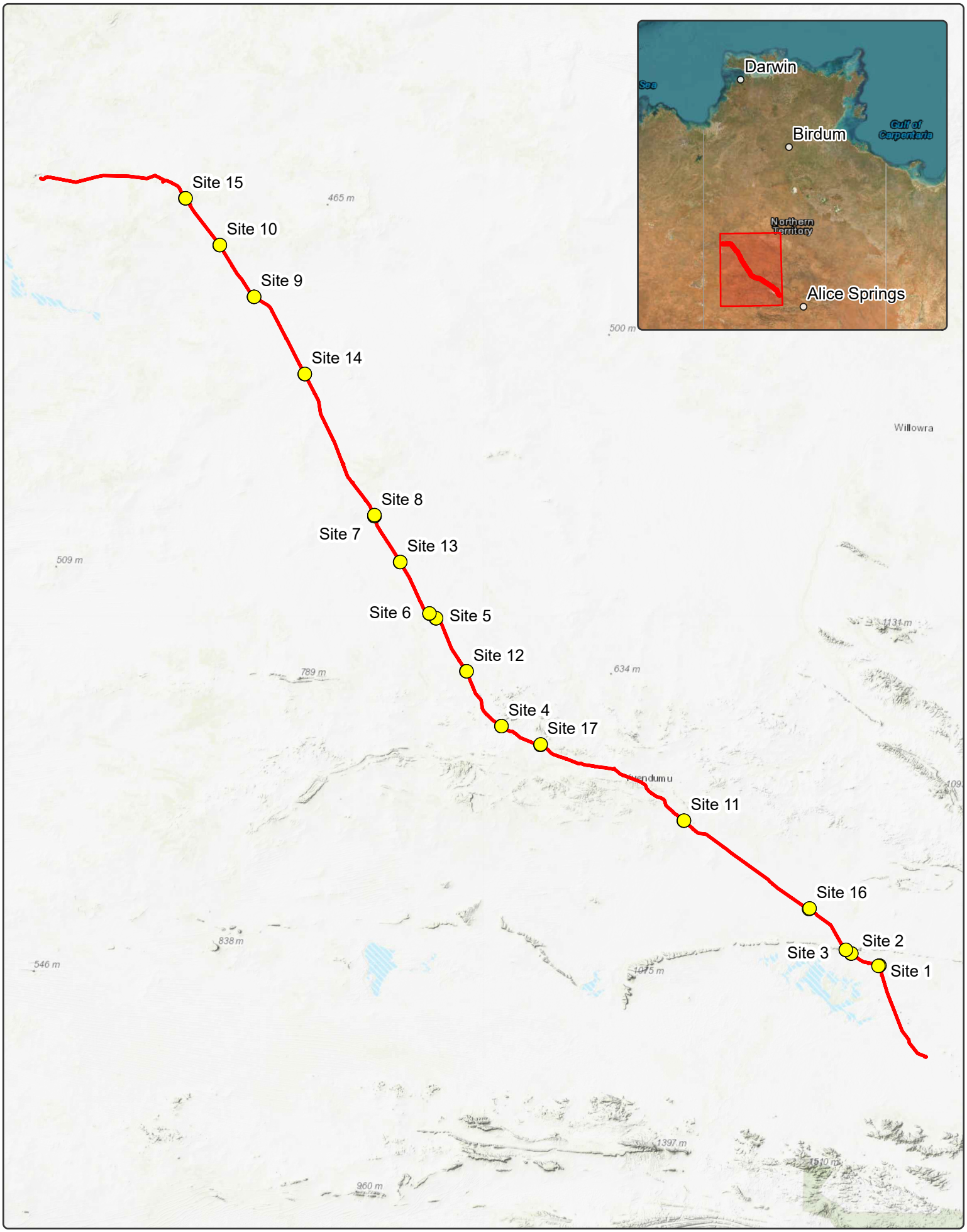

Figure 1-1: Vegetation monitoring site overview

Tanami Newmont Gas Pipeline

Vegetation monitoring site

N

0 25 50

Kilometres

Datum/Projection:
GDA 1994 MGA Zone 52

22PER20889-RD Date: 2/06/2023

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2. Environmental setting

2.1. Climate

The Tanami Gas Pipeline Project Area traverses bioregions with typically arid to semiarid and tropical climates and monsoonal influences, with monsoonal events typically occur over the 'wet season' between November and April (Bastin and the ACRIS Management Committee 2008).

Rabbit Flat weather station (station number 15666; climate data 1996-present) and Alice Springs Airport weather station (station number 15590; climate data 1940-present) are the nearest Bureau of Meteorology (BoM) weather stations to either end of the TNP with active, complete and uncompromised rainfall data sets. In the 12 months preceding the April 2023 field survey, the region received a total of 990 millimetre (mm) and 442 mm at Rabbit Flat and Alice Springs Airport respectively. This is well above the long-term average for Rabbit Flat (467 mm) and the long-term average for Alice Springs Airport (282 mm). In the three months preceding the field survey, the north (Rabbit Flat) received 184 mm which is similar to the long-term average (165 mm) for the same time period, and the south (Alice Springs Airport) received 82 mm which is also similar to the long-term average (89 mm) (BoM 2023).

Mean maximum temperatures in the region ranged from 25.9°C in June to 38.8°C in November and December in the north (Rabbit Flat) and 19.9°C in June and July to 36.4°C in January in the south (Alice Springs Airport). Mean minimum temperatures in the region range from 6.7°C in July to 24.2°C in January in the north (Rabbit Flat) and 3.9°C in July to 21.6°C in January in the south (Alice Springs Airport).

Rainfall and temperature data are presented in **Figure 2-1** below.

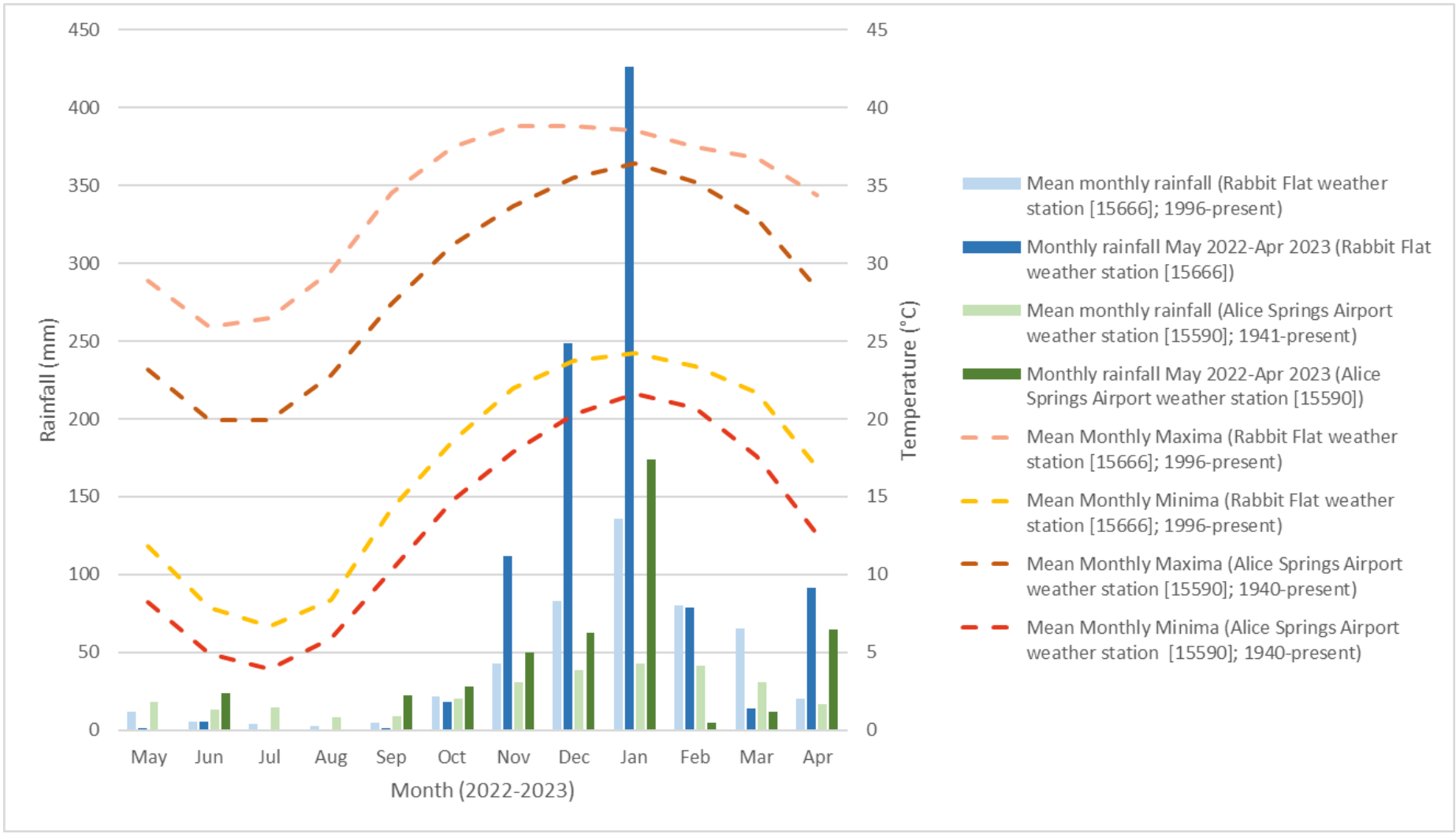

Figure 2-1: Rainfall and temperature data recorded from the Rabbit Flat (15666) and Alice Springs Airport (15590) weather stations 12 months prior to the field survey compared to the long-term average (BoM 2023)

2.2. Regional context

2.2.1. Interim Biogeographic Regionalisation for Australia

The Interim Biogeographic Regionalisation for Australia (IBRA) Version 7 divides Australia into 89 bioregions and 419 subregions across Australia, based on a range of biotic and abiotic factors, including climate variability, vegetation, fauna, geology and landform (Thackway and Cresswell 1995). The TNP traverses three bioregions and six sub-regions, namely Burt Plain (Yuendumu [BRT01] and Atartinga [BRT02] subregions), Great Sandy Desert (Mackay [GDS02], Lake Bennett [GSD05] and Lake Lewis [GSD06] subregions) and Tanami (Tanami Desert [TAN01] subregion) bioregions.

2.2.2. Regional landscape and vegetation

The Burt Plain bioregion is characterised by plain and low rock ranges. Vegetation is predominantly mulga and other *Acacia* woodlands with short grasses and forbs, and spinifex grasslands (Bastin and the ACRIS Management Committee 2008). The Great Sandy Desert bioregion is characterised by red sand plains, dune fields and remnant rocky outcrops. Vegetation is predominantly spinifex grasslands, low woodlands and shrubs (Bastin and the ACRIS Management Committee 2008). The Tanami bioregion is characterised by featureless sand plains with small areas of alluvial plains, low ridges and stony rises. Vegetation is predominantly spinifex hummock grassland with a tall-sparse shrub overstory (Bastin and the ACRIS Management Committee 2008).

2.3. Environmental values

Environmental values relevant to the TNP focuses on habitat values for MNES. More specifically, Threatened flora and fauna species relevant to the TNP include:

- Dwarf Desert Spike Rush (*Eleocharis papillosa*);
- Greater Bilby (*Macrotis lagotis*);
- Great Desert Skink (*Liopholis kintorei*);
- Night Parrot (Pezoporus occidentalis); and
- Princess Parrot (*Polytelis alexandrae*).

Distinct rehabilitation zones for both native vegetation and MNES habitat for species outlined above were defined, with vegetation monitoring sites chosen to ensure appropriate replication within each of the five defined zones, as outlined in the *Tanami Newmont Gas Pipeline Rehabilitation Plan* (ELA 2018a; Table 2.1). Several monitoring sites are recognised as potentially supporting multiple MNES and are therefore represented within more than one rehabilitation zone. For example, monitoring site 10 was established in habitat potentially supporting Greater Bilby, Great Desert Skink, Night Parrot and Princess Parrot.

Table 2.1: Rehabilitation zones outlined in the *Tanami Newmont Gas Pipeline Rehabilitation Plan* (ELA 2018a)

Rehabilitation zone	Zone description (ELA 2018a)	Representative monitoring sites
Native vegetation zone	Defined as all native vegetation within the Project Area, excluding areas mapped as MNES habitat zones below.	11, 12, 13, 14, 15, 17
MNES habitat zone (Dwarf Desert Spike-rush habitat)	For the purposes of this Rehabilitation Plan, preliminary Dwarf Desert Spike-rush habitat zones have been mapped as watercourses known to occur in the Project Area.	1, 3, 4, 6, 8
MNES habitat zone (Greater Bilby and Great Desert Skink habitat)	*Eucalyptus*/*Corymbia*/*Acacia* woodlands over *Triodia* hummocks, and *Melaleuca* and *Acacia* shrublands over *Triodia* hummocks, on sandplains and paleodrainage channels and in proximity to recent records in the north and the south of the Project Area.	2, 5, 7, 9, 10, 16
MNES habitat zone (Night Parrot habitat)	*Triodia* dominated grasslands and *Astrebla* dominated shrubby samphire and chenopod associations with scattered trees and shrubs within the Project Area.	2, 5, 7, 9, 10, 16
MNES habitat zone (Princess Parrot habitat)	Sandplain woodlands and shrublands, dominated by scattered *Eucalyptus*, *Casuarina* or *Allocasuarina*, with an understorey of *Acacia*, *Eremophila*, *Grevillea*, *Hakea*, *Senna* and ground cover of *Triodia*; and riparian areas dominated by large *Eucalyptus* or *Allocasuarina* within the Project Area. Rehabilitation completion criteria in this zone relates only to understorey and ground cover species.	1, 4, 5, 7, 10

3. Methodology

3.1. Field survey

3.1.1. Survey team and timing

The field survey was undertaken from 25 to 30 April 2023 by Dr. Jeff Cargill (Principal Botanist), Daniel Marsh (Botanist), Jeni Morris (Ecologist) and Emily Chetwin (Botanist). The survey team's relevant qualifications, experience and licences are provided below in **Table 3.1**.

Table 3.1: Survey team

Name	Qualification	Relevant experience	Relevant permits / licences
Dr. Jeff Cargill	BSc. Hons. PhD Environmental Sciences	Jeff has over 15 years' experience in botanical and ecological studies throughout WA and the NT including baseline vegetation studies (Reconnaissance and Detailed surveys), Targeted Threatened and Priority flora and fauna surveys, biological data analysis and rehabilitation and vegetation monitoring programs. Jeff completed the baseline TNP vegetation mapping in 2017, and 2020, 2021 and 2022 rehabilitation monitoring of the TNP. Jeff has also completed rehabilitation monitoring for the entire DBNGP, CS2-Tubridgi-Wheatstone Natural Gas Pipeline and the Fortescue River Gas Pipeline.	NT Parks and Wildlife permit number: 72613 CLC Permit and Authority number: P78712
Daniel Marsh	BSc. Hons. Environmental Science	Daniel has over 11 years' experience in botanical surveys and environmental services throughout Western Australia. This includes baseline vegetation studies (reconnaissance and detailed surveys), threatened and priority flora surveys, threatened and priority ecological community surveys and weed surveys. Daniel has an extensive background in both mining and consulting, particularly in remote areas. Daniel completed the 2022 monitoring of the TNP.	CLC Permit and Authority number: P78712
Jeni Morris	BSc. Conservation and Wildlife Biology	Jeni has over 7 years' experience undertaking flora and fauna surveys in the arid zones of WA and the NT, including baseline, Targeted Threatened species surveys and rehabilitation monitoring programs. Jeni completed the 2020, 2021 and 2022 monitoring of the TNP and undertook the flora and fauna pre-clearance surveys for the TNP in 2018.	NT Parks and Wildlife permit number: 72613 CLC Permit and Authority number: P78712
Emily Chetwin	BSc. Hons Geology MSc. Geophysics	Emily is a botanist with over 6 years' experience undertaking botanical surveys over a range of Australian ecosystems, including baseline vegetation studies (reconnaissance and detailed surveys), threatened and priority flora surveys, and threatened and priority ecological community surveys. Emily undertook the 2021 rehabilitation monitoring of the TNP.	CLC Permit and Authority number: P78712

3.1.2. Rehabilitation monitoring

A total of 34 vegetation monitoring sites (17 rehabilitation and 17 control quadrats; each 10 x 50 m in size) were established in 2020 to ensure spatial distance and replication of sites within each of the rehabilitation zones outlined in **Section 2.3** above. Sites were selected based on preliminary sites outlined in the *Tanami Newmont Gas Pipeline Rehabilitation Plan* (ELA 2018a), further refined in the

Pre-clearance Survey Report (ELA 2018b). GPS coordinate locations of monitoring sites are provided in **Appendix B**.

Control quadrats were permanently demarcated with a steel fence dropper in the north-west corner, and wooden fence droppers in the north-east, south-east and south-west corners. Rehabilitation quadrats were not permanently demarcated with metal fence droppers, but rather demarcated with GPS coordinates and reference photos only, due to safety reasons associated with the nature and depth of the high-pressure gas pipeline.

Within each quadrat, the following information was recorded (as relevant to the completion criteria and in accordance with approved methodology outlined in the '*Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping*' (Brocklehurst et al. 2007):

- Site number and quadrat type (rehabilitation or control), coordinates, time and date;
- Native flora species density (number of plants per m^2);
- Native flora species richness (per quadrat);
- Native flora species foliage cover (%);
- Weed foliage cover (%);
- Indicators of the presence of fauna (e.g. scats, burrows, tracks); and
- General observations (i.e. feral animal disturbance, fire occurrence, signs of erosion).

Photo monitoring points were completed at each vegetation monitoring site to provide a visual comparison between sites, with two photographs taken at each site: one at the northwest and one at the southeast corner of each quadrat.

3.1.3. Data analysis

Perennial native species richness, foliage cover and weed foliage cover per 10 x 50 m quadrat and perennial native species density per m^2 were calculated for control and rehabilitation quadrats. The mean and standard error for each factor was then calculated for control and rehabilitation quadrats within each rehabilitation zone. Rehabilitation areas were then compared against controls in view of the completion criteria. Tree species, namely *Corymbia* spp. and *Eucalyptus* spp. were removed from the analysis for rehabilitation quadrats, as specified in the approved completion criteria outlined in **Section 1.4**. It is noted that certain *Acacia* species have the potential to grow in tree form (Mulga), and these will be excluded on an individual basis where appropriate.

3.1.4. Flora nomenclature

Nomenclature for all flora species and classification categories for flora of significance follows that presented in FloraNT (Northern Territory Herbarium 2015).

3.2. Survey limitations and constraints

Constraints and limitations for the rehabilitation monitoring are summarised in **Table 3.2**. No constraints were identified.

Table 3.2: Survey limitations

Constraint	Limitation
Sources of information	**Not a constraint**: The TNP has been well surveyed, with several flora and vegetation survey reports able to be utilised for the purpose of this survey. In addition, publicly available data and information from sources such as FloraNT were accessed.
Scope of work	**Not a constraint**: The survey requirement for rehabilitation monitoring in accordance with the *Tanami Newmont Gas Pipeline Rehabilitation Plan* (ELA 2018a) and the *Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping* (Brocklehurst et al. 2007) was adequately met.
Completeness of survey	**Not a constraint**: The area was surveyed to the satisfaction of the scope.
Intensity of survey	**Not a constraint**: Survey effort was considered adequate to meet the objectives of the scope. A total of 34 quadrats (17 rehabilitation and 17 control) were established across the TNP, with a sufficient number established per rehabilitation zone as per the *Tanami Newmont Gas Pipeline Rehabilitation Plan* (ELA 2018a).
Timing, weather, season, cycle	**Not a constraint**: The 'wet season' in the Northern Territory stretches from November to April, during which floristic material allowing plant identification is most likely to be available for most species. The field survey was undertaken in April 2023, within the recommended timing for flora surveys in this region. In the three months preceding the field survey, the TNP received well above average rainfall (see Section 2.1). The majority of flora species were in flower or fruit, enabling positive identification.
Disturbances	**Not a constraint**: Disturbances within the monitoring sites included the presence of weeds, disturbance from cattle activity (grazing, scats and trampling) and evidence of heat stress. These disturbances did not negatively impact the ability to meet the requirements outline in the scope of works.
Resources	**Not a constraint**: The personnel conducting this field survey were suitably qualified to identify flora specimens, having previously undertaken flora and vegetation assessments in north-eastern WA and NT. Flora identifications were undertaken at the Alice Springs Herbarium by resident taxonomist Dr David Albrecht.
Accessibility	**Not a constraint**: All rehabilitation sites surveyed by ELA in 2023 were able to be accessed by vehicle or on foot over the duration of the field survey.

4. Results

4.1. Flora

A total of 242 vascular plant taxa (237 native and five introduced) were recorded, representing 113 plant genera and 43 plant families. The majority of taxa recorded represented the Poaceae (60 taxa), Fabaceae (43 taxa) and Malvaceae (19 taxa) families. Total species richness was higher in control areas, with 192 species being recorded compared to 171 in rehabilitation areas. Species lists and a species by site matrix are presented in **Appendix C** and **Appendix D** respectively.

4.2. Rehabilitation zones

Native vegetation zone:

Control: 101 vascular plant taxa, representing 62 plant genera and 29 plant families were recorded within the native vegetation zone. The majority of taxa recorded represented the Poaceae (27 taxa), Fabaceae (14 taxa) and Malvaceae (7 taxa) families. Of the vascular plant taxa recorded, none were introduced (weed) species.

Rehabilitation: 100 vascular plant taxa, representing 65 plant genera and 29 plant families were recorded within the native vegetation zone. The majority of taxa recorded represented the Poaceae (27 taxa), Fabaceae (14 taxa) and Malvaceae (10 taxa) families. One introduced (weed) species was recorded in this rehabilitation zone.

MNES habitat zone (Dwarf Desert Spike-rush habitat):

Control: 104 vascular plant taxa, representing 66 plant genera and 28 plant families were recorded within the Dwarf Desert Spike-rush habitat zone. The majority of taxa recorded represented the Poaceae (36 taxa), Fabaceae (12 taxa) and Malvaceae (seven taxa) families. Of the vascular plant taxa recorded, three were introduced (weed) species.

Rehabilitation: 75 vascular plant taxa, representing 53 plant genera and 23 plant families were recorded within the Dwarf Desert Spike-rush habitat zone. The majority of taxa recorded represented the Poaceae (23 taxa), Fabaceae (10 taxa) and Chenopodiaceae (five taxa) families. Of the vascular plant taxa recorded, four were introduced (weed) species.

MNES habitat zone (Greater Bilby and Great Desert Skink habitat) and MNES habitat zone (Night Parrot habitat):

Control: 103 vascular plant taxa, representing 68 plant genera and 32 plant families were recorded within the Greater Bilby and Great Desert Skink and Night Parrot habitat zones. The majority of taxa recorded represented the Poaceae (25 taxa), Fabaceae (16 taxa) and Malvaceae (nine taxa) families. No introduced (weed) species were recorded in this rehabilitation zone.

Rehabilitation: 100 vascular plant taxa, representing 64 plant genera and 30 plant families were recorded within the Greater Bilby and Great Desert Skink and Night Parrot habitat zones. The majority of taxa recorded represented the Poaceae (25 taxa), Fabaceae (20 taxa) and Malvaceae (nine taxa) families. Of the vascular plant taxa recorded, one was an introduced (weed) species.

MNES habitat zone (Princess Parrot habitat):

Control: 90 vascular plant taxa, representing 62 plant genera and 27 plant families were recorded within the Princess Parrot habitat zone. The majority of taxa recorded represented the Poaceae (27 taxa), Fabaceae (18 taxa) and Malvaceae (five taxa) families. Of the vascular plant taxa recorded, two were introduced (weed) species.

Rehabilitation: 79 vascular plant taxa, representing 48 plant genera and 20 plant families were recorded within the Princess Parrot habitat zone. The majority of taxa recorded represented the Fabaceae (20 taxa), Poaceae (18 taxa) and Malvaceae (six taxa) families. Of the vascular plant taxa recorded, two were introduced (weed) species.

4.3. Flora of significance

No Threatened flora species listed under the Commonwealth EPBC Act were recorded within vegetation monitoring sites. One species listed as Data Deficient (DD) under the Northern Territory TPWCA and one species listed as Infraspecific (INFRA) were recorded within the vegetation monitoring sites (**Table 4.1; Figure 4-1**). Classification categories for flora of significance are listed in Appendix A.

Table 4.1: Flora of significance recorded at monitoring sites across the TNP

Species	Conservation status (TPWCA)	Monitoring site	Quadrat type	# individuals
Sida sp. excedentifolia (J.L. Egan 1925)	DD	2A	Rehabilitation	4
Sida sp. excedentifolia (J.L. Egan 1925)	DD	3A	Rehabilitation	30
Sida sp. excedentifolia (J.L. Egan 1925)	DD	3B	Control	42
Sida sp. excedentifolia (J.L. Egan 1925)	DD	11A	Rehabilitation	9
Sida sp. excedentifolia (J.L. Egan 1925)	DD	11B	Control	6
Tephrosia brachyodon	INFRA	3A	Rehabilitation	4
Tephrosia brachyodon	INFRA	3B	Control	41

4.4. Introduced (weed) species

A total of five introduced (weed) species were recorded within the vegetation monitoring sites, namely **Cenchrus ciliaris*, **Citrullus colocynthis*, **Cynodon dactylon*, **Eragrostis minor* and **Eragrostis trichophora*. Of these, none are listed as Declared Weeds or Weeds of National Significance (WoNS) in the Northern Territory (Department of Environment and Natural Resources 2019).

Cenchrus ciliaris* was recorded from within five sites across the length of the TNP; comprising three rehabilitation quadrats (2, 7 and 8) and two control quadrats (1 and 8). **Citrullus colocynthis* was recorded from two sites; one control quadrat (8) and one rehabilitation quadrat (8). **Cynodon dactylon* was recorded from three sites; one control quadrat (1) and two rehabilitation quadrats (1 and 8). **Eragrostis minor* was recorded from two sites; both rehabilitation quadrats (3 and 6). **Eragrostis trichophora* was recorded from two sites; both rehabilitation quadrats (11 and 17). A breakdown of introduced (weed) species recorded is provided in **Appendix E.

4.5. Erosion

Significant erosion was observed in 2022 and again in 2023 within site 6 rehabilitation quadrat (**Plate 1**; ELA 2022). Heavy rainfall preceding the 2022 survey, followed by high early season (Dec/Jan) rainfall in 2023 increased waterflow in the minor creekline, resulting in expansion of the channel bed and

undercutting of the creek bank; Some sheet and pedestal erosion were observed within site 10 rehabilitation quadrat in 2022 and again in 2023 (**Plate 2**; ELA 2022).

Plate 1: Erosion recorded at site 6 – rehabilitation quadrat

Plate 2: Erosion recorded at site 10 – rehabilitation quadrat

4.6. Fulfilment of completion criteria

Results across the 17 established vegetation monitoring sites were averaged for each of the five rehabilitation zones and assessed against approved completion criteria outlined in the AGIG *Tanami Newmont Gas Pipeline Rehabilitation Plan* (ELA 2018a). An overview of results is presented in Table 4.2.

4.6.1. Native vegetation zone

The native vegetation zone, represented by six vegetation monitoring sites (11, 12, 13, 14, 15 and 17), satisfied all four completion criteria (**Table 4.2**); these being: native perennial flora species density (Control: 0.17 ± 0.03; Rehabilitation 0.20 ± 0.08), native perennial flora species richness (Control: 16.17 ± 2.93; Rehabilitation: 11.17 ± 1.7), native perennial flora species foliage cover (Control: 40.98 ± 6.44; Rehabilitation: 22.26 ± 4.94) and weed foliage cover (Control: 0.00 ± 0.00; Rehabilitation: 0.00 ± 0.00). A breakdown of each monitoring site assessed against the completion criteria is presented in **Appendix F.**

4.6.2. MNES habitat zone (Dwarf Desert Spike-rush)

The MNES habitat zone (Dwarf Desert Spike-rush), represented by five vegetation monitoring sites (1, 3, 4, 6 and 8) satisfied three of the four completion criteria (Table 4.2); these being: native perennial flora species density (Control: 0.08 ± 0.03; Rehabilitation 0.07 ± 0.03), native perennial flora species foliage cover (Control: 23.46 ± 6.44; Rehabilitation: 17.70 ± 11.68) and weed foliage cover (Control: 0.43 ± 0.39; Rehabilitation: 0.40 ± 0.89). Native perennial flora species richness failed to meet the minimum requirement outlined in the completion criteria (Control: 17.00 ± 2.85; Rehabilitation: 10.80 ± 3.43). A breakdown of each monitoring site assessed against the completion criteria is presented in **Appendix F.**

4.6.3. MNES habitat zone (Greater Bilby and Great Desert Skink habitat) and MNES habitat zone (Night Parrot habitat)

The MNES habitat zone (Greater Bilby and Great Desert Skink habitat and Night Parrot habitat), represented by six vegetation monitoring sites (2, 5, 7, 9, 10 and 16) satisfied three of the four completion criteria (**Table 4.2**); these being: native perennial flora species density (Control: 0.16 ± 0.03; Rehabilitation 0.20 ± 0.07), native perennial flora species richness (Control: 16.50 ± 3.08; Rehabilitation: 16.83 ± 3.18) and native perennial flora species foliage cover (Control: 40.85 ± 7.70; Rehabilitation: 39.95 ± 7.99). Weed foliage cover failed to meet the minimum requirement outlined in the completion criteria (Control: 0.00 ± 0.00; Rehabilitation: 0.02 ± 0.01). A breakdown of each monitoring site assessed against the completion criteria is presented in **Appendix F.**

4.6.4. MNES habitat zone (Princess Parrot habitat)

The MNES habitat zone (Princess Parrot habitat), represented by five vegetation monitoring sites (1, 4, 5, 7 and 10) satisfied two of the four completion criteria (**Table 4.2**); these being: native perennial flora species richness (Control: 15.80 ± 3.79; Rehabilitation 14.00 ± 4.55) and weed foliage cover (Control: 0.03 ± 0.03; Rehabilitation: 0.01 ± 0.01). Native perennial flora species density (Control: 0.13 ± 0.03; Rehabilitation: 0.09 ± 0.04) and native perennial flora species foliage cover (Control: 42.94 ± 10.68; Rehabilitation: 20.74 ± 10.57) failed to meet the minimum requirement outlined in the completion criteria. A breakdown of each monitoring site assessed against the completion criteria is presented in **Appendix F.**

Table 4.2: Assessment of each of the rehabilitation zones (individual sites combined) assessed against each of the approved completion criteria

Rehabilitation zone	Representative sites	Native flora species density (plants per m2)	Native flora species richness (per quadrat)	Native flora species foliage cover (%)	Weed foliage cover (%)
Native vegetation zone	11, 12, 13, 14, 15, 17	PASS	PASS	PASS	PASS
MNES habitat zone (Dwarf Desert Spike-rush habitat)	1, 3, 4, 6, 8	PASS	FAIL	PASS	PASS
MNES habitat zone (Greater Bilby and Great Desert Skink habitat)	2, 5, 7, 9, 10, 16	PASS	PASS	PASS	FAIL
MNES habitat zone (Night Parrot habitat)	2, 5, 7, 9, 10, 16	PASS	PASS	PASS	FAIL
MNES habitat zone (Princess Parrot habitat)	1, 4, 5, 7, 10	FAIL	PASS	FAIL	PASS

4.7. Comparison of results against completion criteria 2020-2023

A summary of the 2023 survey results for the native vegetation rehabilitation zone and MNES habitat rehabilitation zones against 2020, 2021 and 2022 results are presented in Table 4.3 and Table 4.4 respectively below.

4.7.1. Native flora vegetation zone

Native perennial flora species density has met the specified completion criteria each year from establishment; with an increase recorded between 2022 and 2023. It is noted that native perennial flora species density significantly decreased in 2022 compared to 2020 and 2021, however this result was primarily driven by the number of individual *Yakirra australiensis* var. *australiensis* plants recorded in site 13 rehabilitation quadrat in 2022 (500 individuals) compared to 2020 (4,000 individuals) and 2021 (5,000 individuals).

Native perennial flora species richness has met the specified completion criteria each year from establishment, with values being consistently comparable to those recorded in the controls. Native perennial flora species foliage cover has gradually increased since establishment and following the latest increase between 2022 and 2023, has now met the specified completion criteria.

Weed foliage cover has met the specified completion criteria each year from establishment, with no Declared weeds, WoNS or **C. ciliaris* being recorded in 2023.

4.7.2. MNES habitat zone (Dwarf Desert Spike-rush habitat)

Native perennial flora species density has met the specified completion criteria each year from 2021 onward. Except for an anomalous peak in 2021 (related to pulse recruitment following a high rainfall events), native perennial flora species density has steadily increased since establishment, with comparable values to the controls being recorded in 2023.

Native perennial flora species richness failed to meet the specified completion criteria in 2022 and 2023, with recorded values just below the 70% requirement (65.7% and 63.5%, respectively). It is noted that strong early establishment values were recorded in 2020 and 2021, however following a reduction between 2021 and 2022 native perennial flora species richness has not improved. Native perennial flora species foliage cover met the specified completion criteria in 2022 and 2023, with recorded values being relatively consistent from 2021 onward (~70 to 80% of control).

Weed foliage cover has fluctuated since establishment, with cover in rehabilitation greater than controls in 2021 and 2022. These results have been driven by the changing relative cover of **C. ciliaris* between rehabilitation and controls. Weed foliage cover has met the specified completion criteria in 2023, with the cover of **C. ciliaris* being slightly lower in rehabilitation (0.4%) compared to the controls (0.43%).

4.7.3. MNES habitat zone (Greater Bilby and Great Desert Skink habitat) and MNES habitat zone (Night Parrot habitat)

Native perennial flora species density has met the specified completion criteria each year from establishment; with values being consistently higher those recorded in the controls.

Native perennial flora species richness has met the specified completion criteria each year from establishment, with values from 2021 onward being consistently comparable to those recorded in the controls. Native perennial flora species foliage cover has gradually increased since establishment and following a large increase between 2022 (63.6% of control) and 2023 (97.8% of control), has now met the specified completion criteria.

Weed foliage cover in rehabilitation areas was lower than the controls in 2020 and 2021. However, following the recording of **C. ciliaris* in rehabilitation site 7A in 2022, this zone has again failed meet the specified completion criteria in 2023.

4.7.4. MNES habitat zone (Princess Parrot habitat)

High native perennial flora species density values were recorded between 2020 and 2022 (>100% of control). However, a large decrease was recorded between 2022 (114% of control) and 2023 (68% of control), resulting in rehabilitation values being slightly less than 70% of the controls and therefore failing to meet the specified completion criteria.

Native perennial flora species richness has met the specified completion criteria each year from establishment, with values being consistently comparable to those recorded in the controls (≥80% of control). Native perennial flora species foliage cover has failed to meet the specified completion criteria since establishment. An increase in foliage cover was recorded between 2020 (17.8% of control) and 2021 (35.2% of control), however values have remained at approximately 50% of the controls since.

Weed foliage cover has met the specified completion criteria each year from establishment.

4.8. Photo monitoring points

Photo monitoring points across 2020, 2021, 2022 and 2023 are presented in **Appendix G**.

Table 4.3: Comparison of results against native vegetation rehabilitation zone completion criteria from 2020 to 2023

Aspect[1]	Native vegetation rehabilitation zone completion criteria	Native vegetation zone[2]				
		2020	2021	2022	2023	2023 (Pass/Fail)
Native flora species density (% of control)	Perennial native flora species diversity is equal to or greater than 50% of that of the adjacent control area.	302.6	325.7	77.6[3]	**118.2**	**Pass**
Native flora species richness (% of control)	Perennial native flora species richness is equal to or greater than 50% of that of the adjacent control area and reflects the species composition present in the pre-disturbed habitat type. Note that within 4 m either side of the pipeline, the completion criteria will only apply to ground cover species and not to tree species, which are not suitable to grow in close proximity to the pipeline. Tree species will be allowed to recover outside of the 8 m corridor.	95.1	135.7	109.9	**106.2**	**Pass**
Native flora species foliage cover (% of control)	Percentage of foliage cover of perennial native flora species indigenous to each vegetation community is equal to or greater than 50% of that of the adjacent control area and reflects the pre-disturbed habitat type. Note that within 4 m either side of the pipeline, the completion criteria will only apply to ground cover species and not to tree species, which are not suitable to grow in close proximity to the pipeline. Tree species will be allowed to recover outside of the 8 m corridor.	20.3	46.1	40.9	**54.3**	**Pass**
Weed foliage cover: is rehabilitation greater than control (y/n)?	Percentage of foliage cover of Declared species under the Weeds Management Act, Weeds of National Significance (WONS) and Buffel grass (**Cenchrus ciliaris*) is not greater than that of the adjacent control area at 12 months, 24 months and 36 months.	No	No	No	**No**	**Pass**

[1]Results for native perennial flora species density, richness and foliage cover in rehabilitation areas (above) are presented as a total percentage of the adjacent control areas, in order to show a comparison of results, indicating the development trajectory of each rehabilitation zone.

[2]Note: Site 17 rehabilitation quadrat was relocated in 2022, as such the 2022 figure only compares sites 11, 12, 13, 14, 15 for the native vegetation zone across 2020, 2021 and 2022. The relocated Site 17 rehabilitation quadrat was reassessed in 2023.

[3]This result is primarily driven by the number of individual *Yakirra australiensis* var. australiensis recorded within site 13 rehabilitation quadrat in 2022 (500 individuals) compared to 2020 (4,000 individuals) and 2021 (5,000 individuals).

Table 4.4: Comparison of results against MNES habitat rehabilitation zone completion criteria from 2020 to 2023

Aspect[1]	MNES habitat rehabilitation zone completion criteria	Dwarf Desert Spike-rush habitat					Greater Bilby and Great Desert Skink habitat					Night Parrot habitat					Princess Parrot habitat				
		2020	2021	2022	2023	2023 (Pass/Fail)	2020	2021	2022	2023	2023 (Pass/Fail)	2020	2021	2022	2023	2023 (Pass/Fail)	2020	2021	2022	2023	2023 (Pass/Fail)
Native flora species density (% of control)	Perennial native flora species density is equal to or greater than 70% of that of the adjacent control area and reflects the Dwarf Desert Spike-rush habitat rehabilitation zone requirements (watercourse/riparian vegetation).	57.7	191.7	78.5	**93.7**	**Pass**	192.6	222.5	173.4	**127.9**	**Pass**	192.6	222.5	173.4	**127.9**	**Pass**	250.0	133.2	114.2	**68.3**	**Fail**
Native flora species richness (% of control)	Perennial native flora species richness is equal to or greater than 70% of that of the adjacent control area and reflects the species composition present in the pre-disturbed habitat type. Note that within 4 m either side of the pipeline, the completion criteria will only apply to ground cover species and not to tree species, which are not suitable to grow in close proximity to the pipeline. Tree species will be allowed to recover outside of the 8 m corridor.	82.1	105.3	65.7	**63.5**	**Fail**	70.0	106.7	93.6	**102.0**	**Pass**	70.0	106.7	93.6	**102.0**	**Pass**	79.7	112.3	85.7	**88.6**	**Pass**
Native flora species foliage cover (% of control)	Percentage of foliage cover of perennial native flora species indigenous to each vegetation community is equal to or greater than 70% of that of the adjacent control area and reflects the pre-disturbed habitat type. Note that within 4 m either side of the pipeline, the completion criteria will only apply to ground cover species and not to tree species, which are not suitable to grow in close proximity to the pipeline. Tree species will be allowed to recover outside of the 8 m corridor.	42.0	68.8	82.1	**75.4**	**Pass**	11.5	49.4	63.6	**97.8**	**Pass**	11.5	49.4	63.6	**97.8**	**Pass**	17.8	35.2	53.4	**48.3**	**Fail**
Weed foliage cover: is rehabilitation greater than control (y/n)?	Percentage of foliage cover of Declared species under the Weeds Management Act, Weeds of National Significance (WONS) and Buffel grass (**Cenchrus ciliaris*) is not greater than that of the adjacent control area at 12 months, 24 months and 36 months.	No	Yes	Yes	**No**	**Pass**	No	No	Yes	**Yes**	**Fail**	No	No	Yes	**Yes**	**Fail**	No	No	No	**No**	**Pass**

[1]Results for native perennial flora species density, richness and foliage cover in rehabilitation areas (above) are presented as a total percentage of the adjacent control areas, in order to show a comparison of results, indicating the development trajectory of each rehabilitation zone.

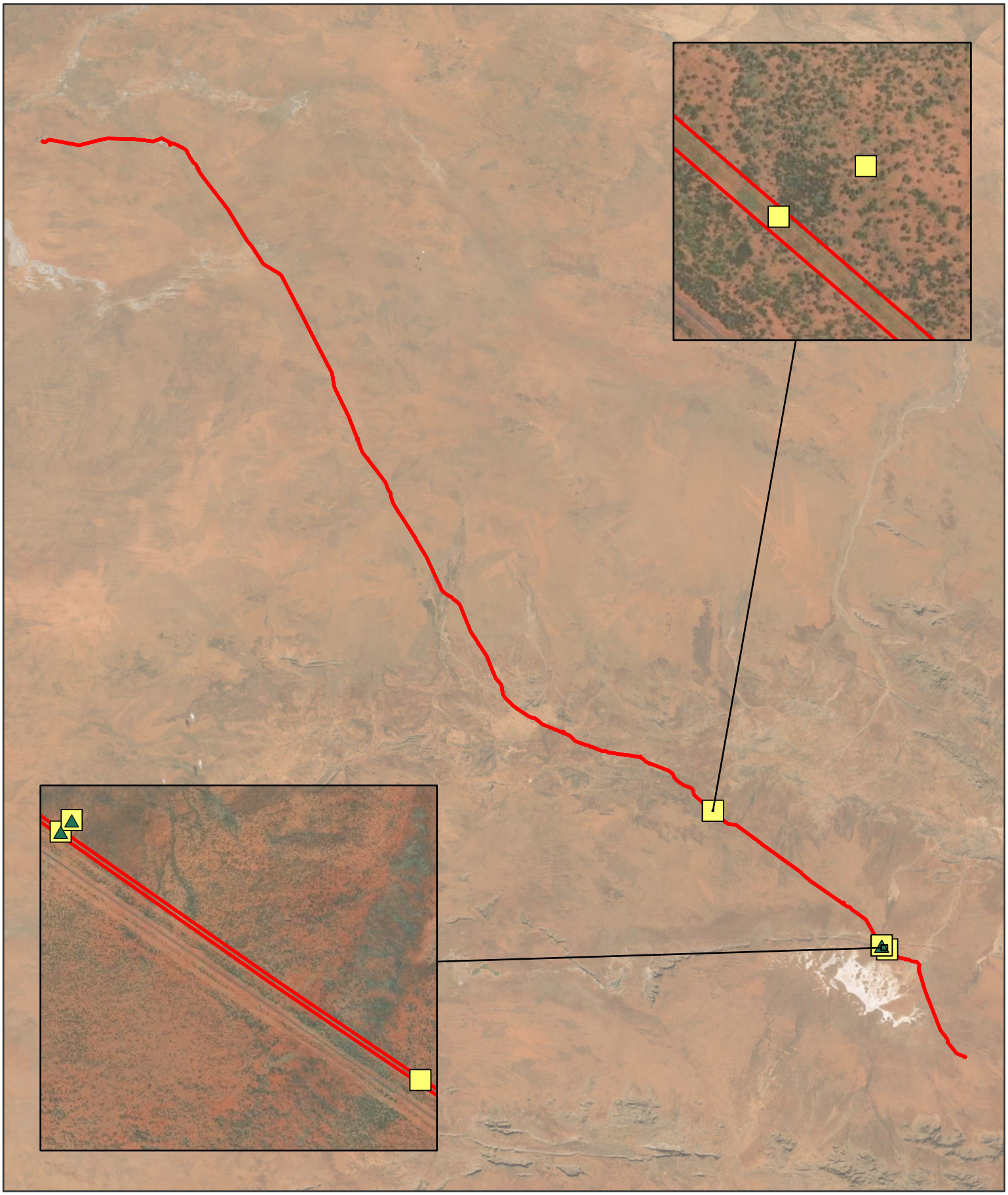

Figure 4-1: Flora of significance recorded at monitoring sites across the TNP

Tanami Newmont Gas Pipeline

Flora of Significance

Sida sp. excedentifolia (J.L. Egan 1925; DD)

Tephrosia brachyodon (INFRA)

0 25 50

Kilometers

Datum/Projection:
GDA 1994 MGA Zone 52

23PER4680-JP Date: 13/06/2023

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5. Summary and recommendations

The following summary and recommendations are specific are based on the methodology outlined in Section 3 (Table 5.1).

Table 5.1: Summary, changes over time and recommendations of each rehabilitation zone across the TNP

Rehabilitation zone	Summary	Changes over time	Recommendations
Native vegetation zone	A total of 100 vascular plant taxa (all native) were recorded in rehabilitation quadrats, compared to 101 recorded in the controls. No introduced (weed) species were recorded. The native vegetation zone satisfied all four completion criteria in 2023: • Perennial native flora species diversity is equal to or greater than 50% of that of the adjacent control area was met; • Perennial native flora species richness is equal to or greater than 50% of that of the adjacent control area and reflects the species composition present in the pre-disturbed habitat type was met; • Percentage of foliage cover of perennial native flora species indigenous to each vegetation community is equal to or greater than 50% of that of the adjacent control area and reflects the pre-disturbed habitat type was met; and • Percentage of foliage cover of Declared species under the Weeds Management Act, WONS and Buffel grass (**Cenchrus ciliaris*) is not greater than that of the adjacent control area at 12 months, 24 months and 36 months was met.	Rainfall has been variable since establishment (2020) and has had a noted impact on annually recorded rehabilitation values (i.e., fluctuations in recorded values depending on high or low rainfall events). Rainfall was well above the long-term average in the 12 months preceding the survey, and comparable to the long-term average in the 3 months preceding the survey. Due to clearing associated with the Tanami Road Upgrade Project, rehabilitation quadrat 17 was relocated in 2022. This influenced analysis in the 2022 report, as no temporal comparison was possible. Reassessment of rehabilitation quadrat 17 was undertaken in 2023, allowing for appropriate analysis and comparisons to be undertaken. Between 2022 and 2023, an additional 16 native vascular plant taxa were recorded across the rehabilitation quadrats. Despite natural fluctuations following pulse recruitment in high rainfall years (2021) and senescence in low rainfall years (2022), native flora species density and native flora species richness have both met the specified completion criteria each year from establishment. Native perennial flora species foliage cover has gradually increased since establishment and following the latest increase between 2022 and 2023 has now met the specified completion criteria. Weeds have not been recorded in this rehabilitation zone.	*Corymbia opaca* was recorded in rehabilitation monitoring quadrat 11A (0.01% cover, 0.15 m tall). Early intervention to remove this individual, and any individuals in the vicinity, is recommended to avoid establishment of large, deep-rooted trees above the natural gas pipeline. All specified completion criteria have now been achieved. Closure of areas associated with the native vegetation zone should be considered.

Rehabilitation zone	Summary	Changes over time	Recommendations
MNES habitat zone (Dwarf Desert Spike-rush habitat)	A total of 75 vascular plant taxa (71 native and four introduced) were recorded in rehabilitation quadrats, compared to 104 recorded in the controls (101 native and three introduced). Introduced (weed) species recorded in rehabilitation quadrats included **Citrullus colocynthis*, **Cenchrus ciliaris*, **Cynodon dactylon* and **Eragrostis minor*. The MNES habitat zone (Dwarf Desert Spike-rush habitat) satisfied three of the four completion criteria in 2023: • Perennial native flora species density is equal to or greater than 70% of that of the adjacent control area and reflects the Dwarf Desert Spike-rush habitat rehabilitation zone requirements (watercourse/riparian vegetation) was met; • Perennial native flora species richness is equal to or greater than 70% of that of the adjacent control area and reflects the species composition present in the pre-disturbed habitat type was not met. Rehabilitation achieved 63.5% of the control value in 2023; • Percentage of foliage cover of perennial native flora species indigenous to each vegetation community is equal to or greater than 70% of that of the adjacent control area and reflects the pre-disturbed habitat type was met; and • Percentage of foliage cover of Declared species under the Weeds Management Act, WONS and Buffel grass *(*Cenchrus ciliaris*) is not greater than that of the adjacent control area at 12 months, 24 months and 36 months was met.	Rainfall has been variable since establishment (2020) and has had a noted impact on annually recorded rehabilitation values (i.e., fluctuations in recorded values depending on high or low rainfall events). Rainfall was well above the long-term average in the 12 months preceding the survey, and comparable to the long-term average in the 3 months preceding the survey. Between 2022 and 2023, an additional 16 vascular plant taxa were recorded across the rehabilitation quadrats. Native perennial flora species density has steadily increased since establishment, with comparable values to that of the controls being recorded in 2023; the noted exception being a peak related to pulse recruitment following a high rainfall event in 2021. Despite strong early establishment values in 2020 and 2021, native perennial flora species richness did not meet the specified completion criteria in 2022 or 2023, with recorded values just below the 70% requirement (65.7% and 63.5%, respectively). Native perennial flora species foliage cover has been relatively consistent from 2021 onward, being at or above the 70% requirement. Weed foliage cover was greater in rehabilitation than controls in 2021 and 2022., due to the higher cover of **Cenchrus ciliaris* in the 8A rehabilitation quadrat (1%) compared to the 8B control quadrat (0.6%). Following the 2023 survey however, **Cenchrus ciliaris* cover in both 8B and 8A was 2%, with an additional 0.05% cover recorded within the 1B control quadrat.	Significant erosion was observed within site 6 rehabilitation quadrat. Several large rainfall events have occurred following establishment which increased waterflow in the minor creekline, resulting in expansion of the channel bed and undercutting of the creek bank. Remediation is recommended to stabilise the landform in this area. One individual of *Corymbia opaca* was recorded within the 4A rehabilitation quadrat (0.5% cover, 2.2 m tall). Early intervention to remove this individual, and any other individuals within the vicinity, is recommended to avoid establishment of these large, deep-rooted trees above the natural gas pipeline. Although no specific management of **C. ciliaris* (Buffel grass) is required under NT or Federal legislation, this species is explicitly mentioned in the approved completion criteria. **C. ciliaris* is a rapidly invasive species that can occur to the exclusion of native flora; therefore, control measure should be considered. Small-scale targeted spraying within areas that have the potential to be spread vectors, such as intersecting creeklines and low-lying ephemeral water holding environments, may be an effective measure to reduce the cover of **C. ciliaris* in rehabilitation zones.

Rehabilitation zone	Summary	Changes over time	Recommendations
MNES habitat zone (Greater Bilby and Great Desert Skink habitat) and MNES habitat zone (Night Parrot habitat)	A total of 100 vascular plant taxa were recorded in rehabilitation quadrats (99 native and one introduced), compared to 103 in the controls (103 native). One introduced (weed) species was recorded, **Cenchrus ciliaris*. The MNES habitat zone (Greater Bilby and Great Desert Skink habitat) and MNES habitat zone (Night Parrot habitat) satisfied three of the four completion criteria in 2023: • Perennial native flora species density is equal to or greater than 70% of that of the adjacent control area was met; • Perennial native flora species richness is equal to or greater than 70% of that of the adjacent control area and reflects the species composition present in the pre-disturbed habitat type was met; • Percentage of foliage cover of perennial native flora species indigenous to each vegetation community is equal to or greater than 70% of that of the adjacent control area and reflects the pre-disturbed habitat type was met; and • Percentage of foliage cover of Declared species under the Weeds Management Act, WONS and Buffel grass (**Cenchrus ciliaris*) is not greater than that of the adjacent control area at 12 months, 24 months and 36 months was not met.	Rainfall has been variable since establishment (2020) and has had a noted impact on annually recorded rehabilitation values (i.e., fluctuations in recorded values depending on high or low rainfall events). Rainfall was well above the long-term average in the 12 months preceding the survey, and comparable to the long-term average in the 3 months preceding the survey. Between 2022 and 2023, an additional 32 vascular plant taxa were recorded across the rehabilitation quadrats. Native perennial flora species density values have been consistently higher those recorded in the controls since establishment (>100% of the control). From 2021 onward, native perennial flora species richness values recorded in rehabilitation have been consistently comparable to those recorded in the controls (~90% to 100% of control). Native perennial flora species foliage cover in rehabilitation has gradually increased each year since establishment, with values following the 2023 survey being comparable to controls. Weed foliage cover in rehabilitation was lower compared to controls in 2020 and 2021, however in 2022 and 2023 **C. ciliaris* was recorded in rehabilitation quadrats 2A (0.05% cover) and 7A (0.05% cover) and absent in controls.	As with the 2022 survey, minor sheet and pedestal erosion was observed within site 10. Although no specific management of **C. ciliaris* (Buffel grass) is required under NT or Federal legislation, this species is explicitly mentioned in the approved completion criteria. **C. ciliaris* is a rapidly invasive species that can occur to the exclusion of native flora; therefore, control measure should be considered. Small-scale targeted spraying within areas that have the potential to be spread vectors, such as intersecting creeklines and low-lying ephemeral water holding environments, may be an effective measure to reduce the cover of **C. ciliaris* in rehabilitation zones. Continue monitoring to ensure completion criteria are achieved.

Rehabilitation zone	Summary	Changes over time	Recommendations
MNES habitat zone (Princess Parrot habitat)	A total of 79 vascular taxa were recorded in rehabilitation quadrats (77 native and two introduced), compared to 90 in the controls (88 native and two introduced). The introduced (weed) species **Cenchrus ciliaris* and **Cynodon dactylon* were recorded. The MNES habitat zone (Princess Parrot habitat) satisfied two of the four completion criteria in 2023: • Perennial native flora species density is equal to or greater than 70% of that of the adjacent control area was not met; achieving 68.3% of control; • Perennial native flora species richness is equal to or greater than 70% of that of the adjacent control area and reflects the species composition present in the pre-disturbed habitat type was met; • Percentage of foliage cover of perennial native flora species indigenous to each vegetation community is equal to or greater than 70% of that of the adjacent control area and reflects the pre-disturbed habitat type was not met (48.3% of control); and • Percentage of foliage cover of Declared species under the Weeds Management Act, WONS and Buffel grass (**Cenchrus ciliaris*) is not greater than that of the adjacent control area at 12 months, 24 months and 36 months was met.	Rainfall has been variable since establishment (2020) and has had a noted impact on annually recorded rehabilitation values (i.e., fluctuations in recorded values depending on high or low rainfall events). Rainfall was well above the long-term average in the 12 months preceding the survey, and comparable to the long-term average in the 3 months preceding the survey. Between 2022 and 2023, an additional 20 vascular plant taxa were recorded across the rehabilitation quadrats. High native perennial flora species density values were recorded between 2020 and 2022. Between 2022 and 2023 however a substantial decrease was recorded (114.2% of control value to 68.3%), resulting in rehabilitation values being less than 70% of the controls. Since establishment, native perennial flora species richness values recorded have been comparable to those recorded in the controls (~80% to 100% of control). Conversely, native flora species foliage cover did not improve between 2022 and 2023, remaining at ~50% of the control values; this is despite low incremental yearly increases in cover between 2020 and 2022. Weed foliage cover in rehabilitation areas has not exceeded the controls, with overall **C. ciliaris* cover in 2023 being low (0.01% in rehabilitation and 0.03% in controls).	As with the 2022 survey, minor sheet and pedestal erosion was observed within site 10. One individual of *Corymbia opaca* was recorded within the 4A rehabilitation quadrat (0.5% cover, 2.2 m tall). Early intervention to remove this individual, and any other individuals within the vicinity, is recommended to avoid establishment of these large, deep-rooted trees above the natural gas pipeline. Although no specific management of **C. ciliaris* (Buffel grass) is required under NT or Federal legislation, this species is explicitly mentioned in the approved completion criteria. **C. ciliaris* is a rapidly invasive species that can occur to the exclusion of native flora; therefore, control measure should be considered. Small-scale targeted spraying within areas that have the potential to be spread vectors, such as intersecting creeklines and low-lying ephemeral water holding environments, may be an effective measure to reduce the cover of **C. ciliaris* in rehabilitation zones.

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Appendix A Framework for conservation significant flora and fauna ranking

CATEGORIES OF THREATENED SPECIES UNDER THE ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (EPBC ACT)

Threatened fauna and flora may be listed in any one of the following categories as defined in Section 179 of the EPBC Act. Species listed as 'conservation dependent' and 'extinct' are not Matters of National Environmental Significance and therefore do not trigger the EPBC Act.

Category	Definition
Extinct (EX)	There is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (EW)	Taxa known to survive only in captivity or as a naturalised population well outside its past range; or taxa has not been recorded in its known and/or expected habitat at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CE)	Taxa considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	Taxa considered to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	Taxa considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	Taxa has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern (LC)	Taxa has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
Data Deficient (DD)	There is inadequate information to make a direct, or indirect, assessment of taxa's risk extinction based on its distribution and/or population status.
Not Evaluated (NE)	Taxa has not yet been evaluated against the criteria.
Migratory (M)	Not an IUCN category. Species are defined as migratory if they are listed in an international agreement approved by the Commonwealth Environment Minister, including: • the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animal) for which Australia is a range state; • the agreement between the Government of Australian and the Government of the People's Republic of China for the Protection of Migratory Birds and their environment (CAMBA); • the agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA); or • the agreement between Australia and the Republic of Korea to develop a bilateral migratory bird agreement similar to the JAMBA and CAMBA in respect to migratory bird conservation and provides a basis for collaboration on the protection of migratory shorebirds and their habitat (ROKAMBA).

CONSERVATION CODES FOR NORTHERN TERRITORY FLORA

Categories for classification	Description
Extinct (EX)	A species is extinct when there is no reasonable doubt that the last individual has died. To call a species extinct, there must have been surveys carried out to look for the species across its previously known range. The survey needs to also consider the life cycle of the species and the times of year when it might be located there.
Extinct in the wild (EW)	A species is extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalised population/s outside the range they once lived in. Calling a species needs for there to have been similar surveys to those done for extinct species.
Critically endangered (CR)	A species is critically endangered when all the evidence shows that the species meets at least one of the IUCN criteria A to E for critically endangered. It is then at an extremely high risk of extinction in the wild. In cases where a species may be extinct but where not all surveys have been done to show the species absence, the species may be classified in a possibly extinct subcategory. These species are considered threatened in the NT.
Endangered (EN)	A species is endangered when all evidence shows that it meets at least one of the IUCN criteria A to E for endangered species, indicating it is facing a high risk of extinction in the wild. These species are considered threatened in the NT.
Vulnerable (VU)	A species is vulnerable when all the evidence shows that it meets at least one of the IUCN criteria A to E for vulnerable, indicating that it is facing a high risk of extinction in the wild. These species are considered threatened in the NT.
Near threatened (NT)	A species is near threatened when it is not classified in one of the above threatened categories, but it is close to being or is likely to be in a threatened category soon.
Least concern (LC)	A species is least concern when there is sufficient information available to make an assessment and it is not classified as critically endangered, endangered, vulnerable or near threatened. Species that are widespread with high numbers are in this category.
Data deficient (DD)	A species is data deficient when there is not enough information to make a direct, or indirect, assessment of its risk of extinction based on distribution and/or population. Data deficient is not a category of threatened species, but data deficient species should not be assumed to be safe. A species in this category may be well studied and well known but there is not enough specific data on numbers and distribution. Species in this category need more information and future research will probably show that they need to be classified as threatened.
Not evaluated (NE)	A species is not evaluated when it is has not been assessed against the criteria. This may be because the species is a rare visitor to the Territory or that the taxonomy of the species has recently changed or is unclear.
Infraspecific (INFRA)	A species which has more than one subspecies, one of which may be listed as a conservation listed species.

Appendix B GPS location coordinates of monitoring sites

Vegetation monitoring site	Quadrat type	Easting	Northing
1	Rehabilitation	254339	7476152
	Control	254001	7476021
2	Rehabilitation	244970	7479633
	Control	245064	7479701
3	Rehabilitation	243182	7480763
	Control	243233	7480821
4	Rehabilitation	747488	7551363
	Control	747548	7551385
5	Rehabilitation	726210	7586380
	Control	726306	7586432
6	Rehabilitation	724112	7587896
	Control	724126	7587997
7	Rehabilitation	706317	7619580
	Control	706202	7619558
8	Rehabilitation	706220	7619848
	Control	706278	7619914
9	Rehabilitation	667090	7690798
	Control	667194	7690803
10	Rehabilitation	655957	7707562
	Control	656048	7707614
11	Rehabilitation	806746	7520645
	Control	806834	7520696
12	Rehabilitation	736102	7569207
	Control	736218	7569193
13	Rehabilitation	714564	7604643
	Control	714672	7604679
14	Rehabilitation	683597	7665666
	Control	683652	7665767
15	Rehabilitation	644804	7722796
	Control	644919	7722815
16	Rehabilitation	230752	7493546
	Control	230921	7493759
17	Rehabilitation	760265	7545359
	Control	760264	7545440

Appendix C Flora species list

Family	Species	Control	Rehab
Acanthaceae	*Rostellularia adscendens* subsp. *adscendens* var. *pogonanthera*		X
Aizoaceae	*Trianthema pilosum*	X	
Aizoaceae	*Trianthema triquetrum*	X	X
Amaranthaceae	*Alternanthera angustifolia*	X	X
Amaranthaceae	*Alternanthera denticulata*		X
Amaranthaceae	*Alternanthera* sp.	X	X
Amaranthaceae	*Gomphrena lanata*	X	
Amaranthaceae	*Gomphrena leptophylla*	X	X
Amaranthaceae	*Ptilotus calostachyus*		X
Amaranthaceae	*Ptilotus fusiformis*	X	X
Amaranthaceae	*Ptilotus helipteroides*		X
Amaranthaceae	*Ptilotus obovatus*	X	
Amaranthaceae	*Ptilotus polystachyus*	X	
Amaranthaceae	*Ptilotus schwartzii*	X	
Asteraceae	*Streptoglossa odora*		X
Asteraceae	*Blumea tenella*	X	X
Asteraceae	*Centipeda minima*	X	X
Asteraceae	*Pluchea dunlopii*	X	X
Asteraceae	*Pluchea ferdinandi-muelleri*	X	X
Asteraceae	*Pluchea tetranthera*	X	
Asteraceae	*Pterocaulon* sp.	X	
Asteraceae	*Pterocaulon sphacelatum*	X	X
Asteraceae	*Rutidosis helichrysoides*	X	
Boraginaceae	*Euploca tanythrix*	X	X
Boraginaceae	*Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206)		X
Boraginaceae	*Heliotropium subreniforme*		X
Boraginaceae	*Trichodesma zeylanicum* var. *zeylanicum*	X	
Byblidaceae	*Byblis filifolia*	X	X
Campanulaceae	*Wahlenbergia ?tumidifructa*	X	
Caryophyllaceae	*Polycarpaea corymbosa*	X	X
Celastraceae	*Macgregoria racemigera*	X	X
Celastraceae	*Stackhousia intermedia*	X	X
Chenopodiaceae	*Dysphania glomulifera*	X	
Chenopodiaceae	*Dysphania rhadinostachya*		X

Family	Species	Control	Rehab
Chenopodiaceae	*Dysphania rhadinostachya* subsp. *rhadinostachya*	X	X
Chenopodiaceae	*Einadia nutans* subsp. *eremaea*	X	
Chenopodiaceae	*Enchylaena tomentosa*	X	X
Chenopodiaceae	*Maireana villosa*	X	X
Chenopodiaceae	*Salsola australis*	X	X
Chenopodiaceae	*Sclerolaena convexula*	X	
Chenopodiaceae	*Sclerolaena cornishiana*	X	X
Chenopodiaceae	*Sclerolaena deserticola*		X
Cleomaceae	*Arivela viscosa*	X	X
Convolvulaceae	*Bonamia deserticola*		X
Convolvulaceae	*Bonamia erecta*	X	X
Convolvulaceae	*Bonamia media*	X	X
Convolvulaceae	*Evolvulus alsinoides* var. *decumbens*	X	
Convolvulaceae	*Evolvulus alsinoides* var. *villosicalyx*	X	X
Convolvulaceae	*Ipomoea costata*		X
Convolvulaceae	*Ipomoea muelleri*	X	X
Cucurbitaceae	**Citrullus colocynthis*	X	X
Cucurbitaceae	*Cucumis argenteus*	X	
Cucurbitaceae	*Cucumis* sp.		X
Cyperaceae	*Bulbostylis barbata*	X	X
Cyperaceae	*Cyperus blakeanus*	X	X
Cyperaceae	*Cyperus iria*		X
Cyperaceae	*Cyperus vaginatus*	X	
Cyperaceae	*Fimbristylis ammobia*	X	
Cyperaceae	*Fimbristylis caespitosa*	X	
Cyperaceae	*Fimbristylis dichotoma*	X	X
Elatinaceae	*Bergia henshallii*	X	
Euphorbiaceae	*Euphorbia biconvexa*	X	
Euphorbiaceae	*Euphorbia ferdinandi*		X
Euphorbiaceae	*Euphorbia ferdinandi* var. *ferdinandi*	X	X
Euphorbiaceae	*Euphorbia papillata* var. *papillata*	X	
Euphorbiaceae	*Euphorbia* sp.		X
Euphorbiaceae	*Euphorbia tannensis*	X	X
Fabaceae	*Acacia adsurgens*	X	X
Fabaceae	*Acacia ancistrocarpa*	X	
Fabaceae	*Acacia aneura*		X
Fabaceae	*Acacia aptaneura*	X	X

Family	Species	Control	Rehab
Fabaceae	*Acacia bivenosa*	X	
Fabaceae	*Acacia colei*	X	X
Fabaceae	*Acacia cuthbertsonii* subsp. *cuthbertsonii*	X	X
Fabaceae	*Acacia elachantha*	X	X
Fabaceae	*Acacia estrophiolata*		X
Fabaceae	*Acacia incuraneura*	X	
Fabaceae	*Acacia kempeana*	X	X
Fabaceae	*Acacia melleodora*	X	X
Fabaceae	*Acacia pruinocarpa*	X	X
Fabaceae	*Acacia sericophylla*	X	X
Fabaceae	*Acacia sibirica*	X	X
Fabaceae	*Acacia* sp.		X
Fabaceae	*Acacia stipuligera*	X	X
Fabaceae	*Acacia tenuissima*	X	X
Fabaceae	*Crotalaria eremaea* sp. *strehlowii*	X	
Fabaceae	*Crotalaria* sp.	X	
Fabaceae	*Senna artemisioides* subsp. *filifolia*	X	
Fabaceae	*Senna artemisioides* subsp. *helmsii*	X	X
Fabaceae	*Senna artemisioides* subsp. *oligophylla*	X	X
Fabaceae	*Senna artemisioides* subsp. *x artemisioides*		X
Fabaceae	*Senna pleurocarpa*		X
Fabaceae	*Senna* sp.		X
Fabaceae	*Sesbania cannabina*	X	
Fabaceae	*Tephrosia brachyodon*	X	X
Fabaceae	*Tephrosia* sp.	X	
Fabaceae	*Tephrosia* sp. D Kimberley Flora (R.D.Royce 1848)	X	X
Fabaceae	*Tephrosia supina*	X	X
Fabaceae	*Glycine canescens*		X
Fabaceae	*Indigofera colutea*	X	X
Fabaceae	*Indigofera linifolia*	X	X
Fabaceae	*Indigofera linnaei*	X	X
Fabaceae	*Leptosema anomalum*		X
Fabaceae	*Leptosema chambersii*	X	
Fabaceae	*Muelleranthus stipularis*	X	X
Fabaceae	*Petalostylis cassioides*		X
Fabaceae	*Rhynchosia minima*		X
Fabaceae	*Vigna lanceolata* var. *latifolia*	X	

Family	Species	Control	Rehab
Fabaceae	*Vigna* sp. McDonald Downs Station	X	
Fabaceae	*Zornia albiflora*	X	X
Goodeniaceae	*Goodenia armitiana*	X	X
Goodeniaceae	*Goodenia modesta*	X	
Goodeniaceae	*Goodenia* sp.		X
Goodeniaceae	*Goodenia triodiophila*	X	X
Goodeniaceae	*Goodenia vilmoriniae*	X	
Goodeniaceae	*Scaevola parvifolia* subsp. *parvifolia*	X	X
Gyrostemonaceae	*Codonocarpus cotinifolius*	X	
Lamiaceae	*Dicrastylis exsuccosa*	X	
Lamiaceae	*Dicrastylis lewellinii*	X	X
Lauraceae	*Cassytha capillaris* (arid form)	X	
Lauraceae	*Cassytha* sp.	X	X
Loganiaceae	*Mitrasacme exserta*	X	
Malvaceae	*Abutilon fraseri* subsp. *fraseri*		X
Malvaceae	*Abutilon macrum*	X	X
Malvaceae	*Abutilon otocarpum*	X	X
Malvaceae	*Androcalva loxophylla*	X	
Malvaceae	*Corchorus sidoides*		X
Malvaceae	*Gossypium australe*	X	X
Malvaceae	*Hibiscus burtonii*	X	X
Malvaceae	*Hibiscus leptocladus*	X	
Malvaceae	*Hibiscus sturtii* var. *campychlamys*	X	
Malvaceae	*Hibiscus sturtii* var. *truncatus*	X	X
Malvaceae	*Seringia nephrosperma*	X	X
Malvaceae	*Sida cardiophylla*	X	X
Malvaceae	*Sida fibulifera*		X
Malvaceae	*Sida platycalyx*	X	X
Malvaceae	*Sida* sp.	X	
Malvaceae	*Sida* sp. Excedentifolia (J.L.Egan 1925)	X	X
Malvaceae	*Sida* sp. Pindan (B.G. Thomson 3398)		X
Malvaceae	*Sida* sp. Rabbit Flat (B.J. Carter 626)	X	
Malvaceae	*Sida* sp. Wakaya Desert (P.K.Latz 11894)	X	X
Marsileaceae	*Marsilea hirsuta*	X	X
Montiaceae	*Calandrinia balonensis*	X	X
Montiaceae	*Calandrinia pleiopetala*	X	X
Montiaceae	*Calandrinia ptychosperma*	X	

Family	Species	Control	Rehab
Myrtaceae	*Corymbia opaca*	X	X
Myrtaceae	*Eucalyptus camaldulensis* subsp. *arida*	X	
Myrtaceae	*Eucalyptus gamophylla*	X	
Myrtaceae	*Melaleuca glomerata*	X	X
Myrtaceae	*Melaleuca lasiandra*	X	X
Nyctaginaceae	*Boerhavia coccinea*	X	X
Phrymaceae	*Mimulus gracilis*	X	X
Phyllanthaceae	*Dendrophyllanthus erwinii*	X	X
Plantaginaceae	*Stemodia glabella*	X	X
Plantaginaceae	*Stemodia* sp.		X
Poaceae	**Cenchrus ciliaris*	X	X
Poaceae	**Cynodon dactylon*	X	X
Poaceae	**Eragrostis minor*		X
Poaceae	**Eragrostis trichophora*		X
Poaceae	*Aristida contorta*	X	X
Poaceae	*Aristida holathera*	X	X
Poaceae	*Aristida holathera* var. *holathera*	X	X
Poaceae	*Aristida inaequiglumis*	X	X
Poaceae	*Aristida latifolia*	X	
Poaceae	*Chloris pectinata*	X	
Poaceae	*Cymbopogon ambiguus*	X	X
Poaceae	*Cynodon dactylon*	X	X
Poaceae	*Dactyloctenium radulans*	X	X
Poaceae	*Digitaria brownii*	X	X
Poaceae	*Digitaria divaricatissima*	X	
Poaceae	*Digitaria hystrichoides*		X
Poaceae	*Echinochloa colona*	X	X
Poaceae	*Enneapogon cylindricus*	X	X
Poaceae	*Enneapogon polyphyllus*	X	X
Poaceae	*Enteropogon ramosus*	X	
Poaceae	*Eragrostis cumingii*	X	X
Poaceae	*Eragrostis cylindriflora*	X	
Poaceae	*Eragrostis eriopoda*	X	X
Poaceae	*Eragrostis eriopoda* subsp. sandy fire weed (P.K Latz 12908)	X	
Poaceae	*Eragrostis falcata*	X	X
Poaceae	*Eragrostis kennedyae*		X
Poaceae	*Eragrostis leptocarpa*	X	X

Family	Species	Control	Rehab
Poaceae	*Eragrostis minor*	X	
Poaceae	*Eragrostis speciosa*	X	X
Poaceae	*Eragrostis tenellula*	X	X
Poaceae	*Eriachne aristidea*	X	X
Poaceae	*Eriachne armitii*		X
Poaceae	*Eriachne helmsii*	X	
Poaceae	*Eriachne obtusa*	X	X
Poaceae	*Eriachne pulchella* subsp. *Dominii*	X	
Poaceae	*Eriachne pulchella* subsp. *pulchella*		X
Poaceae	*Eulalia aurea*	X	
Poaceae	*Iseilema membranaceum*	X	X
Poaceae	*Monachather paradoxus*	X	X
Poaceae	*Panicum australiense*	X	X
Poaceae	*Panicum decompositum*	X	X
Poaceae	*Panicum laevinode*	X	X
Poaceae	*Panicum* sp.	X	
Poaceae	*Paraneurachne muelleri*	X	X
Poaceae	*Paspalidium basicladum*		X
Poaceae	*Paspalidium clementii*	X	
Poaceae	*Paspalidium rarum*	X	
Poaceae	*Paspalidium* sp.		X
Poaceae	*Perotis rara*	X	X
Poaceae	*Polygala isingii*		X
Poaceae	*Schizachyrium fragile*	X	X
Poaceae	*Setaria surgens*	X	
Poaceae	*Sporobolus australasicus*	X	X
Poaceae	*Sporobolus blakei*	X	
Poaceae	*Themeda triandra*		X
Poaceae	*Triodia basedowii*	X	X
Poaceae	*Triodia pungens*	X	X
Poaceae	*Triodia schinzii*	X	
Poaceae	*Tripogonella loliiformis*	X	
Poaceae	*Urochloa piligera*		X
Polygalaceae	*Polygala dependens*		X
Portulacaceae	*Portulaca filifolia*	X	X
Portulacaceae	*Portulaca oleracea* var. *undoolya*	X	X
Portulacaceae	*Portulaca oleracea*	X	X

Family	Species	Control	Rehab
Portulacaceae	*Portulaca pilosa*	X	
Proteaceae	*Grevillea wickhamii* subsp. *aprica*	X	
Proteaceae	*Hakea chordophylla*	X	
Proteaceae	*Hakea macrocarpa*	X	X
Pteridaceae	*Cheilanthes sieberi* subsp. *sieberi*	X	
Rubiaceae	*Dentella asperata*		X
Rubiaceae	*Spermacoce hillii*		X
Rubiaceae	*Spermacoce occidentalis*	X	
Rubiaceae	*Synaptantha tillaeacea* var. *tillaeacea*		X
Santalaceae	*Anthobolus leptomerioides*	X	
Scrophulariaceae	*Eremophila gilesii* subsp. *gilesii*	X	X
Scrophulariaceae	*Eremophila latrobei* subsp. *glabra*	X	
Scrophulariaceae	*Eremophila* sp.	X	X
Solanaceae	*Solanum centrale*	X	X
Solanaceae	*Solanum coactiliferum*		X
Solanaceae	*Solanum gilesii*		X
Solanaceae	*Solanum quadriloculatum*	X	X
Stylidiaceae	*Stylidium desertorum*	X	X
Surianaceae	*Stylobasium spathulatum*	X	X
Zygophyllaceae	*Tribulopis angustifolia*	X	X
Zygophyllaceae	*Tribulus macrocarpus*		X
Zygophyllaceae	*Tribulus minutus*		X
Zygophyllaceae	*Tribulus sp.*	X	

Appendix D Species by site matrix

Family	Species	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B	6A	6B	7A	7B	8A	8B	9A	9B	10A	10B	11A	11B	12A	12B	13A	13B	14A	14B	15A	15B	16A	16B	17A	17B
Acanthaceae	*Rostellularia adscendens* subsp. *adscendens* var. *pogonanthera*																							X											
Aizoaceae	*Trianthema pilosum*		X																																
Aizoaceae	*Trianthema triquetrum*															X	X																		
Amaranthaceae	*Alternanthera angustifolia*							X		X	X	X	X											X	X										
Amaranthaceae	*Alternanthera denticulata*					X						X																							
Amaranthaceae	*Alternanthera* sp.																X					X													
Amaranthaceae	*Gomphrena lanata*						X		X																										
Amaranthaceae	*Gomphrena leptophylla*																	X	X																
Amaranthaceae	*Ptilotus calostachyus*																													X					
Amaranthaceae	*Ptilotus fusiformis*														X											X		X	X						
Amaranthaceae	*Ptilotus helipteroides*																					X													
Amaranthaceae	*Ptilotus obovatus*										X												X				X								
Amaranthaceae	*Ptilotus polystachyus*						X																X												X
Amaranthaceae	*Ptilotus schwartzii*																						X						X						
Asteraceae	*Streptoglossa odora*									X																									
Asteraceae	*Blumea tenella*															X								X	X										
Asteraceae	*Centipeda minima*																							X	X										
Asteraceae	*Pluchea dunlopii*									X	X		X						X																
Asteraceae	*Pluchea ferdinandi-muelleri*													X	X	X	X									X									
Asteraceae	*Pluchea tetranthera*																										X								
Asteraceae	*Pterocaulon* sp.		X														X						X												X
Asteraceae	*Pterocaulon sphacelatum*			X	X											X						X		X											
Asteraceae	*Rutidosis helichrysoides*																								X										
Boraginaceae	*Euploca tanythrix*					X	X		X													X	X												X
Boraginaceae	*Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206)																													X					
Boraginaceae	*Heliotropium subreniforme*													X																					
Boraginaceae	*Trichodesma zeylanicum* var. *zeylanicum*												X																						
Byblidaceae	*Byblis filifolia*																	X	X																
Campanulaceae	*Wahlenbergia* ?*tumidifructa*																		X																
Caryophyllaceae	*Polycarpaea corymbosa*				X		X				X							X	X		X	X	X							X	X		X		X
Celastraceae	*Macgregoria racemigera*																	X	X																
Celastraceae	*Stackhousia intermedia*																	X	X												X				
Chenopodiaceae	*Dysphania glomulifera*																X																		
Chenopodiaceae	*Dysphania rhadinostachya*						X									X																			
Chenopodiaceae	*Dysphania rhadinostachya* subsp. *rhadinostachya*			X	X																														
Chenopodiaceae	*Einadia nutans* subsp. *eremaea*								X														X												
Chenopodiaceae	*Enchylaena tomentosa*				X											X	X		X														X		
Chenopodiaceae	*Maireana villosa*			X	X																														X
Chenopodiaceae	*Salsola australis*	X																																X	X
Chenopodiaceae	*Sclerolaena convexula*				X				X																										X
Chenopodiaceae	*Sclerolaena cornishiana*			X	X	X	X	X	X								X					X											X	X
Chenopodiaceae	*Sclerolaena deserticola*					X																													
Cleomaceae	*Arivela viscosa*		X	X		X	X	X	X	X	X	X	X				X					X	X	X	X		X						X	X

Family	Species	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B	6A	6B	7A	7B	8A	8B	9A	9B	10A	10B	11A	11B	12A	12B	13A	13B	14A	14B	15A	15B	16A	16B	17A	17B
Convolvulaceae	*Bonamia deserticola*									X				X																					
Convolvulaceae	*Bonamia erecta*																											X	X						
Convolvulaceae	*Bonamia media*										X									X													X		
Convolvulaceae	*Evolvulus alsinoides* var. *decumbens*														X																X				
Convolvulaceae	*Evolvulus alsinoides* var. *villosicalyx*			X	X	X	X	X	X	X	X	X	X									X	X	X	X	X						X	X	X	X
Convolvulaceae	*Ipomoea costata*									X																									
Convolvulaceae	*Ipomoea muelleri*									X	X	X	X									X												X	
Cucurbitaceae	**Citrullus colocynthis*											X	X																						
Cucurbitaceae	*Cucumis argenteus*						X		X														X												X
Cucurbitaceae	*Cucumis* sp.															X						X													
Cyperaceae	*Bulbostylis barbata*			X		X			X	X	X				X		X	X	X				X							X	X				X
Cyperaceae	*Cyperus blakeanus*																	X	X																
Cyperaceae	*Cyperus iria*									X																									
Cyperaceae	*Cyperus vaginatus*		X																																
Cyperaceae	*Fimbristylis ammobia*																		X																
Cyperaceae	*Fimbristylis caespitosa*																		X																
Cyperaceae	*Fimbristylis dichotoma*				X	X	X		X	X	X		X										X		X									X	X
Elatinaceae	*Bergia henshallii*										X																								
Euphorbiaceae	*Euphorbia biconvexa*				X		X		X				X												X										
Euphorbiaceae	*Euphorbia ferdinandi*									X		X		X																					
Euphorbiaceae	*Euphorbia ferdinandi* var. *ferdinandi*							X														X	X												X
Euphorbiaceae	*Euphorbia papillata* var. *papillata*										X		X																						
Euphorbiaceae	*Euphorbia* sp.							X																											
Euphorbiaceae	*Euphorbia tannensis*			X				X	X		X												X		X								X	X	
Fabaceae	*Acacia adsurgens*									X	X																X				X				
Fabaceae	*Acacia ancistrocarpa*																												X						
Fabaceae	*Acacia aneura*																					X													
Fabaceae	*Acacia aptaneura*				X		X	X	X														X	X										X	X
Fabaceae	*Acacia bivenosa*																X														X		X		
Fabaceae	*Acacia colei*	X	X																																
Fabaceae	*Acacia cuthbertsonii* subsp. *cuthbertsonii*					X	X																												
Fabaceae	*Acacia elachantha*													X												X				X	X				
Fabaceae	*Acacia estrophiolata*									X																									
Fabaceae	*Acacia incuraneura*												X												X										
Fabaceae	*Acacia kempeana*								X																									X	X
Fabaceae	*Acacia melleodora*													X	X					X	X											X			
Fabaceae	*Acacia pruinocarpa*				X					X																									
Fabaceae	*Acacia sericophylla*																			X	X					X		X	X						
Fabaceae	*Acacia sibirica*												X									X			X										
Fabaceae	*Acacia* sp.													X																					
Fabaceae	*Acacia stipuligera*																												X	X	X				
Fabaceae	*Acacia tenuissima*									X																				X	X				
Fabaceae	*Crotalaria eremaea* sp. *strehlowii*				X																														
Fabaceae	*Crotalaria* sp.								X																										
Fabaceae	*Senna artemisioides* subsp. *filifolia*																						X												
Fabaceae	*Senna artemisioides* subsp. *helmsii*						X	X	X	X	X		X	X										X												X
Fabaceae	*Senna artemisioides* subsp. *oligophylla*								X		X	X		X												X	X							X	X
Fabaceae	*Senna artemisioides* subsp. *x artemisioides*																					X										X			

Family	Species	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B	6A	6B	7A	7B	8A	8B	9A	9B	10A	10B	11A	11B	12A	12B	13A	13B	14A	14B	15A	15B	16A	16B	17A	17B
Fabaceae	*Senna pleurocarpa*																											X							
Fabaceae	*Senna* sp.																																	X	
Fabaceae	*Sesbania cannabina*		X																																
Fabaceae	*Tephrosia brachyodon*					X	X																												
Fabaceae	*Tephrosia* sp.				X																														
Fabaceae	*Tephrosia* sp. D Kimberley Flora (R.D.Royce 1848)													X	X					X								X	X	X					
Fabaceae	*Tephrosia supina*									X	X																								
Fabaceae	*Glycine canescens*							X																										X	
Fabaceae	*Indigofera colutea*									X	X					X	X																		
Fabaceae	*Indigofera linifolia*								X	X	X			X																						
Fabaceae	*Indigofera linnaei*							X	X	X													X											X	X
Fabaceae	*Leptosema anomalum*																													X					
Fabaceae	*Leptosema chambersii*																												X						
Fabaceae	*Muelleranthus stipularis*										X															X					X	X		
Fabaceae	*Petalostylis cassioides*																															X			
Fabaceae	*Rhynchosia minima*													X		X																			
Fabaceae	*Vigna lanceolata* var. *latifolia*		X																																
Fabaceae	*Vigna* sp. McDonald Downs Station																								X										
Fabaceae	*Zornia albiflora*									X	X			X	X																				
Goodeniaceae	*Goodenia armitiana*										X		X													X									
Goodeniaceae	*Goodenia modesta*												X																						
Goodeniaceae	*Goodenia* sp.									X																									
Goodeniaceae	*Goodenia triodiophila*																													X	X				
Goodeniaceae	*Goodenia vilmoriniae*						X																												
Goodeniaceae	*Scaevola parvifolia* subsp. *parvifolia*																			X	X							X	X	X	X	X	X		
Gyrostemonaceae	*Codonocarpus cotinifolius*				X																														
Lamiaceae	*Dicrastylis exsuccosa*																												X						
Lamiaceae	*Dicrastylis lewellinii*																															X	X		
Lauraceae	*Cassytha capillaris (arid form)*																														X				
Lauraceae	*Cassytha* sp.																										X			X					
Loganiaceae	*Mitrasacme exserta*																		X																
Malvaceae	*Abutilon fraseri* subsp. *Fraseri*																																	X	
Malvaceae	*Abutilon macrum*					X		X	X														X			X						X			X
Malvaceae	*Abutilon otocarpum*	X	X		X		X		X	X	X			X		X	X					X										X		X	X
Malvaceae	*Androcalva loxophylla*																				X														
Malvaceae	*Corchorus sidoides*																											X							
Malvaceae	*Gossypium australe*									X	X															X									
Malvaceae	*Hibiscus burtonii*	X	X						X													X	X									X	X	X	
Malvaceae	*Hibiscus leptocladus*		X																				X		X										
Malvaceae	*Hibiscus sturtii* var. *campychlamys*																						X												
Malvaceae	*Hibiscus sturtii* var. *truncatus*					X	X																												
Malvaceae	*Seringia nephrosperma*																											X	X	X		X			
Malvaceae	*Sida cardiophylla*													X																		X	X		
Malvaceae	*Sida fibulifera*							X																											
Malvaceae	*Sida platycalyx*				X																	X		X		X								X	
Malvaceae	*Sida* sp.												X																						
Malvaceae	*Sida* sp. Excedentifolia (J.L.Egan 1925)	X				X	X															X	X												
Malvaceae	*Sida* sp. Pindan (B.G. Thomson 3398)													X																					

Family	Species	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B	6A	6B	7A	7B	8A	8B	9A	9B	10A	10B	11A	11B	12A	12B	13A	13B	14A	14B	15A	15B	16A	16B	17A	17B
Malvaceae	*Sida* sp. Rabbit Flat (B.J. Carter 626)																X		X																
Malvaceae	*Sida* sp. Wakaya Desert (P.K.Latz 11894)			X	X																	X								X		X	X		
Marsileaceae	*Marsilea hirsuta*											X	X											X	X										
Montiaceae	*Calandrinia balonensis*			X	X																											X	X		
Montiaceae	*Calandrinia pleiopetala*																	X	X																
Montiaceae	*Calandrinia pychosperma*												X																						
Myrtaceae	*Corymbia opaca*							X														X	X												
Myrtaceae	*Eucalyptus camaldulensis* subsp. *arida*		X																																
Myrtaceae	*Eucalyptus gamophylla*																										X						X		
Myrtaceae	*Melaleuca glomerata*													X	X	X	X		X																
Myrtaceae	*Melaleuca lasiandra*													X	X			X																	
Nyctaginaceae	*Boerhavia coccinea*			X	X	X	X	X	X	X	X	X	X								X	X	X	X				X	X					X	X
Phrymaceae	*Mimulus gracilis*																	X	X															X	
Phyllanthaceae	*Dendrophyllanthus erwinii*							X	X		X	X	X									X	X	X	X										
Plantaginaceae	*Stemodia glabella*					X	X																												
Plantaginaceae	*Stemodia* sp.																									X									
Poaceae	**Cenchrus ciliaris*		X	X										X		X	X																		
Poaceae	**Cynodon dactylon*	X	X													X																			
Poaceae	**Eragrostis minor*					X						X																							
Poaceae	**Eragrostis trichophora*																					X												X	
Poaceae	*Aristida contorta*			X		X		X	X	X												X			X									X	X
Poaceae	*Aristida holathera*			X	X	X	X					X							X			X		X			X		X		X	X	X	X	
Poaceae	*Aristida holathera* var. *holathera*									X	X		X	X				X		X						X		X		X					
Poaceae	*Aristida inaequiglumis*			X	X	X				X			X										X	X						X		X		X	
Poaceae	*Aristida latifolia*				X		X				X		X										X		X										
Poaceae	*Chloris pectinata*												X				X																		
Poaceae	*Cymbopogon ambiguus*								X	X																									
Poaceae	*Cynodon dactylon*	X							X			X												X											
Poaceae	*Dactyloctenium radulans*							X	X	X		X												X										X	X
Poaceae	*Digitaria brownii*					X		X	X													X		X								X			
Poaceae	*Digitaria divaricatissima*																						X												
Poaceae	*Digitaria hystrichoides*																					X		X											
Poaceae	*Echinochloa colona*											X	X																						
Poaceae	*Enneapogon cylindricus*							X	X				X									X	X	X										X	X
Poaceae	*Enneapogon polyphyllus*			X		X	X				X														X										
Poaceae	*Enteropogon ramosus*																						X												X
Poaceae	*Eragrostis cumingii*				X		X		X	X	X		X					X	X			X	X	X	X									X	X
Poaceae	*Eragrostis cylindriflora*	X																																	
Poaceae	*Eragrostis eriopoda*			X	X	X				X				X							X		X	X						X		X	X	X	
Poaceae	*Eragrostis eriopoda* subsp. sandy fire weed (P.K Latz 12908)																				X								X		X				
Poaceae	*Eragrostis falcata*							X		X						X	X																	X	
Poaceae	*Eragrostis kennedyae*											X																				X			
Poaceae	*Eragrostis leptocarpa*			X			X	X	X	X		X	X											X											X
Poaceae	*Eragrostis minor*												X												X										
Poaceae	*Eragrostis speciosa*	X																X	X															X	
Poaceae	*Eragrostis tenellula*							X		X			X											X	X									X	
Poaceae	*Eriachne aristidea*			X	X					X	X															X			X			X		

Family	Species	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B	6A	6B	7A	7B	8A	8B	9A	9B	10A	10B	11A	11B	12A	12B	13A	13B	14A	14B	15A	15B	16A	16B	17A	17B
Poaceae	*Eriachne armittii*																					X		X											
Poaceae	*Eriachne helmsii*																						X												
Poaceae	*Eriachne obtusa*						X											X	X																
Poaceae	*Eriachne pulchella* subsp. *Dominii*										X		X																						
Poaceae	*Eriachne pulchella* subsp. *pulchella*					X																													
Poaceae	*Eulalia aurea*		X						X														X												
Poaceae	*Iseilema membranaceum*												X											X											
Poaceae	*Monachather paradoxus*			X	X																	X	X									X			
Poaceae	*Panicum australiense*										X			X	X			X	X	X						X					X	X			
Poaceae	*Panicum decompositum*						X																		X							X			
Poaceae	*Panicum laevinode*					X			X														X												X
Poaceae	*Panicum* sp.												X																						
Poaceae	*Paraneurachne muelleri*				X																											X	X		
Poaceae	*Paspalidium basicladum*			X																															
Poaceae	*Paspalidium clementii*				X		X																X												
Poaceae	*Paspalidium rarum*								X				X												X										X
Poaceae	*Paspalidium* sp.											X										X		X											
Poaceae	*Perotis rara*			X	X				X				X									X	X												X
Poaceae	*Polygala isingii*																									X				X					
Poaceae	*Schizachyrium fragile*																		X							X									
Poaceae	*Setaria surgens*																		X														X		
Poaceae	*Sporobolus australasicus*										X	X	X																						X
Poaceae	*Sporobolus blakei*								X																										
Poaceae	*Themeda triandra*							X																											
Poaceae	*Triodia basedowii*			X	X	X																										X	X		
Poaceae	*Triodia pungens*									X	X			X	X		X	X	X	X	X					X	X	X	X	X	X				
Poaceae	*Triodia schinzii*																				X								X						
Poaceae	*Tripogonella loliiformis*				X		X																												
Poaceae	*Urochloa piligera*																							X											
Polygalaceae	*Polygala dependens*									X																									
Portulacaceae	*Portulaca filifolia*					X		X		X						X						X			X									X	
Portulacaceae	*Portulaca oleracea* var. *undoolya*					X																													X
Portulacaceae	*Portulaca oleracea*				X		X	X	X													X	X	X								X			
Portulacaceae	*Portulaca pilosa*																		X																
Proteaceae	*Grevillea wickhamii* subsp. *aprica*																														X				
Proteaceae	*Hakea chordophylla*										X																		X						
Proteaceae	*Hakea macrocarpa*																									X	X								
Pteridaceae	*Cheilanthes sieberi* subsp. *sieberi*								X																										
Rubiaceae	*Dentella asperata*									X																									
Rubiaceae	*Spermacoce hillii*																											X		X					
Rubiaceae	*Spermacoce occidentalis*		X				X		X																										
Rubiaceae	*Synaptantha tillaeacea* var. *tillaeacea*																	X																	
Santalaceae	*Anthobolus leptomerioides*						X																												
Scrophulariaceae	*Eremophila gilesii* subsp. *gilesii*			X			X															X	X												
Scrophulariaceae	*Eremophila latrobei* subsp. *glabra*								X																								X		X
Scrophulariaceae	*Eremophila* sp.			X	X	X																										X		X	
Solanaceae	*Solanum centrale*			X	X	X	X			X	X										X						X			X		X	X	X	X
Solanaceae	*Solanum coactiliferum*																									X									

Family	Species	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B	6A	6B	7A	7B	8A	8B	9A	9B	10A	10B	11A	11B	12A	12B	13A	13B	14A	14B	15A	15B	16A	16B	17A	17B
Solanaceae	*Solanum gilesii*																											X							
Solanaceae	*Solanum quadriloculatum*							X														X	X												
Stylidiaceae	*Stylidium desertorum*										X							X	X																
Surianaceae	*Stylobasium spathulatum*																	X	X							X					X				
Zygophyllaceae	*Tribulopis angustifolia*																			X												X			
Zygophyllaceae	*Tribulus macrocarpus*					X				X																									
Zygophyllaceae	*Tribulus minutus*							X				X																							
Zygophyllaceae	*Tribulus* sp.																						X												

Appendix E Summary of introduced (weed) species recorded across the TNP

Species	WoNS or Declared Pest?	Monitoring site	Quadrat type	# of plants
**Cenchrus ciliaris*	No	1B	Control	2
**Cenchrus ciliaris*	No	2A	Rehabilitation	2
**Cenchrus ciliaris*	No	7A	Rehabilitation	1
**Cenchrus ciliaris*	No	8A	Rehabilitation	40
**Cenchrus ciliaris*	No	8B	Control	33
**Citrullus colocynthis*	No	6A	Rehabilitation	3
**Citrullus colocynthis*	No	6B	Control	2
**Cynodon dactylon*	No	1A	Rehabilitation	1
**Cynodon dactylon*	No	1B	Control	12
**Cynodon dactylon*	No	8A	Rehabilitation	100
**Eragrostis minor*	No	3A	Rehabilitation	7
**Eragrostis minor*	No	6A	Rehabilitation	250
**Eragrostis trichophora*	No	11A	Rehabilitation	5
**Eragrostis trichophora*	No	17A	Rehabilitation	2

Note: Completion criteria states percentage of foliage cover of Declared species under the Weeds Management Act, Weeds of National Significance (WONS) and Buffel grass (**Cenchrus ciliaris*).

Appendix F Assessment of individual monitoring sites within the TNP against minimum standards outlined in approved completion criteria (AGIG *Tanami Newmont Gas Pipeline Rehabilitation Plan*; ELA 2018a)

Monitoring site	Hectares (ha)	Rehabilitation zone	Native flora species density (plants per m^2)			Native flora species richness (per quadrat)			Native flora species foliage cover (%)			Weed foliage cover (%)		
			Control	Rehabilitation	Pass (y/n)	Control	Rehabilitation	Pass (y/n)	Control	Rehabilitation	Pass (y/n)	Control	Rehabilitation	Pass (y/n)
1	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	MNES habitat zone (Dwarf Desert Spike-rush habitat), MNES habitat zone (Princess Parrot habitat)	0.038	0.0004	n	11	1	n	3.86	0.2	n	0.15	0	y
2	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	MNES habitat zone (Greater Bilby and Great Desert Skink habitat), MNES habitat zone (Night Parrot habitat)	0.1062	0.4874	y	26	17	n	29.22	49.44	y	0	0.05	n
3	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	MNES habitat zone (Dwarf Desert Spike-rush habitat)	0.1142	0.0894	y	20	20	y	14.57	13.09	y	0	0	y
4	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	MNES habitat zone (Dwarf Desert Spike-rush habitat), MNES habitat zone (Princess Parrot habitat)	0.158	0.1378	y	26	17	n	39.37	10.76	n	0	0	y
5	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	MNES habitat zone (Greater Bilby and Great Desert Skink habitat), MNES habitat zone (Night Parrot habitat), MNES habitat zone (Princess Parrot habitat)	0.1516	0.1868	y	24	28	y	48.39	51.64	y	0	0	y
6	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	MNES habitat zone (Dwarf Desert Spike-rush habitat)	0.0392	0.0264	n	17	8	n	16.85	1.18	n	0	0	y
7	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	MNES habitat zone (Greater Bilby and Great Desert Skink habitat), MNES habitat zone (Night Parrot habitat), MNES habitat zone (Princess Parrot habitat)	0.1856	0.0978	n	9	16	y	58.2	40.02	n	0	0.05	n
8	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	MNES habitat zone (Dwarf Desert Spike-rush habitat)	0.0296	0.1012	y	11	8	y	42.67	63.29	y	2	2	y
9	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	MNES habitat zone (Greater Bilby and Great Desert Skink habitat), MNES habitat zone (Night Parrot habitat)	0.289	0.1318	n	12	9	y	24.98	45.59	y	0	0	y
10	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	MNES habitat zone (Greater Bilby and Great Desert Skink habitat), MNES habitat zone (Night Parrot habitat), MNES habitat zone (Princess Parrot habitat)	0.1008	0.0104	n	9	8	y	64.86	1.07	n	0	0	y
11	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	Native vegetation zone	0.2734	0.2702	y	29	22	y	27.54	13.91	y	0	0	y
12	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	Native vegetation zone	0.0842	0.0822	y	11	13	y	24.24	4.04	n	0	0	y
13	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	Native vegetation zone	0.1566	0.0422	n	9	16	y	61.04	18.8	n	0	0	y

Monitoring site	Hectares (ha)	Rehabilitation zone	Native flora species density (plants per m^2)			Native flora species richness (per quadrat)			Native flora species foliage cover (%)			Weed foliage cover (%)		
			Control	Rehabilitation	Pass (y/n)	Control	Rehabilitation	Pass (y/n)	Control	Rehabilitation	Pass (y/n)	Control	Rehabilitation	Pass (y/n)
14	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	Native vegetation zone	0.1908	0.2318	y	15	12	y	32.36	34.97	y	0	0	y
15	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	Native vegetation zone	0.0702	0.062	y	14	19	y	58.43	29.03	n	0	0	y
16	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	MNES habitat zone (Greater Bilby and Great Desert Skink habitat), MNES habitat zone (Night Parrot habitat)	0.117	0.301	y	19	23	y	19.46	51.92	y	0	0	y
17	Control quadrat: 0.1 Rehabilitation quadrat: 0.1 Monitoring site total: 0.2	Native vegetation zone	0.2538	0.5276	y	19	21	y	42.27	32.8	y	0	0	y

Appendix G Photo monitoring points 2020-2023

Monitoring site 1

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

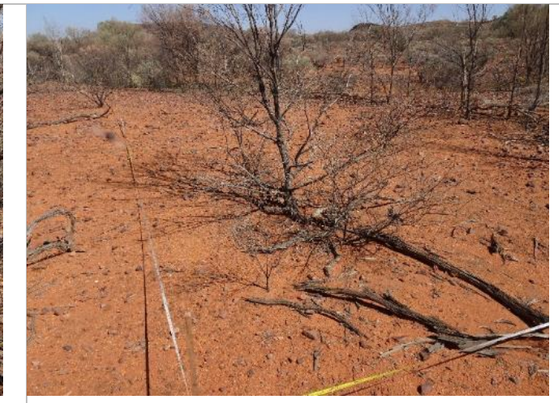
2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 2

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

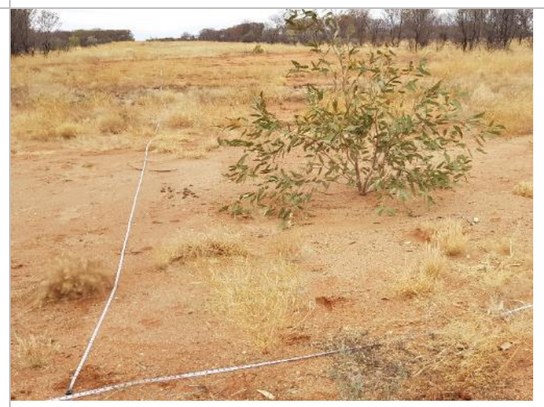
2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 3

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

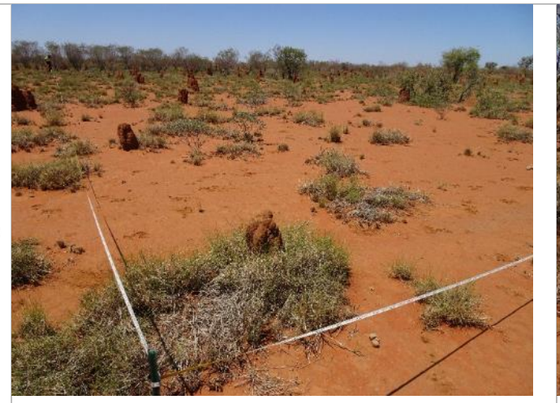
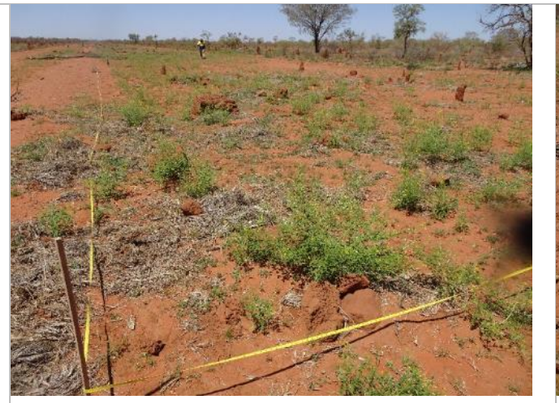
2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 4

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

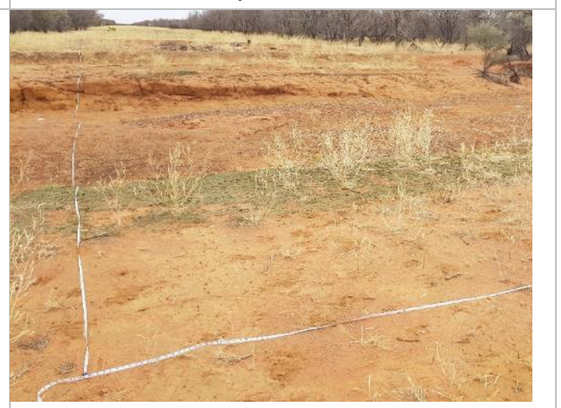
2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 5

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

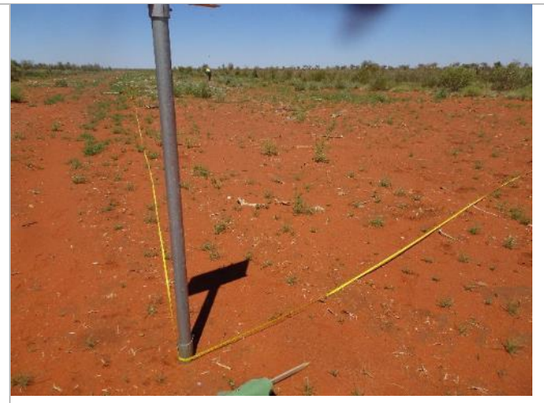
2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 6

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

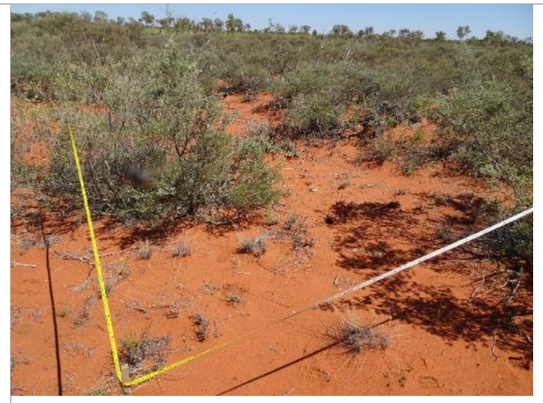
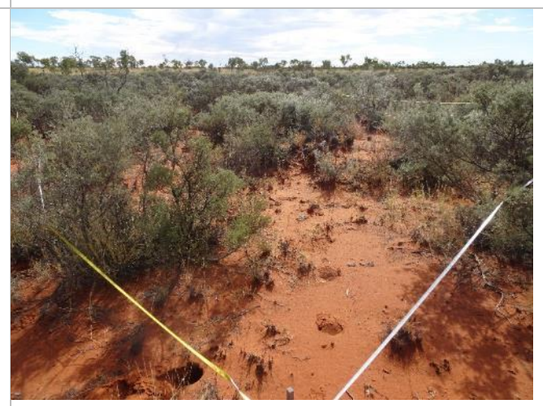
2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

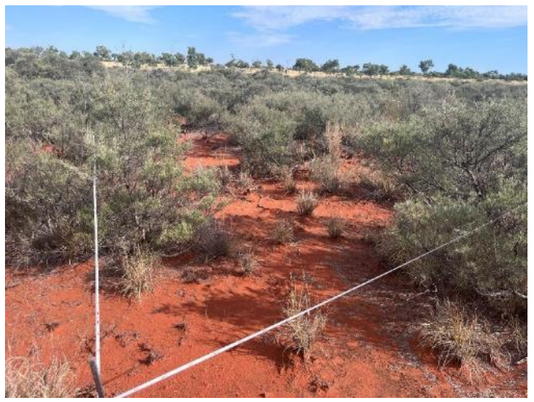
Monitoring site 7

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 8

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 9

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 10

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 11

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 12

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 13

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

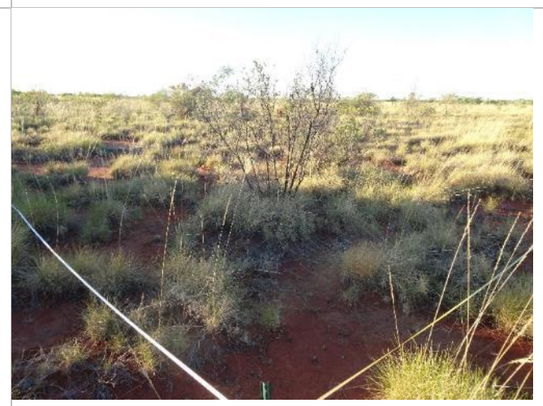
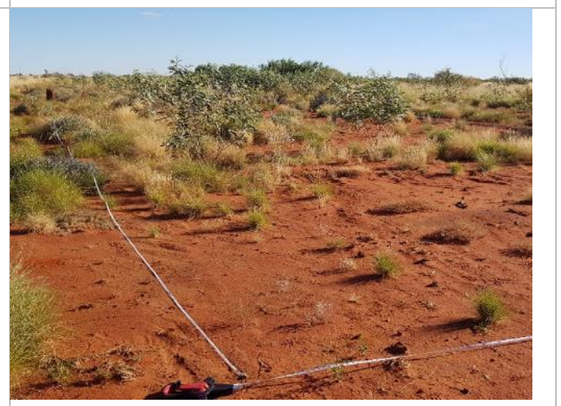
2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 14

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 15

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 16

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

Monitoring site 17

2020				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**
2021				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

2022				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation* – photo from the northwest**	**Rehabilitation* – photo from the southeast**
2023				
	Control – photo from the northwest	**Control – photo from the southeast**	**Rehabilitation – photo from the northwest**	**Rehabilitation – photo from the southeast**

* 17 rehabilitation quadrat was moved in 2022 and 2023 as the 2020/2021 quadrat had been cleared for a camp for another project.

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