

Draft Weed Management Plan

Rum Jungle Rehabilitation

RJ3-4-MP-011

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Acronyms	Full form
CEMP	Construction Environmental Management Plan
DENR	Department of Environment and Natural Resources
DEPWS	Department of Environment, Parks and Water Security
DITT	Department of Industry, Tourism and Trade (NT)
DRWS	Darwin Regional Weed Strategy
EIS	Environmental Impact Statement
ESCP	Erosion and Sediment Control Plan
FAMP	Feral Animal Management Plan
FMP	Fire Management Plan
FRALT	Finness River Aboriginal Land Trust
HSE	Health Safety Environment
NPA	National Partnership Agreement
NT	Northern Territory
NT EPA	Northern Territory Environment Protection Authority
NTG	Northern Territory Government
WMA	Weed Management Act
WMP	Weed Management Plan
WoNS	Weeds of National Significance

WRD	Waste Rock Dump
WSF	Water Storage Facility

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1. Introduction

The Northern Territory Government (NTG; *the proponent*), represented by the Department of Industry, Tourism and Trade (DITT) in partnership with the Commonwealth of Australia (represented by the Department of Industry, Science, Energy and Resources (DISER)), proposes the rehabilitation of the former Rum Jungle Mine, associated satellite mines and two borrow sites (*the project*) – locations are specified below:

- Rum Jungle Site – Section 2968 Hundred of Goyder
- Mt Burton – Section 998 Hundred of Goyder
- Mt Fitch – within NT Portion 3283
- Coomalie Council low permeability borrow area – within Section 2830 Hundred of Goyder
- FRALT granular material borrow area – within Section 2940 Hundred of Goyder

The complete project details can be found within the [Draft EIS](#).

This Weed Management Plan (WMP) outlines scheduled weed management and reporting actions for Stage 3 of the project – the Construction Stage. It has been informed by WMPs and weed surveys from previous stages and has been developed in consultation with relevant stakeholders.

1.1. Scope and Objectives

This WMP will address weed management for all land areas during Stage 3 – the former Rum Jungle Mine, Mt Burton, Mt Finch and all borrow areas. This WMP does not set long-term weed management objectives for Stage 4 onwards; however, actions described within this plan will form the basis and be supportive of achieving project objectives.

From extensive survey efforts of the project, it is known that there are significant areas of weed-dominated vegetation as well as isolated occurrence within the landscape. The project contains declared, environmental weeds and Weeds of National Significance (WoNS) which require control. This WMP prioritises the management of weed species and areas, and identifies appropriate methods of control and timing over the pre-construction and construction components of Stage 3.

The objectives of this WMP are to:

- Comply with all applicable legislation, regulations, conditions and regional weed management plans.
- Identify priority weed species and areas.
- Provide a schedule of control actions to prevent the proliferation or introduction of weeds.

1.2. Background

Weed management activities in the Project area have been occurring for several years as outlined by previous WMPs, Wildman Land Management (2011) and EcOz (2018). The 2018 WMP has been implemented and priorities for control have formed the basis of the onsite weed work to date. This WMP does not take the place of the 2018 WMP for the site, the work as described within the 2018 WMP is to continue as planned until 2023 or commencement of this WMP.

The 2018 WMP prioritised weed control activities within designated 'Infrastructure' or 'High ecological value' zones. This WMP assumes that these activities are underway and that no weed management, to date, has been undertaken in the 'Rehabilitation' zones – the areas where most of the Stage 3 construction will take place.

Stage 3 activities include the removal of existing buildings and landforms – old workshop, WRD, tailing heaps – and construction of new infrastructure and landforms – haul roads, WSF and riverbed reinstatement. During the design phase, consideration was given to the presence of intact native vegetation and culturally-significant flora species. The current design proposes to maximise the use of existing disturbed areas and to minimise loss of remnant vegetation, significant vegetation and culturally-significant flora species.

The significant vegetation includes riparian vegetation along the Finnis River and tributaries, and monsoon vine thicket. The remainder of the site consists of either Eucalypt woodland or disturbed areas. Disturbed areas are currently heavily impacted by weeds and have low ecological value when compared to areas of intact native vegetation. Areas of Eucalypt vegetation that are in good condition (i.e. low weed infestation) were also considered to have high ecological value.

Two borrow areas are located south of the Rum Jungle property area – see Figure 1-1. The Coomalie Council Borrow Area is heavily infested with Gamba Grass, while the FRALT Borrow Area is primarily remnant bushland with isolated patches of Gamba Grass within the woodland areas, as well as along the tracks in the vicinity of the revegetated borrow areas in the centre of the survey area.

1.3. Roles and Responsibilities

The overriding document that details the operational framework under which the Former Rum Jungle Mine Site is managed is the *National Partnership Agreement (NPA) on the management of the former Rum Jungle Mine Site*. Under the NPA, DITT will manage a range of site maintenance activities, including weed management. Responsibility for implementation may be delegated to contractors undertaking the work; however, DITT will maintain overarching responsibility for compliance. The Environmental Manager will conduct follow-up treatment inspections to monitor effectiveness and annual weed monitoring.

1.4. Regulatory framework and guidelines

Document	Relevance to project site and activities
<i>Environmental Protection and Biodiversity Conservation Act (Commonwealth)</i>	Within the EIS, the proponent has made a commitment to develop and implement a Weed Management Plan – to address the impacts of weeds on MNES. Additional conditions of approval may address weeds; however, these are unavailable at the time of writing.
Weeds of National Significance	Commonwealth, state and territory governments have agreed on the declaration of 32 Weeds of National Significance (WoNS), based on invasiveness, potential for spread and environmental, social and economic impacts. Landowners and land managers are responsible for the control and management of WoNS, and state and territory governments are responsible for the requisite legislation, regulation and administration. Three WoNS have been recorded within the project footprint– <i>Mimosa (Mimosa pigra)</i> , <i>Gamba grass (Andropogon gayanus)</i> and <i>Olive Hymenachne (Hymenachne amplexicaulis)</i> .
<i>Weeds Management Act (NT)</i>	This Act is administered by the NT Department of Environment, Parks and Water Security (DEPWS). The WMA declares undesirable species of plants as weeds, and requires these species to be controlled, eradicated or prevented from entering the NT depending on their classification. Classification is as follows: <ul style="list-style-type: none"> • Class A declared plant: to be eradicated • Class B declared plant: growth and spread to be controlled • Class C declared plant: not to be introduced into the NT <i>(Note: Class A and B weeds are also Class C weeds)</i>

Document	Relevance to project site and activities
<i>NT Statutory Weed Management Plans</i>	Once a plant species is declared as a weed under the WMA, the Minister can approve a statutory weed management plan, which identifies a strategic approach to managing the weed species in the NT. A statutory weed management plan establishes the objectives, management requirements and management actions to be achieved by land managers. Land managers must undertake land management practices in accordance with the weed management plans to ensure compliance with the requirements of the WMA. There are three statutory weed management plans relevant to the site: <ul style="list-style-type: none"> • Mimosa • Gamba Grass • Grader Grass
<i>Darwin Regional Weed Strategy 2021-2026</i>	The <i>Darwin Regional Weed Strategy 2021-2026</i> (DRWS) (DEPWS 2021) was developed by the DEPWS. The DRWS was developed by experts to support local weed management priorities, which includes identification of priority weeds, landscape areas and pathways of spread.

Table 1 Regulatory Framework Guidelines

1.5. Related Documents

Background information can be found in:

- Rum Jungle Rehabilitation Project – Draft Environmental Impact Statement (EIS)
- Rum Jungle Rehabilitation Project – EIS – Supplementary Report

The WMP should be read in conjunction with:

- RJP-3-MP-003 Rum Jungle Construction Environmental Management Plan (CEMP) including:
 - RJ3-3-Fr-004 Revegetation Framework
 - RJ3-4-MP-009 Revegetation Management Plan (RMP)
 - RJ3-4-MP-013 Cultural Heritage Management Plan (CHMP)
 - RJ3-4-MP-014 Erosion and Sediment Control Plan (ESCP)
 - RJ3-4-Pr-007 Vegetation Clearing Procedure
 - RJ3-4-Pr-008 Cycad Salvaging Procedure
 - RJ3-4-MP-027 Fire Management Plan (FMP)
 - RJ3-4-MP-008 Feral Animal Management Plan (FAMP)
 - RJ3-4-Pr-009 Rehabilitation Media Stripping and Stockpiling Procedure

1.6. Resource Material

The following weed identification books, field guides and reference materials are available:

Northern Territory Weed Management Handbook 2018
(https://nt.gov.au/_data/assets/pdf_file/0004/233833/NT-Weedmanagement_handbook_2018.pdf)

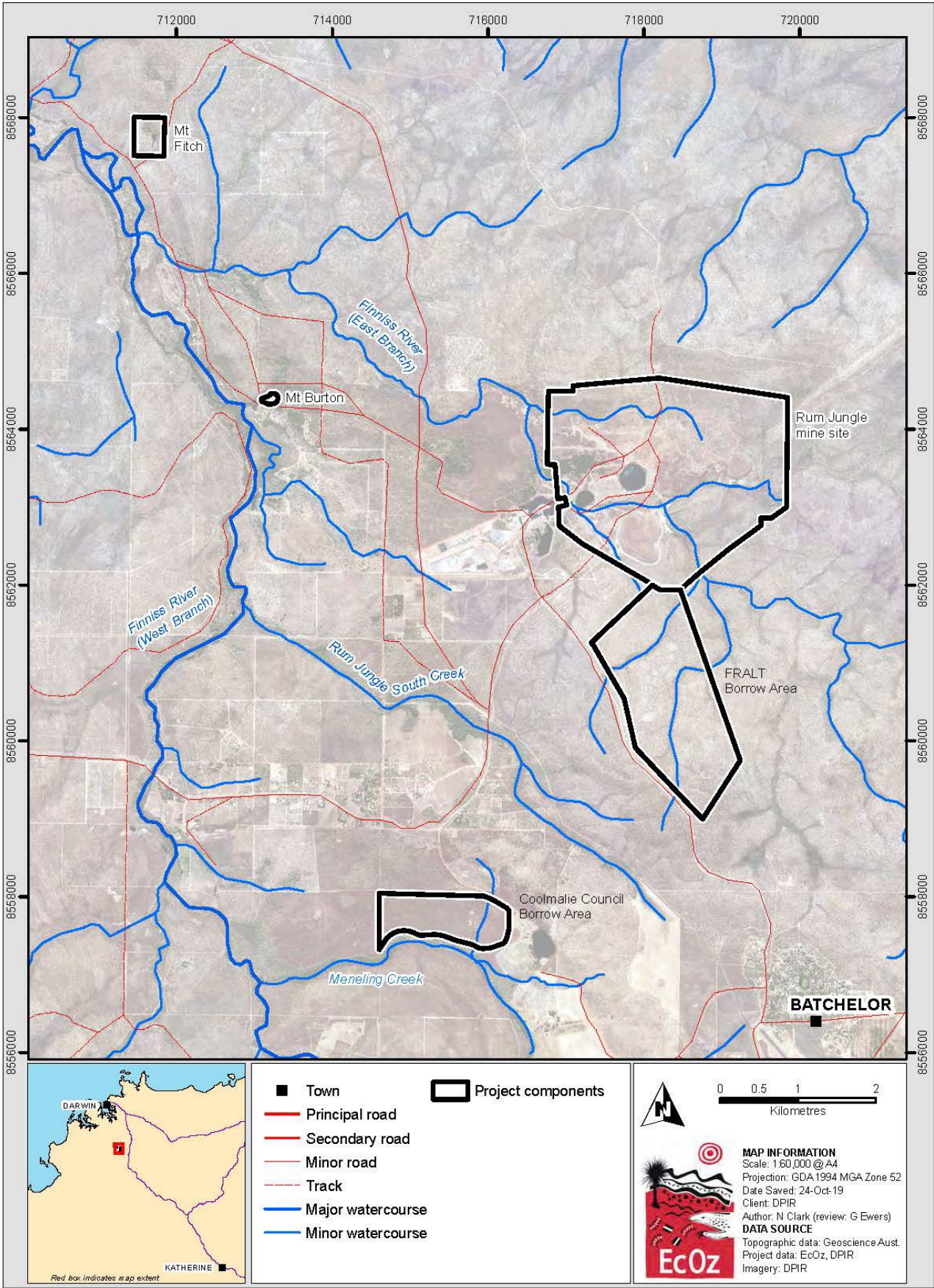
Weeds of Northern Australia: A Field Guide (Smith 2011)

Northern Territory Weed ID Deck 3rd Edition (NTG 2021)
(https://depws.nt.gov.au/_data/assets/pdf_file/0012/257988/2021-weed-id-desk.pdf)

NTG DEPWS Weed Notes (<https://depws.nt.gov.au/rangelands/publications2/weed-management-publications/weed-publications/weed-notes>)

Weed Data Collection – A Field Guide for Collecting Weed Data for the NT (DENR 2016). (https://nt.gov.au/_data/assets/pdf_file/0009/233856/weed-data-collection-field-guide.pdf).

Northern Territory Weed Data Collection Manual Section 1 & 2 (DLRM 2015). (https://nt.gov.au/_data/assets/pdf_file/0007/233854/nt-weed-data-collection-manual-section-1.pdf) & (https://nt.gov.au/_data/assets/pdf_file/0008/233855/nt-weed-data-collection-manual-section-2.pdf)



Path: Z:\01 EcOz_Documents\04 EcOz\anlaga GIS\EZ17175 - Rum Jungle EIS - ecology\01 Project Files\Report maps\September 2019 V2\Figure 1-1: Rum Jungle project footprint.mxd

Figure 1 Map of the Rum Jungle Project areas

2. Weeds relevant to the Project

Weed surveys have been conducted by the Rangers, DITT and private contractors since 1993. The results of these surveys – including mapped occurrences – can be found within the 2018 WMP (EcOz 2018). *Darwin Regional Weed Strategy 2021 – 2026* (DRWS) is the guiding document for prioritisation of weed management for the project. This plan presents three regional weed management priorities:

1. Priority weeds, of which Gamba Grass, Mimosa, Olive Hymenachne, Mission Grass and Grader Grass have been recorded in the project.
2. Priority landscapes, of which sites with no/low incursions of weeds is the most relevant to this project
3. Priority pathways of spread, the most relevant of which are mining areas and river corridors.

The proliferation of Gamba Grass is arguably the most serious environmental problem in the region and one of the most serious threats to the success of the project.

2.1. Records

Rum Jungle Site

The 2018 weed survey by EcOz of the project recorded 978 weed occurrences of 22 species (see Table 2-1). There are 11 species of declared weeds – all Class B, meaning their growth and spread is to be controlled by landowners – and 11 species of environmental weeds. Three of the declared weeds found at the site are also WoNS – see Table 2-1

Much of the woodland communities in the south-east and along the central-north border of the Rum Jungle Site have low densities of Gamba Grass (less than 1 to 10% cover). Infestations were highest to the west and south-west of the Rum Jungle Site. The EcOz (2018) survey of Rum Jungle found that 42% of the Gamba Grass recorded was at greater than 50% density – see Figure 2-1.

Mimosa was found at a few sites in the north-west corner of the Rum Jungle Site and Olive Hymenachne was present along the riparian corridor with higher densities present further upstream, but still within the site – see Figure 2-3.

Calopo vine (*Calopogonium mucunoides*) – while not a declared weed or addressed in the DRWS – poses a threat to riparian revegetation due to its quick growth and habit of smothering vegetation, including seedlings and smaller plants. The EcOz (2018) survey found 38% of Calopo occurrences were recorded at 11-50% density.

Mt Burton

The Mt Burton WRD is almost entirely devoid of vegetation. The adjacent rainforest is also weed-free. Declared weeds recorded in the vicinity of the WRD are Hyptis, Snakeweed, Gamba Grass, Spinyhead Sida and Sicklepod.

Mt Fitch

Mt Fitch is characterised by high densities of Gamba Grass, Sicklepod and Hyptis. There is Perennial Mission Grass and Mimosa on the drainage line at the base of the WRD.

Low permeability material borrow area

All the non-riparian vegetation within the low permeability material borrow area is heavily infested by Gamba Grass, with Guinea Grass (*Panicum maximum*) – an environmental weed species – also abundant.

Granular material borrow area

The most common weed species in the granular material borrow area is Gamba Grass which was observed in the riparian areas and drainage lines – sometimes in dense patches. There are also some isolated patches of Gamba Grass in woodland, as well as along the tracks in the vicinity of the revegetated borrow areas in the centre of the survey area. Creek lines also contain patches of Hyptis.

Location	Common name	Scientific name	WoNS	Declared weed	Enviro weed
Rum Jungle Mine	Gamba Grass	<i>Andropogon gayanus</i>	X	B	-
	Mimosa	<i>Mimosa pigra</i>	X	B	-
	Olive Hymenachne	<i>Hymenachne amplexicaulis</i>	X	B	-
	Grader Grass	<i>Themeda quadrivalvis</i>	-	B	-
	Mission Grass (Perennial)	<i>Cenchrus polystachios</i>	-	B	-
	Hyptis	<i>Hyptis suaveolens</i>	-	B	-
	Sicklepod	<i>Senna obtusifolia</i>	-	B	-
	Spinyhead Sida	<i>Sida acuta</i>	-	B	-
	Flannel Weed	<i>Sida cordifolia</i>	-	B	-
	Paddy's Lucerne	<i>Sida rhombifolia</i>	-	B	-
	Snakeweed	<i>Stachytarpheta sp.</i>	-	B	-
	Mission Grass (Annual)	<i>Cenchrus pedicellatus</i>	-	-	X
	Calopo	<i>Calopogonium mucunoides</i>	-	-	X
	Coffee Bush	<i>Leucaena leucocephala</i>	-	-	X
	Guinea Grass	<i>Panicum maximum</i>	-	-	X
	Para Grass	<i>Urochloa mutica</i>	-	-	X
	Rat's Tail Grass	<i>Sporobolus sp.</i>	-	-	X
	Rattle Pod	<i>Crotalaria sp.</i>	-	-	X
	Red Natal Grass	<i>Melinis repens</i>	-	-	X
	Rosella	<i>Hibiscus sabdariffa</i>	-	-	X
Stylo	<i>Stylosanthes sp.</i>	-	-	X	
Wild Passionfruit	<i>Passiflora foetida</i>	-	-	X	

Location	Common name	Scientific name	WoNS	Declared weed	Enviro weed
Mt Burton	Gamba grass	<i>Andropogon gayanus</i>	X	B	-
	Hyptis	<i>Hyptis suaveolens</i>	-	B	-
	Sicklepod	<i>Senna obtusifolia</i>	-	B	-
	Spinyhead Sida	<i>Sida acuta</i>	-	B	-
	Snakeweed	<i>Stachytarpheta</i> sp.	-	B	-
	Mission Grass (Annual)	<i>Cenchrus pedicellatus</i>	-	-	X
	Calopo	<i>Calopogonium mucunoides</i>	-	-	X
	Red Natal Grass	<i>Melinis repens</i>	-	-	X
Mt Fitch	Gamba Grass	<i>Andropogon gayanus</i>	X	B	-
	Mimosa	<i>Mimosa pigra</i>	X	B	-
	Mission Grass (Perennial)	<i>Cenchrus polystachios</i>	-	B	-
	Hyptis	<i>Hyptis suaveolens</i>	-	B	-
	Sicklepod	<i>Senna obtusifolia</i>	-	B	-
Granular borrow area	Gamba Grass	<i>Andropogon gayanus</i>	X	B	-
	Hyptis	<i>Hyptis suaveolens</i>	-	B	-
Low permeability material borrow area	Gamba Grass	<i>Andropogon gayanus</i>	X	B	-
	Guinea Grass	<i>Panicum maximum</i>	-	-	X

Table 2 Weeds recorded during the 2018 survey of the project area

2.2. Statutory Weed Management Plans

Under the *Weeds Management Act*, landowners and occupiers are required to control the growth and spread of declared weeds. It is also an offence under the Act to move or transport any declared weed on a public road by itself or as a contaminant (i.e. in soil/cleared vegetation). Three of the weeds recorded within the project footprint have statutory management plans under the Act – Gamba Grass, Mimosa and Grader Grass. The latter, however, is not a priority for Stage 3 weed management and so is not considered in this WMP.

2.2.1. Gamba Grass (*Andropogon gayanus*)

Gamba Grass is the most widespread weed within the Rum Jungle region – recorded across the extent of the mine site, but at highest densities in the north-west, central and south-west areas. Much of the woodland communities in the south-east and central-north border of Rum Jungle mine site have low densities of Gamba Grass (less than 1 to 10% cover). The species also occurs across

the extent of the WRD at Mt Fitch and in the vicinity of the WRD at Mt Burton. All the non-riparian vegetation within the low permeability material borrow area is heavily infested by Gamba Grass. In the granular material borrow area, Gamba Grass predominately occurs in the riparian areas and drainage lines, sometimes in dense patches.

Gamba Grass control activities are required prior to Stage 3 works and ongoing throughout Stage 3.

Under the *Weed Management Plan for Gamba Grass 2020-2030* (NTG 2020) the project footprint is best categorised as a Class B Zone – Land parcels (>140 ha). Specific requirements of this category relevant to the project are:

<i>This project is not adjacent to a Class A Zone and, as such, item 4.2 is not applicable to the project and has been omitted from the table. *This includes all land parcels greater than 140 Ha which may include pastoral land parcels, Aboriginal Land or national parks.</i> Class B Zone – Land parcels (>140 Ha*) Control growth and spread	
4.1	Establish and maintain by chemical, mechanical or physical means, a Gamba Grass free buffer on all land parcels, a distance of 15 m in width along the inside of the land parcel boundaries, around infrastructure (houses, sheds bores and fences), and on both sides of tracks and roads (main access into a property) prior to seeding each year.
4.3	Undertake annual monitoring and control activities and weed spread prevention activities to ensure gamba grass free areas remain Gamba Grass free.

Table 3 Required actions for Gamba Grass within the project

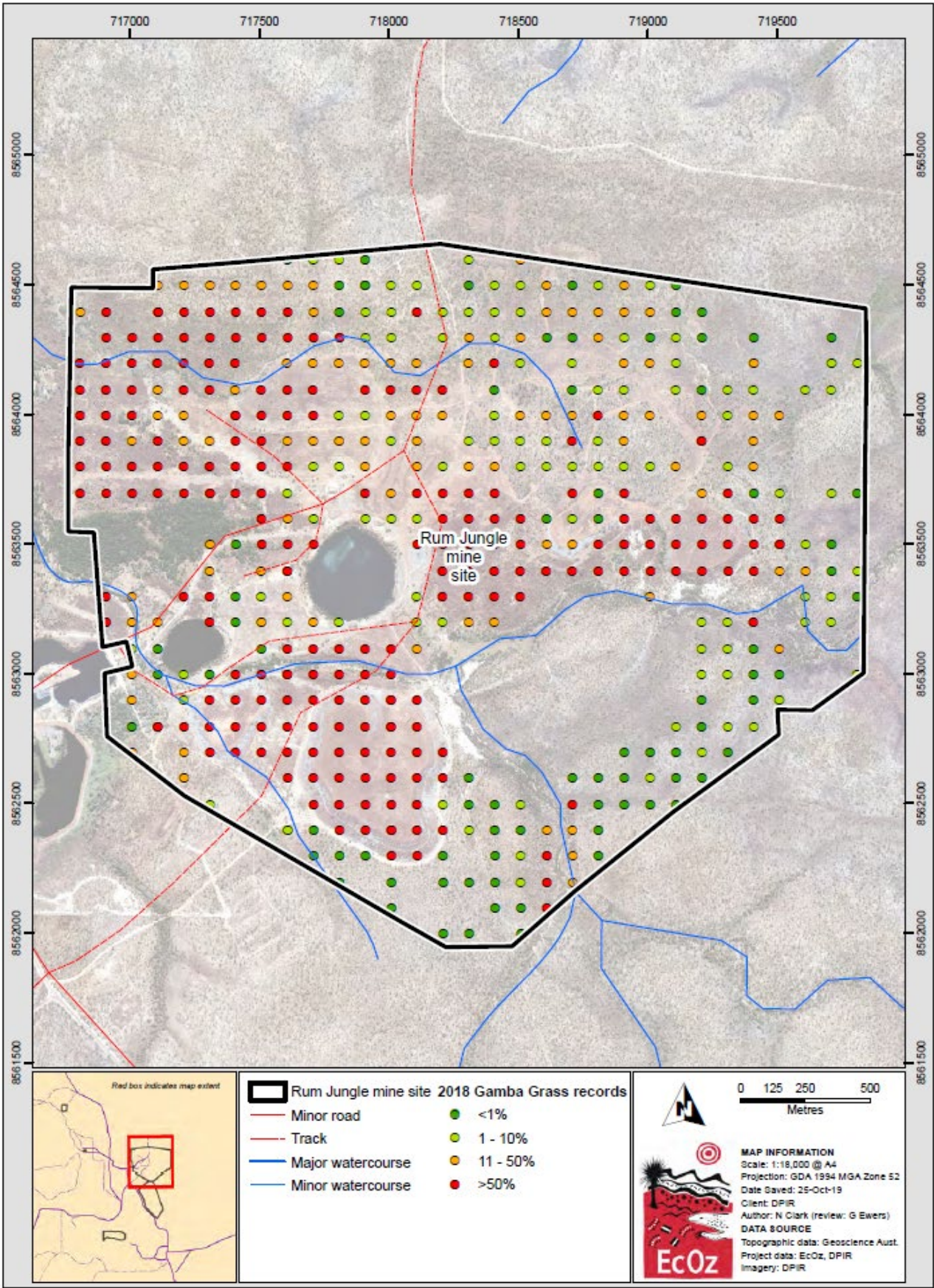


Figure 2 Extent of Gamba Grass infestations at the Rum Jungle Site

2.2.2. Grader Grass (*Themeda quadrivalvis*)

Grader Grass was detected in 2018 within the Rum Jungle Site. Although it is a priority weed with a statutory management plan, it will be managed secondary to Gamba Grass because it is less extensive and because the treatment and prevention measures for both species have significant overlaps. This means that while focussing on treating and preventing the spread of Gamba Grass, the treatment and prevention of Grader Grass will also be occurring. Specific requirements of the management of Grader Grass, relevant to the project are listed within Table 2-3.

Requirements for all persons	
1.1	Take reasonable action to ensure grader grass is not spread.
1.2	Do not drive machinery or vehicles through seeding grader grass.
1.3	Implement vehicle hygiene measures as required to ensure grader grass is not spread.
<i>The project does not present a high risk of spreading Grader Grass due to the controls in place for treating and preventing the spread of Gamba Grass and, as such, item 1.4 is not applicable to the project and has been omitted from the table</i>	
All land other than transport corridors	
2.1	Must establish and maintain by chemical, mechanical or physical means, a Grader Grass free buffer on all land parcels, a distance of 15 m in width along the inside of the land parcel boundaries, around infrastructure, and on both sides of tracks and roads prior to seeding each year.
2.2	All isolated* Grader Grass plants must be destroyed immediately.
2.3	Monitoring must be undertaken to check for the regrowth or new introductions of Grader Grass after isolated Grader Grass plants have been destroyed. All regrowth and new introductions must be destroyed
2.4	A property weed management plan must be documented and implemented on request by the Weed Management Branch in accordance with section 7 of the Weed Management Plan for Grader Grass .
2.5	The property weed management plan required by requirement 2.4 must be provided to the Weed Management Branch on request.
<i>*For the purposes of this plan, isolated grader grass plants refer to grader grass plants away from and not continuous with a larger established grader grass infestation.</i>	
Transport corridors	
3.1	For all transport corridors, establish and maintain by chemical, mechanical or physical means, a grader grass free buffer of 15 m in width on both sides of all roads and railway lines, from the edge of the road and railway line, prior to seeding.

Table 4 Required Actions for Grader Grass within the project

2.2.3. Mimosa (*Mimosa pigra*)

At the Rum Jungle Site and Mt Fitch, Mimosa plants were detected in 2018. The Rum Jungle Site population was prioritised for control in the 2018 WMP. Mimosa plants at Mt Fitch, and any outlier or infestations that are remaining within the Rum Jungle Site, will require control and quarantine measures in place prior to Stage 3 works commencing.

Under the *Weed Management Plan for Mimosa (Mimosa pigra) 2018* (DENR 2018d), the project is classified as Class B Zone, with Part 2 applicable.

PART 2 – Class B zone – All land outside Part 1	
All land owners and occupiers with mimosa on their land in this zone must:	
2.1	Destroy all outlier Mimosa plants and infestations as a priority.
2.2	Control, contain and demonstrably reduce all mimosa infestations within ten years of commencement of this plan.
2.3	Prevent mimosa spreading into clean areas or adjoining land.
2.4	Minimise seed production by controlling Mimosa prior to flowering and seeding.
2.5	Monitor areas under active control for new infestations and control annually.
2.6	Commence annual control of all mimosa within 80m of all boundaries and within 1km upstream of a wetland within ten years over the life of this plan.
2.7	<i>Not applicable</i>
2.8	For properties > 200ha: Develop a property weed management plan which identifies buffer zones as priority control areas and areas for containment and submit to the Weed Management Branch upon request.
2.10	For development and construction areas: Control mimosa in areas scheduled for construction works prior to flowering and seeding and before any works commence.
2.11	For development and construction areas: Dispose of weed contaminated topsoils by deep burial on site. Weed contaminated soil must be buried greater than 1 m deep under construction material (including roads and buildings) or in areas that will not be exposed in the future. No material is to be transported off site.
2.12	Not use mimosa contaminated soil as clean fill or topsoil.
2.13	Notify the Weed Management Branch of the presence of mimosa within 14 days when identified in areas which it has not been observed previously.

Table 5 Required actions for Mimosa within the project

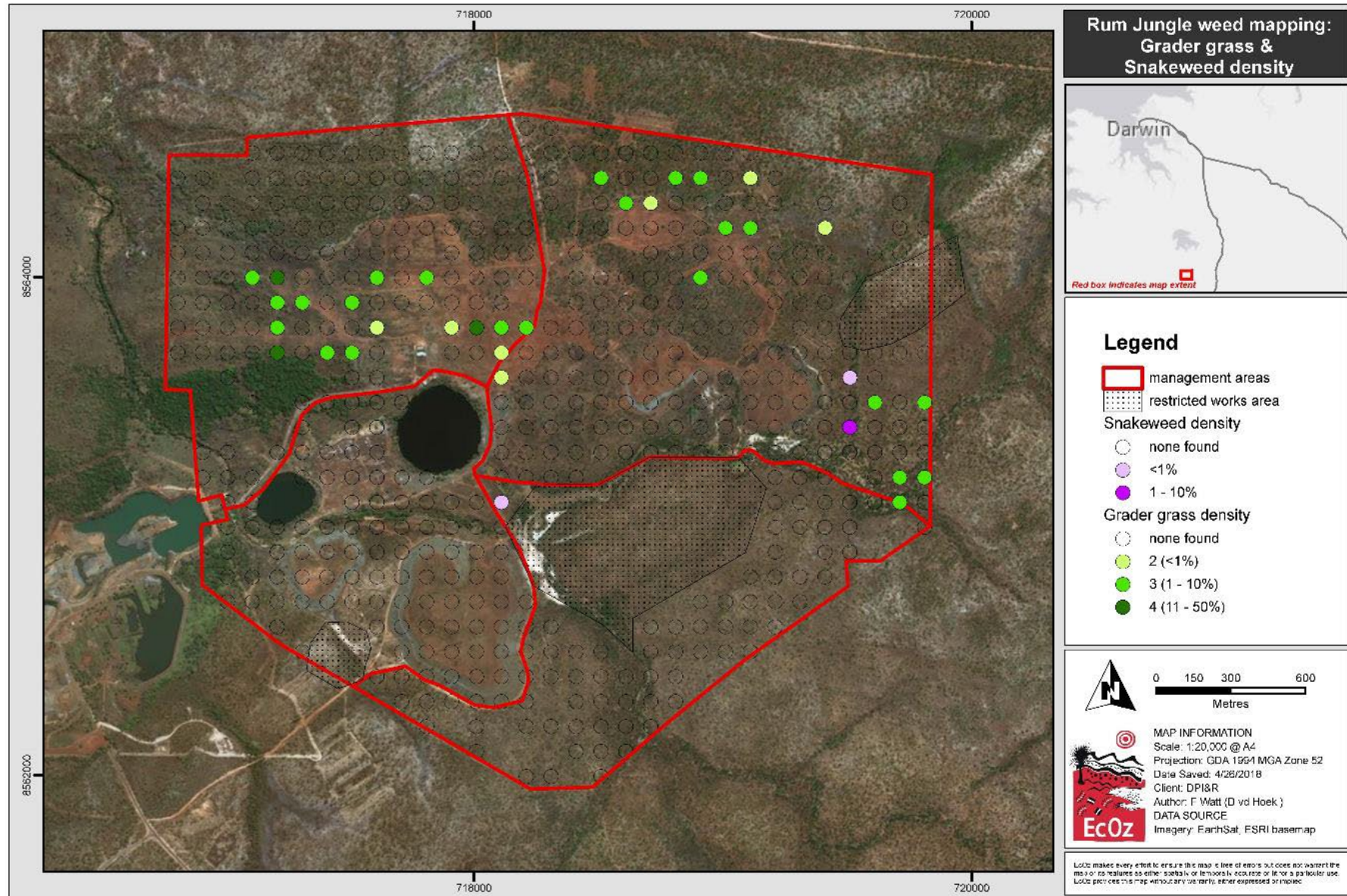


Figure 3 Extent of Grader Grass infestation at the Rum Jungle Site

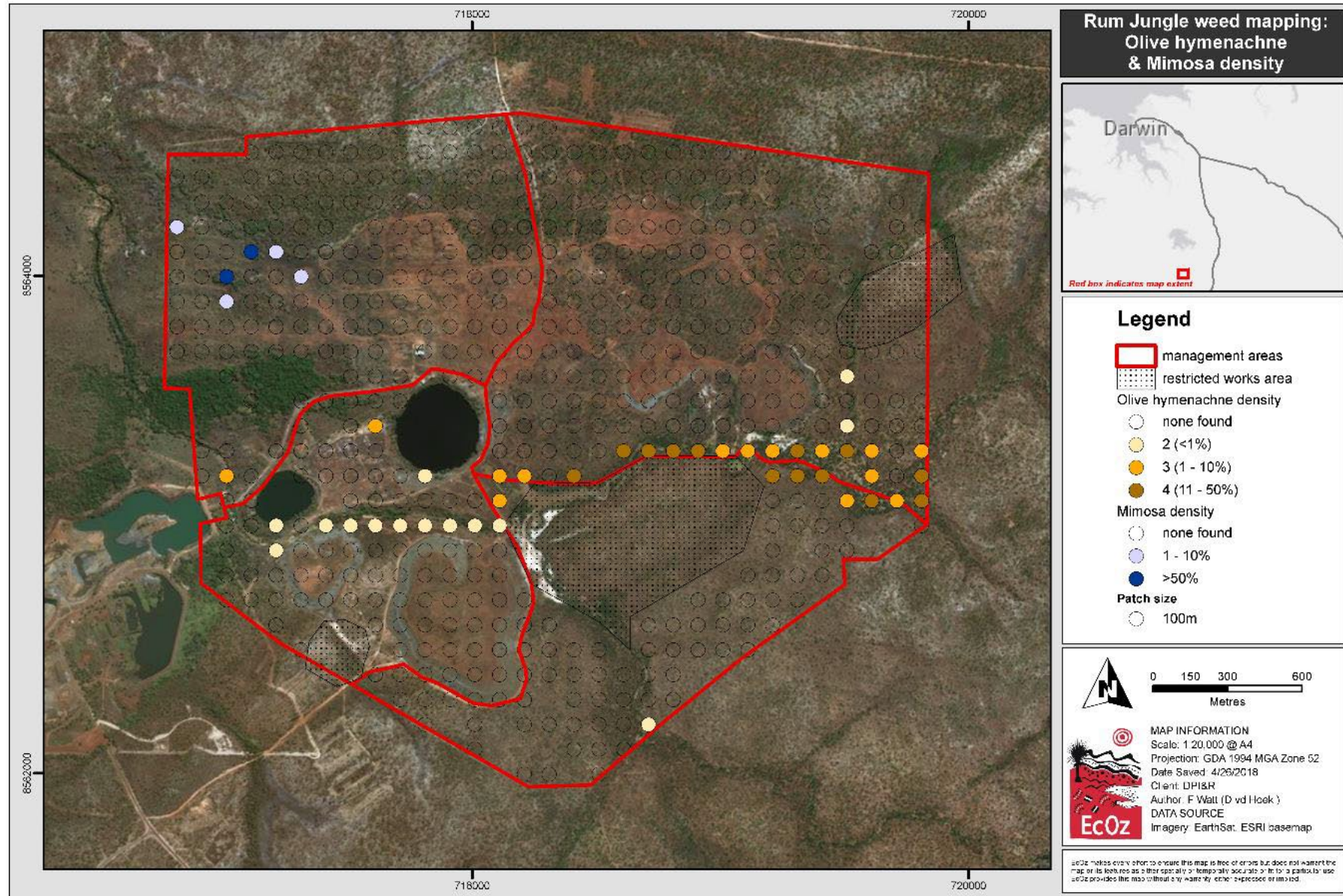


Figure 4 Extent of Mimosa and Olive Hymenachne infestations at the Rum Jungle Site

3. Management Objectives

Following discussions with the Flora and Fauna Division, and the Weed Management Division of DEPWS, weed management for Stage 3 of this project has two primary focuses:

1. Controlling weed species that present the highest risk to rehabilitation success
2. Maintaining areas within or adjacent to the project footprint that currently have low/no weed infestations.

The key species of concern is Gamba Grass (which is widespread and prolific both regionally and within much of the project footprint, and has the capacity to completely alter the ecological landscape). The other species of concern are Olive Hymenachne (an aquatic weed), Mimosa (which, fortunately, only occurs in small patches within the project footprint) and Calopo (which poses a threat to revegetation and cover sites). These species are also the three WoNS recorded within the project footprint.

Relevant sites within the project footprint that are relatively weed-free are:

- Areas within the granular material borrow area away from watercourses and historically-disturbed sites
- Remnant bushland surrounding the proposed WSF
- The verges of public roads between the Coomalie Council Borrow Area and the Rum Jungle Site
- The rainforest at Mt Burton.

It is also imperative that, during works, there is no proliferation of weeds on rehabilitated cover sites. Such an event could severely curtail the stability of surface cover at those sites and even impact upon the integrity of the WSF.

Performance indicators of weed management success are:

- A reduction in density of Gamba Grass in construction areas
- No proliferation of weeds on rehabilitated cover areas
- No proliferation of weeds in the relatively weed-free areas.

4. Management Activities

4.1. Survey / Data Gathering

A weed survey of the project site was undertaken in 2018. As soon as possible prior to construction works, a baseline weed survey will be undertaken of:

- The proposed granular material borrow pit/s and surrounding bushland
- The proposed haul route between the granular material borrow pits and the mine site.
- The haul route between the low permeability material borrow area and the mine site
- The weed hygiene station sites and immediate surrounds
- Former Rum Jungle Mine site (if no year 3 or 5 survey data is available)

The data from this survey will be the benchmark against which the success of weed management in these areas of the project footprint is measured. Data from the survey will also form the basis for quarantine zones.

4.2. Introduction of new weeds

Measures to prevent the introduction of new weeds during construction include hygiene cleaning and inspections. Vehicles and machines will remain on site for the course of the active works or be subject to radiation decontamination and weed hygiene cleaning. The process will be:

- On first arrival at site, all vehicles, machinery and equipment present a declaration that they are free of weeds, soil or seeds.
 - This is particularly relevant for vehicles, machinery and equipment transported from interstate or between weed management regions.
- If a declaration is not provided or equipment is visibly soiled, a weed hygiene inspection must be undertaken immediately on arrival at the work site.
 - Any items that fail the inspection will be refused access to site until the item has been cleaned and passed re-inspection.
- A register will be maintained of all inspections for each vehicle, equipment and machine. The register will include the locations of all weed hygiene activities to inform future monitoring.
- Companies will also maintain a cleaning log for each vehicle, equipment and machine.

4.3. Movement and spread of existing weeds

During construction, weed management activities will be undertaken to meet statutory requirements for declared weeds, as well as to ensure no increase in distribution or density of environmental weeds within the project. This will be achieved through adaptive weed management measures incorporating eradication and control of weeds.

Adaptive weed management techniques will be employed, with both physical and chemical control methods used – these are described in the [NTG Weed Management Handbook](#). All weed control activities are to be undertaken by suitably trained and qualified persons. The NT Government provides information on the requirements for training on the use of agricultural chemicals and equipment. All persons undertaking weed management activities will have training provided so that they are able to undertake the environmental management and monitoring activities specified in this procedure. Where upskilling is not suitable or time effective for the project, specialised contractors will be engaged.

The Weeds Management Division can be contacted for specific enquires relating to control of individual species. The *NT Government Weed Management Handbook* (WMB 2015, DENR 2018c) and statutory weed management plans detail specific control methods for declared weeds.

Records of all control activities are to be kept and can be used when planning the following seasons works in conjunction with survey results.

4.3.1. Quarantine Zones

Quarantine zones will be designated to prevent movement and spread of weeds within the project footprint.

Two weed zones will be mapped and are shown in Figure 4-1:

- **Green zones: Weed free, clean zone.**

Weeds are not present within the work area, no weed hygiene measures required.

- **Red zones: Weed material or seed present.**
- Existing weeds identified in the works area, weed hygiene measures are required for all material, vehicles or equipment working in the area.

4.3.2. Weed hygiene facilities

In each red zone, a weed hygiene facility will be established for cleaning all machinery used in that area prior to that machinery leaving that area. If that area is dry, weed hygiene will be in the form of blow-downs and the use of brooms and other tools to remove soil and seeds. In the event of wet weather, or where vehicles and machinery are wet, wash-downs will be used. Weed survey and control of the weed hygiene stations will occur as a minimum annually to prevent the germination and spread of material cleaned off machinery.

4.3.3. Soil / fill movements

Due to the extensive weed infestations through the project, topsoil will be stockpiled after it has been stripped and quarantined as a red zone. Quarantined topsoil stockpiles will be isolated from disturbance and all machinery until it has been treated and assessed as suitable for revegetation purposes.

No soil can be moved from within a red zone area unless it is fill that will be buried or material accompanied by a form declaring it to be weed-free. If it is the former, the material will be carried in covered trucks if it is being moved between project sites – e.g. from the low permeability material borrow area to the mine site.

4.3.4. Working with neighbours

It is preferable that a 100m to 200m buffer around each borrow site and the project boundary is established as weed free. This is a significant undertaking but would greatly reduce weed spread from surrounding property into the work area. Targets are the south and east to prevent prevailing winds during dry season from blowing in seeds. It is currently not known if neighbouring properties would be willing to support this cooperation but this is to be included in consultation program.

4.4. Fire management

Controlled burns in the early dry season can contribute to reducing high fuel loads that may cause potentially dangerous fires later in the dry season. Burns undertaken early in the wet season may be implemented to remove 'rank' growth of Gamba Grass prior to applying chemical control on re-shooting tussocks.

Utilising fire to manage Gamba Grass infestations must be used in conjunction with chemical or physical control methods. This is because Gamba Grass is extremely fire tolerant and may not die once a fire has passed through an infestation (NTG 2020).

Fire management is not an effective method for removing Mimosa. However, it can assist in making it more difficult for Mimosa to establish and can increase ease of access for physical or chemical control (DENR 2018d).

Any weed management that incorporates burning must be done in accordance with the Bushfires Management Act 2016 and the Fire and Emergency Act 1996. A permit to burn must be obtained from the local Volunteer Fire Brigade Captain or local area Fire Warden through Bushfires NT on 08 8922 0844.

5. Weed Control

5.1. Pre-Construction

Planned construction / excavation areas – WRD, WSF, borrow areas

Aerial spray large patches of existing introduced grass infestations on previously-disturbed areas within the Rum Jungle, Mt Burton and Mt Fitch mine site for two years prior to works commencing. For any areas that will be disturbed in later years, maintain annual aerial spraying until they are disturbed. This approach will aim to kill the seed bank prior to works. Because most areas to be disturbed are essentially Gamba Grass monocultures, carefully undertaken aerial spraying should not significantly impact on native flora.

For the low permeability material borrow area, the process will be to:

1. Aerial spray in April/May prior to opening the borrow area.
2. When opening the area and once dead, burn the grass and remove the topsoil into piles. Apply residual herbicide to the stockpiles as per Luck et al. (2019) around October/November.
3. Keep soil in stockpiles with gaps between them to allow access for follow-up ground spraying if required. This is to reduce the likelihood of bringing contaminated soil into the mine site.

Aerial applications will be made by fixed wing aircraft using a professional contractor. The contractor will deploy a weather station onsite to monitor wind and humidity. The best month for such treatment is April/May (i.e. prior to seed fall). Weather conditions are chosen to reduce spray drift to a minimum. The droplet size is adjusted to the optimal Delta T point to minimise loss of the biocide due to evaporation and to maximise absorption by the intended target. The Delta T is the relationship between temperature and humidity that determines evaporation rate and droplet survival. Ground-sprayed buffer zones will be used to around significant vegetation.

Ground-based spraying should occur in areas where aerial spraying is not practical due to weed location or presence of other vegetation – i.e. granular material borrow pit, near riparian vegetation and vine thicket.

Roads and access tracks

All existing and proposed access road and tracks will receive ground-based topical spraying of weeds for two seasons prior to construction. This is to reduce the likelihood of weed spread along roads and tracks by vehicle movement.

Firebreaks / boundaries

Create and maintain a 15 m wide weed buffer around the perimeter of the Rum Jungle mine site, Mt Fitch, Mt Burton, and both borrow areas. This may be through a combination of a graded firebreak along the fence line with topical weed control in adjacent bushland.

Woodlands / riparian areas

Undertake ground-based topical spraying of weed occurrences within the riparian and woodland sections of the project, particularly the granular material borrow area that will be disturbed by construction – with a ~50 m buffer. This is to reduce the likelihood of bringing contaminated soil into the mine site or spreading weeds into surrounding bushland.

5.2. Construction

Planned construction / excavation areas – WRD, WSF, borrow pits

Undertake ground-based topical weed spraying to prevent the growth and seed set of new weeds. No soil/material is to be moved with visible weed growth.

A high level of coordination is required to ensure weed control activities can be undertaken during WRD de-construction and WSF construction. Aerial spraying may be suitable in the early stages of the project.

Topsoil stockpiles

Apply herbicide to any soil stockpiles in the event of germination of weed species. Ongoing weed control is required prior to placement of topsoil on rehabilitated areas or the WSF. This is to reduce the likelihood of placing contaminated soil into these areas. If stockpiles are to be retained for long periods and not used in areas for revegetation, a residual herbicide can be used to suppress all vegetation growth.

Roads and access tracks

All access road and tracks will receive ground based topical spraying of weeds during construction. This is to reduce the likelihood of weed spread along roads and tracks by vehicle movement. Do not drive through weeds with seed.

Firebreaks / boundaries

Maintain a 15 m wide weed buffer around the perimeter of the Rum Jungle Site, Mt Fitch, Mt Burton, and both Borrow Areas. This may be through a combination of a graded firebreak along the fence line with topical weed control in adjacent bushland.

Woodlands / riparian areas

At the Rum Jungle, Mt Fitch and Mt Burton sites, ground spray weeds within surrounding bushland that is adjacent to areas that will be disturbed the following year or adjacent to areas that have had topsoil reapplied. This is to occur seasonally for the purpose of creating a 50m buffer to minimise spread of weeds from undisturbed areas into newly disturbed/rehabilitated areas.

Rehabilitated / revegetated areas

Undertake ground based topical spraying of weeds on revegetated / rehabilitated sites as needed.

Revegetation strategies and planting will minimise weed recruitment and spread – See RJ3-4-MP-009 Revegetation Management Plan.

5.3. Post-construction

Weed management for Stage 4 onwards will require a separate WMP. The following controls provide an overview of what the WMP should address.

Rehabilitated areas – WRD, WSF, borrow pits, haul roads

In areas where construction is complete, no longer used for construction or rehabilitated the most important time for weed control will be in the early wet season the first year after construction, as disturbed areas and rainfall will provide ideal germination conditions. Actions at this time will provide the best results for weed eradication.

Revegetation areas

Weed control may be required within revegetated areas - RJ3-4-MP-009 Revegetation Management Plan describes the revegetation methodology. Stage 4 weed management plan will be developed and cover weed control in revegetated areas.

Roads and access tracks

Continue ground based topical spraying of weeds along remaining access roads and tracks. Do not drive through weeds with seed.

Firebreaks / boundaries

Maintain a 15 m wide weed buffer around the perimeter of the Rum Jungle Site, Mt Fitch, Mt Burton, and both Borrow Areas. This may be through a combination of a graded firebreak along the fence line with topical weed control in adjacent bushland.

Woodlands / riparian areas

Continue weed control within the Rum Jungle, Mt Fitch and Mt Burton woodland sites.

6. Monitoring and Reporting

6.1. Monitoring

Weed monitoring will be undertaken during both the construction and post-construction phases of Stage 3. Weed data collected will be in accordance with the *NT Weed Data Collection Manual* (WMB 2015) and field guide (DENR)

The data from the survey described in Section 4.1 will be the benchmark against which the success of weed management in these areas of the project footprint is measured. Monitoring will occur annually and be early enough for weeds to be identifiable and controlled (potentially simultaneously). A database will be developed to record all weed monitoring and control events.

During construction, monitoring will focus on:

- The granular material borrow area and surrounding bushland
- The haul route between the FRALT Borrow Area and the Rum Jungle Site
- The haul route between the low permeability material borrow area and the mine site
- The weed hygiene station sites and immediate surrounds
- Areas within the project that have been subject to weed control the previous year.
- Topsoil stockpiles prior to placement on rehabilitated areas.
- Seasonal monitoring of undisturbed areas of bushland within the site to capture and record any new infestations and allow for scheduling of treatment for isolated/outlier weeds. Seasonal monitoring should be undertaken at least four times throughout the year. The following are suggested times for seasonal monitoring:
 - Early dry season (~March-April) – to locate any new, isolated occurrences of weeds prior to seed maturity and fall.
 - Early wet season (~October-November) – to identify and treat any germinated seed and any possible re-emergence from treated weeds.
 - Two to three weeks after the first major rainfall – to identify and treat any germinated seeds and young growth, should access allow.

- Mid wet season (~December-February) – to locate any weeds prior to flowering and seeding.
- Monthly surveys of all disturbance areas, including stockpiles to monitor infestation and allow for scheduling of treatment of new infestations and any new isolated/outlier weeds.
- Regular monitoring of waterways, water bodies and areas of runoff to manage infestations that may be carried by water and spread downstream.

Results from the monitoring program will enable annual weed mapping of the entire site to capture and record any new infestations and allow for scheduling of treatment for isolated/outlier weeds.

Post construction, the Stabilisation and Monitoring Phase Plan will include weed monitoring of all land that was disturbed by project activities.

For both phases of Stage 3, the monitoring results will be used to trigger and inform any corrective actions that are required. Such actions will likely be a combination of responsive control of new infestations/re-infestations and a review of the adequacy of the existing weed hygiene and control regime.

6.2. Reporting

A weed control report is required to be completed at the end of each year. Upon completion of each control period, the annual control report will identify if the prescribed weed management aims have been met for the period. Any contractors used are required to produce a report to inform DITT of completed weed management actions and recommendations for future control, for weed occurrences within their respective scope of works.

Weed management is a dynamic process, influenced by both environmental and management impacts and practices. Monitoring of weed populations to detect change could warrant changes to the control prioritisations. In addition, new occurrences of weeds may be found and will need to be addressed.

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