Revegetation Management Plan

Dam and Drainage Line at Lots 9951 and 9952, Boorara Brook

JUNE 2025

SW Environmental

Version control

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Abbreviations and acronyms

Common terms	
Proposed clearing / Site / Survey Area	Proposed clearing footprint (4.57 ha)
DBCA	WA Department of Biodiversity, Conservation and Attractions

DCCEEW	Federal Department of Climate Change, Energy, the Environment and Water
DWER	WA Department of Water and Environmental Regulation
FRTBC	Forest Red-tailed Black Cockatoo
RMP	Revegetation Management Plan
WA	Western Australia
Legislation	
BC Act	WA *Biodiversity Conservation Act 2016*
EP Act	WA *Environmental Protection Act 1986*
EPBC Act	Federal *Environment Protection and Biodiversity Conservation Act 1999*
Measurements	
cm	Centimetre
ha	Hectare
km	Kilometre
m	Metre

1 Introduction

1.1 Project Background

Marvelus Berry Developments Pty Ltd 'the proponent' is planning to construct a new circa 6.41 hectare (ha) dam to service an existing commercial strawberry farm on Lot 9951 and Lot 9952 deposited Plan 203883, Boorara Brook. Lots 9951 and 9952 are located approximately eight kilometres (km) south of Northcliffe, within the Shire of Manjimup. The 'Survey Area' for the project is 4.57 ha in size, comprised of two sites proposed to be revegetated; an area following the perimeter of the north dam, along with an area covering a drainage line that runs in a northeast direction through a paddock (Appendix A – Figure 1). The revegetation sites are labelled 'Revegetation Area 1' and 'Revegetation Area 2', respectively, for the purpose of this report.

A Clearing Permit application was submitted by the proponent to the Department of Water and Environmental Regulation (DWER) on the 4th of October 2023 (CPS 10364/1). Further information was requested by DWER for the proponent to provide additional information on how they proposed to undertake revegetation at the site. SW Environmental was subsequently engaged to prepare a Revegetation Management Plan (RMP) for the site.

The revegetation site currently consists of paddock-cleared area dominated by introduced plant taxa, with small pockets of remnant vegetation present. Vegetation Condition across the Survey Area is predominantly Completely Degraded (EPA, 2016). This Revegetation Management Plan (RMP) has been prepared with the objective of establishing native vegetation that will return biodiversity value to the site, improving site stabilisation, general ecosystem functioning and fauna habitat value.

1.2 Purpose of the Plan

This RMP has been prepared to provide a framework and management document to formally capture the revegetation management commitments proposed by the proponent. The objectives of the Plan are to:

- Revegetate the Survey Area, establishing native vegetation to a condition capable of generating long-term environmental values.
- Implement successful revegetation by controlling present and ongoing risks to the site.

The Plan has been prepared with general reference to the Department of Water and Environment Regulation's (DWER) publication: *A guide to preparing revegetation plans for clearing permits* (DWER, 2018).

The RMP aims to recreate vegetation to a condition that supports the objectives of the plan. The reintroduction of native vegetation through revegetation would improve site stabilisation, general ecosystem functioning and fauna habitat value.

1.3 Personnel Preparing the Plan

The Plan has been prepared by Georgia Johnsen (Project Officer – Ecology, SW Environmental), with input from Greg Overton (Revegetation Specialist, SW Environmental), Kelly Paterson (Senior Botanist, SW Environmental) and Shane Priddle (Principal Consultant, SW Environmental). All individuals involved in the plan compilation are experienced in the preparation of revegetation management plans and/or implementing revegetation programs.

1.4 Responsibilities

The proponent is responsible for the implementation of the RMP.

1.5 Management Commitments

1.5.1 Vision Statement and Objectives

The management vision for the site is:

> *To recreate the ecological values of the study area by revegetating the landscape post-disturbance, whilst implementing ongoing weed control and management measures.*

The vision, objectives and completion targets are consistent with the **SMART** principles (DWER, 2018):

- **S**pecific
- **M**easurable
- **A**chievable
- **R**elevant
- **T**ime-bound

In view of the above, the key objectives and aims associated with the revegetation works are to:

- Recreate the ecological values present at the site by revegetating the area with existing, endemic flora taxa where possible,
- Implement successful revegetation by controlling present and ongoing risks to the site
- Return the site to a vegetation condition that supports the objectives of the plan (meeting or exceeding the pre-existing condition in the long-term)
- Recreate fauna habitat values
- Meet the proposed project completion targets (provided in Section 3.2 below) and requirements of DWER to create a revised plan (in line with recommendations outlined in DWER's guide to revegetation plans (DWER, 2018)).

1.6 Completion Target

The target is to meet the objectives outlined in Section 3.1. Table 1-1 summarises recommended completion targets for the site, used to measure the success of revegetation.

Table 1-1 Rehabilitation and revegetation targets

Aspect	Attribute	Measure	Target
Flora and vegetation	Vegetation cover	Number of stems per hectare	2000 stems/ha after 10 years
	Species richness	Number of species present	60 % of species planted to be present after 10 years
	Weed species presence and abundance	List of weed species and approximate percentage cover	For number of weeds present to not inhibiting the successful rehabilitation.
	Vegetation condition	Assessment against the Vegetation Condition Scale presented in EPA (2016) Technical Guidance, as adapted from Keighery (1994).	Create vegetation that meets the definition of Good or better vegetation condition.
Fauna	Long-term presence of habitat capable of supporting local fauna for foraging and/or breeding	Presence of fauna habitat features such as growth of foraging species or refuge within vegetation.	For flora with value to local fauna to be present and growth rates to be increasing.
	Presence of local fauna species within revegetated area for foraging and/or breeding habitat	Number of local fauna species observed at site and/or presence of secondary evidence such as feeding residue or scratch marks.	For evidence of local fauna species within the revegetation site to be present after.

2 Methods

2.1 Desktop Assessment

A brief desktop assessment was undertaken, including a review of available information, datasets and reports relevant to the project. This was undertaken to provide background information to support the RMP. Sources/references interrogated as part of the desktop assessment included:

- 2018 South West Vegetation Complex Statistics Report, utilising the DBCA-047 spatial dataset (DBCA, 2019, 2018)
- Soil Landscape Mapping (Best Available DPIRD-027) spatial dataset (DPIRD, 2022)
- Bureau of Meteorology Climate Data Online (BoM, 2025)
- SW Environmental (2024a). *Basic and Targeted Fauna Survey: Proposed dam on Lots 9951 and 9952, Boorara Brook.* [Prepared for Marvelus Berry Developments Pty Ltd, July 2024].

2.2 Field Survey

2.2.1 Survey Timing and Overview

A site visit was conducted on the 6th of June 2025 to assess the existing values of the Survey Area, along with reference vegetation in an area adjacent to the revegetation site. During this visit, a list of key structural flora and observed weeds was created. Notes were made on the site condition.

The Survey Area was traversed on foot and by car, with point locations marked (utilising a handheld Global Positioning System (GPS) unit) for corresponding notes on existing site values. Representative photographs were taken. Disturbances to the Survey Area were noted. Personnel involved in survey aspects are listed in Table 2-1.

Table 2-1 Survey Personnel and Licensing Information

Personnel	Experience	Flora Collecting Permit (WC Act (WA))	Role
Georgia Johnsen ***Ecologist/Botanist*** ***BSc (Marine Science & Conservation Biology)***	~3 years	FB62000470-2 TFL 2324-0179	Field Survey/Lead Reporting
Greg Overton ***Revegetation Expert***	> 40 years	N/A	Technical Advice
Kelly Paterson ***Senior Botanist*** ***BSc (Natural Resource Management - Botany)***	>10 years	FB62000182-2b TFL-2425-0086	Plant Identifications Advice
Shane Priddle ***Principal Consultant*** ***BSc (Marine Science)*** ***Certified Environmental Practitioner EIANZ (No. 910)***	~25 years	N/A	Project Manager

2.2.2 Vegetation Assessment

In an area adjacent to the Survey Area (Figure 2, Appendix A), an assessment of intact vegetation was undertaken, with the purpose of compiling a list of locally occurring species to inform the revegetation species list, presented in Appendix B. Notes on vegetation structure were made, and native vascular flora taxa were recorded. Additional, opportunistic records were made whilst traversing the Survey Area, noting the presence of introduced plant taxa, significant weeds and/or additional patches of native remnant vegetation. A full list of vascular flora taxa observed during the site visit is presented in Appendix C.

Plant Collection and Identification

Plants were collected using methodology consistent with guidance from the Western Australian Herbarium (2020). All plant material was collected under relevant *Flora Taking (Biological Assessment) Licence* (under Regulation 62 of the WA *Biodiversity Conservation Regulations 2018*) and *Authorisation to Take or Disturb Threatened Species* (pursuant to Section 40 of the BC Act).

Plant identifications were undertaken using taxonomic keys where available, utilising available resources such as existing herbarium specimens and/or consultation with taxonomic experts. Plant identifications were overseen by a Senior Botanist with extensive previous experience working in the region (>10 years) (outlined in Table 2-1).

3 Results

3.1 Desktop Assessment

3.1.1 Climate, Landform and Soils

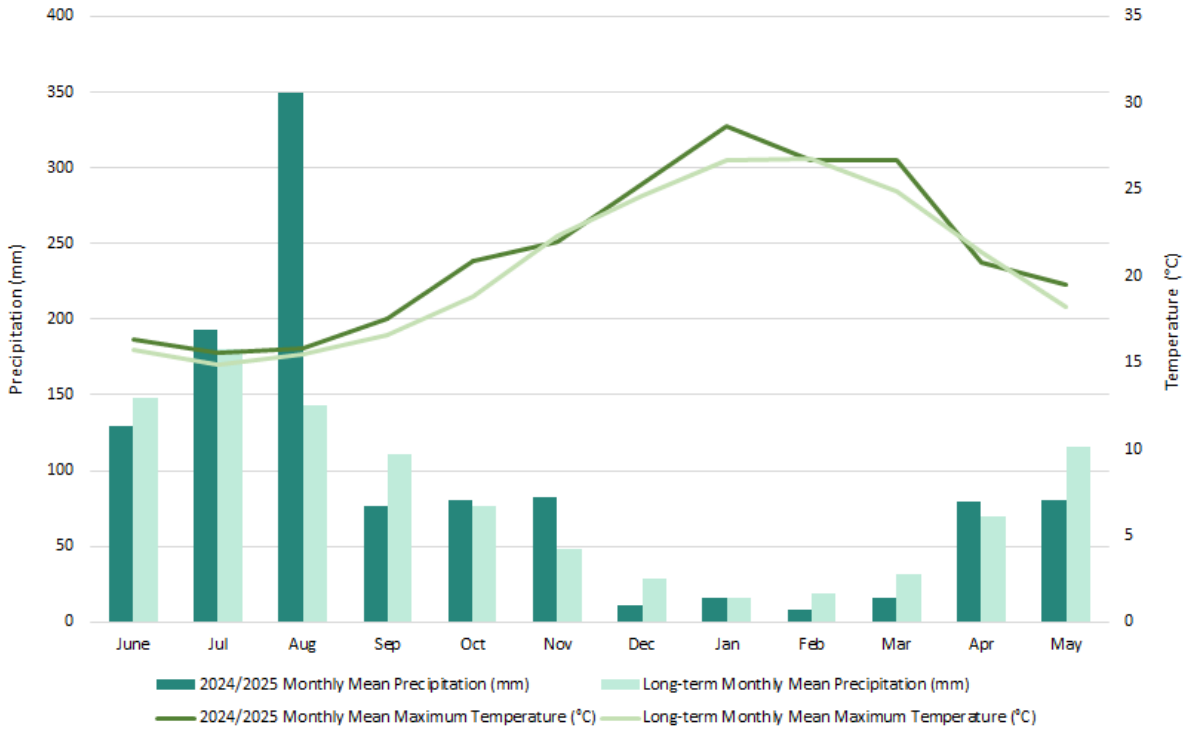
The Survey Area is located within the Warren Interim Biogeographic Regionalisation for Australia (IBRA) bioregion, specifically within the Warren (WAR01) IBRA subregion (DCCEEW, 2022, 2023). Soils within the Study Area, as mapped by Department of Agriculture (now the Department of Primary Industries and Regional Development) (DPIRD, 2022), include:

- **254Pv2 Major Valleys V2 Subsystem (Pimelia) –** Valleys in granitic areas; 20-40 m relief; smooth, moderate slopes; narrow terrace.
- **254NfCOy Collis yellow duplex Phase –** Gravelly yellow duplex soils; Jarrah-Marri forest.
- **254NfCOb Collis brow gravelly duplex Phase –** Brown gravelly duplex soils; Marri-Jarrah-Karri forest.

The Warren botanical subdistrict is of a moderate Mediterranean climate, typically experiencing winter precipitation ranging between 650 to 1500 mm per annum and a short dry season of only 3 to 4 months (Beard, 2015). Graph 1 presents climatic information from the Shannon (station number 9960) weather station, ~13 km from the Survey Area (BoM, 2025). This station contained the most comprehensive, up-to-date precipitation and mean maximum temperature data to the Survey Area.

Long-term mean maximum temperatures ranged from 26.8°C in the hottest month of February, to 14.9°C in the coolest month of July. The long-term average annual rainfall is 1122.8 mm, with 672.4 mm recorded in winter months of 2024.

Weather records from 2024/2025 indicate that temperatures have exceeded the long-term average over nine of the 12 months preceding the site visit. Precipitation recorded between June 2024 and May 2025 exceeded the long-term average by ~134 mm. The month of greatest variation between long-term and recent rainfall was experienced in August 2024, with a value ~206 mm above average (Graph 1).



Graph 1 Temperature and rainfall data from the Shannon station (station number 9960) (BoM, 2024)

3.1.2 Regional Vegetation

Vegetation complexes of the southwest forest region (Webb et al., 2016) that intersect the Survey Area are mapped as:

- **Granite Valleys (Vh2) – Darling Plateau Valleys:** Tall open forest of *Eucalyptus diversicolor-Eucalyptus patens* on slopes with *Agonis flexuosa-Allocasuarina decussata-Callistachys lanceolata* on valley floors in hyperhumid and perhumid zones.
- **Collis 1 (Coy1) – Darling Plateau Uplands:** Tall open forest to woodland of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla-Banksia grandis-Allocasuarina fraseriana* on low hills and with *Allocasuarina decussata* on slopes in perhumid and humid zones.
- **Collis (Cob) – Darling Plateau Uplands:** Tall open forest of *Eucalyptus diversicolor-Corymbia calophylla* on crests of hills arising above the southern coastal plain in the hyperhumid zone.

3.1.3 Regional Fauna

SW Environmental (2024a) completed a Basic and Targeted Fauna Survey within the dam clearing site at Lots 9951 and 9952, Boorara Brook. Twenty species of fauna were observed during the survey (15 birds and five mammals). Three conservation significant fauna were recorded, being Baudin's cockatoo (*Zanda baudinii*) (Endangered), Forest Red-tailed Black Cockatoo (*Calyptorhynchys banksia* subsp. *naso* (Vulnerable) and Southern brown bandicoot (*Isoodon obesulus* subsp. *fusciventer*) (Priority 4). Western Ringtail Possum (*Pseudocheirus occidentalis*) (Threatened) may occur within the northern dam site, within the vegetation to the east of the powerline.

Carnaby's Cockatoo (*Zanda latirostris*) (Endangered), Water Rat (*Hydromys chrysogaster*) (Priority 4) and the Western False Pipistrelle (*Falsistrellus mackenziei*) (Vulnerable) are possible to occur, with core or supporting habitat present at the site (SW Environmental, 2024a). Overall, 218 fauna taxa were returned in desktop searches for fauna that may occur or have been recorded within a 10 km buffer of the site (SW Environmental, 2024a).

The Survey Area falls within the Region 4: South Coast (DAWE, 2022) Referral Guideline region for black cockatoos, characterised by the presence of Jarrah-Marri forest, along with Karri (*Eucalyptus diversicolor*) and *Banksia* spp. low heath and scrub. All three black cockatoo species forage within Region 4, and critical breeding habitat for Carnaby's and Baudin's cockatoo species occurs in the region (DAWE, 2022).

No evidence of black cockatoos roosting within or immediately adjacent to the Survey Area were observed by SW Environmental (2024a). Forty-five suitable Diameter at Breast Height (DBH) trees were recorded during the survey, of which one Jarrah was hollow bearing. The hollow was observed to be potentially suitable for black cockatoos, with no signs of use. Other various fauna species may also utilise the available hollow. Karri trees are unlikely to develop large hollows until they are at least 75 cm DBH (SW Environmental, 2024b).

Western grey kangaroo (*Macropus fuliginosus*) scat and tracks were also found within the Survey Area. The revegetation area may also be considered as suitable habitat for introduced European rabbit (*Oryctolagus cuniculus*).

3.2 Field Survey

3.2.1 Existing Vegetation

The majority of the revegetation Survey Area consisted of paddock-cleared, weedy grasses and forbs or cleared ground (Photo 3-3, Photo 3-4). Some small patches of remnant vegetation existed in the eastern paddock revegetation area (Photo 3-5, Photo 3-6). The presence of introduced species was high, with weed presence further discussed in Section 4.4.

Photo 3-1 Revegetation area containing weedy grasses and forbs

Photo 3-2 Cleared ground within revegetation area

Photo 3-3 Remnant patch of vegetation in eastern paddock revegetation area

Photo 3-4 Fragmented patches of remnant vegetation and weeds in eastern paddock revegetation area

3.2.2 Reference Vegetation

Remnant vegetation adjacent to the Survey Area consisted of *Eucalyptus diversicolor* tall open forest over *Allocasuarina decussata* isolated clumps of mid trees over *Agonis flexuosa* and *Banksia* spp. low trees over closed shrubland over various sedges, ferns and forbs (Photo 3-5). The location of reference vegetation is presented in Figure 2 (Appendix A). The reference site occurred on the same soil type as the revegetation area, and was in Very Good to Excellent vegetation condition (EPA, 2016). A list of vascular flora taxa recorded during the survey, inclusive of species within reference vegetation is presented in Appendix C.

Photo 3-5 Reference vegetation

3.3 Hydrology and Drainage

A drainage line runs in a northeast direction through the eastern paddock revegetation area (Photo 3-6, Photo 3-7). An erosion gully has formed along the drainage line.

Photo 3-6 Drainage line in eastern paddock revegetation area

Photo 3-7 Erosion present along drainage line

4 Revegetation Management

4.1 Disturbances, Risks and Management

The proposed revegetation site, having been previously subject to historical clearing disturbance, faces a number of risks requiring management. Erosion and weed proliferation are the primary risks to the revegetation area. Management strategies can be put in place to mitigate the effect of these risks to achieve successful revegetation of the Survey Area, as detailed below.

4.1.1 Erosion

Revegetation Area 1 (Dam Perimeter)

Erosion is a prevalent risk for dam sites. The revegetation of the dam perimeter may assist in mitigating dam erosion in multiple ways, inclusive of acting as a wind break to reduce water evaporation rates and by adding plants within the dam inflow zone and dam margins that will subsequently reduce silting of the dam and soil erosion (Sustainable Farms, 2021), whilst simultaneously providing biodiversity value.

Revegetation Area 2 (Paddock Drainage Line)

The drainage line and surrounding revegetation area has been subject to environmental degradation through disturbances such as historical clearing, manmade ground disturbance and weed presence. To achieve the greatest chances of revegetation success and create biodiversity values within the eastern drainage revegetation site, the risk of erosion must be managed. Currently, mounds of piled soil are evident surrounding the drainage line from previous ground disturbance at the site (Photo 4-1). The banks of the drainage line have formed an erosion gully (Photo 4-2).

Photo 4-1 Topsoil mounds surrounding drainage line

Photo 4-2 Erosion gully

4.1.2 Weeds

Invasive flora taxa were observed to be proliferating across the entirety of the Survey Area. Predominant weed types within the revegetation areas included widespread grassy weeds (Photo 4-3), broadleaf

weeds (Photo 4-4) and various other invasive herbs (Photo 4-5), inclusive of *Zantedeschia aethiopica* (Photo 4-6), a Declared Pest under the *Biosecurity and Agriculture Management Act 2007* (DPIRD, 2024b). Multiple observed weeds are capable of high ecological impact and/or rapid invasiveness, as per DBCA's (2023) Warren Impact and Invasiveness Rating system. Weed species observed opportunistically during the site visit are presented in Appendix C.

The site is likely to require significant ongoing monitoring and maintenance if initial weed control efforts are not comprehensive. There is a potential for ongoing weed invasion to occur from adjacent, open properties, however this risk can be minimised with periodic monitoring and follow-up weed control (as detailed in Section 4.4), along with the successful establishment of native species, which may outcompete invasive flora taxa. Overall, planting of native species sourced from local provenance will improve vegetation condition, habitat quality and connectivity within the site over the long term.

Photo 4-3 Dominant Kikuyu (*Cenchrus clandestine*) weedy grass

Photo 4-4 Concentrated patch of broadleaf weeds

Photo 4-5 Fleabane (*Erigon* sp.) in flower

Photo 4-6 Arum Lily (*Zantedeschia aethiopica*) at site

4.1.3 Grazing Pressures

With evidence of Western grey kangaroo (*Macropus fuliginosus*) activity observed within the study area (Photo 3-1, Photo 3-2), it is likely that grazing pressure would be a threat to young seedlings that will be planted during revegetation. Management strategies to exclude grazing pressures include the installation of fencing around revegetation areas. By ensuring that grazing species are excluded from the rehabilitation area prior to the commencement of revegetation works (through fencing installation),

requirements for ongoing management are likely to be reduced, along with the requirement for plant guards.

Photo 4-7 Kangaroo scat

Photo 4-8 Kangaroo tracks

4.1.4 Other

Phytophthora cinnamomi may exist on site. This along with other pathogens could be introduced through tubestock, or equipment used in rehabilitation (including on the clothes or person of site workers). This risk can be reduced by only using material from a Nursery and Garden Industry Western Australia (NGIWA) accredited nursery. Standard plant hygiene practices would also be utilised during revegetation, to minimise the risk of further spread (provided in Appendix D).

4.2 Implementation Schedule

Recommended timing for implementation of primary weed control and initial planting activities are shown in Table 4-1. Implementation has been broken down into three phases, detailing the tasks to be undertaken:

- prior to **(Phase I)**
- during/around the time of **(Phase II)**
- and following the completion of **(Phase III)** planting.

Actual implementation timing may be impacted by the stages of clearing. availability of seedlings, contractors and rainfall. The timing and extent of ongoing maintenance activities depend on findings from site monitoring following revegetation (Section 5).

Table 4-1 Implementation schedule for primary weed control and planting at the site

Task	Timing	Process Notes
Phase I		
Sourcing of plant stock	Immediately	Recommended use of native species stock (indicative list in Appendix B), sourced from local provenance (Appendix E)
Weed control – initial	At the earliest opportunity practicable, ideally during the dry period (around summer)	As detailed in Section 4.4
Ground preparation	During and following dam construction and earthworks tasks	As detailed in Section 4.3.2
Fencing installation	Following dam construction	As detailed in Section 4.3.3
Phase II		
Weed control – ongoing	During year of revegetation when weather conditions are suitable, through until time of planting and after sufficient soil moisture is present.	As detailed in Section 4.4
Planting and Bacteria Reintroduction	Around June when soil moisture levels are suitable (period when reasonable rainfall has occurred or is predicted to occur during planting)	As detailed in Section 4.5.6
Watering	Not required if planting occurs during period of suitable soil moisture content	–
Plant protection	Not required if fencing is installed sufficiently	Installation of fencing and elimination of grazing pests should eliminate the requirement of plant guards
Phase III		
Monitoring	To occur: - In spring the year following implementation of works - Annually for two years following implementation - 5- and 10-years post completion	As detailed in Section 5

	To reduce ongoing costs, it is recommended that additional brief monitoring checks-ups are undertaken each month following implementation for the following growing season	
Weed control – follow-up	Following planting for at least one year, as required. Recommended use of a combination of selective and river-safe herbicide. Further requirements as identified through regular monitoring.	Selective herbicides suitable for weeds present (Section 4.4)

4.3 Site Preparation

Site preparation activities are essential for the site to obtain the greatest chance of successful rehabilitation to meet completion requirements. Recommendations for site and soil preparation to be carried out prior to revegetation within the study area are outlined in Table 4-1.

Table 4-2 Summary of recommended tasks for site preparation within the study area, to be performed prior to revegetation.

Task	Purpose	Process
Weed control – initial	Remove invasive weeds Improve chances of growing success for native species (both regenerated and revegetated) by reducing competition Improve condition of site	General non-selective herbicide application for patches of mixed weeds. Selective herbicide application for concentrated patches of same-type weeds following planting.
Fencing installation	Grazing exclusion	Installation of fencing around the outermost perimeter of revegetation sites.
Ground preparation	Moisture retention for enhanced plant growth Manage erosion risk and slow water flow	Directional spreading of soil down inflow zone of dam with a bulldozer or similar machine using tracks. Widening of drainage line to manage erosion and stabilise the channel.

4.3.1 Weed Control – Initial

As detailed in Section 4.4, widespread, non-selective, river-safe herbicide application is recommended for initial control of weed-dominated ground cover within infested areas of the revegetation site.

Timing: To be undertaken at the earliest time practicable, or within the year prior to planting. To predominantly occur across dry months (around summer) in appropriate weather conditions.

4.3.2 Ground Preparation

Adequate ground preparation is essential for ensuring the maximum chances of revegetation success within the Survey Area.

Revegetation Area 1 (Dam Perimeter)

Part of the dam perimeter revegetation site adjoins to the dam construction area and will hence be subject to considerable earthworks activities. During dam construction, topsoil should be retained, and following weed control practices, should be spread down the inflow and margin areas in a direction that is conducive to revegetation. This can be achieved with the use of a bulldozer or similar tracked machinery. By spreading topsoil in a perpendicular direction towards the water, track marks will be left. The indents left from tracks will be in a direction that is parallel to the dam waterbody. This will allow slowing of water runoff down the sloping gradient of the inflow and dam margin, increasing water retention for seedlings that will be planted during revegetation. This will also aid in reducing the risk of erosion.

Revegetation Area 2 (Paddock Drainage Line)

To ensure the success of revegetation efforts within the drainage line and surrounding paddock area, the existing drainage line should be widened and reshaped. The drainage line presents a significant erosion risk in its current condition, and ground preparation is required prior to any planting in the area. As aforementioned, the current drainage line has become an erosion gully, with steep banks present.

Ground preparation recommended at the site includes widening of the drainage line banks and reshaping to achieve a gentle gradient of the bank into the waterline. The objective would be to make the drainage line shallower and wider, consequently slowing the water down and achieving channel stabilisation with the added effect of revegetation of channel banks.

Ground management of the surrounding area also needs to be undertaken, including the spreading of topsoil mounds that currently exist from previous disturbance activities. Caution must be taken to ensure that weed control is implemented prior to the movement of topsoil mounds (that are currently proliferating with weeds).

Timing: To be undertaken during and following dam construction and earthworks tasks.

4.3.3 Fencing Upgrade

For the purpose of grazing exclusion – as opposed to ongoing control – it is recommended that boundary fencing around the rehabilitation area is installed prior to revegetation. Currently, rehabilitation areas are unfenced. Fencing is considered to be a more effective and environmentally friendly choice than installing plant guards and will require less maintenance effort long-term. With kangaroos presenting the most significant grazing risk to seedlings, fencing should be at least 1.2 – 1.5 m in height. Ringlock fencing, as opposed to plain wire fencing, is recommended for kangaroo exclusion, with a row of barbed wire across the top. Vermin mesh can also be considered.

Timing: To be undertaken after damn construction, before revegetation of all sites.

4.4 Weed Control

The implementation of a weed control program is essential as part of a revegetation plan, to support the success of native plant establishment, as well as encouraging natural regeneration in areas where remnant vegetation still exists.

Weed control for the Survey Area is inclusive of:

- Initial widespread/general control, preferably during the dry period (predominantly between December and March as indicated in long-term climate data presented in Section 3.1.1). Dry conditions should be ensured to reduce the likelihood of herbicide run-off into nearby areas or watercourses. The use of Roundup Biactive® or a similar non-selective herbicide that has been specifically formulated for use in aquatic and sensitive areas is recommended.
- Ongoing weed control during dry weather conditions is recommended in the lead-up to planting, during the year of planting. The use of a river-safe non-selective herbicide is again recommended, particularly near the drainage line and dam.
- Follow-up, targeted control of remnant weeds following planting. Additional care should be taken to protect establishing native plants, with consideration of both selective and

river-safe herbicides and careful spot spraying to specifically target weed species. Personnel should be trained and able to identify native species, including emergent seedlings.

- Follow-up, targeted control of remnant weeds identified during ongoing monitoring. Once again, care must be taken to avoid impact to native plants and waterways.

Chemical weed control should be undertaken in accordance with the general guidelines for herbicide application included in Table 4-3.

Table 4-3 Standard guidelines for herbicide application

Standard	Detail
Trained personnel and legal use	Herbicide application should be undertaken by qualified personnel who are able to identify relevant weed species, identify and avoid native species including emergent seedlings, and follow legal requirements for application (including application in accordance with manufacturers' instructions and safety requirements).
Monitor for weeds appearing later/not identified in survey	Late summer and/or autumn spraying may be necessary for weeds that were not present during initial treatment, ensuring dry weather conditions are guaranteed.
Work planning/staging	Weed control activities should generally commence in areas of best condition, moving into areas in worse condition. This helps to minimise the risk of transporting weeds from the low condition areas into better areas.
Weather conditions	Spray during still, dry conditions, when no rain is predicted within 12 hours. Conduct spraying to minimise spray drift that could affect non-target species. Plan for weed control during typical dry months for the area (referring to long-term average precipitation presented in the Section 3.1.1 climate graph).
Timing of post-treatment planting	Weed control should preferably begin at least 12 months preceding planting to allow for sufficient time to manage weeds entirely before revegetation efforts are implemented. Planting should not occur until at least two weeks after last period of spraying, or once sprayed weeds are effectively dead. The weeds require some time to break down.

4.4.1 Species-Specific Control Methods

Note: Weed management methodology should be carried out by a suitably qualified weed contractor with specialist knowledge of weed control in natural areas.

Grasses

Various weedy grasses were observed to be proliferating across the site as the dominant ground cover, such as the perennial Kikuyu (*Cenchrus clandestinus*). For initial and ongoing control (during dry season around Summer and in suitable dry weather conditions in months leading up to planting), blanket application using non-selective, river-safe herbicide is recommended for areas invaded with both grass and broadleaf weeds.

For follow-up control following planting, grass-selective herbicide can be utilised to eliminate remaining invasive grasses with caution taken that conditions are suitable and that proximity to waterways or waterlogged soils is not a risk.

Control method: For non-selective application, spray with using non-selective, river-safe herbicide such as Roundup Biactive® (mixed as per label instructions). For grass-selective application, spot-spray with a Haloxyfop® herbicide if the weeds are not nearby to existing drainage lines, waterbodies or waterlogged soils.

Broadleaf Weeds

Broadleaf weeds including Flat weed and Smooth Cats-ear (*Hypochaeris* spp.), Wild Radish (*Raphanus raphanistrum*) and Dandelion (*Taraxacum khatoonae*) were widespread across the Survey Area, in both concentrated patches and scattered throughout grassland. These may easily be controlled through initial widespread application of non-selective, river-safe herbicide. If broadleaf weeds persist following planting, follow-up control of selective herbicide could be carefully applied in areas that are not nearby to existing drainage lines, waterbodies or waterlogged soils.

Control method: For non-selective application, spray with using non-selective, river-safe herbicide such as Roundup Biactive® (mixed as per label instructions). For broadleaf-selective application, spot-spray with a Lontrel® herbicide (mixed as per label instructions).

Invasive Herbs

Invasive herbs such as Burr Medic (*Medicago polymorpha*), Thistles (*Cirsium* spp.), Fleabane (*Erigeron* sp.), Docks (*Rumex* spp.), Arum Lily (*Zantedeschia aethiopica*) and Wild Turnip (*Brassica* spp.) were recorded during the site visit. With the widespread occurrence of various invasive herbs scatted amongst dominant grassy weeds, initial non-selective application of river-safe herbicide is recommended, with ongoing monitoring to be utilised as a measure of exclusion effectiveness. Non-selective river-safe herbicide application can occur during both initial and follow-up control periods for the site.

Control methods: Spray invasive herbs as part of widespread non-selective herbicide application, if singular occurrences persist following planting, they can be spot-sprayed using non-selective, river-safe herbicide such as Roundup Biactive® (mixed as per label instructions).

4.4.2 Weed Control Schedule

Adequate weed control is essential to be implemented prior to revegetation and ground preparation activities, up to the time of planting, and following planting, with additional control occurring as per requirements identified during post-revegetation monitoring. By following the recommended schedule of weed control at the site, the chances of successful seedling establishment and growth will be enhanced. It is essential that currently proliferating weeds are eradicated in the paddock drainage line area prior to ground preparation practice such as spreading of existing topsoil mounds. Table 4-4 provides a guide to weed control implementation at the site. Follow-up maintenance weed control following revegetation is likely to be required.

Table 4-4 Recommended weed control timeline within the study area.

Timing		Control
Phase I (prior to planting)	During dry period (summer through to autumn)	Widespread, non-selective, river-safe herbicide control
Phase II (during/around the time of planting)	Autumn	Non-selective, river-safe herbicide control during a period up until time of planting if weather conditions permit safe application)
Phase III (following planting/during monitoring)	As dictated by weed presence	Selective or non-selective herbicide for remnant weeds where/if required, based on site condition and weed presence following planting

4.5 Planting

For the purpose of this RMP, three indicative management areas for planting are referred to, being the Margin (0.71 ha), Interzone (2.06 ha), and Upslope zones (1.80 ha), as presented in Figure 3 (Appendix A). Based on their preferred habitat, taxa within the revegetation species list have been selected for use in corresponding management areas, as outlined in Appendix B.

4.5.1 Revegetation Requirements

The total revegetation area at Lot 9951 and Lot 9952, Boorara Brook is 4.57 ha in size (Figure 1, Appendix A). The majority of the Survey Area is in Completely Degraded vegetation condition. Objectives for the revegetation are to establish native vegetation to a condition capable of generating long-term environmental values, controlling present and ongoing risks to the site. This includes the provision of species that will be of value of general and conservation significant fauna that have been recorded in the area, inclusive of black cockatoos and the Southern Brown Bandicoot (observed during the SW Environmental (2024a) fauna survey). Fauna assemblages expected to utilise the area are discussed in Section 3.1.3.

4.5.2 Plant Stock

Seedlings may include tube stock, with a preference for forestry pots over small plant cells to maximise chances of success. Forestry pots are economical and are generally at a stage of growth that can establish successfully during revegetation.

An indicative list of species for revegetation are listed in Appendix B. It is possible that not all species listed will be available, or additional species will be required to reach the diversity criteria. Where possible, tube stock should be sourced from suppliers that collect local provenance seed and propagation material, as therefore plants will have a higher likelihood of being genetically similar to the naturally occurring plants adapted to growing conditions of the Area. A list of local potential suppliers and revegetation contractors is provided in Appendix E.

Tubestock may help introduce microorganisms that have become depleted in the site soil, which can be beneficial to revegetation success. It is essential that plants are sourced from a reputable supplier and inspected for health prior to purchase and importation to the site stock must be sourced from accredited dieback free suppliers (refer to Appendix E for recommended suppliers).

4.5.3 Density

Planting density for the Survey Area is recommended at 3000 plants per hectare across all management zones as a general rate. Professional revegetation practitioners should be engaged to oversee appropriate distribution of seedlings throughout the site, which will vary across the site. The recommended densities are aimed at achieving a target of 2000 stems/ha after 10 years.

The density of tree canopy species varies slightly between planting management areas, based on habitat preferences. The Indicative Revegetation Species Lists containing planting rates per management area are presented in Appendix B. Plants should be randomly distributed, rather than evenly spaced, to achieve a natural effect. Grouping of several seedlings of the same species will also reflect a more natural distribution.

4.5.4 Diversity

Species diversity of 60% of the total taxa on the revegetation species list (Appendix B) is the recommended requirement after 10 years, achieving a Good or better vegetation condition rating (EPA, 2016). This diversity will be achieved through direct planting of seedlings in a combination of advanced 1 litre pots and forestry pots.

4.5.5 Timing

Planting of seedlings across most of the site should occur when soil moisture levels are suitable, usually following a rainfall event. Planting timing is recommended around the months May/June. Timing of planting must also give due consideration to weed control activities, with regular weed control carried out. Weed control recommendations for the site area detailed in Section 4.4.

4.5.6 Bacteria Reintroduction

The soil microbe is influenced both biotic and abiotically by vegetation evident growing within the area, through the plant-soil feedback mechanism, subsequently influencing surrounding seedling growth (Bennett & Klironomos, 2018). A loss in soil microbial diversity has been considered as a significant threat to the balance of ecosystems (Yang et al., 2020). The use of pesticides and insecticides is also known to negatively impact the microbiome (Jeyaseelan et al., 2024), a practice that may be prevalent in adjacent agricultural farming areas.

The revegetation survey area is currently in Completely Degraded vegetation condition, with no vegetation present with the exception of weedy herbs and grasses dominating the ground cover. With historical widespread clearing disturbances evident within and surrounding the Survey Area, it is likely that a large portion of the area has been devoid of extensive, intact vegetation for a prolonged period of time. This may have affected the soil quality, inhibiting functioning with regard to the plant-soil feedback mechanism. The potential use of pesticides and insecticides in adjacent areas used for

agricultural farming practices may also have impacted the soil quality. Seedling performance following revegetation planting may be inhibited as a result of these environmental factors.

To enhance the bacterial community and subsequently the soil microbe and overall quality within the Survey Area, bacteria can be reintroduced to the soil profile prior to planting. This would promote plant growth, boosting chances of revegetation success and seedling performance. The product Bactivate®5, applied with Bactivate® BioBoost Enhance can be sprayed in liquid form across the site during planting to introduce bacteria, along with some carbon to the soil. This will increase chances of successful plant growth.

4.5.7 Methodology

An auger should be used for planting of seedlings within the Upslope Dryland and Seasonally Damp Interzone areas. For the Water Margin management area, the use of a Pottiputki® or similar tool would be more suitable for planting. The use of an auger for the majority of the revegetation area would ensure that sufficient planting depth is achieved, and a shallow basin is formed around plants for maximising moisture retention. Plant root balls should be loosened in soil during planting to overcome compaction and improve drainage. This will facilitate successful plant establishment. Plants are not required to be staked for support. Free standing plants generally have increased durability and strength in the long-term, as opposed to staked plants.

Techniques to enhance planting success include planting mid and understory species as community plantings, consisting of planting multiple seedlings of the same species together in groups of approximately five to six plants. Certain species such as *Juncus pallidus* that are well suited to waterlogged areas and can be subject to water submersion should be planted at the high waterline around the Revegetation Area 1 dam, and within/on the banks of the drainage line within Revegetation Area 2.

Low phosphorous fertiliser pills are recommended to be added at the time of planting for all seedlings (with the exclusion of Proteaceae spp.). Plants should be placed in suitable locations based on individual species light requirements or growth habits. Professional revegetation practitioners distribute plants and seed accordingly, relevant to the existing values of the area. Bacterial re-introduction is also recommended to occur at the time of planting, spread as per Bactivate® BioBoost Enhance spraying instructions.

4.5.8 Revegetation Maintenance

Revegetation works will require ongoing maintenance after planting, including:

- follow-up weed control as discussed in Section 4.4, and
- replacement plantings if necessary.

It is expected that following revegetation there will be a maximum loss of about 50% of the original plantings. Subsequently, replacement plantings may be required to maintain the original planting numbers and achieve completion targets.

5 Monitoring and Maintenance

A program of revegetation monitoring is required to ensure that the revegetation objectives are achieved. Monitoring is recommended to be undertaken at the following intervals:

- In spring the year following implementation of revegetation works
- Annually in spring for the following two years
- After five years
- After 10 years

Additionally, regular (monthly) quick check-ups during the initial monitoring interval are recommended to ensure that weed and grazing control measures are acting effectively on the site. This may reduce long-term costs by decreasing the requirement for significant maintenance works down the track.

An example of relevant monitoring sheets that can be used to identify maintenance requirements are presented in Appendix F, derived from the *Monitoring and Evaluating Biodiversity Conservation Projects* document by Coote (2003) for the Department of Conservation and Land Management.

Recommended monitoring methodology is inclusive of the following:

- Monitoring transects within each indicative management area for planting consisting of:
    - Twenty permanent 1 m by 1 m quadrats along a 20 m transect measuring stem count (Margin, Interzone and Upslope areas)
    - Two permanent 50 m by 5 m transects measuring presence/signs of fauna activity, weed inundation, general vegetation density, vegetation structure, habitat values, and canopy tree coverage if present (Interzone and Upslope areas)
- Opportunistic recording of vegetation condition mapping notes, utilising the Vegetation Condition scale presented in Section 5.6 of EPA (2016) *Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment*, presented in Appendix G.
- Visual monitoring of bank stability and erosion at relevant areas of water inundation/drainage, with recommended utilisation of example monitoring sheets found in Appendix F. The same areas should be visually monitored at later monitoring dates for an accurate representation of revegetation success to be achieved.

The location of monitoring transects can be identified during the spring following the implementation of the rehabilitation. Graphs can then be produced to illustrate vegetation cover, species richness and growth rates. Signs of fauna habitat utilisation and signs of pest activity and/or grazing may be opportunistically recorded during monitoring visits. Monitoring of weed presence should determine any further control measures required at the site. Where issues are identified, reference should be made to control methodologies detailed throughout Section 4. If additional weed or pest species become established over time, advice must be sought from a suitably experienced contractor to determine suitable control methods.

Fence boundaries should also be inspected upon each monitoring visit to ensure that their integrity has not been compromised. If fencing becomes inadequate, maintenance activities should be undertaken. If areas of planting are unsuccessful and do not meet completion targets, additional planting may be required. If the scale of additional planting required is significant, consideration should be given as to potential reasoning why seedling establishment was unsuccessful, and any issues should be addressed for subsequent plantings. Examples of problems may be:

- Grazing by fauna due to insufficiencies in fencing upgrade
- Competition with weeds
- Poor planting technique
- Poor herbicide application/herbicide or pesticide drift from adjacent agricultural practices
- Excessive shading
- Localised conditions not suited to species
- Physical disturbance by humans

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Appendix A Figures

Figure 1 Location Map of Dam and Revegetation Areas

Figure 2 Reference Vegetation Area

Figure 3 Indicative Management Areas for Planting

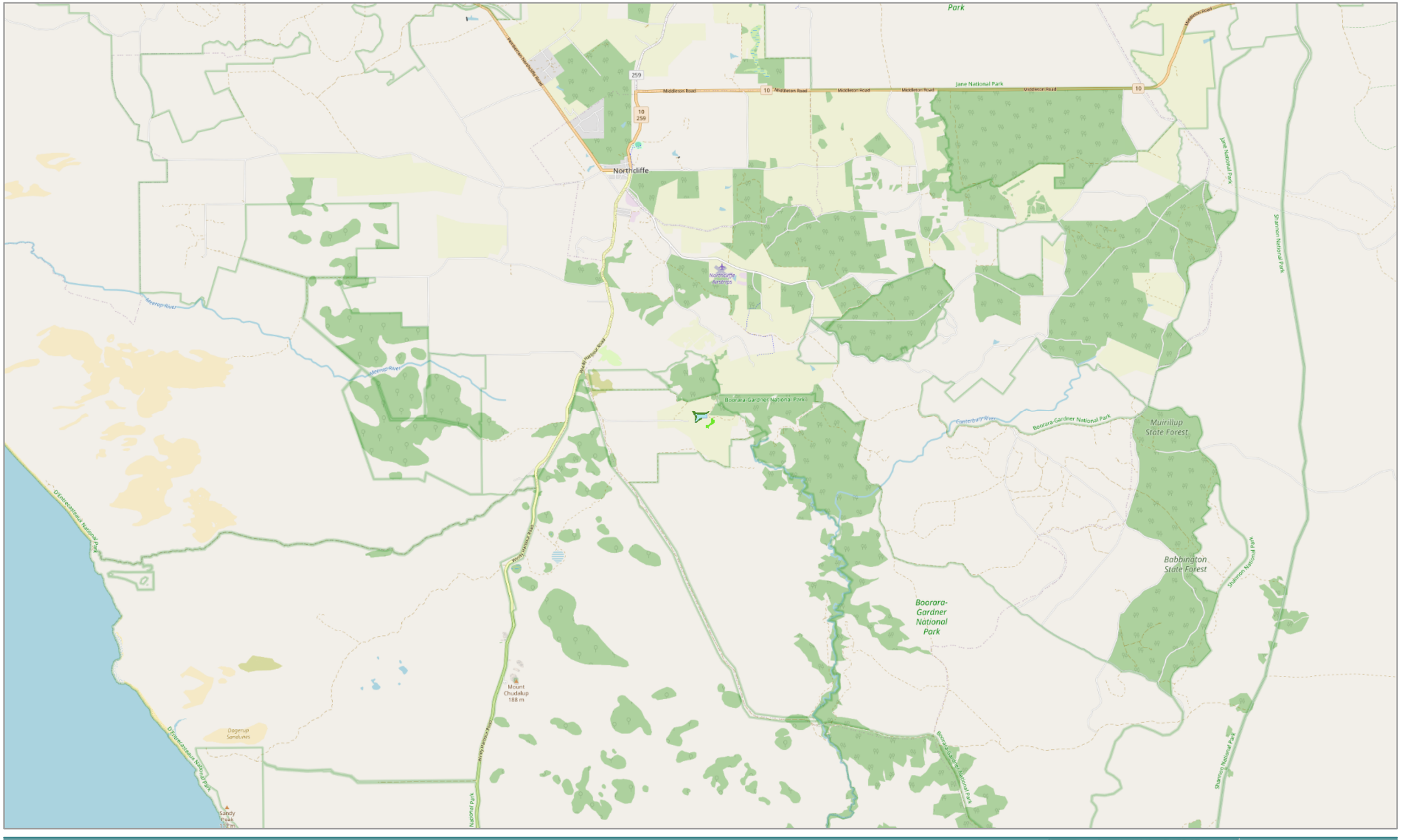

FIGURE 1 - LOCATION MAP OF DAM AND REVEGETATION AREAS

Proposed reshaping and revegetation
Proposed revegetation
Proposed dam footprint (approximate)

PROPOSED DAM BOORARA BROOK

Ref: SW718
Date: 20/06/2025 Author: SP

A3 @ 1:100000

0 0.5 1 2 km

GRID: GDA zone 50

N

SW Environmental
www.swenvironmental.com.au

ANDREWS RD

FIGURE 2 - REFERENCE VEGETATION AREA

PROPOSED DAM BOORARA BROOK

Ref: SW718
Date: 20/06/2025 Author: SP

- Reference vegetation point
- Proposed reshaping and revegetation
- Proposed revegetation
- Proposed dam water level
- (approximate) Road
- Minor drainage line

Source: Base map © Esri and its data suppliers. SLIP Landgate (2025)

A3 @ 1:2500

0 10 20 40 m

GRID: GDA zone 50

N

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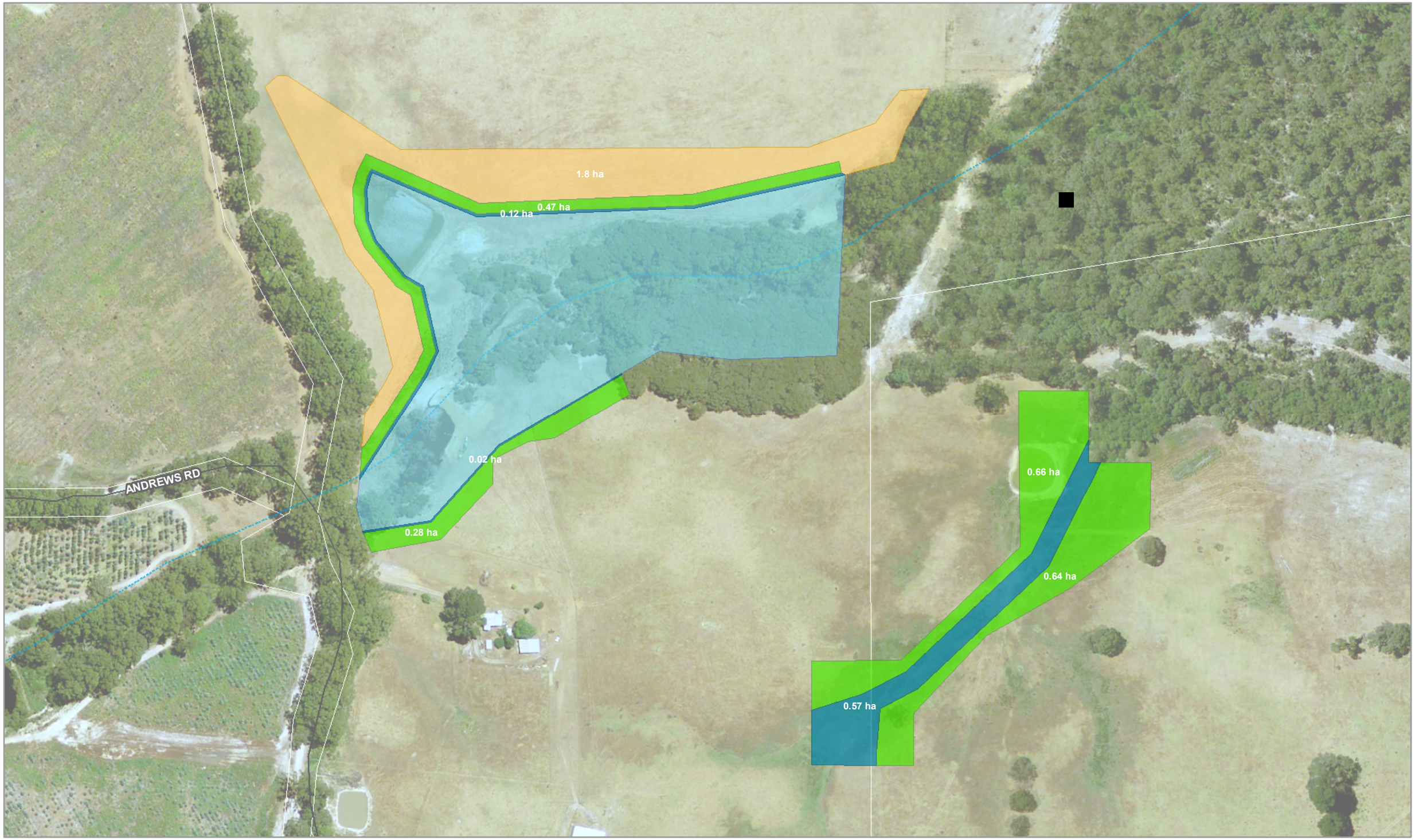


FIGURE 3 - INDICATIVE MANAGEMENT AREAS FOR PLANTING

PROPOSED DAM BOORARA BROOK

Ref: SW718
Date: 20/06/2025 Author: SP

Reference vegetation point

Management category (indicative)
- Margin
- Interzone
- Upslope
- Proposed dam water level (approximate)

Road
Minor drainage line

A3 @ 1:2500

0 10 20 40 m

GRID: GDA zone 50

N

SW Environmental

www.swenvironmental.com.au

Appendix B Indicative Revegetation Species Lists

Plants highlighted in green indicate alternative species that are known to be available at native nurseries, providing options for where proposed taxa may be unavailable at the time of seedling acquisition. Similar rates to other plants of the same/similar form that may not be available can be replicated.

Management Area for Planting: Margin

	Per Ha (Stems)	Total (Stems)
Sedges/Restionaceae/Rushes		
Empodisma gracillimum	**100**	**71**
Ficinia nodosa	**600**	**426**
Hypolaena pubescens	**100**	**71**
Juncus pallidus	**1000**	**710**
Lepidosperma effusum	**500**	**355**
Lepidosperma tetraquetrum	**200**	**142**
Leptocarpus scariosus	**100**	**71**
Machaerina vaginalis	**100**	**71**
Herbs		
Microlaena stipoides	**100**	**71**
Lobelia anceps	**100**	**71**
Liparophyllum latifolium	**100**	**71**
Total	**3000**	**2130**

Management Area for Planting: Interzone

	Per Ha (Stems)	Total (Stems)
Canopy		
Eucalyptus patens	**200**	**412**
Eucalyptus megacarpa	**100**	**206**
Trees		
Allocasuarina decussata	**100**	**206**
Agonis flexuosa	**200**	**412**
Banksia seminuda	**100**	**206**
Shrubs		
Bossiaea linophylla	**100**	**206**
Callistachys lanceolata	**300**	**618**
Chorilaena quercifolia	**200**	**412**
Taxandria fragrans	**100**	**206**
Taxandria linearifolia	**500**	**1030**
Acacia divergens	**100**	**206**
Acacia urophylla	**50**	**103**
Eutaxia myrtifolia	**50**	**103**
Acacia myrtifolia	**50**	**103**
Hypocalymma cordifolium	**50**	**103**
Sedges/Restionaceae/Rushes		
Empodisma gracillimum	**100**	**206**
Lepidosperma effusum	**100**	**206**
Leptocarpus scariosus		
Hypolaena pubescens		
Machaerina vaginalis		
Netrostylis sp. Jarrah Forest (R. Davis 7391)		
Herbs		
Anigozanthos flavidus	**200**	**412**
Dampiera hederacea	**200**	**412**
Lobelia anceps	**200**	**412**
Tremandra stelligera		
Microlaena stipoides		
Total	**3000**	**6180**

Management Area for Planting: Upslope

	Per Ha (Stems)	Total (Stems)
Canopy		
Corymbia calophylla	**200**	**360**
Eucalyptus diversicolor	**200**	**360**
Eucalyptus marginata	**200**	**360**
Trees		
Allocasuarina decussata	**100**	**180**
Agonis flexuosa	**200**	**360**
Banksia seminuda	**100**	**180**
Shrubs		
Bossiaea linophylla	**200**	**360**
Chorilaena quercifolia	**500**	**900**
Taxandria fragrans		
Trymalium odoratissimum subsp. trifidum	**100**	**180**
Taxandria linearifolia		
Acacia pentadenia		
Acacia divergens		
Acacia pulchella	**100**	**180**
Acacia urophylla	**100**	**180**
Hibbertia cuneiformis	**100**	**180**
Podocarpus drouynianus		
Eutaxia myrtifolia	**200**	**360**
Acacia myrtifolia		
Chorizema ilicifolium		
Hypocalymma cordifolium	**200**	**360**
Cycads		
Macrozamia reidlei*		
Sedges/Restionaceae/Rushes		
Hypolaena pubescens		
Netrostylis sp. Jarrah Forest (R. Davis 7391)		
Herbs		
Anigozanthos flavidus	**100**	**180**
Tremandra stelligera	**100**	**180**
Microlaena stipoides		
Dampiera hederacea		
Climbers		
Hardenbergia comptoniana	**200**	**360**
Kennedia carinata	**100**	**180**
Clematis pubescens		
Chorizema diversifolium		
Total	**3000**	**5400**

*If sourced, a low number of individuals should be planted, spread across the area, as natural occurrences are isolated.

Appendix C Vascular Plants Observed

Family	Species	Form	Observed	Additional Recommended Species**	Margin (0.71 ha)	Interzone (2.06 ha)	Upslope (1.80 ha)
Myrtaceae	*Corymbia calophylla*	1. Canopy	x				x
	Eucalyptus diversicolor		x				x
	Eucalyptus marginata		x				x
	Eucalyptus megacarpa			x		x	
	Eucalyptus patens			x		x	
Casuarinaceae	*Allocasuarina decussata*	2. Trees 10-30 m	x			x	x
Myrtaceae	*Agonis flexuosa*	3. Small trees <10 m	x			x	x
Proteaceae	*Banksia seminuda*		x			x	x
Fabaceae	*Acacia pentadenia*	4. Tall shrubs >2 m		x			x
	Bossiaea linophylla		x			x	x
	Callistachys lanceolata		x			x	
Myrtaceae	*Taxandria fragrans*		x			x	x
	Taxandria linearifolia			x		x	x
Rhamnaceae	*Trymalium odoratissimum* subsp. *trifidum*		x				x
Rutaceae	*Chorilaena quercifolia*		x			x	x
Thymelaeaceae	*Pimelea clavata*		x			x	x
Malvaceae	*Lasiopetalum floribundum*	5. Small shrubs 1-2 m / Tall shrubs > 2m	x				x
Dilleniaceae	*Hibbertia cuneiformis*	5. Small shrubs 1-2 m	x				x
Ericaceae	*Leucopogon* sp.		x				
	Styphelia propinqua		x				x
Fabaceae	*Acacia divergens*		x			x	x

	Acacia myrtifolia			x		x	x
	Acacia pulchella		x				x
	Acacia urophylla		x			x	x
	Chorizema ilicifolium			x			x
	Eutaxia myrtifolia		x			x	x
Myrtaceae	*Hypocalymma cordifolium*			x		x	x
Podocarpaceae	*Podocarpus drouynianus*		x				x
Zamiaceae	*Macrozamia reidlei*	6. Cycad, to 2 m	x				x
Cyperaceae	*Ficinia nodosa*	7. Sedges/Restios/Rushes	x		x		
	Lepidosperma effusum		x		x	x	
	Lepidosperma sp.		x				
	Lepidosperma tetraquetrum		x		x		
	Machaerina vaginalis			x	x	x	
	Netrostylis sp. Jarrah Forest (R. Davis 7391)			x		x	x
Juncaceae	*Juncus pallidus*		x		x		
Restionaceae	*Empodisma gracillimum*			x	x	x	
	Hypolaena pubescens		x		x	x	x
	Leptocarpus scariosus			x	x	x	
Campanulaceae	*Lobelia anceps*	8. Herbaceous			x	x	
Dennstaedtiaceae	*Pteridium esculentum*		x			x	x
Elaeocarpaceae	*Tremandra stelligera*		x			x	x
Goodeniaceae	*Dampiera hederacea*			x		x	x
Haemodoraceae	*Anigozanthos flavidus*		x			x	x
Poaceae	*Microlaena stipoides*		x		x	x	x
Rubiaceae	*Opercularia hispidula*		x				x
	Opercularia volubilis		x				x
Fabaceae	*Chorizema diversifolium*	9. Climber		x			x

	Hardenbergia comptoniana		x				x
	Kennedia carinata		x				x
Ranunculaceae	*Clematis pubescens*			x			x
Araceae	**Zantedeschia aethiopica*	*Weed	x				
Asteraceae	**Cirsium* sp.		x				
	**Erigeron* sp.		x				
	**Hypochaeris glabra*		x				
	**Hypochaeris radicata*		x				
	**Taraxacum khatoonae*		x				
Brassicaceae	**Brassica* spp.		x				
	**Raphanus raphanistrum*		x				
Fabaceae	**Medicago polymorpha*		x				
Juncaceae	**Juncus microcephala*		x				
Poaceae	**Cenchrus clandestinus*		x				
	**Poaceae* spp.		x				
Polygonaceae	**Rumex* spp.		x				
Solanaceae	**Solanum laciniatum*		x				

Note: Taxa prefaced with * indicates that they are alien to Western Australia

Appendix D Plant Hygiene

Activity	Requirement
All site access – personnel	Ensure shoes and gloves are clean. Sterilize if known to have recently visited a site where pathogens are present (e.g. *Phytophthora spp*), or working in wet areas. This can be achieved by first scraping boots clear of mud, then standing the soles in a disinfecting solution that contains benzalkonium chloride. The remainder of the boot should be rinsed or sprayed with disinfecting solution. Note: disinfecting solutions should be prevented from entering any water bodies. Use of rubber boots (gumboots) is recommended because of the ease of cleaning these.
Use of tools and machinery	All tools and machinery should be adequately cleaned, and if necessary, disinfected, prior to use on the site, especially if previously used in a damp area or where disease is known to be present.
Tubestock acquisition	Ensure stock has no signs of disease, e.g. no withered or discoloured leaves, deformed growth, discolouration, shrivelled or insufficient looking quantity of roots; no visible pests on foliage, stems or roots; and no weeds growing in pots.

Appendix E Relevant Local Suppliers and Contractors

Potential local plant/seed stockists

Note: early ordering of plant/seed is of high importance. Ordering from multiple suppliers as opposed to just one may decrease the risk of not obtaining stock.

Carramar Coastal Nursery: 1834 Mandurah Road, Port Kennedy, Ph: 0407 472 894

Hamel Nursery: 178 Attein Road, West Coolup, Ph: 0439 769 379

Leschenault Landcare Community Nursery: 114 Johnston Road, Bunbury, Ph: 0477 799 900

Geographe Community Landcare Nursery: Queen Elizabeth Ave, Busselton, Ph: 0429 644 885

The Tube Nursery: Blond St, Cowaramup, Ph: 9755 5509

Everyday Potted Plants: Sebbes Rd, Forest Grove, Ph: 9757 7424

Boyanup Botanical: South West Highway, Boyanup, Ph: 9731 5470

APACE: 1 Johanna St, Fremantle, Ph: 93361262

Potential local revegetation contractors

CapeLife Environmental Services: 57 Kevill Road, Margaret River, Ph: 0422 428 884

Tranen Revegetation Southwest: 20 Possum Place, City of Busselton, Ph: 9754 2643

Appendix F Example Monitoring Sheets

FORESHORE CONDITION ASSESSMENT FORM :

FOR PADDOCK SCALE SURVEYS

General details

Date:.....

Recorder's Name: .....

.....

Recorder's Contact Details: .....

.....

Farm Name:.....

Farm Address:.....

.....

Nearest road intersection:.....

.....

Catchment:.....

Stream name:.....

Location or Lot No:.....

Aerial Photo Ref:.....

Owner/manager consent obtained:
Yes / No

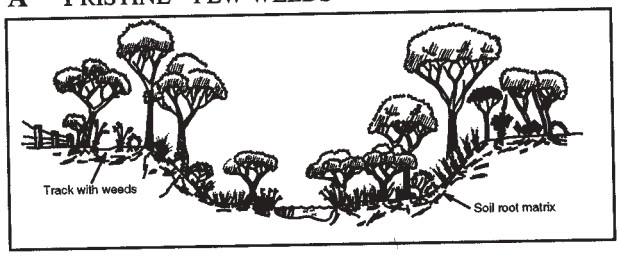
Owner/manager present during survey:
Yes / No

Foreshore assessed:
left ☐ right ☐ (facing upstream) both ☐

Site diagram

FORESHORE GRADE

A PRISTINE - FEW WEEDS ☐

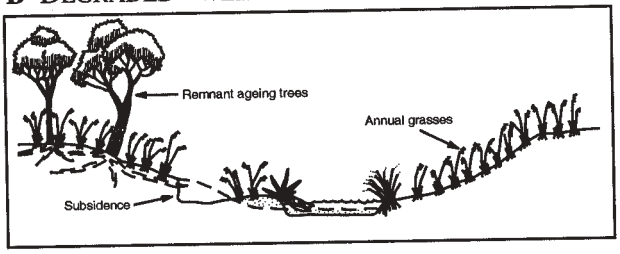


A1 Pristine: no weeds ☐

A2 Near pristine: some weeds ☐

A3 Slightly disturbed: local weed infestations ☐

B DEGRADED - WEED INFESTED ☐

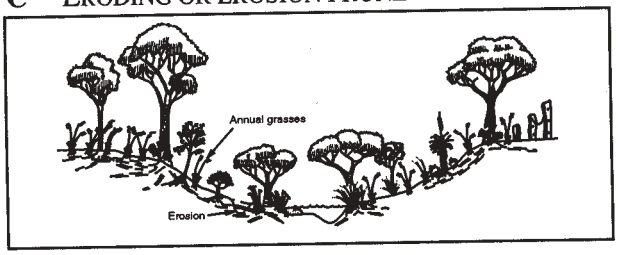


B1 Weed infested: understorey mainly natives ☐

B2 Heavily weed infested: natives = weeds ☐

B3 Degraded: understorey weed dominated ☐

C ERODING OR EROSION PRONE ☐

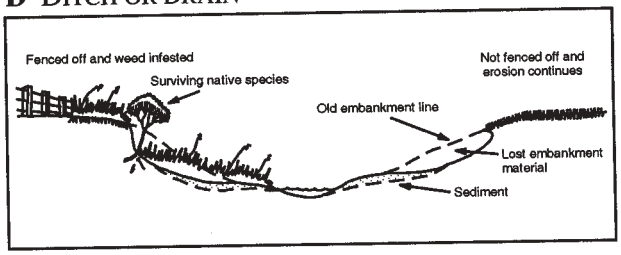


C1 Erosion prone: understorey weeds only ☐

C2 Surface erosion: soil exposed ☐

C3 Erosion and subsistence present ☐

D DITCH OR DRAIN ☐



D1 Eroding: extensive erosion and siltation ☐

D2 Freely eroding (ditch): erosion / siltation out of control ☐

D3 Weed infested (drain): highly eroded ☐

FENCING STATUS

Fenced off: Yes ☐ No ☐

Stock access to foreshore: Yes ☐ No ☐

Crossing point present: Yes ☐ No ☐

Comments:.....

.....

.....

ADDITIONAL INFORMATION

General bank steepness

- ☐ >60° — Very steep
- ☐ 45-60° — Steep
- ☐ 10-45° — Moderate slope
- ☐ 0-10° — Slight slope

General soil cohesion

- ☐ Excellent - rock, stone
- ☐ Good - clay, clayey loam
- ☐ Poor - sand, loose loam

Major erosion/siltation

- ☐ None
- ☐ Points of cutting/undercutting
- ☐ Major undercutting
- ☐ Firebreak/track washouts
- ☐ Bank subsidence
- ☐ Large sediment deposits

Vegetation health

- ☐ Looks healthy
- ☐ Some sick trees
- ☐ Many sick and/or dying trees
- ☐ Many dead trees
- ☐ Mainly long dead trees

Tree seedlings and saplings present: Yes ☐ No ☐

Comments

Stream environmental health rating (refer to Table C)

Rating	Floodway & bank vegetation	Verge vegetation	Stream cover	Bank stability & sediment	Habitat diversity
Excellent	(15)	(8)	(8)	(8)	(6)
Good	(12)	(6)	(6)	(6)	(4)
Moderate	(6)	(4)	(4)	(4)	(2)
Poor	(3)	(2)	(2)	(2)	(1)
Very poor	(0)	(0)	(0)	(0)	(0)

Surrounding landuse:

- ☐ Conservation reserve (8)
- ☐ Remnant bush (6)
- ☐ Rural residential (4)
- ☐ Urban (2)
- ☐ Agricultural (2)
- ☐ Commercial/industrial (1)

Score	*40-55*	*30-39*	*20-29*	*10-19*	*0-9*
Rating	*Excellent*	*Good*	*Moderate*	*Poor*	*Very poor*

Total score = ...

Environmental rating = ...

LIVING STREAMS SURVEY: INFORMATION TO DETERMINE OVERALL STREAM ENVIRONMENTAL RATING

	Floodway and Bank Vegetation	Verge Vegetation	Stream Cover	Bank Stability and Erosion	Habitat Diversity
Excellent	• Healthy undisturbed native vegetation. • No weeds. (15 points)	• Healthy undisturbed native vegetation. • Verges more than 20m wide. (8 points)	• Abundant cover: shade, overhanging vegetation. • Snags, leaf litter, rocks and/or aquatic vegetation in stream. (8 points)	• No erosion, subsidence or sediment deposits. • Dense vegetation cover on banks and verge. • No disturbance. (8 points)	• Three or more habitat types. • Some permanent water. (6 points)
Good	• Mainly healthy undisturbed native vegetation. • Some weeds. • No recent disturbances. (12 points)	• Mainly healthy undisturbed native vegetation. • Verges less than 20m wide. (6 points)	• Abundant shade and overhanging vegetation. • Some cover in the stream. (6 points)	• No significant erosion, subsidence or sediment deposits in floodway or on lower banks. • May be some soil exposure and vegetation thinning on upper bank and verge. (6 points)	• Two habitat types. • Some permanent water. (4 points)
Moderate	• Good vegetation cover, but a mixture of native and exotic species. • Localised clearing. • Little recent disturbance. (6 points)	• Good vegetation cover, but mixture of exotic and native species. • Verges 20m wide or more. (4 points)	• Some permanent shade and overhanging vegetation. • Some instream cover. (4 points)	• Good vegetation cover. • Only localised erosion, bank collapse and sediment heaps. • Verges may have sparse vegetation cover. (4 points)	• Mainly one habitat type with permanent water, or a range of habitats with no permanent water. (2 points)
Poor	• Mainly exotic ground cover. • Obvious site disturbance. (3 points)	• Narrow verges only (< 20m wide). • Mainly exotic vegetation. (2 points)	• Channel mainly clear. • Little permanent shade or instream cover. (2 points)	• Extensive active erosion and sediment heaps. • Bare banks and verges common. • Banks may be collapsing. (2 points)	• Mainly one habitat type with no permanent water. (1 point)
Very Poor	• Mostly bare ground or exotic ground cover (i.e. pasture, gardens or weeds but no trees). (0 points)	• Mostly bare ground or exotic ground cover (i.e. pasture, gardens or weeds but no trees). (0 points)	• Virtually no shade or instream cover. (0 points)	• Almost continuous erosion. • Over 50% of banks collapsing. • Sediment heaps line or fill much of the floodway. • Little or no vegetation cover. (0 points)	• Stream channelised. • No pools, riffles or meanders. • The stream forms a continuous channel. (0 points)

RECORD SHEET 3

Photopoints

Photopoint location:	Date:	Time:
Location details:	Compass bearing:	GPS: S E
Direction of photo:	Negative number:	
Lens type/other camera settings:	Photographers name:	
Purpose of photo/site observations:		
Attach photograph here		

Photopoint location:	Date:	Time:
Location details:	Compass bearing:	GPS: S E
Direction of photo:	Negative number:	
Lens type/other camera settings:	Photographers name:	
Purpose of photo/site observations:		
Attach photograph here		

RECORD SHEET 4

Vegetation transect notes

Project Name: ..... **Project location:** .....

Recorders Name: ..... **Date recorded:** .....

Tick if applicable

In the transect identify which of the following apply:

Soil / Habitat

- Heavy leaf litter, twigs
- Evidence of active erosion (gullies or rills, exposed roots)
- Large patches of bare earth
- large loose rocks
- Signs of salinity present
- Fallen hollow logs
- site degraded by stock

Other

_____

_____

_____

_____

Fauna

- evidence of rabbits
- evidence of foxes
- bird calls

Vegetation

- a range of tree ages
- signs of insect attack
- degraded vegetation
- fungal disease
- signs of dieback
- exposed roots
- signs of dieback
- aquatic plants
- regrowth
- domination by weeds
- branch tips with no leaves
- an understorey of shrubs
- regeneration evident

Measurable attributes

% weed cover = ...
No. weed species = ...
No. regenerating species = ...
% canopy cover = ...
Canopy height (m) = ...
% Ground cover = ...
Soil pH = ...
Soil litter depth (mm) = ...

Management actions/project activities conducted within transect

.....
.....
.....
.....
.....
.....

Additional notes: (i.e. time of year, climate, rainfall patterns, average temperature or unusual events)

.....
.....
.....

Notes (whether the site is patchy or consistent in terms of soil, vegetation or hydrology may also be noted)

.....
.....
.....

RECORD SHEET 5

Monitoring Regeneration and Planting Success

This record sheet has been designed to record the results of *Monitoring Techniques D and E*. This sheet can be used to record data for all species or for individual species at the site. The species list for the site should be recorded as an attachment to this sheet.

Project Name: ..... **Recorder's Name:** .....

Location of site: ..... **Size of activity area:** .....

Date of initial planting: ..... **No. of species planted:** .....

Planting method used: .....

Observation date	Number of species present	Plant density	Survival rate	Notes
1/2/1992	*15*	*340 plants per hectare*	*89%*	*Seedlings appear to be growing well but some weed control is indicated*

RECORD SHEET 6

Monitoring Weeds

Project Name: ..... **Site location:** .....

First year of observation: ..... **Site description:** .....

Recorder's Name: ..... **Transect length and quadrat size:** .....

Weed species: ..... **Scientific Name:** .....

Control methods: .....

Observation date	Monitoring Location	Density	Notes (growth stage, status)	Next management action
22/3/2000	*Transect 1*	*<5%*	*Mature plants with fruit, environmental weed*	*Hand removal of remaining mature plants prior to seeding*

RECORD SHEET 7

Vegetation quality assessment results

Project Name: .....

Site location: .....

First year of observation: .....

Site description: .....

Recorder's Name: .....

Management activities undertaken at site:

.....

.....

Observation date	Monitoring Location	Assessment rating	Assessment of remnant quality	Next management action indicated by assessment
22/3/2000	*Transect 1*	*42*	*Very high*	*Some weed control indicated, fence at north end needs to be repaired.*

RECORD SHEET 8

Fauna Observations

Project Name: ..... **Recorder's Name:** ..... **Year:** .....

Site Location: .....

.....

Common Name	Date Observed	Weather conditions on day	Location (map reference or GPS reading if available)	Time	Notes (i.e. seen or heard mammal, male, female, vegetation types observed in, dawn/dusk, general conditions etc)
Kangaroo	*12/7/2000*	*Cold/cloudy*	*E 115 34 06.3 S 34 12 16.5*	*6.40pm*	*In a mob of thirty, some with joeys, by the dam*

RECORD SHEET 9

Bird Observations

Project Name:	**Recorder's Name:**	**Date:**
Site location:		

Species	Yes	Species	Yes	Species	Yes
Cockatoos and Parrots		**Honeyeaters and Chats**		**Swallows and Martins**	
Red-tailed Black Cockatoo		White-eared Honeyeater		Welcome Swallow	
White-tailed Black Cockatoo		Brown-headed Honeyeater		White-backed Swallow	
Carnabys Black Cockatoo		Spiny-cheeked Honeyeater		Tree Martin	
Pink and Grey Galah		New Holland Honeyeater		Fairy Martin	
Corella		Singing Honeyeater			
28 - ringneck		Yellow-plumed Honeyeater		**Owls, nightjars and frogmouths**	
		Brown Honeyeater		Southern Boobook	
Hawks, Eagles and falcons		Tawny-crowned Honeyeater		Barking Owl	
Black Shouldered Kite		Crimson Chat		Masked Owl	
Brown Goshawk		White-fronted Chat		Barn Owl	
Australian Hobby (Little Falcon)		Red Wattlebird		Owlet Nightjar	
Australian Kestrel		Yellow-throated Miner		Tawny Frogmouth	
Spotted Harrier					
Peregrine Falcon		**Robins, Whistlers and Shrike-thrushes**		**Waterbirds**	
Wedge-tailed Eagle		Red-capped Robin		Black Swan	
Little Eagle		Jacky-Winter		Australian Shelduck	
Brown Falcon		Golden Whistler		Australian Wood Duck	
		Rufous Whistler		Grey Teal	
Pigeons		Grey Shrike-thrush		Musk Duck	
Common Bronzewing		Western Yellow Robin		White-faced Heron	
Crested Pigeon		Southern Scrub-robin		Straw-necked Ibis	
				Australian White Ibis	
Crows and Ravens		**Fairy wrens and scrub wrens**			
Australian Raven		Splendid Fairy-wren		**Other**	
Little Crow		White-winged Fairy-wren		Magpie-lark	
		Shy Hylacola		Richard's Pipit	
Fantails and Flycatcher		Rufous Fieldwren		Bush Stone-curlew	
Grey Fantail				Striated Pardalote	
		Thornbills		Mallee fowl	
Restless Flycatcher		Yellow-rumped Thornbill		Magpie	
Willie Wagtail		Chestnut-rumped Thornbill		Emu	
		Western Thornbill		Mistletoe bird	
Sitellas and Treecreepers		Inland Thornbill		Black-faced Cuckoo Shrike	
Rufous Treecreeper				Western Gerygone	
Varied Sitella		**Kingfishers & Bee-eaters**		Weebill	
		Rainbow Bee-eater		White-browed Babbler	
		Sacred Kingfisher			

Appendix G Vegetation Condition Scale (EPA, 2016)

Table 2: Vegetation Condition Scale (adapted from Keighery 1994 and Trudgen 1988)

Vegetation Condition	South West and Interzone Botanical Provinces	Eremaean and Northern Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.	
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor		Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.