



# Clearing Permit Decision Report

## 1 Application details and outcome

### 1.1. Permit application details

Permit number:	CPS 10205/1
Permit type:	Purpose permit
Applicant name:	Department of Primary Industry, Research and Development
Application received:	19 May 2023
Application area:	1 hectare of native vegetation within a 9.11 hectare footprint
Purpose of clearing:	Construction and operation of a Managed Aquifer Recharge (MAR) pilot
Method of clearing:	Mechanical
Property:	Lot 6307 on Deposited Plan 39948, Myalup
Location (LGA area/s):	Shire of Harvey
Localities (suburb/s):	Myalup

### 1.2. Description of clearing activities

The vegetation proposed to be cleared is 1 hectare of native vegetation within a 9.11 hectare footprint, that lies within a previously cleared area of a pine plantation within the Myalup State Forest No. 16 (see Figure 1, Section 1.5). The application is to clear vegetation to enable the installation of the Managed Aquifer Recharge (MAR) Pilot, which is a scientific investigation to determine the feasibility of storing irrigation water for horticulture in the Superficial Aquifer (DPIRD, 2023a).

### 1.3. Decision on application

Decision:	Granted
Decision date:	23 October 2023
Decision area:	1 hectare of native vegetation within a 9.11 hectare footprint as depicted in Section 1.5, below.

### 1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and five submissions were received. Consideration of matters raised in the public submissions is summarised in Appendix B.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix C), relevant datasets (see Appendix G.1.), the findings of a flora and vegetation survey, targeted flora survey and fauna assessment (see Appendix F), the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration that the purpose of the clearing is to conduct a pilot study for the wider MAR Pilot Project, and that the project is being funded and supported by the National Water Grid Authority under its National Water Grid Fund schedule to the Federal Funding Agreement – Infrastructure (DPIRD, 2023a).

The assessment identified that the proposed clearing will result in:

- the potential introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to appreciable land degradation or have long-term adverse impacts on the mapped wetland or ecological communities and can be minimised and managed to unlikely lead to an unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing;
- progressive one directional clearing to allow fauna to escape into adjacent native vegetation;
- clearing of large regrowth of *Eucalyptus marginata*, *Corymbia calophylla*, *Nuytsia floribunda* and *Agonis flexuosa* is not authorised; and
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback.

## 1.5. Site map

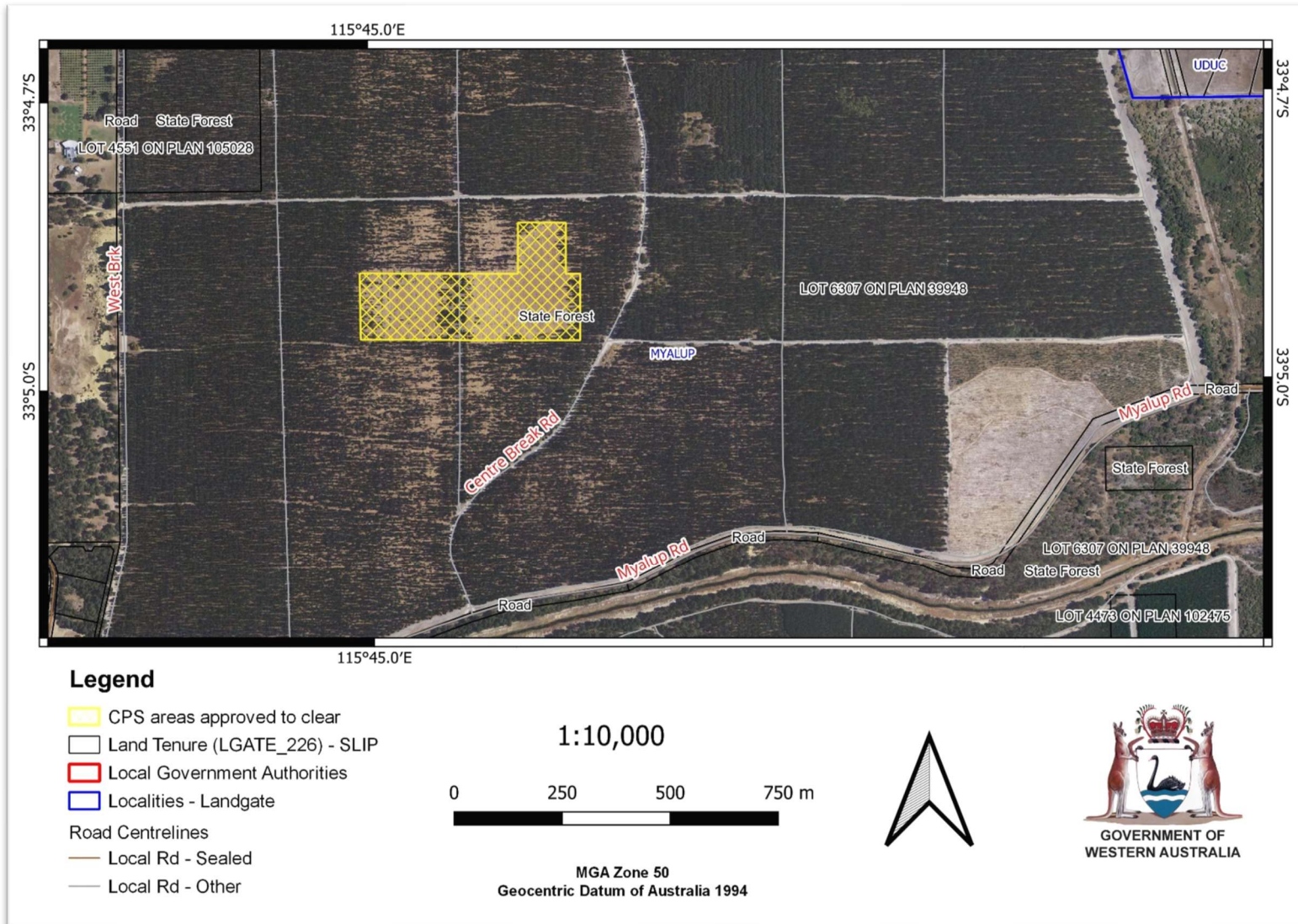


Figure 1: Map of the application area. The area crosshatched yellow indicates the area authorised to be cleared under the granted clearing permit.

## 2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Rights in Water and Irrigation Act 1914* (RIWI Act)
- *Soil and Land Conservation Act 1945* (WA)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

## 3 Detailed assessment of application

### 3.1. Avoidance and mitigation measures

The project site was selected because it comprises part of a pine plantation that was harvested in 2013 and has remained fallow since (i.e. is largely devoid of remnant native vegetation). The pipeline corridor comprises existing cleared access tracks in State Forest 16 and again was selected because it is largely devoid of remnant native vegetation (DPIRD, 2023b).

The Department of Primary Industries and Regional Development (DPIRD) will minimise impacts on regrowth zamia palms (*Macrozamia riedlei*) wherever possible. Additionally, no clearing of the regrowth native tree species onsite will occur, which includes *Eucalyptus marginata*, *Corymbia calophylla*, *Nuytsia floribunda* and *Agonis flexuosa* (DPIRD, 2023a). The supply pipeline for the pilot will be located along existing cleared access tracks and will involve no impacts on native vegetation (DPIRD, 2023a).

DPIRD's environmental management plan (EMP) includes several management actions that seek to minimise land degradation during the pilot project. These include:

- fencing around the MAR basins to prevent unauthorised access;
- designated access routes to minimise ground disturbance;
- protection measures for native vegetation to be retained (e.g. bunting and signage);
- hygiene practices to minimise the spread of weeds, pests and diseases;
- retention of topsoil for use during decommissioning;
- measures to prevent wind and water erosion;
- no chemical storage onsite; and
- if fuel needed, to minimise the likelihood of spills, self-bunded diesel gensets will be used (DPIRD, 2023a).

DPIRD has undertaken 18 months of baseline water quality monitoring for the source water (Harvey River Diversion Drain) and the Superficial Aquifer into which the water will be infiltrated (DPIRD, 2023b).

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

### 3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix C) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water

resource values.

The assessment against the clearing principles (see **Error! Reference source not found.**) identified that the impacts of the proposed clearing may present a risk to biological values, significant remnant vegetation, conservation areas, and land and water resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

### **3.2.1. Biological values (flora) - Clearing Principles (a) and (c)**

#### Assessment

Available databases and mapping indicated that 27 conservation significant flora species have been recorded within the local area, six of which are listed as Threatened species and 21 Priority flora species. A flora and vegetation survey was conducted within the application area (Ecoedge, 2023), including the area adjacent to the application area. The survey included targeted searches for threatened orchids (Ecoedge, 2019). It is considered that the timing and intensity of the flora surveys were sufficient to determine the impacts to flora within the application area. Both of these surveys found no Threatened or Priority flora within the application area.

The 2019 survey covering the wider MAR project area identified seven priority-listed flora and five taxa that are either range-extensions, or near the limit of their natural range on the Swan Coastal Plain (Ecoedge, 2019: 2023). The seven Priority Flora species were *Acacia semitrullata* (P4), *Acacia flagelliformis*(P4), *Boronia capitata* subsp. *gracilis* (P3), *Caladenia speciosa* (P3), *Chamaescilla gibsonii* (P2), *Dillwynia dillwynioides* (P3), and *Lasiopetalum membranaceum* (P3). None of these occurrences are expected to be impacted from the proposed clearing.

#### Conclusion

Based on the above assessment, and findings of the flora surveys, the proposed clearing is unlikely to impact on any threatened or priority flora species. However, the proposed clearing may increase the risk of weeds and dieback spreading into adjacent native vegetation, noting that non-native species were recorded in the Flora Survey. Weed and dieback management will assist in mitigating this risk.

#### Conditions

To address the above impacts, the following management measure will be required as a condition on the clearing permit:

- To address the potential spread of weeds into adjacent native vegetation, the clearing permit contains a condition that requires the applicant to undertake weed hygiene management measures.

### **3.2.2. Biological values (fauna) - Clearing Principles (a) and (b)**

#### Assessment

Within the local area (10 kilometre radius of the application area), 27 conservation significant fauna species have been recorded (see Appendix C.5.). The application area has previously been cleared and utilised as a pine plantation with associated access roads. The pine plantation has subsequently been cleared and some minor regeneration of vegetation has occurred. DPIRD have proposed to clear *Macrozamia riedlei* (zamia palms) and avoid the regrowth of native tree species, which includes *Eucalyptus marginata*, *Corymbia calophylla*, *Nuytsia floribunda* and *Agonis flexuosa* (DPIRD, 2023a).

A Level 1 Fauna Survey was undertaken within the application area and surrounding project area in 2019, and the application area was revisited in August 2023 to inform the native clearing assessment (Harewood, 2019: 2023). The fauna surveys concluded that as a consequence of the subject site's high degree of historical disturbance it can be regarded as having a very low/negligible fauna habitat value. The only species likely to utilise degraded habitat of this type would be common, widespread bird species (e.g. Australian magpie), but given its poor condition and limited extent it is unlikely to support entire populations of any one species (Harewood, 2023). It is considered highly unlikely that the proposed MAR Pilot will have any significant impact on any species of conservation significance or their preferred habitat. Some species may very occasionally occur in or over the subject site, however typically these species would simply be in transit between areas of suitable habitat which may be present in adjoining areas (Harewood, 2023).

#### Conclusion

Due to the transient behaviour, ability to fly or relocate to different coastal locations, and an abundance of suitable habitat surrounding the application area, the proposed clearing is unlikely to result in a significant impact to mammal and bird species. The clearing of one hectare across a large footprint of degraded disjointed remnant vegetation is unlikely to impact on habitat significant for conservation fauna. Not authorising clearing of *Eucalyptus marginata*, *Corymbia calophylla*, *Nuytsia floribunda* and *Agonis flexuosa* regrowth will minimise impact to foraging habitat.

The implementation of minimisation and avoidance measures (Section 3.1) will minimise the risk of impacts from clearing activities. However, impacts to individuals that may be present at the time of clearing may occur. Undertaking clearing in a slow direction towards adjacent native vegetation will minimise this risk.

#### Conditions

To address the above impacts, the following management measure will be required as a condition on the clearing permit:

- To address the potential impact to fauna individuals present at the time of clearing, the clearing permit contains a condition that requires slow directional clearing to allow fauna present to move into adjacent vegetation ahead of the clearing activity.
- Clearing of large regrowth of *Eucalyptus marginata*, *Corymbia calophylla*, *Nuytsia floribunda* and *Agonis flexuosa* is not authorised to minimise impacts to foraging habitat.

### **3.2.3. Environmental values (conservation area) - Clearing Principle (h)**

#### Assessment

The application area is located within Myalup State Forest (SF6) which consists of a previously cleared pine plantation, containing regrowth of zamia palms and native tree species. Myalup State Forest is vested in the Conservation and Parks Commission (CPC) and managed by the Department of Biodiversity, Conservation and Attractions (DBCA). DBCA confirmed that the CPC has consented to access and the clearing of regrowth native trees and shrubs on Lot 6307 within the proposed MAR Pilot basin area (DPIRD, 2023a).

DPIRD staff have mapped the regrowth native plants onsite and estimate that approximately 100 *Macrozamia riedlei* shrubs are unavoidable and will need to be removed to provide for the project. Notwithstanding this, DPIRD seeks authorisation to clear all regrowth native vegetation shrubs from within the 9.11 hectare basin site (n.b. approximately 616 shrubs) in case additional clearing is ultimately required for the project. However, DPIRD have committed to minimising impacts on the regrowth native shrubs wherever possible. Additionally, no clearing of the regrowth native tree species onsite will occur, which includes *Eucalyptus marginata*, *Corymbia calophylla*, *Nuytsia floribunda* and *Agonis flexuosa*.

#### Conclusion

Noting the degraded condition of the vegetation with clearing limited to sparse shrubs, it is considered that the impacts of the proposed clearing on the Myalup State Forest does not constitute a significant residual impact. Weed and dieback management measures will minimise impacts to the Myalup State Forest adjacent to the application area.

#### Conditions

No additional management conditions required.

### **3.2.4. Environmental values (land degradation) - Clearing Principle (g)**

#### Assessment

According to the mapped soil type within the area proposed to be cleared, there is a high to extremely high risk of wind erosion, water repellence, sub-surface acidification and phosphorous export. Advice was obtained from the Commissioner of Soil and Land Conservation (CSLC) regarding the potential land degradation risks as a result of the proposed clearing (CSLC, 2023). Research staff from the Office of the CSLC conducted a site investigation of the application area on 24 August 2023 (CSLC, 2023). The CSLC identified that there is no significant risk of land degradation as a result of acid sulfate soils (ASS), water erosion, water logging and ground water salinity arising from the MAR Pilot project (CSLC, 2023).

A licence condition through the Section 97A licence (under the CALM Act) requires DPIRD to prepare an EMP in order to minimise environmental impacts during the pilot's construction, operation and decommissioning. The EMP has been drafted and reviewed by DBCA. The EMP includes several management actions that seek to minimise land degradation during the pilot, including (DPIRD, 2023b):

- installation of fencing around the MAR basins to prevent unauthorised access;
- establishment of designated access routes to minimise ground disturbance;
- protection measures for native vegetation to be retained (e.g. bunting and signage);
- implementation of hygiene practices to minimise the spread of weeds, pests and diseases;
- retention of basin spoil onsite (topsoil kept separate). Spoil will be used to return the natural soil level during decommissioning;
- stabilisation of earthwork slopes, batters and spoil piles to prevent wind and water erosion;
- use of covered trucks, wetting techniques and avoid high wind conditions during earthworks;
- no storage of chemicals onsite; and
- use of self-bunded diesel gensets (if required) to minimise the likelihood of spills.

The MAR pilot is unlikely to cause adverse impacts on local hydrology because:

- the quality of the HRDD water is similar to that in the Superficial Aquifer as demonstrated through previous baseline monitoring; and
- the groundwater mound caused by the pilot is anticipated to be localised to the basin area (i.e. within 100-200 metres) based on current knowledge of the aquifer.

Additionally, DPIRD will undertake the following management actions to minimise potential adverse hydrological impacts (DPIRD, 2023b):

- investigations into the potential for aquifer matrix reactions (i.e. adverse changes in aquifer water chemistry due to the addition of the HRDD water) prior to the commencement of the pilot;
- preparation of an Operating Strategy to guide the overall MAR Pilot, which will be tied to statutory licences issued by DWER under the RIWI Act; and
- installation and ongoing monitoring of bores and pilot infrastructure to track changes in water level and quality caused by the pilot.

An ASS study was undertaken within the application area and the findings of the study indicates that ASS is not present at the borehole location at the site (Galt Geotechnics, 2023). All soil at each location is classified as non-acid sulfate soil (NASS) and as such, no treatment or management of this material is required if disturbed (excavated or dewatered) during the proposed works (Galt Geotechnics, 2023).

The Myalup Primary Industries Reserve (MPIR) and MAR Pilot projects are discrete and will proceed independent of one another. Environmental investigations and approvals are being progressed for the MPIR separate to those being undertaken for the MAR Pilot. A EP Act section 38 referral is currently being prepared for the MPIR, which will address any land degradation and hydrological risks associated with the MPIR project (DPIRD, 2023b).

#### Conclusion

For the reasons set out above, it is considered that the impacts of the proposed clearing on land degradation can be managed. There is not likely to be any significant impacts to the surrounding vegetation arising from land degradation.

#### Conditions

No additional management conditions required.

### **3.3. Relevant planning instruments and other matters**

The application area is located within Lot 6307 on Deposited Plan 39948, Myalup which is vested in the CPC and managed by DBCA. DPIRD has sought and received a section 97A licence under the CALM Act to undertake the project on Lot 6307. DBCA confirmed that the CPC has consented to the grant of the licence for the purpose of the MAR Pilot Project, including for access and to clear regrowth native trees and shrubs on Lot 6307 within the proposed MAR Pilot basin area (DPIRD, 2023a).

The application area is within the South West Coastal Groundwater Area, proclaimed under the RIWI Act. The site will contain infiltration basins, which do not intercept groundwater and therefore do not require a licence under RIWI Act for this purpose (DWER, 2023). Monitoring and recovery bores will be regulated under a RIWI licence (to construct and take water) associated with the MAR proposal. Water quality is being measured as part of the project so as not to detrimentally impact the existing groundwater quality as part of the project (DWER, 2023). DPIRD will apply for 5C and 26D licences following the first year of operation of the pilot. DPIRD is in ongoing liaison with DWER's South West Regional office about this requirement (DPIRD, 2023a).

On 4 October 2022, the Shire of Harvey's Manager Planning Services advised DPIRD in writing that planning approval under the Greater Bunbury Region Scheme would not be required for the MAR Pilot. On 16 March 2023, the Shire of Harvey's Manager Planning Services advised DPIRD in writing that a building permit would not be required for the MAR Pilot (DPIRD, 2023b).

The application area is located within the boundaries of the registered Gnaala Karla Booja Indigenous Land Use Agreement (WI2015/005). No Aboriginal Heritage Places have been mapped within the application area. Several Aboriginal sites of significance have been mapped within the local area. It is the permit holder's responsibility to ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

**End**



## Appendix A. Additional information provided by applicant

Summary of comments	Consideration of comment
Submission of response to DWER's request for further information August 2023 – including Level 1 Fauna Survey	DPIRD's response and fauna survey was used during the assessment of conservation significant fauna within the application area, which has been detailed in Section 3.2.2 of this report and to address comments received through public submissions detailed in Appendix B.
Submission of Targeted Flora Survey	Survey was used during the assessment of conservation significant flora within the application area, which has been detailed in Section 3.2.1 of this report and address comments received through public submissions, detailed in Appendix B.

## Appendix B. Details of public submissions

Summary of comments	Consideration of comment
Application presents a staged clearing proposal with uncertainty as to development envelope and requested native vegetation clearing area. Species are variable and unspecified. The future plan indicates the clearing of 2,051 ha for intensive irrigated agriculture (but not included in this application). This subsequent plan is a major and significant proposal on which the MAR pilot data is dependent.	<p>The Delegated Officer assessed the clearing application based on the MAR Pilot area proposal, which included 1 hectare of native vegetation within a 9.1 hectare footprint on Lot 6307 on Deposited Plan 39948, Myalup.</p> <p>DPIRD have confirmed that they propose to mostly only clear zamia palms and have committed to avoiding the clearing of the regrowth native tree species, which include <i>Eucalyptus marginata</i>, <i>Corymbia calophylla</i>, <i>Nuytsia floribunda</i> and <i>Agonis flexuosa</i>, which has been conditioned on the permit. The additional shrubs included within the application area is for incidental clearing.</p> <p>The potential wider MPIR project is beyond the scope of this application. DWER is assessing the application as applied for. DPIRD have advised that any development with the larger MPIR will be referred under Section 38 of the EP Act.</p>
The <i>Macrozamia</i> plants being cleared provide food for Emu's that are observed in the area and also provide refugia for mammals and birds, providing for safe transect across the site to adjoining habitat.	<p>The Delegated Officer acknowledges that zamia palms provide a primary food source for emus.</p> <p>The area proposed to be cleared is largely cleared and devoid of remnant native vegetation, albeit a few scattered shrubs. As a result it is unlikely to provide a refugia or safe transect to adjoining habitat for fauna (see site photos available in Appendix F). The areas surrounding the application area provide a more suitable habitat for refuge and foraging as the pine plantation has not been cleared.</p>
A map with legend of all native vegetation surveyed within and adjacent to the site needs to be provided by experienced botanist's. Surveys conducted to contemporary standards and in the optimal seasons are required to accurately identify native vegetation regrowth and rare flora, e.g. orchids.	A Targeted Flora Survey was conducted by Ecoedge in September 2023 (Ecoedge, 2023). The survey found no Threatened or Priority Flora within the application area and detailed in Section 3.2.1. of this report. The timing and intensity of the survey was deemed appropriate to assess impacts within the application area.
The field surveys were carried out during the period 17 August 2018 to 10 January 2019 which is not optimal	A Targeted Flora Survey was conducted by Ecoedge in September 2023 (Ecoedge, 2023). The survey found



Summary of comments	Consideration of comment
for Fauna or Flora. Spring surveys and targeted orchid surveys are required, noting <i>Drakaea</i> species observed through the forest and along cleared roadside.	no Threatened or Priority Flora within the application area and detailed in Section 3.2.1. of this report.
Level 2 Fauna surveys are required, that are targeted to the site and adjoining land to establish habitat connectivity for protection. The proponent has not undertaken or provided site specific Fauna survey data.	A Level 1 Fauna Survey was conducted within the application area and wider area in 2019 (Harewood, 2019). A follow up site visit and report was submitted in September 2023 (Harewood, 2023). Due to the limited native vegetation proposed to be cleared and the avoidance of clearing vegetation that potentially provides habitat for local fauna, it was not deemed necessary for a higher level survey to be undertaken.
“Removal of all native vegetation, regrowth and pine stumps from within a 9.11 hectare area, clearing will attempt to avoid remnant native vegetation“, as stated in the application, presents potential risk of erosion and/or surface runoff into adjoining wetlands or Harvey Diversion drain, a waterway which under EP Act has 50m buffer for protection.	The Delegated Officer obtained advice from the CSLC regarding the potential land degradation risks as a result of the proposed clearing (CSLC, 2023). Research staff from the Office of the CSLC conducted a site investigation of the application area on 24 August 2023 (CSLC, 2023). The CSLC identified that there is no significant risk of land degradation as a result of acid sulfate soils (ASS), water erosion, water logging and ground water salinity arising from the MAR Pilot project (CSLC, 2023).
The construction of infrastructure, pumps and drilling equipment that are intended to intercept the superficial aquifer presents risks of ASS exposure along with groundwater contamination from chemical use i.e. hydrocarbon, fuels and lubricants. Similar risks are to the exchange with waters of Harvey Diversion Drain.	The Delegated Officer obtained advice from the CSLC regarding the potential land degradation risks as a result of the proposed clearing (CSLC, 2023). This investigation confirmed the absence of an ASS risk (CSLC, 2023). It was also noted that issues of ASS, water erosion, waterlogging and groundwater salinity will not present a significant risk of land degradation, and the conditions imposed by their Section 97A licence under their EMP will mitigate other land degradation risks posed by the MAR trial. Further details can be found in Section 3.2.4. of this report.
Impacts to fauna as a result of the clearing due to wildlife entrapment, bird or mammal strike with machinery or from vehicle movement, flyway obstruction, and species home range likely impacted.	The Delegated Officer has included Fauna Management conditions on the Clearing Permit to ensure the approved clearing is conducted in a slow directional manner, to allow any fauna located in the area to relocate into the adjoining vegetation ahead of the clearing activity. A fauna survey of the application area considered it highly unlikely that the proposed MAR Pilot will have any significant impact on any species of conservation significance or their preferred habitat (Harewood, 2023). A detailed assessment of impacts to conservation significant fauna can be found in Section 3.2.2. of this report.
Myalup’s native vegetation represents natal foraging grounds and nesting area for black cockatoos. The sites remnant native vegetation displays a variety of seeds for foraging and adjacent wetlands provide water for birdlife and fauna. The site is within close proximity to two roost sites for Carnaby’s and forest red- tailed black cockatoos and includes important foraging resources.	Due to DPIRD’s avoidance and minimisation measures, which can be found in Section 3.1. of this report, the proposed clearing does not contain foraging habitat for black cockatoos.  The Delegated Officer has included Fauna Management conditions in CPS 10205/1 Clearing Permit to allow any fauna located in the area to relocate into the adjoining vegetation. A detailed assessment of impacts conservation significant fauna can be found in Section 3.2.2. of this report.
The site and adjoining land within Lot 6307, supports many threatened and protected species, listed under	Due to DPIRD’s avoidance and minimisation measures, which can be found in Section 3.1. of this

Summary of comments	Consideration of comment
<p>EPBC Act and WA's BC Act, consisting of, but not limited to: three species of Black Cockatoo, Forest Red tailed(vulnerable) Baudin's and Carnaby's (both IUCN listed endangered), Western Ringtail Possum (critically endangered), Brush Tailed Phascogale (protected), Quenda, Emus, and bat species (rare). Therefore, the project's scale and potential impact of clearing and construction with infrastructure is significant, requiring referral for formal assessment.</p>	<p>report, the proposed clearing does not contain foraging habitat for black cockatoos.</p> <p>A fauna survey of the application area considered it highly unlikely that the proposed MAR Pilot will have any significant impact on any species of conservation significance or their preferred habitat (Harewood, 2023). A detailed assessment of impacts to conservation significant fauna can be found in Section 3.2.2. of this report. Fauna management condition imposed on the clearing permit will minimise any potential impacts to fauna present at the time of clearing.</p>
<p>The clearing of any native vegetation, remnant or regrowth cannot be supported, as it contributes to ongoing net habitat loss, which is something that should not be approved by a conservation department, for species whose declines won't be halted until net habitat loss is halted.</p>	<p>The proposed clearing does not contain any conservation significant flora or vegetation or foraging habitat for black cockatoos, due to DPIRD's avoidance and minimisation measures, which can be found in Section 3.1. of this report. DWER's assessment identified that the proposed clearing of sparse shrubs over a larger footprint to not result in a significant residual impact. No offsets or revegetation were required as a result of the proposed works.</p>
<p>Potentially impact groundwater systems which are intrinsically linked geomorphically and hydrologically to wetlands, and could impact hydrological systems of the region. This aspect of the broader proposal requires further evaluation.</p>	<p>The Delegated Officer sought advice from DWER Water Licensing. The application area is proclaimed for groundwater under the RIWI Act. The site will contain infiltration basins (which do not intercept groundwater and therefore do not require a licence under RIWI Act). Monitoring and recovery bores, which the latter will be regulated under a RIWI licence (to construct and take water) associated with the MAR proposal, will measure water quality as part of the project to ensure no detrimental impact to the existing groundwater quality as part of the project (DWER, 2023).</p> <p>The MPIR and MAR Pilot projects are discrete and will proceed independent of one another. Environmental investigations and approvals are being progressed for the MPIR separate to those being undertaken for the MAR Pilot. An EP Act section 38 referral is currently being prepared for the MPIR, which will address any land degradation and hydrological risks associated with the MPIR project (DPIRD, 2023b).</p>
<p>Is the application for clearing regrowth native vegetation or a mix of regrowth native vegetation and original native vegetation?</p> <p>As all the 'scrub' is proposed for clearing, the following statement can hardly apply: 'To minimise the project's impact the advice is: 'Ensure that due care is taken to avoid impacting the regrowth native vegetation on site during the construction, operation and decommissioning of the project' (page 8, dot-point 2)</p>	<p>The Delegated Officer have been informed that the application area was harvested for pine in 2013. The clearing application based on the MAR Pilot area proposal, is for up to one hectare of native vegetation within a 9.1 hectare footprint on Lot 6307, that largely comprises of individual shrubs. The majority of the application area is in a completely degraded conditions, dominated by weedy species, as a result of the historical pine plantation (EcoEdge, 2023).</p> <p>DPIRD have committed to avoiding the clearing of the regrowth native tree species onsite, which includes <i>Eucalyptus marginata</i>, <i>Corymbia calophylla</i>, <i>Nuytsia floribunda</i> and <i>Agonis flexuosa</i>, which has been conditioned on the permit.</p>
<p>'DPIRD seeks authorisation to clear all regrowth native vegetation shrubs from within the 9.11 ha basin site (n.b.616 shrubs) in case additional clearing is</p>	<p>DPIRD have confirmed that they are applying for a Purpose Permit, which will entail clearing a maximum of 1 hectare of native vegetation within the 9.11</p>

Summary of comments	Consideration of comment
<p>ultimately required for the project.’ (p 9, Application for new permit...). Perhaps this application is made too soon if the proposed MAR pilot is yet to have a plan. As well, the subsequent proposal is ‘(subject to the resolution of several government processes, which are yet to formally commence)’ (page 7, 5.3 Application for new permit).</p>	<p>hectares footprint. This clearing will consist of regrowth <i>Macrozamia riedlei</i> (zamia palm) and other small shrubs that have regrown after the harvesting of the pine plantation. All regrowth native tree species onsite including <i>Eucalyptus marginata</i>, <i>Corymbia calophylla</i>, <i>Nuytsia floribunda</i> and <i>Agonis flexuosa</i> will be avoided. DPIRD have all of the CALM Act and RIWI Act licences required to commence the MAR Pilot project.</p>
<p>More information is required about the Managed Aquifer Recharge (MAR) pilot – the subject of this Clearing Permit application. For example:</p> <p>a. What would be the quality of the water being recharged?</p> <p>b. Where would the water be sourced from?</p> <p>c. Would water investment ‘stack up’ environmentally?</p> <p>d. Could the MAR pilot data be obtained theoretically through modelling?</p> <p>e. Would the proposal affect more shallow rooted native plants? Potential indirect impacts include the ‘alteration of the local hydrology resulting from the permanent removal of pine plantations which may affect nearby groundwater dependent ecosystems (p3 Ecoedge Flora Report)</p>	<p>DWER requested advice from DPIRD to address the specific questions raised in the submission. Their response is below.</p> <p>a) DPIRD has undertaken 18 months of baseline water quality monitoring for the source water (Harvey River Diversion Drain) and the Superficial Aquifer into which the water will be infiltrated. DPIRD’s environmental consultant, Stream Environment and Water Pty Ltd, has undertaken a scientific investigation of the monitoring data and concluded that the chemistry of source water is generally consistent with that in the Superficial Aquifer. Further, the MAR Pilot will be governed by an Operating Strategy (in prep.), which will be tied to statutory licences issued by DWER under the RIWI Act (DPIRD, 2023b).</p> <p>b) The water will be sourced from the Harvey River Diversion Drain via an existing private offtake structure (i.e. no new construction within the drain is proposed) (DPIRD, 2023b).</p> <p>c) The MAR Pilot is a science investigation that seeks to determine the feasibility of the project in Myalup. It does not involve the establishment of irrigated agriculture. The statutory approvals required to undertake this investigation will ensure environmental factors are taken into consideration when issuing licences and approvals (DPIRD, 2023b).</p> <p>d) While the pilot involves comprehensive modelling, the physical infiltration of water into the aquifer and associated monitoring is required to calibrate the model (i.e. confirm that the model accurately represents the physical environment). As such, both modelling and monitoring are required in order for the pilot to achieve its science objectives (DPIRD, 2023b).</p> <p>e) The infiltration of water into the aquifer through the pilot is unlikely to impact native vegetation because 1) the quality of the water is similar to that in the aquifer as demonstrated through previous baseline monitoring 2) the groundwater mound caused by the pilot is anticipated to be localised to the basin area (i.e. within 100-200 metres) based on current knowledge of the aquifer and the closest stand of remnant native vegetation is located 530 metres away 3) the top of the groundwater mound is anticipated to be at depth (i.e. several metres below the soil surface) (DPIRD, 2023b).</p>
<p>Climate change and water availability. ‘Climate modelling predicts that mean annual runoff in the Harvey to Preston region will reduce by between 7 and 40 per cent in 2030 compared to the period 1975-2007 (scenarios C-wet and C-dry respectively, CSIRO 2009)’. <a href="https://rivers.dwer.wa.gov.au/basin/harvey-">https://rivers.dwer.wa.gov.au/basin/harvey-</a></p>	<p>The MAR Pilot is a science investigation that seeks to determine the feasibility of MAR in Myalup. It does not involve the establishment of irrigated agriculture (DPIRD, 2023b).</p>

Summary of comments	Consideration of comment
river/. Is irrigated agriculture sustainable in a drying climate with water scarcity?	
<p>Purpose for the clearing request: Construction and operation of a managed aquifer recharge pilot (MAR) proposed to be in operation for 3 years. The proponent provides no detailed of scoping or design layout to support the MAR application. Providing: size, height, infrastructure, storage and laydown area, pumps and fuel storage also length and depth of pipeline corridor?</p>	<p>DPIRD conducted hydrological modelling studies prior to selecting the current location for the MAR pilot investigation (see Schmit et al, 2018). In addition, DPIRD has undertaken 18 months of baseline water quality monitoring for the source water (Harvey River Diversion Drain) and the Superficial Aquifer into which the water will be infiltrated. DPIRD's environmental consultant, Stream Environment and Water Pty Ltd, has undertaken a scientific investigation of the monitoring data and concluded that the chemistry of source water is generally consistent with that in the Superficial Aquifer. Further, the MAR Pilot will be governed by an Operating Strategy (in prep.), which will be tied to statutory licences issued by DWER under the RIWI Act (DPIRD, 2023b).</p> <p>The purpose of this clearing application is to further investigate the viability of the wider aquifer recharge project. Specific details of the location of where particular attributes (i.e. storage, pumps etc.) is not required for this assessment, noting the minimal environmental impacts from clearing proposed.</p>
<p>More intensive hydrological monitoring required, providing more reliable data and studies to determine hydrological impacts including water quality and potential groundwater impacts.</p>	<p>The Delegated Officer received advice from DWER Regional Water Licensing regarding potential hydrological and groundwater impacts from the development. The area is proclaimed for groundwater and the site will contain infiltration basins, which do not intercept groundwater and therefore do not require a licence under RIWI. The monitoring and recovery bores will be regulated under a RIWI licence (to construct and take water) associated with the MAR proposal. Water quality is being measured as part of the project so as not to detrimentally impact the existing groundwater quality as part of the project (DWER, 2023).</p> <p>In 2018, CSIRO undertook groundwater scenario modelling for the Myalup Managed Aquifer Recharge Project, during initial investigations (Schmid <i>et al.</i>, 2018). DPIRD has undertaken 18 months of baseline water quality monitoring for the source water Superficial Aquifer into which the water will be infiltrated. DPIRD's environmental consultant, Stream Environment and Water Pty Ltd, has undertaken a scientific investigation of the monitoring data and concluded that the chemistry of source water is generally consistent with that in the Superficial Aquifer. Further, the MAR Pilot will be governed by an Operating Strategy (in prep.), which will be tied to statutory licences issued by DWER under the RIWI Act.</p>

## Appendix C. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix D.

## C.1. Site characteristics

Characteristic	Details
Local context	<p>The area proposed to be cleared is located within Myalup State Forest (SF16) in a previously cleared pine plantation that has remained fallow. The regrowth of a number of native plants has occurred within the application area, including <i>Macrozamia riedlei</i> shrubs, <i>Eucalyptus marginata</i>, <i>Corymbia calophylla</i>, <i>Nuytsia floribunda</i> and <i>Agonis flexuosa</i>.</p> <p>The application area is within the intensive land use zone of Western Australia.</p> <p>Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 18.6 per cent of the original native vegetation cover.</p>
Ecological linkage	<p>There is a South West Regional Ecological Linkage (ID 47) mapped parallel to the coastline approximately 542 metres west of the application area. These regional ecological linkage axis lines aim to link patches of remnant vegetation assessed to be of regional significance by retaining the best (condition) and/or most contiguous patches available to act as stepping stones for flora and fauna between regionally significant areas (Molloy, et al. 2009).</p> <p>Myalup Road, which runs horizontal and approximately 570 metres south of the application area at the closest point, was identified as a Roadside Conservation (DBCA-030) area in a Dec 2008 survey.</p> <p>The proposed clearing is not going to impact or sever any ecological linkages or impact fauna movement through the landscape.</p>
Conservation areas	<p>The application area lies within Myalup State Forest (Register No. LR3133/472), consisting of a pine plantation with scattered native vegetation.</p>
Vegetation description	<p>Photographs and surveys provided by the applicant indicate the vegetation within the proposed clearing area consists of cutover pine plantation with native species scattered throughout, that have germinated or grown-on since the pines were harvested (Ecoedge, 2019: Ecoedge 2023). Representative photos are available in Appendix F.</p> <p>Due to the historical disturbance of the application area, the proposed clearing area is inconsistent with the mapped vegetation types:</p> <ul style="list-style-type: none"> <li>• Karrakatta Complex-Central and South, which is predominantly open forest of <i>Eucalyptus gomphocephala</i> (tuart) – <i>Eucalyptus marginata</i> (jarrah) – <i>Corymbia calophylla</i> (marri) and woodland of <i>Eucalyptus marginata</i> (jarrah) – <i>Banksia</i> species. <i>Agonis flexuosa</i> (peppermint) is co-dominant south of the Capel River.</li> <li>• Bassendean Complex-Central and South, which is described vegetation ranges from woodland of <i>Eucalyptus marginata</i> (Jarrah) – <i>Allocasuarina fraseriana</i> (Sheoak) – <i>Banksia</i> species to low woodland of <i>Melaleuca</i> species, and sedgelands on the moister sites. This area includes the transition of <i>Eucalyptus marginata</i> (jarrah) to <i>Eucalyptus todtiana</i> (pricklybark) in the vicinity of Perth.</li> </ul> <p>The mapped vegetation types retains approximately 23.49 and 26.87 per cent of the original extent (Government of Western Australia, 2019a).</p>
Vegetation condition	<p>Photographs and photos supplied by the applicant indicate the vegetation within the proposed clearing area is in Completely Degraded (Keighery, 1994) condition.</p> <p>The full Keighery (1994) condition rating scale is provided in Appendix E. Representative photos are available in Appendix F.</p>
Climate and landform	<p>The application area is in the high rainfall zone, with a mean annual rainfall of approximately 770 millimetres, closest recording at Myalup, 3.4 kilometres west of the site.</p>

Characteristic	Details
	The area proposed to be cleared is located on a north-south orientated dune at an elevation of approximately 26m AHD. The location contains dune ridges and slopes up to 15 per cent.
Soil description	<p>The soil is mapped as 211Sp__S1c - Spearwood S1c Phase which is defined as dune ridges with deep bleached grey sands with yellow-brown subsoils, and slopes up to 15 per cent.</p> <p>According to Ecoedge's recent flora survey, the soils are deep white sands, over limestone at some depth (Ecoedge, 2023).</p>
Land degradation risk	The mapped soil type within the application area has a low risk of water erosion, salinity and flood risk and a medium to high risk of water logging and phosphorus export risk. The mapped soil type has a medium to high risk of wind erosion.
Waterbodies	The desktop assessment and aerial imagery indicated that the application area is approximately 620 metres north of the Harvey River Diversion Drain, within approximately 750 metres of a mapped multiple use wetland and mapped conservation category wetland and approximately 1.22 kilometres west of a resource enhancement wetland.
Hydrogeography	<p>The application area is located within the Coastal Plain Hydrological Zone – defined by coastal and fixed sand dunes and calcarenite. Non-calcareous sands, podsolised soils with low-lying wet areas. Further inland, alluvial deposits, colluvial deposits adjacent to the Darling Scarp. Clayey to sandy alluvial soils with wet areas.</p> <p>The location is situated within the Harvey Diversion_Harvey River Catchment (UFI 67), South West catchment division (UFI 2) and Harvey River Basin (No. 613).</p> <p>The application area is within the South West Coastal Groundwater Area (UFI 43) proclaimed under the RIWI Act.</p>
Flora	<p>Available databases show 27 conservation significant flora species have been recorded within the local area, six of which are listed as Threatened species and 21 Priority flora species. The closest of which is recorded approximately 40 metres away from the application area and is a Priority 4 species, <i>Acacia semitrullata</i>.</p> <p>A targeted flora survey within the application area found no threatened or priority flora species (Ecoedge, 2023). A flora survey undertaken within the wider surrounding area, within the State Forest (Ecoedge, 2019) found no Threatened flora. However, seven priority-listed flora that are either range-extensions, or near the limit of their natural range on the Swan Coastal Plain, were found (see Appendix F: Table 1). These records are not being impacted by the proposed clearing.</p>
Ecological communities	<p>There are no Threatened (TEC) or Priority (PEC) Ecological Communities mapped within the application area, according to the Ecoedge flora and vegetation survey and available mapping (Ecoedge, 2019).</p> <p>According to available mapping, five TECs and two PECs are located within the local area. The closest and most abundant is the Endangered Banksia Woodlands of the Swan Coastal Plain ecological community with 584 records within the local area, with the closest mapped approximately 471 metres from the application area.</p>
Fauna	<p>According to available databases, 27 conservation significant fauna have been recorded within the local area. The most frequent occurring is <i>Pseudocheirus occidentalis</i> (western ringtail possum), and the following threatened species have been recorded within the application area, however they are historical records from 1981 and earlier, prior to the application area being cleared for a pine plantation:</p> <ul style="list-style-type: none"> <li>• (EN) <i>Calyptorhynchus sp.</i> 'white-tailed black cockatoo' (white-tailed black cockatoo)</li> <li>• (MI) <i>Calidris ruficollis</i> (red-necked stint)</li> <li>• (MI) <i>Thalasseus bergii</i> (crested tern)</li> <li>• (VU) <i>Thalassarche cauta cauta</i> (shy albatross)</li> </ul>

Characteristic	Details
	Further details on the locally mapped fauna can be found in Appendix C.4.  A Level 1 fauna assessment was undertaken within the application area and wider project area in 2019 (Harewood, 2019), followed up by a site visit in 2023 (Harewood, 2023). It was concluded that the application area contained very low/negligible fauna habitat value due to the high degree of historical disturbance (Harewood, 2023).

## C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
<b>IBRA bioregion**</b>					
Swan Coastal Plain -	1,501,221.93	579,813.47	38.62	222,916.97	14.85
<b>Vegetation complex*</b>					
Swan Coastal Plain - <i>Karrakatta Complex-Central and South</i>	53,080.99	12,467.20	23.49	4,282.73	8.068
Swan Coastal Plain - <i>Bassendean Complex-Central and South</i>	87,476.26	23,508.66	26.87	4,377.36	5.00
<b>Local area</b>					
10km radius	33,058	6138.28	18.6	-	-

\*Government of Western Australia (2019a)

\*\*Government of Western Australia (2019b)

## C.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G.2.), and biological survey information, impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<b>Threatened Flora</b>							
<i>Austrostipa bronweniae</i>	EN	N	N	N	6.66	4	N/A
<i>Caladenia procera</i>	CR	N	N	N	8.43	1	N/A
<i>Diuris drummondii</i>	T	N	N	N	4.75	2	N/A
<i>Diuris purdiei</i>	EN	N	N	N	9.46	1	N/A
<i>Drakaea elastica</i>	CR	N	N	Y	7.80	4	Y
<i>Drakaea micrantha</i>	EN	N	N	Y	3.06	5	Y
<b>Priority Flora</b>							



Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Acacia flagelliformis</i>	4	Y	N	Y	7.91	1	Y
<i>Acacia semitrullata</i>	4	Y	N	Y	0.04	10	Y
<i>Acacia</i> sp. Binningup (G. Cockerton et al. WB 37784)	1	N	N	N	6.13	9	N/A
<i>Boronia capitata</i> subsp. <i>gracilis</i>	3	N	N	Y	0.30	6	Y
<i>Boronia juncea</i> subsp. <i>juncea</i>	1	Y	N	Y	3.04	8	Y
<i>Caladenia speciosa</i>	4	Y	N	Y	2.43	7	Y
<i>Caladenia swartsiorum</i>	2	Y	N	Y	9.71	1	N/A
<i>Cyathochaeta teretifolia</i>	3	N	N	Y	6.33	1	N/A
<i>Dillwynia dillwynioides</i>	3	Y	N	Y	2.25	4	Y
<i>Eucalyptus foecunda</i> subsp. <i>foecunda</i>	4	N	Y	Y	7.09	2	N/A
<i>Haloragis aculeolata</i>	2	N	N	Y	8.99	2	N/A
<i>Hemigenia microphylla</i>	3	N	N	N	6.25	5	N/A
<i>Lasiopetalum membranaceum</i>	3	Y	Y	Y	2.88	5	Y
<i>Meionectes tenuifolia</i>	3	N	N	Y	6.23	2	Y
<i>Muriophyllum echinatum</i>	3	N	N	N	5.76	2	N/A
<i>Pterostylis frenchii</i>	2	N	N	Y	9.75	2	Y
<i>Schoenus</i> sp. Waroona (G.J. Keighery 12235)	3	N	N	N	5.76	1	N/A
<i>Sphaerolobium calcicola</i>	3	N	N	N	6.23	1	N/A
<i>Stylidium paludicola</i>	3	N	N	N	9.62	1	Y
<i>Styphelia filifolia</i>	3	Y	N	Y	4.18	1	Y
<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)	4	N	N	N	8.88	1	N/A

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

#### C.4. Land degradation risk table

Risk categories	211Sp__S1c - Spearwood S1c Phase
Wind erosion	H2: >70% of map unit has a high to extreme wind erosion risk
Water erosion	L1: <3% of map unit has a high to extreme water erosion risk
Water logging	L1: <3% of map unit has a moderate to very high waterlogging risk
Water Repellence	H2: >70% of map unit has a high water repellence risk
Sub-surface Acidification	H1: 50-70% of map unit has a high subsurface acidification risk or is presently acid
Phosphorous export	H1: 50-70% of map unit has a high to extreme phosphorus export risk
Salinity	L1: 30-50% of map unit has a moderate to high salinity risk or is presently saline
Flooding	L1: <3% of the map unit has a moderate to high flood risk
Acid Sulphate Soils	No known risk mapped
Groundwater salinity	500-1000 tds mg/l

#### C.5. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<b>Threatened Fauna</b>						
<i>Actitis hypoleucos</i> (common sandpiper)	MI	N	N	6.29	1	Y
<i>Arctocephalus tropicalis</i> (subantarctic fur-seal)	VU	N	N	9.69	1	N/A
<i>Calidris acuminata</i> (sharp-tailed sandpiper)	MI	N	N	5.01	1	Y
<i>Calidris ferruginea</i> (curlew sandpiper)	CR	N	N	5.01	2	Y
<i>Calidris ruficollis</i> (red-necked stint)	MI	N	N	0.00	11	Y
<i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo)	VU	N	N	2.99	8	Y
<i>Calyptorhynchus latirostris</i> (Carnaby's cockatoo)	EN	N	N	0.58	82	Y
<i>Calyptorhynchus sp.</i> 'white-tailed black cockatoo' (white-tailed black cockatoo)	EN	N	N	0.00	10	Y
<i>Caretta caretta</i> (loggerhead turtle)	EN	N	N	6.25	11	N/A
<i>Charadrius leschenaultii</i> (greater sand plover, large sand plover)	VU	N	N	5.01	1	N/A
<i>Dasyurus geoffroyi</i> (chuditch, western quoll)	VU	N	N	4.04	1	Y
<i>Falco peregrinus</i> (peregrine falcon)	OS	N	N	5.97	1	Y
<i>Galaxiella nigrostriata</i> (black-stripe minnow, black-striped dwarf galaxias)	EN	N	N	5.18	76	N/A
<i>Numenius madagascariensis</i> (eastern curlew)	CR	N	N	5.01	1	Y
<i>Phascogale tapoatafa wambenger</i> (south-western brush-tailed phascogale, wambenger)	CD	N	N	2.09	22	Y
<i>Pseudocheirus occidentalis</i> (western ringtail possum, ngwayir)	CR	N	N	3.92	146	Y

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Thalassarche cauta cauta</i> (shy albatross)	VU	N	N	0.00	1	Y
<i>Thalasseus bergii</i> (crested tern)	MI	N	N	0.00	5	Y
<i>Tringa nebularia</i> (common greenshank, greenshank)	MI	N	N	4.82	4	Y
<i>Westralunio carteri</i> (Carter's freshwater mussel)	VU	N	N	9.29	2	N/A
<b>Priority</b>						
<i>Ctenotus ora</i> (Coastal Plains skink)	P3	N	N	3.52	3	Y
<i>Falsistrellus mackenziei</i> (Western false pipistrelle, western falsistrelle)	P4	N	N	4.08	3	Y
<i>Hydromys chrysogaster</i> (Water-rat, rakali)	P4	N	N	2.78	1	N/A
<i>Isoodon fusciventer</i> (Quenda, southwestern brown bandicoot)	P4	N	N	2.37	49	Y
<i>Lerista lineata</i> (Perth slider, lined skink)	P3	N	N	7.81	5	Y
<i>Notamacropus irma</i> (Western brush wallaby)	P4	N	N	4.44	4	Y
<i>Thinornis rubricollis</i> (hooded plover, hooded dotterel)	P4	N	N	4.39	10	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

## Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><u>Principle (a):</u> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain any Threatened or Priority flora, vegetation representative of a PEC or TEC or significant fauna habitat. Application area is not considered to comprise a high level of biodiversity.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1 and 3.2.2, above.</i>
<p><u>Principle (b):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.”</i></p> <p><u>Assessment:</u></p> <p>Whilst the application area contains foraging habitat for conservation significant fauna, the applicant will be avoiding all trees that provide the foraging resource.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared is not likely to contain threatened flora.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (d):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contains species that can indicate a threatened ecological community.</p>	Not at variance	No
<b>Environmental value: significant remnant vegetation and conservation areas</b>		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The extent of the mapped vegetation type is inconsistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.</p> <p>Noting the composition of the vegetation proposed to be cleared is not representative of the mapped vegetation types and does not provide significant habitat for flora or fauna species, the vegetation is not considered significant as a remnant of native vegetation in an area that has been extensively cleared.</p>	Not at variance	No
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u></p> <p>The proposed clearing may have an impact on the environmental values of adjacent State Forest. Weed and dieback management practices will minimise this risk.</p>	May be at variance	Yes <i>Refer to Section 3.2.3, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
<b>Environmental value: land and water resources</b>		
<p><u>Principle (f)</u>: <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment</u>:</p> <p>Given no water courses or wetlands are recorded within the application area, the proposed clearing is not within an environment associated with a watercourse and wetland.</p>	Not likely to be at variance	No
<p><u>Principle (g)</u>: <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment</u>:</p> <p>The mapped soils are highly susceptible to wind erosion, water repellence, subsurface acidification and nutrient export. Noting the condition of the vegetation and management measures, the proposed clearing is not likely to have an appreciable impact on land degradation. The CSLC (2023) advised that land degradation impacts are not likely to occur as a result of the proposed clearing.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.4, above.</i>
<p><u>Principle (i)</u>: <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment</u>:</p> <p>Given no water courses, wetlands or Public Drinking Water Sources Areas are recorded within the application area, the proposed clearing is unlikely to impact surface or ground water quality.</p>	Not likely to be at variance	No
<p><u>Principle (j)</u>: <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment</u>:</p> <p>The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding.</p> <p>Given no water courses or wetlands are recorded within the application area, the proposed clearing is unlikely to contribute to waterlogging.</p>	Not at variance	No

## Appendix E. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

### Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
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 or shrubs.

**Appendix F. Biological survey information excerpts / photographs of the vegetation**

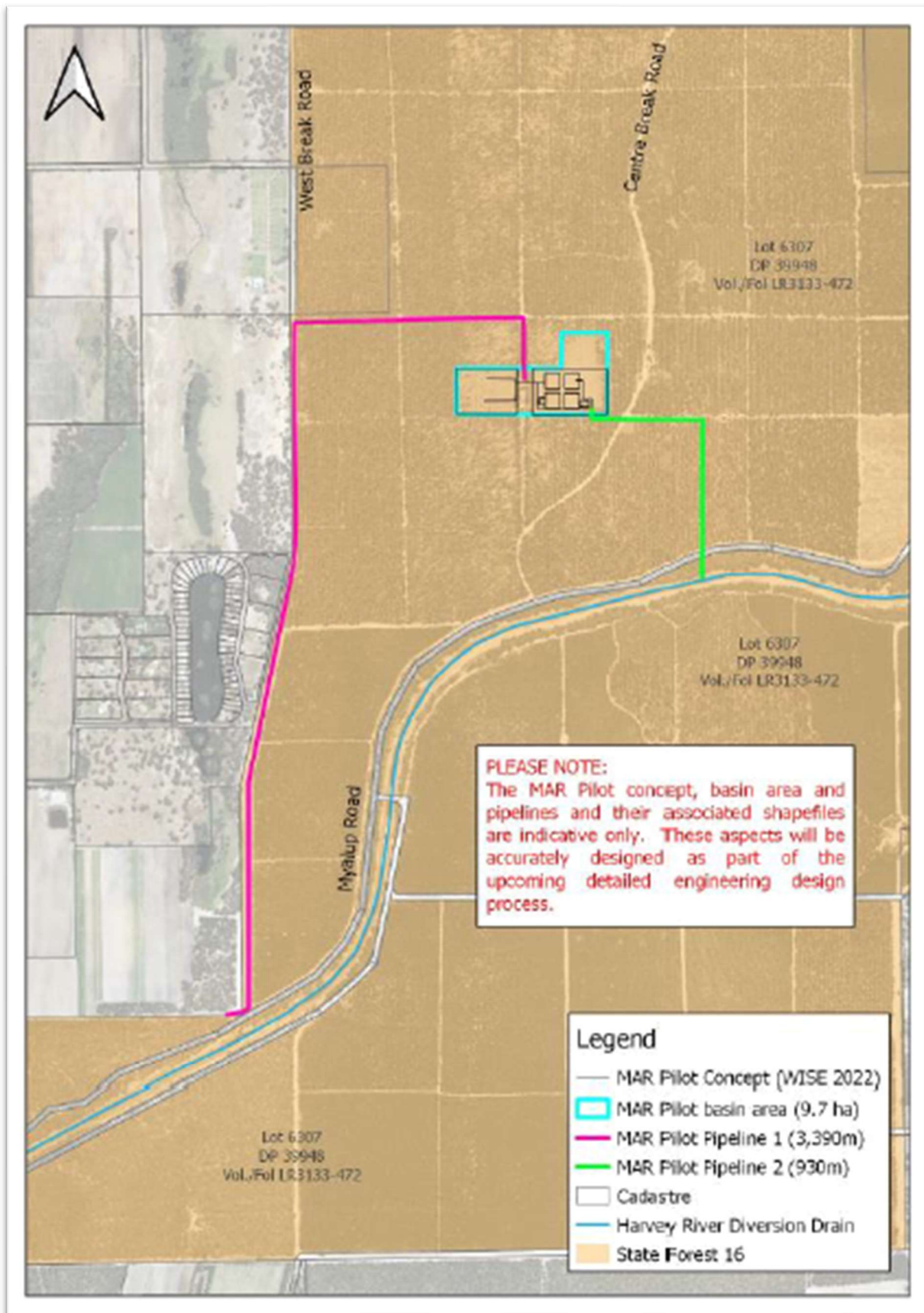


Figure 2: MAR Pilot project map (DPIRD, 2023a).





Figure 3: View of area previously planted to pines showing some regeneration of native species amongst a dominant introduced flora (Ecoedge, 2019).





Figure 4: View to south-east from the north-west corner of the area pegged to be cleared for MAR basins (CSLC, 2023).



Fauna Habitat Description	Example Images
<p>Propose Basin Area.</p> <p>Cleared pine plantation – grassland of introduced species with widely scattered regrowth zamia palms (<i>Macrozamia riedlei</i>).</p>	
<p>Proposed Above-Ground Water Pipeline Route</p> <p>Bare ground or sparse grassland of introduced species</p>	

Figure 5: Photographs of fauna habitats within the subject site (DPIRD, 2023b).





Figure 6: Main rectangle area is cleared *Pinus pinaster* left to pasture. Dominant vegetation is weedy herbs and grasses, mostly ephemerals, dominated by *Ehrharta longiflora*, *E. calycina*, *Arctotheca calendula*, *Hypochaeris glabra*, *Ursinia anthemoides*, *Pertrorhagia dubia* (Ecoedge, 2023)



Figure 7: *Agonis flexuosa*, *Corymbia calophylla* and *Nuytsia floribunda* individuals with occasional *Macrozamia riedlei* and *Hibbertia cuneiformis* emergent from the weed beds (Ecoedge, 2023), which DPIRD are avoiding during the proposed clearing (DPIRD, 2023a).



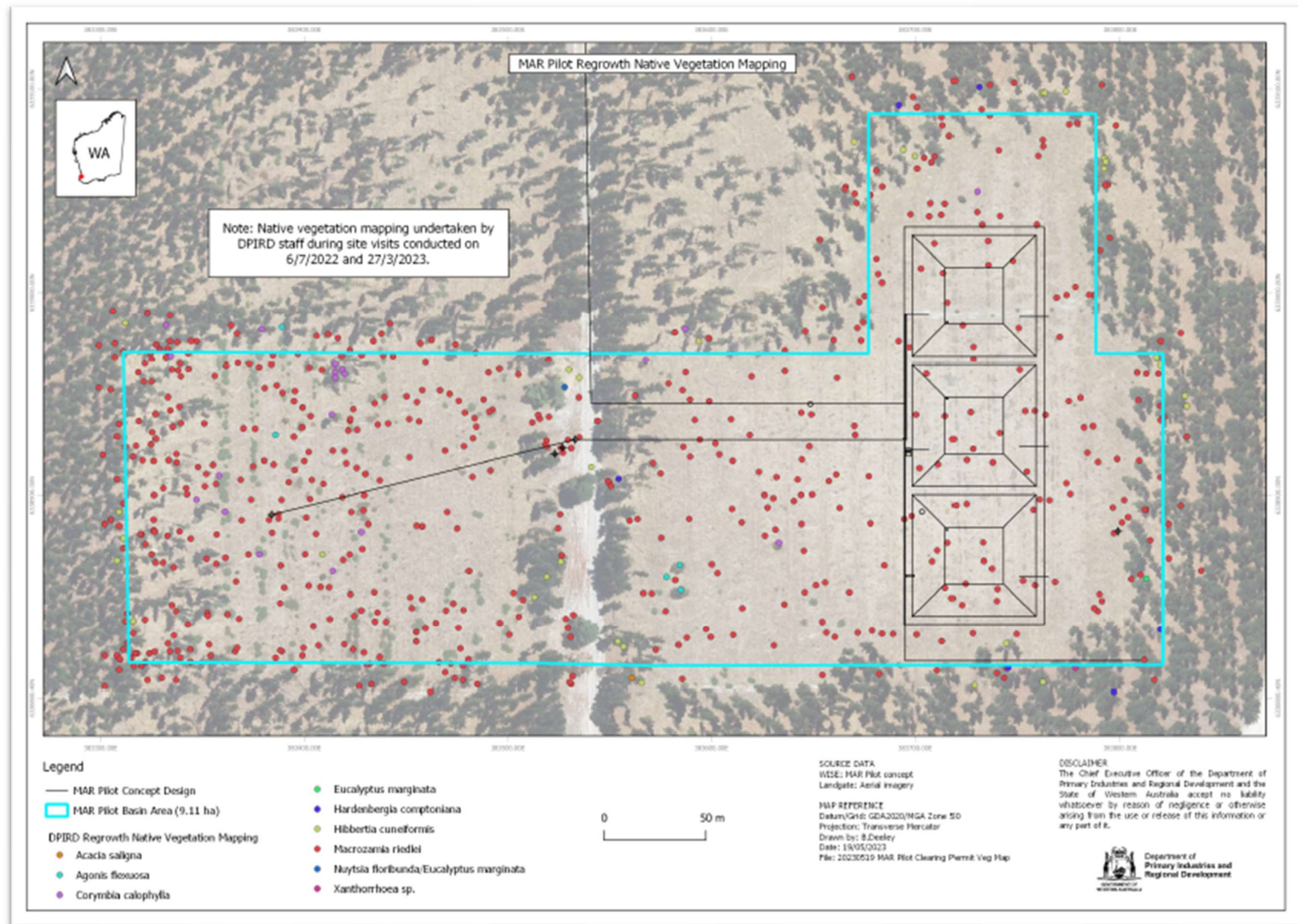


Figure 8: Regrowth vegetation mapping undertaken during Ecoedge's 2019 survey (Ecoedge, 2019).

Table 1: Priority flora and other significant flora found within the wider Myalup Project Area (Ecoedge, 2023).

<b>Taxon</b>	<b>Status</b>
<i>Acacia semitrullata</i>	Priority 4
<i>Acacia flagelliformis</i>	Priority 4
<i>Boronia capitata</i> subsp. <i>gracilis</i>	Priority 3
<i>Caladenia speciosa</i>	Priority 4
<i>Chamaescilla gibsonii</i>	Priority 3
<i>Dillwynia dillwynioides</i>	Priority 3
<i>Lasiopetalum membranaceum</i>	Priority 3
<i>Callitris pyramidalis</i>	Near southern limit on Swan Coastal Plain
<i>Drosera porrecta</i>	Near southern limit on Swan Coastal Plain
<i>Melaleuca systema</i>	Near southern limit on Swan Coastal Plain
<i>Schoenus subfascicularis</i>	Near southern limit on Swan Coastal Plain
<i>Stenopetalum gracile</i>	Near southern limit on Swan Coastal Plain
<i>Tersonia cyathiflora</i>	Near southern limit on Swan Coastal Plain



Table 2: Threatened and Priority List flora known to occur within 5 km of Myalup Project Area, used in 2023 Targeted Flora Survey (Ecoedge, 2023).

Species	Cons Status*	Flowering	Description and Habitat	Pre-Likelihood	Post likelihood
<i>Drakaea elastica</i>	T (EN)	Oct-Nov	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red, green, yellow. White or grey sand. Low-lying situations adjoining winter-wet swamps.	Moderate	U3
<i>Drakaea micrantha</i>	T (VU)	Sep-Oct	Tuberous, perennial, herb, 0.15–0.3 m high. Fl. red, yellow. White-grey sand.	Moderate	U3
<i>Boronia juncea</i> subsp. <i>juncea</i>	P1	Apr	Slender or straggly shrub, pedicels and sepals glabrous. Fl. pink. Sand. Low scrub.	Moderate	U3
<i>Alyogyne</i> sp. Rockingham (G.J. Keighery 14463)	P2	Dec	Found within Yalgorup National Park and Kemerton Nature Reserve	Moderate	U3
<i>Pterostylis frenchii</i>	P2	Nov-Dec	Tuberous, herb, to 0.35 m high, with rosette leaves. Fl. white. Calcareous sand with limestone, laterite. Flatlands and gentle slopes.	Moderate	U3
<i>Boronia capitata</i> subsp. <i>gracilis</i>	P3	Jun-Nov	Slender shrub, 0.3-0.6(-3) m high, branches pilose. Fl. pink. White/grey or black sand. Winter-wet swamps,	Moderate	U3
<i>Cyathochaeta teretifolia</i>	P3	Oct-Jan	Rhizomatous, clumped, robust perennial, grass-like or herb (sedge), to 2 m high, to 1.0 m wide. Fl. brown. Grey sand, sandy clay. Swamps, creek edges.	Moderate	U3
<i>Dillwynia dillwynioides</i>	P3	Aug-Dec	Decumbent or erect, slender shrub, 0.3–1.2 m high. Fl. red, yellow, orange. Sandy soils. Winter-wet depressions, inundated flats generally alongside rivers or deeper swamps.	Moderate	U3
<i>Hibbertia spicata</i> subsp. <i>leptotheca</i>	P3	Jul-Oct	Erect or spreading shrub, 0.2-0.5 m high. Fl. yellow. Sand. Near-coastal limestone ridges, outcrops & cliffs.	Moderate	U3
<i>Lasiopetalum membranaceum</i>	P3	Sep-Dec	Multi-stemmed shrub, 0.2-1 m high. Fl. pink, blue, purple. Sand over limestone.	High	U3
<i>Meionectes tenuifolia</i>	P3	Oct	Haloragaceae family, broadly distributed across the Swan Coastal Plain, northern and southern Jarrah forests.	Moderate	U3
<i>Pimelea calcicola</i>	P3	Sep-Nov	Erect to spreading shrub, 0.2-1 m high. Fl. pink. Sand. Coastal limestone ridges.	Moderate	U3
<i>Platysace ramosissima</i>	P3	Oct-Nov	Perennial, herb, to 0.3 m high. Fl. white, cream. Sandy soils.	Moderate	U3
<i>Stylidium maritimum</i>	P3	Sep-Nov	Caespitose perennial, herb, 0.3-0.7 m high. Inflorescence paniculate. Fl. white/purple. Sand over limestone. Dune slopes and flats.	Moderate	U3
<i>Stylidium paludicola</i>	P3	Oct-Dec	Reed-like perennial, herb, 0.35-1 m high. Inflorescence racemose. Fl. pink. Peaty sand over clay. Winter wet habitats.	Moderate	U3
<i>Stylidium trudgenii</i>	P3		Caespitose perennial, herb, 0.05-0.5 m high. Grey sand, dark grey to black sandy peat. Margins of winter-wet swamps, depressions.	Moderate	U3
<i>Styphelia filifolia</i>	P3	Mar - May	Erect shrubs to 90 cm high, 70 cm wide, Inflorescence axillary, pendulous; 1–4-flowered; flowers pendulous, Fl white. Sandy soils usually in Banksia or Jarrah woodland and in low-lying situations.	Moderate	U3
<i>Acacia flagelliformis</i>	P4	May-Sep	Rush-like, erect or sprawling shrub, 0.3-0.75(-1.6) m high. Fl. yellow. Sandy soils. Winter-wet areas.	High	U3
<i>Acacia semitrullata</i>	P4	May-Oct	Slender, erect, pungent shrub, (0.1-)0.2-0.7(-1.5) m high. Fl. cream, white. White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	High	U3
<i>Caladenia speciosa</i>	P4	Sep-Oct	Tuberous, perennial, herb, 0.35-0.6 m high. Fl. white, pink. White, grey or black sand.	High	U3
<i>Conostylis pauciflora</i> subsp. <i>pauciflora</i>	P4	Aug-Oct	Rhizomatous, stoloniferous perennial, grass-like or herb, 0.1-0.35 m high. Fl. yellow. Grey sand, limestone. Hillslopes, consolidated dunes.	Moderate	U3
<i>Stylidium longitubum</i>	P4	Oct-Dec	Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. Pink. Sandy clay, clay. Seasonal wetlands.	Moderate	U3
<i>Hakea oligoneura</i>	P4	Sept	Shrubs to 2 m high x 2 m wide. Bark smooth or finely fissured. Inflorescences white; pedicels 2-2.5 mm long. White-brown sand on limestone ridges in open Mallee over <i>Melaleuca acerosa</i> , <i>Xanthorrhoea</i> and <i>Hibbertia</i> .	Moderate	U3

Note: The WC Act Conservation Status is shown, EPBC Act status, where relevant, is in brackets.



## Appendix G. Sources of information

### G.1. GIS databases

Publicly available GIS Databases used (sourced from [www.data.wa.gov.au](http://www.data.wa.gov.au)):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

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