Clearing Assessment Report – CPS 818

We're working for Western Australia.

Muir Highway 9.0 -19.6 SLK

December 2021

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Contents

Amendments

Report Compilation & Review	Name and Position	Document Revision	Date
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Reviewer:	Environment Officer Main Roads Western Australia	Final	27/01/2022

1 PURPOSE

The purpose of this Clearing Assessment Report (CAR) is to provide a report detailing the assessment of native vegetation clearing that is proposed to be undertaken using the Statewide Clearing Permit CPS 818 issued to Main Roads Western Australia (Main Roads).

The CAR outlines the key activities associated with the project, the existing environment and an assessment of native vegetation clearing. This assessment provides an evaluation of the vegetation clearing impacts associated with the project using the ten Clearing Principles, and the strategies used to manage vegetation clearing.

2 SCOPE

2.1 Project Scope

Project Name: Muir Highway 9.0 – 19.6 straight line kilometre (SLK) Low Cost Shoulder Sealing (LCSS)

Project Purpose / Components: The target for LCSS is to achieve a 9 metre (m) sealed formation, including a minimum sealed shoulder of 1 m and two 3.5 m traffic lanes. Clearing of vegetation is proposed within 3 m of the existing edge of seal, as it is required to safely construct the sealed shoulder, extend culverts and improve the open drainage system. The proposed works are critical to improve road user safety along this length of road, which is currently below Austroads and Main Roads standards.

The proposed clearing undertaking using CPS 818 is : The works require the removal of up to 50 trees, with no native understory proposed for removal. It is anticipated that clearing will not exceed 0.5 hectares (ha) within a 31.8 ha Development Envelope (DE).

The proposed temporary clearing undertaking using CPS 818 is: None

Project Location(s): The proposal is located on Muir Highway (M024) 9.0 – 19.6 SLK, east of Manjimup in the Shire of Manjimup (Figure 1).

- 34.3246747°S, 116.2541195°E to - 34.3348163°S, 116.2951910°E

The location of the proposed works is at Figure 1.

2.2 Assessment Report Scope

The assessment area, see Figure 2, is confined to a local area of a 10 km radius.

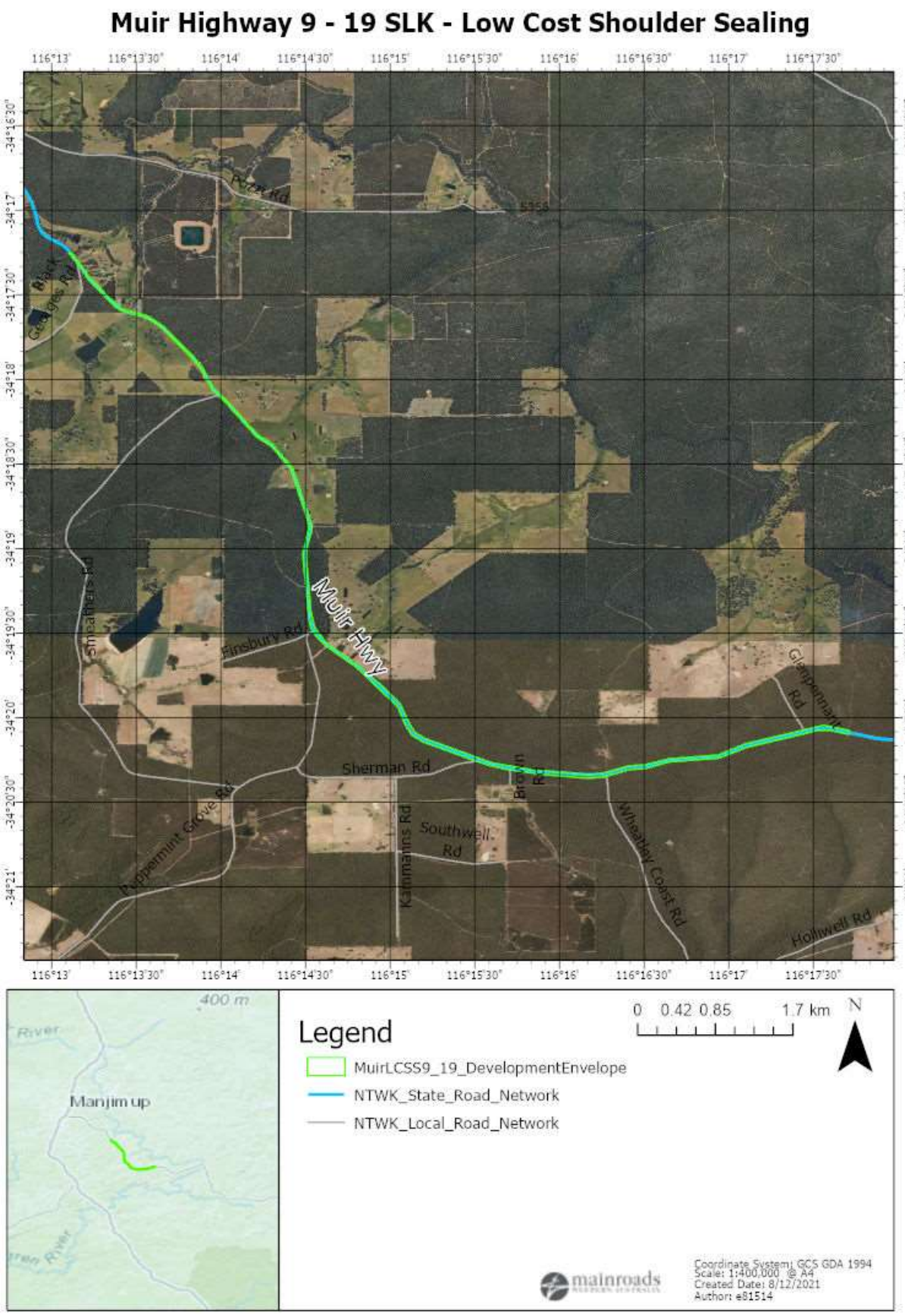

Figure 1. Development Envelope

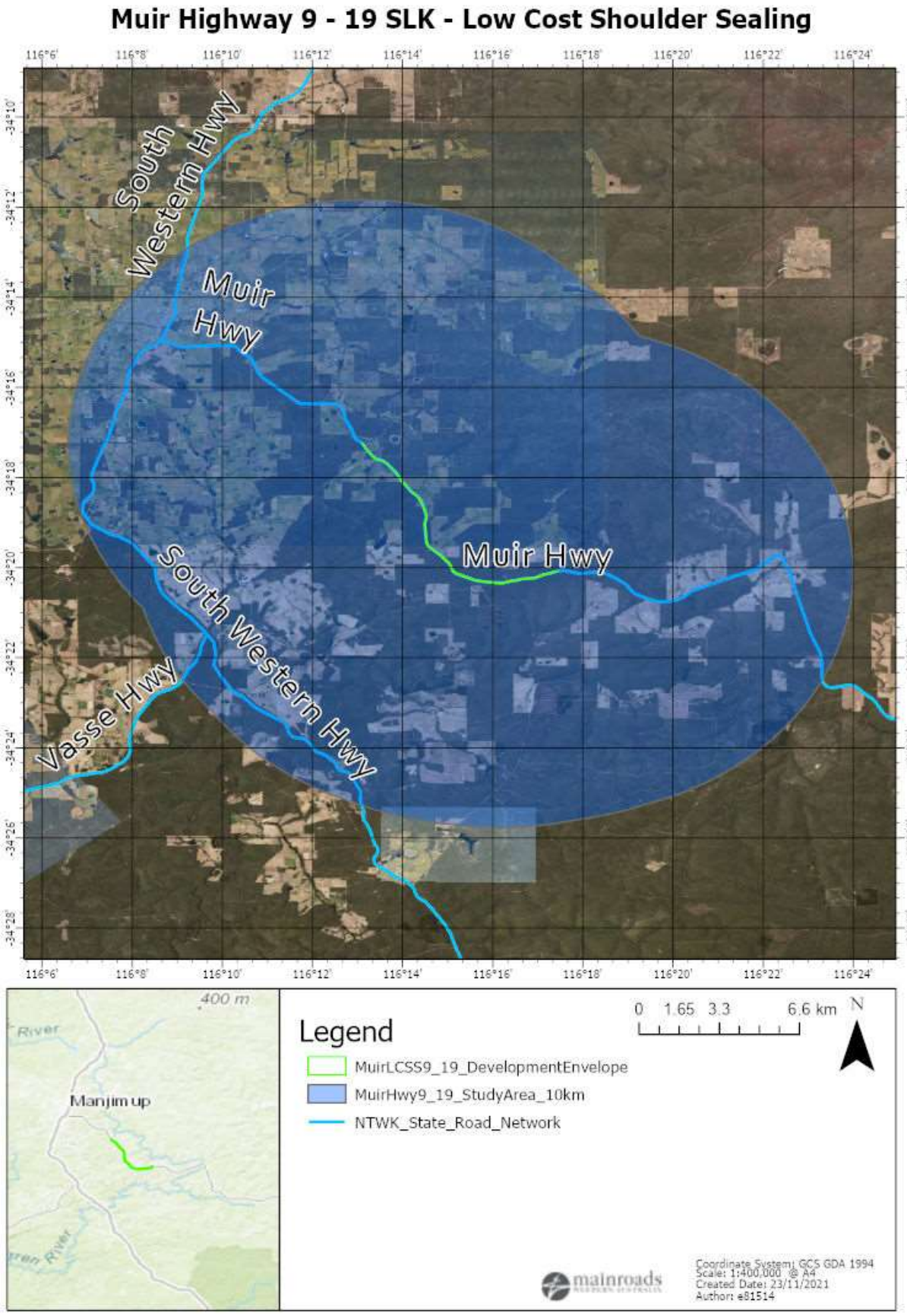

Figure 2. Assessment Area

2.3 Alternatives to clearing

The proposed scope for the low cost shoulder widening is a minimal intervention package of works that is intended to improve safety standards on narrow rural roads, with as limited clearing/environmental impacts as possible. The scope cannot be further reduced as vegetation clearing has been reduced as much as possible.

2.4 Measures to Avoid, Minimise, Reduce and Manage Project Clearing Impacts

The design and management measures implemented to avoid and minimise the clearing impacts by the project are provided in Table 1.

Table 1. Measures undertaken to Avoid, Minimise, Reduce and Manage the Project Clearing Impacts

Design or Management Measure	Discussion and Justification
Steepen batter slopes	As the scope of works is low cost shoulder sealing, there is no opportunity to change the slope of batter.
Installation of safety barriers	As the scope of works is low cost shoulder sealing, there is no opportunity to install barriers.
Alignment to one side of existing road	As the scope of works is low cost shoulder sealing, there is no opportunity for works to occur on one side of the carriageway.
Alternative alignment to follow existing road (or) to preferentially locate within pasture or a degraded areas	As the scope of works is low cost shoulder sealing, there is no opportunity for road realignments.
Installation of kerbing	Installation of kerbing will only marginally reduce the footprint of the minor clearing required. Kerbing requires appropriate drainage and slope to capture the runoff, which can only be achieved in discrete locations for the low cost shoulder sealing works. Kerbing has been considered and as there is no design, will be installed where it is deemed appropriate during works.
Simplification of design to reduce number of lanes and/or complexity of intersections	As the scope of works is low cost shoulder sealing, this is not applicable.
Preferential use of existing cleared areas for access tracks, construction storage and stockpiling	Existing cleared areas will be used for precoating and stockpiling. No temporary clearing is required.
Drainage modification	As the scope of works is low cost shoulder sealing, there is limited opportunity for drainage modifications that wouldn't result in more clearing. Culvert extensions will tie into existing drainage which will maintain current surface drainage throughout the landscape.

2.5 Approved Policies and Planning Instruments

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 1.3), Main Roads has also had regard to the below instruments.

Other Legislation of relevance for assessment of clearing and planning/other matters

- Biodiversity Conservation Act 2016 (WA) (BC Act)
- Conservation and Land Management Act 1984 (WA) (CALM Act)
- Country Areas Water Supply Act 1947 (WA) (CAWS Act)
- Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act)
- Planning and Development Act 2005 (WA) (P&D Act)
- Soil and Land Conservation Act 1945 (WA)
- Rights in Water and Irrigation Act 1914
- Aboriginal Heritage Act 1972 (WA)
- Town Planning and Development Act 1928

Environmental Protection Policies

- Environmental Protection (Peel Inlet - Harvey Estuary) Policy 1992;
- Environmental Protection (Western Swamp Tortoise Habitat) Policy 2011

Other Relevant policies and guidance documents:

- Environmental Offsets Policy (Government of Western Australia, 2011)
- A guide to the assessment of applications to clear native vegetation (DEC, December 2014)
- Procedure: Native vegetation clearing permits (DWER, October 2019)
- Environmental Offsets Guidelines (Government of Western Australia, August 2014)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016)
- Technical guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA, 2020)
- Approved conservation advice under section 266B of the EPBC Act for threatened flora/fauna/vegetation communities
- Approved Recovery Plans for threatened species
- EPBC Act Referral guidelines for the three threatened black cockatoo species
- Strategic advice - EPA

3 SUMMARY OF SURVEYS

3.1 Biological Survey

No Biological Survey was undertaken for the Proposal. The Site Inspection (Main Roads WA, 2021) identified that the vegetation proposed to be removed is limited to isolated trees adjacent to the existing highway (Marri and Jarrah) over introduced weed species. Trees to be removed were identified during the site inspection and assessed in the Black Cockatoo Habitat Assessment, and therefore no Biological Survey was warranted.

3.2 Dieback survey

Consultation has been undertaken with DBCA throughout the development of the proposal. Due to the short funding cycle for low cost shoulder sealing works, there was insufficient time for a dieback assessment and management plan to be completed, prior to works commencing. The works were therefore staged to allow culvert extensions to occur ahead of the dieback assessment and management plan. Each culvert extension will be undertaken with clean on entry and exit, making the risk of spreading any dieback present throughout the works area.

The dieback assessment outcomes and management plan will be incorporated into the Maintenance Environmental Management Plan (MEMP) and implemented for the shoulder widening portion of the works.

No additional surveys or assessments are needed as part of the project activities. The project will be implemented in accordance with the MEMP and HMP.

3.3 Summary of Black Cockatoo Habitat Assessment

A Black Cockatoo Breeding Habitat Assessment was undertaken by Greg Harewood on the 24/09/2021. There were 24 Jarrah, and 49 Marri recorded within close proximity to the works extent. Only three (3) of these trees contained hollows, none of which were considered suitable for Black Cockatoo breeding. The data from the assessment is in Appendix D.

No further assessment was recommended.

4 VEGETATION DETAILS

4.1.1 Project Site Vegetation Description

The area under application is in a degraded to completely degraded condition, consisting of *Corymbia calophylla* (Marri) and *Eucalyptus marginata* (Jarrrah) over introduced grasses. There are no native understory or midstory species that will be removed in association with the works.

Tables 2 and 3 provide details of the Pre-European Vegetation Associations for the vegetation proposed to be cleared within the development envelope and the remaining extents of these associations.

For a full description of the existing vegetation, refer to the Site Inspection Report in Appendix A.

Table 2. Summary of Development Envelope's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 3 described as a Medium forest: jarrah-marri (Government of Western Australia, 2017)	Clearing of up to 0.5 ha of isolated Jarrah/Marri trees over introduced grasses (that have been regularly slashed/mowed) for low cost shoulder sealing and drainage works on Muir Highway, Shire of Manjimup.	Degraded to Completely Degraded condition (EPA 2016). No vegetation within the Development Envelope that is in Good condition or better, will be removed in association with the works.	Vegetation description and condition determined from Main Roads site visit on 30/07/2021 and aerial imagery.

Table 3. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 3	**Statewide**	2 661 404	1 806 035	68	81
	IBRA Bioregion Jarrah Forest	2 390 591	1 606 737	67	80
	IBRA Sub-region Southern Jarrah Forest	1 482 491	883 557	59	81
	Local Government Authority Shire of Manjimup	287,389.56	238,176.00	82.88	94.70

4.1.2 Vegetation Complexes and Representation

Table 4. Vegetation Complexes (Heddle/Mattiske) within the Development Envelope

Heddle/Mattiske Veg Complex	Pre-European Extent (ha)	2013 Vegetation Extent	% Remaining
Bevan 1	104,760.74	90,233.80	86.13
Pemberton	29,542.40	18,430.55	62.39
Yanma	30,238.63	24,560.53	81.22
Crowea	88,422.17	71,237.96	80.57

5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

In assessing whether the project's proposed clearing is likely to have a significant impact on the environment, the project was assessed against the ten Clearing Principles (Environmental Protection Act 1986, Schedule 5).

Each principle has been assessed in accordance with DWER's 'A Guide to the Assessment of Applications to Clear Native Vegetation' and other relevant CPS Decision Reports prepared by DWER.

The proposed clearing is not likely to be at variance with the 10 Clearing Principles.

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Proposed clearing is not likely to be at variance to this Principle
Comment The native vegetation proposed to be cleared is in degraded to completely degraded condition, consisting of *Corymbia calophylla* (Marri) and *Eucalyptus marginata* (Jarrah) over introduced grasses. There are no native understory species or midstory species that will be removed in association with the works (Main Roads WA, 2021). The NatureMap Search and GIS shapefiles identified six (6) conservation significant flora species within the study area. Threatened *Caladenia christineae* has a single known population of 78 records within the study area. The record is from 2007 and at its nearest point is more than 6.5 kilometres (km) north to north east of the DE. *C. christineae* grows on winter-wet flats (on the margins as well as in standing water) in heath and tall scrub communities, within Jarrah Marri forest and sometimes under *Melaleuca* sp. (paperbarks). The vegetation proposed for removal within the Development Envelope (DE) is only Jarrah/Marri over non-native grasses and is not characterised by winter wet flats (see photos in Appendix A). *Deyeuxia inaequalis* (P1) is known in the study area from one (1) record approximately 5 km west of the works area. This species grows in Eucalyptus woodlands with a shrubby understorey on sandy loams and gravelly brown clays. The highly disturbed nature of the works area that is lacking in native understory is not likely to contain habitat for the species. An additional four Priority 2 – 4 species also have known records within the study area, however the highly disturbed nature of the vegetation proposed to be cleared within the DE, is unlikely to provide suitable habitat for the species and they are therefore not likely to be directly nor indirectly impacted. No additional flora species were identified in the Protected Matters Search Tool (PMST) Report that were considered likely to occur in the vegetation proposed for removal within the DE. NatureMap Search and GIS shapefiles identified ten (10) Threatened (T) fauna species and a further ten (10) Priority (P) or specially protected (S) fauna species within the study area. The three Black Cockatoo (T) species have known records within the study area. Works require the removal of up to 50 trees (~0.5 ha) that provide foraging habitat for the species and are of a suitable diameter at breast height (DBH) to form hollows. A Black Cockatoo Breeding Habitat Assessment was undertaken by Greg Harewoods (2021) that identified no trees with suitable hollows within the survey area (mapping is in Appendix D), which included all trees within 3 m of the current edge of seal (the maximum works extent). According to GIS shapefiles the nearest known breeding tree is more than 30 km east of the DE and the nearest known roost tree is more than 7 km west of the DE.

Within a local and regional context the removal of up to 0.5 ha of foraging habitat for Black Cockatoos is unlikely to have a significant impact to the persistence of the species. There are extensive quantities of native vegetation contained within DBCA managed land and other large masses of intact vegetation within the study area (Figure 2). The removal of up to 0.5 ha of foraging habitat for Black Cockatoo species, over a 10 km linear strip, adjacent to a busy road and in comparably poorer condition than the adjacent State Forest, is not likely to have a significant indirect impact on any populations of Black Cockatoo or more broadly, the persistence of the species. Given there are no known roosts and no suitable breeding trees that are proposed for removal within the DE, project activities are also unlikely to have a direct impact on any individuals.

Chuditch (VU), Bilby (VU), Numbat (EN), Quokka (VU) Western Ringtail Possum (CR), Woylie (CR), Brush-tailed Phascogale (S), South-western Brush-tailed Phascogale (S), Quenda (P4) Tammar Wallaby (P4) and Water-rat (P4), Western Brush Wallaby (P4) all have known records within the study area. The degraded to completed degraded condition of the vegetation proposed to the cleared within the DE, is not considered critical habitat for any of these conservation significant mammal species. The works will not require the clearing of any riparian vegetation nor native understory All species are highly mobile and unlikely to reside in the road drainage and road shoulder, except for short periods of times whilst dispersing throughout the landscape to adjacent State Forest, containing better quality fauna habitat. In addition to this, the proposed clearing comprises a thin narrow strip adjacent to an existing highway which would act as a deterrent for these species. Given the already highly modified nature of the DE and comparably higher quality fauna habitat in the adjacent State Forest, the proposed works are not likely to have a significant direct nor indirect impact on these species.

There is one known record of Malleefowl (VU) in the study area from 2007, approximately 10 km south of the works area. Malleefowl prefer areas dominated by 'mallee' – multi-stemmed, low-growing, Eucalyptus vegetation. The isolated trees over weeds proposed for removal within the DE is not representative of habitat for Malleefowl and is adjacent to an existing road which would form a deterrent for the species. Therefore it is unlikely that the Malleefowl will be significantly impacted directly, nor indirectly.

Mud Minnow (VU) has one known record from 1996 approximately 5 km east of the DE. The species prefers swift-flowing streams in Karri forests, near submerged vegetation. The water in these streams is usually acidic (pH 3.0-6.0) and darkly tannin-stained, and the water temperature fluctuates widely with the seasons. It also occasionally occurs in ponds, swamps and roadside drains. There is no Karri forest nor submerged vegetation proposed for removal within the DE and it is not anticipated that the species would be present within the DE.

Peregrine Falcon (OS) has a vast range of habitats, requiring abundant prey and nest sites around coastal and inland cliffs. The Masked Owl (southwest) (P3) inhabits forests, woodlands, timbered waterways and open country on the fringe of these areas. The main requirements are tall trees with suitable hollows for nesting and roosting and adjacent areas for foraging. Both species are highly mobile and have large habitat ranges. Given the already highly modified nature of the DE adjacent to an existing highway and the highly mobile nature of both species, the proposed works are not likely to have a significant direct nor indirect impact on these species.

Carter's Freshwater Mussel (VU) prefers to inhabit flowing riverine/creekline habitats that do not completely dry out in summer months. The DE is intersected by four minor non-perennial watercourses, none of which would allow mussels to persist during dry summer periods. Given the lack of suitable habitat within the DE, there is unlikely to be a direct or indirect impact on any individuals or reduction in habitat resulting from the works.

The PMST Report identified a further five (5) Threatened fauna species that may have habitat within the study area: Australasian Bittern, Balston's Pygmy Perch, Blackstriped Dwarf Galaxia, Curlew Sandpiper and Eastern Curlew.
The Australasian Bittern inhabits wetland and floodplain environments. Curlew Sandpiper and Eastern Curlew are wader species that largely inhabit coastal estuaries, bays, harbours, inlets and lagoons, with occasional

occurrences further inland at ephemeral or permanent lakes and wetlands. The proposed works are isolated to disturbed roadside land and constructed roadside drainage. The works are not in nor immediately adjacent to suitable habitat for any of the three species. Furthermore, there are no known records of any of the species within the study area.

Balston's Pygmy Perch is known from a small area of coastal peat flats in south-western Western Australia that extends from Margaret River to Two Peoples Bay. The species is found among inundated riparian vegetation associated with slow-flowing, low salinity, acidic and tannin-stained waters, and complex instream habitat. Blackstriped Dwarf Galaxias populations are confined to peat flat wetlands, specifically tannin stained and vegetated wetland of approximately 300 mm deep and a pH range of 3 - 8. They are known to occur in the Warren sub-region between Augusta and Albany. There are no known records of either fish species within the study area. Although there are a number of minor non-perennial watercourses that intersection the DE, none of these are likely to contain suitable habitat. The culverts and roadside drainage that will be impacted by the works are unvegetated and not peaty, nor tannin stained. Given the lack of known records within the study area and the lack of suitable habitat within the DE, there is unlikely to be a direct or indirect impact on any individuals or reduction in suitable habitat resulting from the works.

The isolated Jarrah/Marri trees over introduced grass species (Main Roads WA, 2021) is not representative of any known Threatened Ecological Community (TECs)/ or Priority Ecological Community (PECs). In addition to this the DE is not mapped as a TEC nor PEC and is also not an Environmentally Sensitive Area (ESA). The minor clearing adjacent to an existing road corridor will not further dissect any local or regional ecological linkage.

There are no formal ecological linkages intersecting the Development Envelope. The removal of isolated trees immediately adjacent to the existing road formation will not result in a gap in the canopy that would result in fragmentation of any existing linkage. Furthermore, there is no groundcover or understory vegetation being removed as part of the Proposal and therefore, the movement of terrestrial fauna, if present, will not be impeded.

Given the works require the removal of up to 50 isolated trees over introduced grass species (0.5 ha) across a 10 km stretch of highly disturbed road verge, clearing of native vegetation is not likely to be at variance with this Clearing Principle.

Methodology

Atlas of Living Australia (Accessed 24/11/2021)
DBCA shapefiles
Department of Natural Resources and Environment (2002)
EPA (2016, 2020)
Government of WA (2013)
Main Roads Site Inspection (July 2021)
Main Roads GIS Shapefiles
Natural Resource Management SLIP Soil Systems (Accessed 24/11/2021)
NatureMap (Accessed 23/11/2021)

(b) 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 indigenous to Western Australia.

Proposed clearing is not likely to be at variance to this Principle

Comment

The area proposed to be cleared within the DE is in degraded to completely degraded condition, consisting of *Corymbia calophylla* (Marri) and *Eucalyptus marginata* (Jarrah) over introduced grasses (Main

Roads WA, 2021). There are no unique fauna habitat types or landforms within the DE and the vegetation proposed for removal within the DE is in comparably worse condition to that in adjacent DBCA Managed Land (Main Roads WA, 2021).

NatureMap, GIS Shapefiles and the PMST Report identified the following conservation significant species within the study area:

- Australasian Bittern (EN)
- Balston's Pygmy Perch (VU)
- Blackstriped Dwarf Galaxias (EN)
- Baudin's Cockatoo (EN)
- Bilby (VU)
- Carnaby's Cockatoo (EN)
- Carter's Freshwater Mussel (VU)
- Curlew Sandpiper (V)
- Chuditch (VU)
- Eastern Curlew (V)
- Forest Red-tailed Black Cockatoo (VU)
- Malleefowl (VU)
- Mud Minnow (VU)
- Numbat (EN)
- Quokka (VU)
- Western Ringtail Possum (CR)
- Woylie (CR)
- Peregrine Falcon (OS)
- Brush-tailed Phascogale (CD)
- South-western Brush-tailed Phascogale (CD)
- Masked Owl (southwest) (P3)
- Quenda (P4)
- Tammar Wallaby (P4)
- Water-rat (P4)
- Western Brush Wallaby (P4)

The three Black Cockatoo (T) species have known records within the study area. Works require the removal of up to 50 trees (~0.5 ha) that provide foraging habitat for the species and are of a suitable diameter at breast height (DBH) to form hollows. A Black Cockatoo Breeding Habitat Assessment was undertaken by Greg Harewoods (2021) that identified no trees with suitable hollows within the survey area (mapping is in Appendix D). According to GIS shapefiles the nearest known breeding tree is more than 30 km east of the DE and the nearest known roost tree is more than 7 km west of the DE.

Within a local and regional context the removal of up to 0.5 ha of foraging habitat for Black Cockatoos is unlikely to have a significant impact to the persistence of the species. There are extensive quantities of native vegetation contained within DBCA managed land and other large masses of intact vegetation within the study area (Figure 2). The removal of up to 0.5 ha of foraging habitat for Black Cockatoo species, over a 10 km linear strip, adjacent to a busy road and in comparably poorer condition than the adjacent State Forest, is not likely to have a significant indirect impact on any populations of Black Cockatoo or more broadly, the persistence of the species. Given there are no known roosts and no suitable breeding trees that are proposed for removal within the DE, project activities are also unlikely to have a direct impact on any individuals.

The Australasian Bittern inhabits wetland and floodplain environments. Curlew Sandpiper and Eastern Curlew are wader species that largely inhabit coastal estuaries, bays, harbours, inlets and lagoons, with occasional occurrences further inland at ephemeral or permanent lakes and wetlands. The proposed works are isolated to disturbed roadside land and constructed roadside drainage. The works are not in nor immediately adjacent to suitable habitat for any of the three species. Furthermore, there are no known records of any of the species within the study area.

Balston's Pygmy Perch is known from a small area of coastal peat flats in south-western Western Australia that extends from Margaret River to Two Peoples Bay. The species is found among inundated riparian vegetation associated with slow-flowing, low salinity, acidic and tannin-stained waters, and complex instream habitat. Blackstriped Dwarf Galaxias populations are confined to peat flat wetlands, specifically tannin stained and vegetated wetland of approximately 300 mm deep and a pH range of 3 - 8. They are known to occur in the Warren sub-region between Augusta and Albany. There are no known records of either fish species within the study area. Although there are a number of minor non-perennial watercourses that intersection the DE, none of these are likely to contain suitable habitat. The culverts and roadside drainage that will be impacted by the works are unvegetated and not peaty, nor tannin stained. Given the lack of known records within the study area and the lack of suitable habitat within the DE, there is unlikely to be a direct or indirect impact on any individuals or reduction in suitable habitat resulting from the works.

Carter's Freshwater Mussel (VU) prefers to inhabit flowing riverine/creekline habitats that do not completely dry out in summer months. The DE is intersected by four minor non-perennial watercourse, none of which would allow mussels to persist during dry summer periods. Given the lack of suitable habitat within the DE, there is unlikely to be a direct or indirect impact on any individuals or reduction in habitat resulting from the works.

Mud Minnow (VU) has one known record from 1996 approximately 5 km east of the DE. The species prefers swift-flowing streams in Karri forests, near submerged vegetation. The water in these streams is usually acidic (pH 3.0-6.0) and darkly tannin-stained, and the water temperature fluctuates widely with the seasons. It also occasionally occurs in ponds, swamps and roadside drains. There is no Karri forest nor submerged vegetation proposed for removal within the DE and therefore it is not anticipated that the species would be present.

Chuditch (VU), Bilby (VU), Numbat (EN), Quokka (VU) Western Ringtail Possum (CR), Woylie (CR), Brush-tailed Phascogale (S), South-western Brush-tailed Phascogale (S), Quenda (P4) Tammar Wallaby (P4) and Water-rat (P4), Western Brush Wallaby (P4) all have known records within the study area. The degraded to completed degraded condition of the vegetation proposed to the cleared within the DE, is not considered critical habitat for any of these conservation significant mammal species. The works will not require the clearing of any riparian vegetation nor native understory All species are highly mobile and unlikely to reside in the road drainage and road shoulder, except for short periods of times whilst dispersing throughout the landscape to adjacent State Forest, containing better quality fauna habitat. In addition to this, the proposed clearing comprises a thin narrow strip adjacent to an existing highway which would act as a deterrent for these species. Given the already highly modified nature of the DE and comparably higher quality fauna habitat in the adjacent State Forest, the proposed works are not likely to have a significant direct nor indirect impact on these species.

Peregrine Falcon (OS) has a vast range of habitats, requiring abundant prey and nest sites around coastal and inland cliffs. The Masked Owl (southwest) (P3) inhabits forests, woodlands, timbered waterways and open country on the fringe of these areas. The main requirements are tall trees with suitable hollows for nesting and roosting and adjacent areas for foraging. Both species are highly mobile and have large habitat ranges. Given the already highly modified nature of the DE and the highly mobile nature of both species, the proposed works are not likely to have a significant direct nor indirect impact on these species.

Water-rats (P4) live in burrows on low banks of rivers, lakes, wetlands, estuaries and even along the coast. Intact riparian vegetation and associated bank stability is critical to their survival. The DE is not representative of this habitat type and therefore it is unlikely the species will be directly nor indirectly impacted by the works.

Fauna habitat proposed for removal within the DE is Jarrah and Marri trees over introduced grass species in degraded to completely degraded condition and in poorer condition than that in the surrounding and highly vegetated landscape. Contextually, the 0.5 ha of habitat to be removed occurs within a 10 km study area that is approximately 60% vegetated with State Forest. Clearing does not comprise significant habitat

for native fauna and impacts to significant fauna species are considered unlikely. The proposed clearing is not likely to be at variance with this Clearing Principle.

Methodology
DBCA Shapefiles
DBCA website
EPA (2016, 2020)
Main Roads Site Inspection (July 2021)

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Proposal is not likely to be at variance to this Principle

Comment
NatureMap and ArcGIS searches identified one known record of Threatened flora species within the study area (*Caladenia christineae*) for which there is a single known population of 78 records within the study area. The record is from 2007 and at its nearest point, is more than 6.5 km north to north east of the DE. *C. christineae* grows on winter-wet flats (on the margins as well as in standing water) in heath and tall scrub communities, within Jarrah Marri forest and sometimes under *Melaleuca* sp. (paperbarks). The degraded to completed degraded and highly modified Jarrah/Marri over non-native grasses that are proposed for removal (Main Roads WA, 2021) are not characterised by winter wet flats and not likely to provide suitable habitat for the species.

Given the degraded to completely degraded condition of the vegetation proposed for removal within the DE, it is unlikely that the clearing of up to 0.5 ha of native vegetation will impact any Threatened flora. The proposed clearing of native vegetation is not likely to be at variance with this Clearing Principle.

Methodology
DBCA shapefiles
EPA (2016)
Florabase (Accessed 24/11/2021)
Main Roads Site Inspection (July 2021)

(d) 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.

Proposed clearing is not at variance to this Principle

Comment
The area proposed to be cleared within the DE is in degraded to completely degraded condition, consisting of *Corymbia calophylla* (Marri) and *Eucalyptus marginata* (Jarrah) over introduced grasses (Main Roads WA, 2021), which is not representative of any known TEC. According to GIS shapefiles there are no TECs within the study area. The nearest TEC "Scott River Ironstone Association" is approximately 60 km west of the DE. Given the significant distance to this TEC and the minor scale of activities, this TEC will not be impacted.

Clearing of native vegetation is not likely to be at variance with this Clearing Principle.

Methodology
DBCA shapefiles
EPA (2016)
Main Roads Site Inspection (July 2021)

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Proposed clearing is not at variance to this Principle

Comment

The area proposed to be cleared within the DE is in degraded to completely degraded condition, consisting of *Corymbia calophylla* (Marri) and *Eucalyptus marginata* (Jarrah) over introduced grasses (isolated mature trees that have been mowed/slashed around) (Main Roads WA, 2021). The works require the removal of up to 0.5 ha of degraded roadside vegetation within the 31.8 ha DE. The clearing will occur adjacent to Muir Highway to facilitate the shoulder widening in addition to the extension of culverts and reinstatement of existing roadside drainage. Vegetation associations and complexes are as represented in the two tables below.

Summary of Development Envelope's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 3	**Statewide**	2 661 404	1 806 035	68	81
	IBRA Bioregion Jarrah Forest	2 390 591	1 606 737	67	80
	IBRA Sub-region Southern Jarrah Forest	1 482 491	883 557	59	81
	Local Government Authority Shire of Manjimup	287,389.5	238,176	82.88	94.70

Pre-European Vegetation Representation

Heddle/Mattiske Veg Complex	Pre-European Extent (ha)	2013 Vegetation Extent	% Remaining
Bevan 1	104,760.74	90,233.80	86.13
Pemberton	29,542.40	18,430.55	62.39
Yanma	30,238.63	24,560.53	81.22
Crowea	88,422.17	71,237.96	80.57

According to the Pre-European Vegetation Association and Vegetation Complex mapping the percentage of vegetation remaining does not fall below the regional threshold of 30%. In addition to this, the area proposed to be cleared within the DE is in degraded to completely degraded condition. The minor clearing adjacent to an existing road corridor will not further dissect any local or regional ecological linkage (refer to Figure 2 for further detail).

Methodology

Aerial photography
EPA (2016)
Government of Western Australia (2017)
Main Roads Site Inspection (July 2021)
Perth Biodiversity Project (2013)
Shepherd (2009)

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Proposed clearing is not at variance to this Principle

Comment

The area proposed to be cleared within the DE is in degraded to completely degraded condition, consisting of *Corymbia calophylla* (Marri) and *Eucalyptus marginata* (Jarrah) over introduced grasses. The works require the removal of up to 0.5 ha of degraded roadside vegetation within a 31.8 ha DE. The clearing will occur in adjacent to Muir Highway to facilitate the shoulder widening in addition to the extension of culverts and reinstatement of existing roadside drainage. No vegetation growing in association with a watercourse or wetland will be cleared under CPS818.

Given works will not require the removal of vegetation growing in association with a watercourse or wetland, the clearing of native vegetation is not at variance with this Clearing Principle.

Methodology

DWER and DBCA shapefiles
Main Roads Site Inspection (July 2021)

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Proposed clearing is not at variance to this Principle

Comment

The works require the removal of up to 0.5 ha of degraded to completely degraded roadside vegetation within a 31.8 ha DE. The clearing will occur adjacent to Muir Highway, an existing roadside environment and includes the reinstatement of roadside drainage. The proposed works are minor in nature, adjacent to a highly modified road corridor and will retain large tract of remnant vegetation in the adjacent State Forest. The clearing of native vegetation is not at variance with this clearing principle.

Methodology

Main Roads Site Inspection (July 2021)

(h) 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.

Proposed clearing is not likely to be at variance to this Principle

Comment

The area proposed to be cleared is up to 0.5 ha of degraded to completely degraded vegetation, consisting of *Corymbia calophylla* (Marri) and *Eucalyptus marginata* (Jarrah) over introduced grasses. The DE is in comparably worse condition to that in adjacent DBCA Managed Land.

There are a number of parcels of DBCA Managed Land within the study area that collectively make up Tone State Forest (F 38). These abut the road reserve in a number of locations throughout the works extent, however do not overlap with the DE. Consultation has been undertaken with DBCA throughout the development of the proposal scope and the only concerns raised with the proposal is dieback and vehicle hygiene.

A Dieback Assessment has been undertaken by DBCA (Appendix E), which identified the DE as predominantly unprotectable and uninterpretable. A hygiene management plan will be prepared by Main Roads in consultation with DBCA, prior to the shoulder widening component of the works proceeding and

will take into consideration the outcomes of the Dieback Assessment. The culvert extensions will be undertaken with 'clean on entry and exit' to each culvert, as approved by DBCA.

With the above assessment and management, it is not likely that works will have any direct nor indirect impacts on the conservation values of the adjacent State Forest. Clearing of native vegetation is not likely to be at variance with this Clearing Principle.

Methodology
DBCA shapefiles
EPA (2016)
Main Roads Site Inspection (July 2021)

(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.

Proposed clearing is not at variance to this Principle

Comment
The works require the removal of up to 0.5 ha of degraded to completely degraded condition, roadside vegetation within a 31.8 ha DE. The clearing will occur adjacent to an existing road corridor and include reinstatement of existing roadside drainage following the extension of culverts. As the works are within a Proclaimed Surface Water Area, a Bed and Banks Permit (PMB206560[1]) has been obtained from DWER. None of the vegetation proposed for removal under CPS818, is growing in association with a watercourse. Surface water quality is unlikely to be negatively impacted by the removal of up to 0.5 ha of vegetation growing in the road verge. The works will result in additional seal to the road shoulder, improving existing roadside drains and are therefore likely to reduce sedimentation that could potentially occur due to runoff from rainfall events.

The removal of up to 0.5 ha of native vegetation is unlikely to impact groundwater levels or quality. Works are not within a Proclaimed Groundwater Area nor Public Drinking Water Source Area. Furthermore, the works are not likely to intercept groundwater levels as they will not exceed 0.5 m below current ground level.

The clearing of native vegetation is not at variance with this clearing principle.

Methodology
Main Roads Site Inspection (July 2021)
DWER and DBCA shapefiles
EPA (2016)

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Proposed clearing is not likely to be at variance to this Principle

Comment
The works require the removal of up to 0.5 ha of degraded roadside vegetation within a 31.8 ha DE. The clearing will occur adjacent to an existing road corridor to facilitate the shoulder widening in addition to the extension of culverts and reinstatement of existing roadside drainage. Given the small, intermittent patches of clearing proposed within a largely vegetated local landscape, clearing is unlikely to exacerbate the incidence or intensity of flooding.

The clearing of native vegetation is not at variance with this clearing principle.

Methodology
Main Roads Site Inspection (July 2021)
Natural Resource Management SLIP Soil Systems (Accessed 24/11/2021)

6 ADDITIONAL ACTIONS REQUIRED

Table 5 summarises what further pre-clearing impact assessment and vegetation management is required in accordance with CPS 818.

Table 5. Summary of Additional Management Actions Required by CPS 818

Impact of Clearing	Yes/No or NA	*Further Action Required*
1. The CAR indicates that the clearing is 'At Variance' or 'May be at Variance' with one or more of the Clearing Principles. Where the clearing is at variance or may be at variance to Clearing Principle (f) and no other Clearing Principle, and the area of the proposed clearing is less than 0.5 ha in size and the Clearing Principle (f) impacts only relate to: (i) a minor non-perennial watercourse(s); (ii) a wetland(s) classed as a multiple use management category wetland(s); and/or (iii) a wetland that is not a defined wetland; the preparation of an Assessment Report, as required by condition 6(e), is not required.	**No**	No further action required.
2. Clearing is at variance or may be at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality or (j) the incidence of flooding.	**N/A**	N/A
3. The project involves clearing for temporary works (as defined by CPS 818).	**No**	No further action required.
4 a. Project is within Region that: - Has rainfall greater than 400mm and - Is South of the 26th parallel and - Works are in 'Other than dry conditions' and - Works have potential for **uninfested** areas to be impacted	**Yes**	Comply with the Dieback Management Process D20#56909.
4b. Does the proposed works require clearing within or adjacent to DBCA estate in non-dry conditions?	**Yes**	Dieback assessment and Management Plan in consultation with DBCA
5. Main Roads has been notified by DWER or an environmental specialist that the area to be cleared is susceptible to a pathogen other than dieback	**No**	No further action required.
6. The vegetation within the area to be cleared and/or the surrounding vegetation in a good or better condition	**No**	No further action required.

Impact of Clearing	Yes/No or NA	*Further Action Required*
and weeds likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition		

7 STAKEHOLDER CONSULTATION

The CAR has determined in accordance with CPS 818/15 Condition 8 that stakeholder consultation is not warranted for the proposal.

8 REFERENCES

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9 APPENDICES

Appendix	Title
Appendix A	Site Photos
Appendix B	DAWE Protected Matters Database Search
Appendix C	NatureMap Search
Appendix D	Black Cockatoo Breeding Habitat Mapping
Appendix E	Dieback Assessment

Appendix A: Site Photos

SLK 11.78 to 12.48 L1 (12 trees to remove within 5 Metres from centre line)
Tree size ranging between 250mm to 800mm diameter.

Trees marked below are 500mm in diameter.
Overlay showing 4.5m sealed shoulder and relevance with existing trees.

Trees marked below are 4.2 to 4.5 metres from centre line.

Section 2-SLK 17.25 to 16.76 R1 (Total of 16 trees to remove within 5 metres from centre line)
Large tree marked at 5 metres in photo below left to be retained with kerbing.

Section 2-
Start kerb at culvert 17.24 to 16.76.Kerb length =500 metres

Section 3-Proposed Kerbed section- SLK 18.21 to 17.73 R1
11 trees to remove to achieve sealed shoulder to 5 metres and kerb placed at 4.5 metres from centreline.

Section 3-SLK 18.40 to 17.66 R1 (Total of 11 trees to remove within 5 metres of centre line)
-Proposed kerbing placed at 4.5 metres from centre line (sealed behind kerb out to 5 metres)Kerb length is 480 mtrs between SLK 18.21 to 17.73 fed into existing culvert.

Dangerous leaning tree to be removed in network scheduled works.
Proposed kerbing around large Eucalyptus tree SLK 18.44 R1

Trees for removal to allow batter and drain refurbishment between SLK 18.90 to 18.65 R1

3 trees marked to be removed to achieve sealed shoulder width of 4.5 metres from centre line and reshaping of drain.

Tie-in works -SLK 19.19-2 trees to clear to form the open drain continuation to culvert.
Large Eucalyptus tree in left photo to be retained.

Appendix B: DAWE Protected Matters Database Search

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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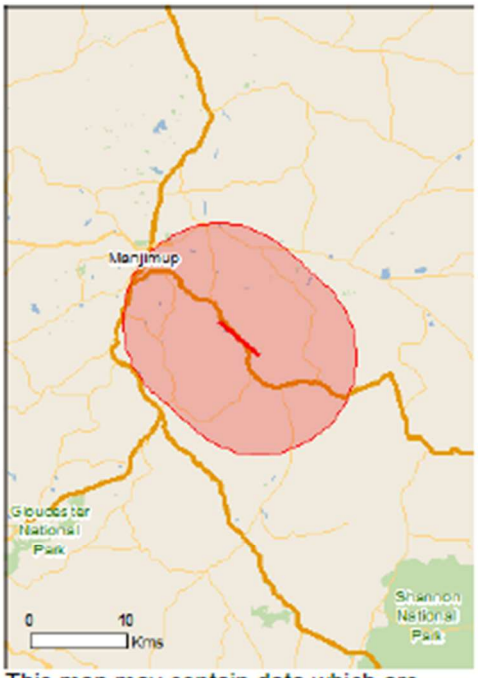
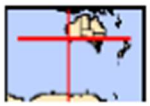


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

Coordinates
Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	17
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	4
Regional Forest Agreements:	1
Invasive Species:	22
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Fish		
Galaxiella nigrostriata Blackstriped Dwarf Galaxias, Black-stripe Minnow [88677]	Endangered	Species or species habitat may occur within area
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat may occur within area
Mammals		
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat known to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Myrmecobius fasciatus Numbat [294]	Endangered	Species or species habitat known to occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat known to occur within area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Other		
Westralunio carteri		
Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Caladenia christineae		
Christine's Spider Orchid [56716]	Vulnerable	Species or species habitat known to occur within area
Caladenia harringtoniae		
Harrington's Spider-orchid, Pink Spider-orchid [56786]	Vulnerable	Species or species habitat likely to occur within area
Drakaea micrantha		
Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat likely to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name

Commonwealth Land -

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
NTWA Bushland covenant (0049)	WA
Sir James Mitchell	WA
Smith Brook	WA
Unnamed WA39199	WA

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-34.28855 116.21563,-34.31567 116.25199

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Appendix C: NatureMap Search

NatureMap

NatureMap Species Report

Created By Guest user on 23/11/2021

Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Line'
Vertices	34° 19' 29" S,116° 15' 15" E 34° 19' 29" S,116° 15' 15" E 34° 19' 29" S,116° 15' 15" E 34° 18'
Group By	56" S,116° 15' 07" E
	Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	472	3480
Other specially protected fauna	3	19
Priority 1	1	2
Priority 3	3	7
Priority 4	4	97
Rare or likely to become extinct	12	145
TOTAL	495	3750

	Name ID	Species Name	Naturalised	Conservation Code	'Endemic To Query Area
Rare or likely to become extinct					
1.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
2.	13617	*Caladenia christineae*		T	
3.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
4.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)*		T	
5.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
6.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
7.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
8.	34026	*Galaxiella munda (mud minnow, western dwarf galaxias)*		T	
9.	24168	*Macrotis lagotis (Bilby, Dalgyte, Ninu)*		T	
10.	24146	*Myrmecobius fasciatus (Numbat, Walpurti)*		T	
11.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum, ngwayir)*		T	
12.	34113	*Westralunio carteri (Carter's Freshwater Mussel)*		T	
Other specially protected fauna					
13.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
14.	25508	*Phascogale tapoatafa (Brush-tailed Phascogale)*		S	
15.	48070	*Phascogale tapoatafa subsp. wambenger (South-western Brush-tailed Phascogale, Wambenger)*		S	
Priority 1					
16.	298	*Deyeuxia inaequalis*		P1	
Priority 3					
17.	14791	*Cryptandra arbutiflora var. pygmaea*		P3	
18.	8100	*Leptinella drummondii*		P3	
19.	24855	*Tyto novaehollandiae subsp. novaehollandiae (Masked Owl (southwest))*		P3	
Priority 4					
20.	24215	*Hydromys chrysogaster (Water-rat, Rakali)*		P4	
21.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
22.	48024	*Notamacropus eugenii subsp. derbianus (Tammar Wallaby, Tammar)*		P4	
23.	48022	*Notamacropus irma (Western Brush Wallaby)*		P4	
Non-conservation taxon					
24.	15429	*Acacia alata var. alata*			
25.	15466	*Acacia applanata*			
26.	3307	*Acacia divergens*			
27.	3331	*Acacia extensa (Wiry Wattle)*			
28.	3453	*Acacia myrtifolia*			
29.	15482	*Acacia pulchella var. goadbyi*			
30.	30036	*Acacia saligna subsp. stolonifera*			
31.	3557	*Acacia stenoptera (Narrow Winged Wattle)*			

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NatureMap

	Name ID	Species Name	Naturalised	Conservation Code	†Endemic To Query Area
32.	3184	*Acaena echinata (Sheep's Burr)*			
33.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
34.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
35.	24262	*Acanthiza inornata (Western Thornbill)*			
36.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
37.		*Acariformes sp.*			
38.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
39.	25536	*Accipiter fasciatus (Brown Goshawk)*			
40.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
41.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
42.	5316	*Agonis flexuosa (Peppermint, Wonil)*			
43.	23474	*Agrostocrinum hirsutum*			
44.	184	*Aira caryophyllea (Silvery Hairgrass)*	Y		
45.		*Alamptogonus novarae*			
46.	2648	*Alternanthera denticulata (Lesser Joyweed)*			
47.	38756	*Amanita umbrinella*			
48.	4585	*Amperea ericoides*			
49.	13101	*Amperea simulans*			
50.	194	*Amphipogon amphipogonoides*			
51.	20184	*Amphipogon laguroides subsp. laguroides*			
52.	1062	*Anarthria prolifera*			
53.	24312	*Anas gracilis (Grey Teal)*			
54.	24316	*Anas superciliosa (Pacific Black Duck)*			
55.		*Ancylidae sp.*			
56.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
57.	1407	*Anigozanthos flavidus (Tall Kangaroo Paw)*			
58.	1411	*Anigozanthos manglesii (Mangles Kangaroo Paw, Kurulbrang)*			
59.	24561	*Anthochaera carunculata (Red Wattlebird)*			
60.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
61.	6211	*Apium prostratum (Sea Celery)*			
62.	24285	*Aquila audax (Wedge-tailed Eagle)*			
63.		*Arachnura higginsi*			
64.	41324	*Ardea modesta (great egret, white egret)*			
65.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
66.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
67.	27584	*Athonia ilicina*			
68.	20127	*Astartea glomerulosa (Early Astartea)*			
69.	20283	*Astartea scoparia (Common Astartea)*			
70.	7851	*Asteridea pulverulenta (Common Bristle Daisy)*			
71.	6323	*Astroloma ciliatum (Candle Cranberry)*			
72.	6325	*Astroloma drummondii*			
73.	6334	*Astroloma pallidum (Kick Bush)*			
74.	42106	*Austroparmelina conlabrosa*			
75.	38764	*Austropaxillus muelleri*			
76.	17233	*Austrostipa campylachne*			
77.	24318	*Aythya australis (Hardhead)*			
78.		*Baetidae sp.*			
79.	1819	*Banksia grandis (Bull Banksia, Pulgarla)*			
80.	1822	*Banksia ilicifolia (Holly-leaved Banksia)*			
81.	1830	*Banksia littoralis (Swamp Banksia, Pungura)*			
82.	1848	*Banksia seminuda (River Banksia)*			
83.	32315	*Barbula calycina*			
84.		*Barnardius zonarius*			
85.	743	*Baumea juncea (Bare Twigrush)*			
86.	48868	*Bellardia viscosa*	Y		
87.	25798	*Billardiera fusiformis (Australian Bluebell)*			
88.	3159	*Billardiera laxiflora*			
89.	24319	*Biziura lobata (Musk Duck)*			
90.		*Boletus sp.*			
91.	4441	*Boronia spathulata (Boronia)*			
92.	14397	*Bossiaea aquifolium subsp. laidlawiana*			
93.	3713	*Bossiaea linophylla*			
94.	3714	*Bossiaea ornata (Broad Leaved Brown Pea)*			
95.	14291	*Bossiaea praetermissa*			
96.	6341	*Brachyloma preissii (Globe Heath)*			
97.	245	*Briza minor (Shivery Grass)*	Y		
98.	250	*Bromus hordeaceus (Soft Brome)*	Y		
99.	12770	*Burchardia congesta*			
100.	1385	*Burchardia multiflora (Dwarf Burchardia)*			
101.	25714	*Cacatua pastinator (Western Long-billed Corella)*			

NatureMap

	Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
102.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
103.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
104.		*Caenidae sp.*			
105.	1276	*Caesia micrantha (Pale Grass Lily)*			
106.		*Caesia sp.*			
107.	15353	*Caladenia hebertiana*			
108.	1608	*Caladenia nana (Pink Fan Orchid)*			
109.	27618	*Calicium glaucellum*			
110.	27620	*Calicium salicinum*			
111.	28200	*Calicium victorianum var. victorianum*			
112.	10861	*Callistachys lanceolata (Wonnich)*			
113.	27629	*Caloplaca ferruginea*			
114.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
115.	32461	*Campylopus bicolor var. bicolor*			
116.	32338	*Campylopus introflexus*	Y		
117.	754	*Carex divisa (Divided Sedge)*	Y		
118.	2951	*Cassytha flava (Dodder Laurel)*			
119.	2957	*Cassytha racemosa (Dodder Laurel)*			
120.		*Cebidae sp.*			
121.	6539	*Centaurium erythraea (Common Centaury)*	Y		
122.	6542	*Centaurium tenuiflorum*	Y		
123.		*Cephalozelia exiliflora*			
124.		*Cephalozelia hirta*			
125.	32462	*Ceratodon purpureus subsp. convolutus*			
126.		*Ceratopogonidae sp.*			
127.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
128.		*Cercophonius sulcatus*			
129.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
130.	1280	*Chamaescilla corymbosa (Blue Squill)*			
131.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
132.		*Chiloscyphus semiteres var. semiteres*			
133.		*Chironominae sp.*			
134.	3754	*Chorizema diversifolium*			
135.	12765	*Chorizema nanum*			
136.	24288	*Circus approximans (Swamp Harrier)*			
137.	27663	*Cladia aggregata*			
138.	27668	*Cladia schizopora*			
139.	28208	*Cladonia cervicornis subsp. verticillata*			
140.	27675	*Cladonia chlorophaea*			
141.	28209	*Cladonia crispata var. cetrariiformis*			
142.	27678	*Cladonia enantia*			
143.	27684	*Cladonia krempelhuberi*			
144.	27685	*Cladonia macilenta*			
145.	27688	*Cladonia ochrochlora*			
146.	27691	*Cladonia ramulosa*			
147.	27692	*Cladonia rigida*			
148.	27694	*Cladonia southlandica*			
149.	27696	*Cladonia sulcata*			
150.	27697	*Cladonia tessellata*			
151.	2929	*Clematis pubescens (Common Clematis)*			
152.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
153.	4550	*Comesperma calymega (Blue-spike Milkwort)*			
154.	4551	*Comesperma ciliatum*			
155.	1418	*Conostylis aculeata (Prickly Conostylis)*			
156.	11826	*Conostylis aculeata subsp. aculeata*			
157.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
158.		*Corvidae sp.*			
159.	25592	*Corvus coronoides (Australian Raven)*			
160.	17104	*Corymbia calophylla (Marri)*			
161.	18319	*Cotoneaster glaucophyllus*	Y		
162.	24671	*Coturnix pectoralis (Stubble Quail)*			
163.	25701	*Coturnix ypsilophora (Brown Quail)*			
164.	25595	*Cracticus tibicen (Australian Magpie)*			
165.	7952	*Crepis capillaris (Smooth Hawksbeard)*	Y		
166.	25398	*Crinia georgiana (Quacking Frog)*			
167.	25049	*Ctenotus labillardieri*			
168.	24322	*Cygnus atratus (Black Swan)*			
169.	285	*Cynosurus echinatus (Rough Dogstail)*	Y		
170.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
171.	7420	*Dampiera alata (Winged-stem Dampiera)*			

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	Name ID	Species Name	Naturalised	Conservation Code	†Endemic To Query Area
172.	7444	*Dampiera hederacea (Karri Dampiera)*			
173.	7484	*Dampiera trigona (Angled-stem Dampiera)*			
174.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
175.	1218	*Dasypogon bromeliifolius (Pineapple Bush)*			
176.	6218	*Daucus glochidiatus (Australian Carrot)*			
177.	3799	*Davesia cordata (Bookleaf)*			
178.	10894	*Delairea odorata (Ivy Groundsel, Cape Ivy)*	Y		
179.	17691	*Desmocladus fasciculatus*			
180.	299	*Deyeuxia quadriseta (Reed Bentgrass)*			
181.	306	*Dichelachne crinita (Longhair Plumegrass)*			
182.		*Dingupa glauerti*			Y
183.	3867	*Dipogon lignosus (Dolichos Pea)*	Y		
184.	4782	*Dodonaea viscosa (Sticky Hopbush)*			
185.	24470	*Dromaius novaehollandiae (Emu)*			
186.	3118	*Drosera pallida (Pale Rainbow)*			
187.		*Dytiscidae sp.*			
188.	340	*Echinopogon ovatus (Hedgehog Grass)*			
189.		*Echomidae sp.*			
190.		*Egretta novaehollandiae*			
191.		*Ehrharta sp.*			
192.		*Elanus axillaris*			
193.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
194.		*Eolophus roseicapillus*			
195.	24652	*Eopsaltria georgiana (White-breasted Robin)*			
196.	18301	*Eriobotrya japonica*	Y		
197.	15413	*Eriochilus dilatatus subsp. undulatus*			
198.	5605	*Eucalyptus cornuta (Yate, Yeid)*			
199.	5615	*Eucalyptus decipiens (Limestone Marlock, Moit)*			
200.	13547	*Eucalyptus marginata subsp. marginata (Jarrah)*			
201.	5739	*Eucalyptus patens (Swan River Blackbutt, Dwuda)*			
202.	5763	*Eucalyptus rudis (Flooded Gum, Kulurda)*			
203.	19088	*Euchiton collinus*			
204.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
205.	25623	*Falco longipennis (Australian Hobby)*			
206.	25677	*Falcunculus frontatus (Crested Shrike-tit)*			
207.	24041	*Felis catus (Cat)*	Y		
208.	32369	*Fissidens tenellus*			
209.	27745	*Flavoparmelia haysomii*			
210.	25727	*Fulica atra (Eurasian Coot)*			
211.	39033	*Fuligo septica*			
212.	31532	*Fumaria muralis subsp. muralis*	Y		
213.	18143	*Genista monspessulana*	Y		
214.	4339	*Geranium molle (Dove's Foot Cranesbill)*	Y		
215.	4340	*Geranium retrorsum*			
216.	25530	*Gerygone fusca (Western Gerygone)*			
217.		*Glossiphoniidae sp.*			
218.		*Gomphidae sp.*			
219.	3953	*Gompholobium ovatum*			
220.	3954	*Gompholobium polymorphum*			
221.	24443	*Grallina cyanoleuca (Magpie-lark)*			
222.	41485	*Graphis assimilis*			
223.	2080	*Grevillea quercifolia (Oak-leaf Grevillea)*			
224.		*Gripopterygidae sp.*			
225.		*Gyrinidae sp.*			
226.	2128	*Hakea amplexicaulis (Prickly Hakea)*			
227.	2170	*Hakea lasianthoides*			
228.	2175	*Hakea lissocarpha (Honey Bush)*			
229.	2191	*Hakea oleifolia (Dungyn)*			
230.	2216	*Hakea varia (Variable-leaved Hakea)*			
231.	41267	*Halegrapha mucronata*			
232.	24295	*Haliastur sphenurus (Whistling Kite)*			
233.	3961	*Hardenbergia comptoniana (Native Wisteria)*			
234.		*Hemicordulidae sp.*			
235.	25117	*Hemiergis peronii subsp. peronii*			
236.	41142	*Hesperocyparis lusitanica*	Y		
237.	5109	*Hibbertia amplexicaulis*			
238.	5114	*Hibbertia commutata*			
239.	5117	*Hibbertia cuneiformis (Cutleaf Hibbertia)*			
240.	5118	*Hibbertia cunninghamii*			
241.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			

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	Name ID	Species Name	Naturalised	Conservation Code	†Endemic To Query Area
242.	5169	*Hibbertia serrata (Serrate Leaved Guinea Flower)*			
243.	5173	*Hibbertia subvaginata*			
244.	47965	*Hieraaetus morphnoides (Little Eagle)*			
245.	24491	*Hirundo neoxena (Welcome Swallow)*			
246.	444	*Holcus lanatus (Yorkshire Fog)*	Y		
247.	3965	*Hovea elliptica (Tree Hovea)*			
248.	5218	*Hybanthus debilissimus*			
249.	5221	*Hybanthus floribundus*			
250.		*Hydraenidae sp.*			
251.		*Hydrophilidae sp.*			
252.		*Hydroptilidae sp.*			
253.	32394	*Hypnum cupressiforme*			
254.	5827	*Hypocalymma strictum*			
255.	9352	*Hypochaeris radicata (Flat Weed, Cats-ear)*	Y		
256.	27784	*Hypogymnia lugubris*			
257.	27785	*Hypogymnia pulchrilobata*			
258.	27786	*Hypogymnia pulverata*			
259.	27787	*Hypogymnia subphysodes*			
260.	28218	*Hypogymnia subphysodes var. austerodioides*			
261.	28219	*Hypogymnia subphysodes var. subphysodes*			
262.	1070	*Hypolaena exsulca*			
263.	17841	*Hypolaena pubescens*			
264.		*Hysterangium affine*			
265.	27789	*Imshaugia aleurites*			
266.	912	*Isolepis cyperoides*			
267.	917	*Isolepis marginata (Coarse Club-rush)*			
268.	3992	*Isotropis cuneifolia (Granny Bonnets)*			
269.	1297	*Johnsonia lupulina (Hooded Lily)*			
270.	1177	*Juncus articulatus (Jointed Rush)*	Y		
271.	1178	*Juncus bufonius (Toad Rush)*	Y		
272.	1184	*Juncus holoschoenus (Jointleaf Rush)*			
273.	1186	*Juncus microcephalus*	Y		
274.	1188	*Juncus pallidus (Pale Rush)*			
275.	4036	*Kennedia carinata*			
276.	4037	*Kennedia coccinea (Coral Vine)*			
277.	4044	*Kennedia prostrata (Scarlet Runner)*			
278.	5841	*Kunzea recurva*			
279.	3669	*Labichea punctata (Lance-leaved Cassia)*			
280.	20019	*Lachnagrostis filiformis*			
281.	18585	*Lagenophora huegelii*			
282.	4047	*Lathyrus tingitanus (Tangier Pea)*	Y		
283.		*Lecanora sp.*			
284.		*Lecidea sp.*			
285.	936	*Lepidosperma leptostachyum*			
286.	940	*Lepidosperma pubisquameum*			
287.	945	*Lepidosperma squamatum*			
288.	48820	*Lepra subventosa*			
289.	15418	*Leptoceras menziesii*			
290.		*Leptoceridae sp.*			
291.		*Leptophlebiidae sp.*			
292.	29871	*Leptospermum rotundifolium*	Y		Y
293.	25154	*Lerista microtis subsp. microtis*			
294.	6360	*Leucopogon australis (Spiked Beard-heath)*			
295.	6367	*Leucopogon capitellatus*			
296.	44201	*Leucopogon decrescens*			
297.	40941	*Leucopogon obovatus subsp. revolutus*			
298.	6436	*Leucopogon propinquus*			
299.	6440	*Leucopogon racemulosus*			
300.	6454	*Leucopogon verticillatus (Tassel Flower)*			
301.	25661	*Lichmera indistincta (Brown Honeyeater)*			
302.	4363	*Linum trigynum (French Flax)*	Y		
303.	9289	*Lobelia anceps (Angled Lobelia)*			
304.	478	*Lolium rigidum (Wimmera Ryegrass)*	Y		
305.	1222	*Lomandra brittanii*			
306.	1223	*Lomandra caespitosa (Tufted Mat Rush)*			
307.	1225	*Lomandra drummondii*			
308.	1228	*Lomandra hermaphrodita*			
309.	1229	*Lomandra integra*			
310.	1238	*Lomandra pauciflora*			
311.	1239	*Lomandra preissii*			

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	Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
312.	1243	*Lomandra sericea (Silky Mat Rush)*			
313.		*Lomandra sp.*			
314.	1246	*Lomandra suaveolens*			
315.	18049	*Lyginia imberbis*			
316.	32401	*Macromitrium archeri*			
317.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
318.	85	*Macrozamia riedlei (Zamia, Djiridji)*			
319.	25650	*Malurus elegans (Red-winged Fairy-wren)*			
320.	25654	*Malurus splendens (Splendid Fairy-wren)*			
321.	25822	*Manorina sylvaticus*			
322.	27850	*Megalaria grossa*			
323.	25758	*Megalurus gramineus (Little Grassbird)*			
324.	5921	*Melaleuca incana (Grey Honeymyrtle)*			
325.	5980	*Melaleuca thymoides*			
326.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
327.	27854	*Menegazzia platytrema*			
328.	953	*Mesomelaena graciliceps*			
329.	47237	*Mesophelia traballs*			
330.		*Microcarbo melanoleucos*			
331.	485	*Microlaena stipoides (Weeping Grass)*			
332.	24223	*Mus musculus (House Mouse)*	Y		
333.		*Mycocalicium albonigrum*			
334.	25610	*Mylagra inquieta (Restless Flycatcher)*			
335.	6189	*Myriophyllum crispatum*			
336.	6195	*Myriophyllum limnophilum*			
337.	24738	*Neophema elegans (Elegant Parrot)*			
338.	30457	*Notocladonia cochleata*			
339.	44869	*Notoparmelia tenuirima*			Y
340.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
341.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
342.	24195	*Nyctophilus gouldi (Gould's Long-eared Bat)*			
343.	8143	*Olearia paucidentata (Autumn Scrub Daisy)*			
344.		*Oligochaeta sp.*			
345.	7348	*Opercularia hispidula (Hispid Stinkweed)*			
346.	46316	*Orianthera serpyllifolia subsp. angustifolia*			
347.	46315	*Orianthera serpyllifolia subsp. serpyllifolia*			
348.	36181	*Ornduffia parnassifolia*			
349.	4113	*Ornithopus compressus (Yellow Serradella)*	Y		
350.		*Orthocladiinae sp.*			
351.	1539	*Orthrosanthus multiflorus (Morning Iris)*			
352.	1540	*Orthrosanthus polystachyus (Many Spike Orthrosanthus)*			
353.	4359	*Oxalis violacea (Violet Wood Sorrel)*	Y		
354.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
355.		*Palaemonidae sp.*			
356.	27892	*Pannoparmelia wilsonii*			
357.	1667	*Paracaleana nigrita (Flying Duck Orchid)*			
358.	27905	*Parapsoroma glauca*			
359.		*Parastacidae sp.*			
360.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
361.	24626	*Pardalotus punctatus subsp. xanthopyge (Yellow-rumped Pardalote)*			
362.	25682	*Pardalotus striatus (Striated Pardalote)*			
363.	27923	*Parmotrema cooperi*			
364.	30458	*Parmotrema reticulatum*			
365.	533	*Paspalum vaginatum (Salt Water Couch)*			
366.	11550	*Patersonia umbrosa var. xanthina (Yellow Flags)*			
367.	4342	*Pelargonium australe (Wild Geranium)*			
368.	4346	*Pelargonium littorale*			
369.	27929	*Peltigera didactyla*			
370.	6246	*Pentapeltis silvatica (Southern Pentapeltis)*			
371.	2267	*Persoonia longifolia (Snottygobble)*			
372.		*Perthidae sp.*			
373.	27955	*Pertusaria thiophanirica*			
374.	48061	*Petrochelidon nigricans (Tree Martin)*			
375.	48066	*Petroica boodang (Scarlet Robin)*			
376.	2306	*Petrophile rigida*			
377.	25699	*Phalacrocorax varius (Pied Cormorant)*			
378.	24409	*Phaps chalcoptera (Common Bronzewing)*			
379.	25587	*Phaps elegans (Brush Bronzewing)*			
380.	18532	*Philotheca nodiflora subsp. lasiocalyx*			
381.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			

NatureMap
Mapping Western Australia's Biodiversity

	Name ID	Species Name	Naturalised	Conservation Code	†Endemic To Query Area
382.	4675	*Phyllanthus calycinus (False Boronia)*			
383.		*Phytophthora cinnamomi*			
384.	5240	*Pimelea cracens*			
385.	48975	*Pisolithus microcarpus*			
386.	16322	*Pittosporum undulatum*	Y		
387.		*Planorbidae sp.*			
388.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
389.	25720	*Platycercus icterotis (Western Rosella)*			
390.	24745	*Platycercus icterotis subsp. icterotis (Western Rosella)*			
391.	17681	*Platychorda applanata*			
392.	6259	*Platysace tenuissima*			
393.	575	*Poa homomalla*			
394.	578	*Poa porphyroclados*			
395.	25703	*Podargus strigoides (Tawny Frogmouth)*			
396.	86	*Podocarpus drouynianus (Wild Plum, Kula)*			
397.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
398.	24683	*Pomatostomus superciliosus (White-browed Babbler)*			
399.	4690	*Poranthera huegelii*			
400.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
401.	24769	*Porzana fluminea (Australian Spotted Crake)*			
402.	1672	*Prasophyllum fimbria (Fringed Leek Orchid)*			
403.	17211	*Prunus cerasifera*	Y		
404.	46202	*Prunus persica var. persica*	Y		
405.	27997	*Pseudocyphellaria neglecta*			
406.	24063	*Pseudorca crassidens (False Killer Whale)*			
407.	41651	*Pteridium esculentum subsp. esculentum*			
408.	1698	*Pterostylis vittata (Banded Greenhood)*			
409.	4181	*Pultenaea reticulata*			
410.		*Purpureicephalus spurius*			
411.	16368	*Pyrorchis forrestii*			
412.	32480	*Racopilum cuspidigerum var. convolutaceum*			
413.	28037	*Ramboldia stuartii*			
414.	2932	*Ranunculus colonorum (Common Buttercup)*			
415.	24243	*Rattus fuscipes (Western Bush Rat)*			
416.	48096	*Rhipidura albiscapa (Grey Fantail)*			
417.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
418.	17020	*Robinia pseudoacacia*	Y		
419.	3066	*Rorippa nasturtium-aquaticum (Watercress)*	Y		
420.	28056	*Sarcogyne clavus*			
421.	7598	*Scaevola auriculata*			
422.	7646	*Scaevola striata (Royal Robe)*			
423.	13175	*Scaevola striata var. striata*			
424.	41660	*Schenkia australis*			
425.	32433	*Sematophyllum homomallum*			
426.	20663	*Senecio multicaulis subsp. multicaulis*			
427.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
428.		*Simuliidae sp.*			
429.	30948	*Smicrornis brevirostris (Weebill)*			
430.	24111	*Sminthopsis gilberti (Gilbert's Dunnart)*			
431.	9367	*Sonchus hydrophilus (Native Sowthistle)*			
432.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
433.	1312	*Sowerbaea laxiflora (Purple Tassels)*			
434.	1558	*Sparaxis bulbifera*	Y		
435.	4207	*Sphaerolobium medium*			
436.	4733	*Stackhousia monogyna*			
437.	24645	*Stagonopleura oculata (Red-eared Firetail)*			
438.		*Staphylinidae sp.*			
439.	25597	*Strepera versicolor (Grey Currawong)*			
440.	39881	*Stylidium acuminatum subsp. meridionale*			
441.	7684	*Stylidium amoenum (Lovely Triggerplant)*			
442.	39880	*Stylidium angustifolium subsp. glaucifolium*			
443.	46517	*Stylidium planiscula*			
444.	7785	*Stylidium repens (Matted Triggerplant)*			
445.	1260	*Stypandra glauca (Blind Grass)*			
446.	25902	*Symphyotrichum squamatum (Bushy Starwort)*	Y		
447.	2323	*Synaphea gracillima*			
448.	12911	*Synaphea obtusata*			
449.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
450.	24207	*Tachyglossus aculeatus (Short-beaked Echidna)*			
451.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			

NatureMap is a collaborative project of the Department of Biodiversity, Conservation and Attractions and the Western Australian Museum.

Department of Biodiversity, Conservation and Attractions

WESTERN AUSTRALIAN MUSEUM

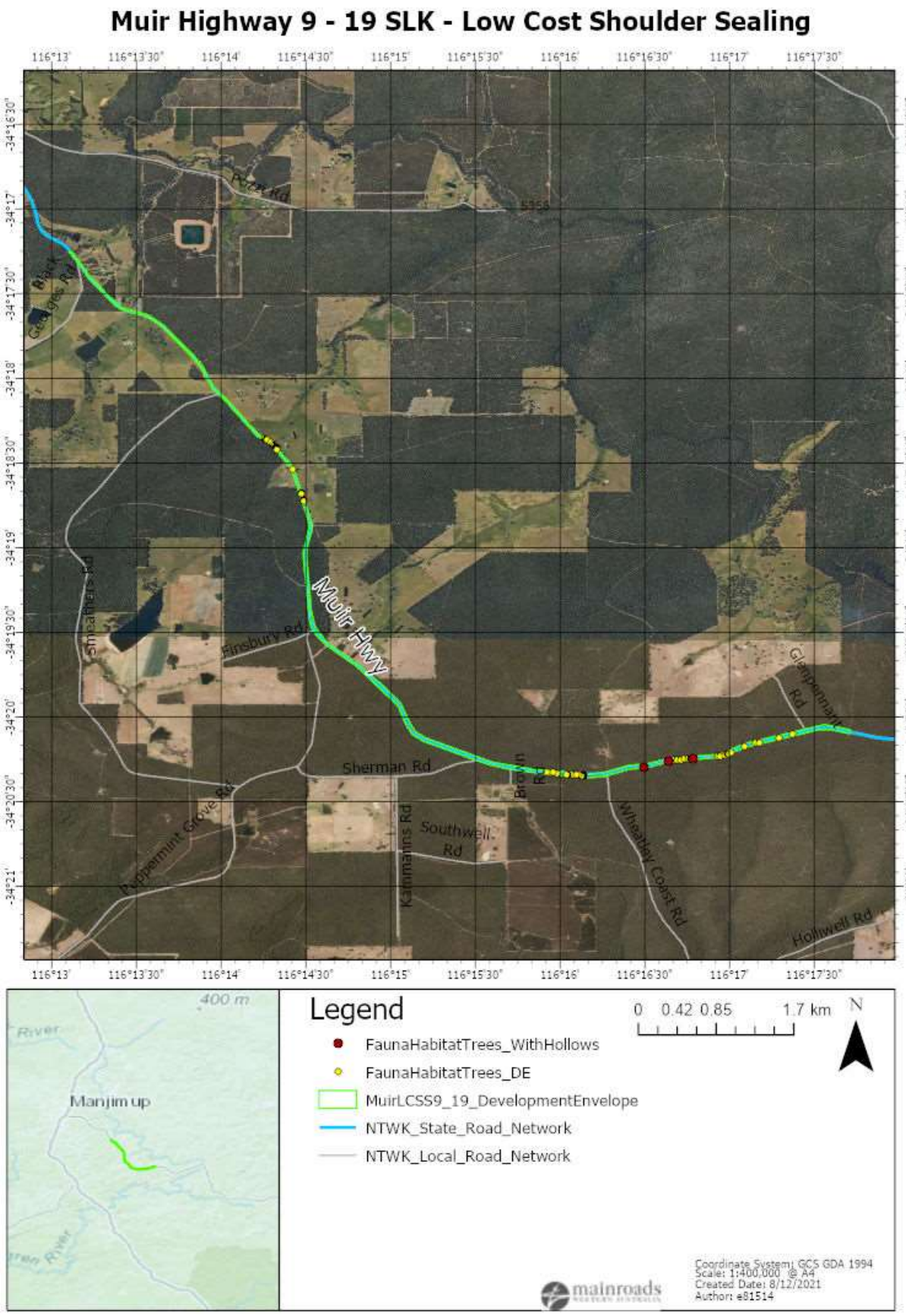
NatureMap
Mapping Western Australia's Biodiversity

	Name ID	Species Name	Naturalised	Conservation Code	†Endemic To Query Area
452.		*Tanypodinae sp.*			
453.	20135	*Taxandria linearifolia*			
454.		*Telephlebiidae sp.*			
455.	1036	*Tetraria octandra*			
456.	35579	*Tetraria sp. Jarrah Forest (R. Davis 7391)*			
457.	667	*Tetrarrhena laevis (Forest Ricegrass)*			
458.	4526	*Tetratheca affinis*			
459.	11143	*Thelymitra graminea*			
460.	5084	*Thomasia grandiflora (Large Flowered Thomasia)*			
461.	5092	*Thomasia pauciflora (Few Flowered Thomasia)*			
462.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
463.	32486	*Thuidium sparsum var. hastatum*			
464.	28071	*Thysanotheclum scutellatum*			
465.	1338	*Thysanotus manglesianus (Fringed Lily)*			
466.	1339	*Thysanotus multiflorus (Many-flowered Fringe Lily)*			
467.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
468.	28077	*Trapelia coarctata*			
469.	4547	*Tremandra diffusa*			
470.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
471.	4360	*Tropaeolum majus (Garden Nasturtium)*	Y		
472.	48147	*Turnix varius (Painted Button-quail)*			
473.	28086	*Usnea dasaea*			
474.	28087	*Usnea inermis*			
475.	28090	*Usnea rubicunda*			
476.	28093	*Usnea subalpina*			
477.	28094	*Usnea subcilliata*			
478.	25225	*Varanus rosenbergi (Heath Monitor)*			
479.		*Velildae sp.*			
480.	7665	*Velleia trinervis*			
481.	8257	*Vellereophyton dealbatum (White Cudweed)*	Y		
482.	7109	*Veronica calycina (Cup Speedwell)*			
483.	7110	*Veronica distans*			
484.	24206	*Vespadelus regulus (Southern Forest Bat)*			
485.	24040	*Vulpes vulpes (Red Fox)*	Y		
486.	722	*Vulpia bromoides (Squirrel Tail Fescue)*	Y		
487.	724	*Vulpia myuros (Rat's Tail Fescue)*	Y		
488.	18108	*Watsonia meriana var. bulbillifera*	Y		
489.	45919	*Websdanea lyginiae*			
490.		*Xanthorrhoea sp.*			
491.	6283	*Xanthosia atkinsoniana*			
492.	6284	*Xanthosia candida*			
493.	6289	*Xanthosia huegelii*			
494.	44861	*Xerochrysum macranthum*			
495.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

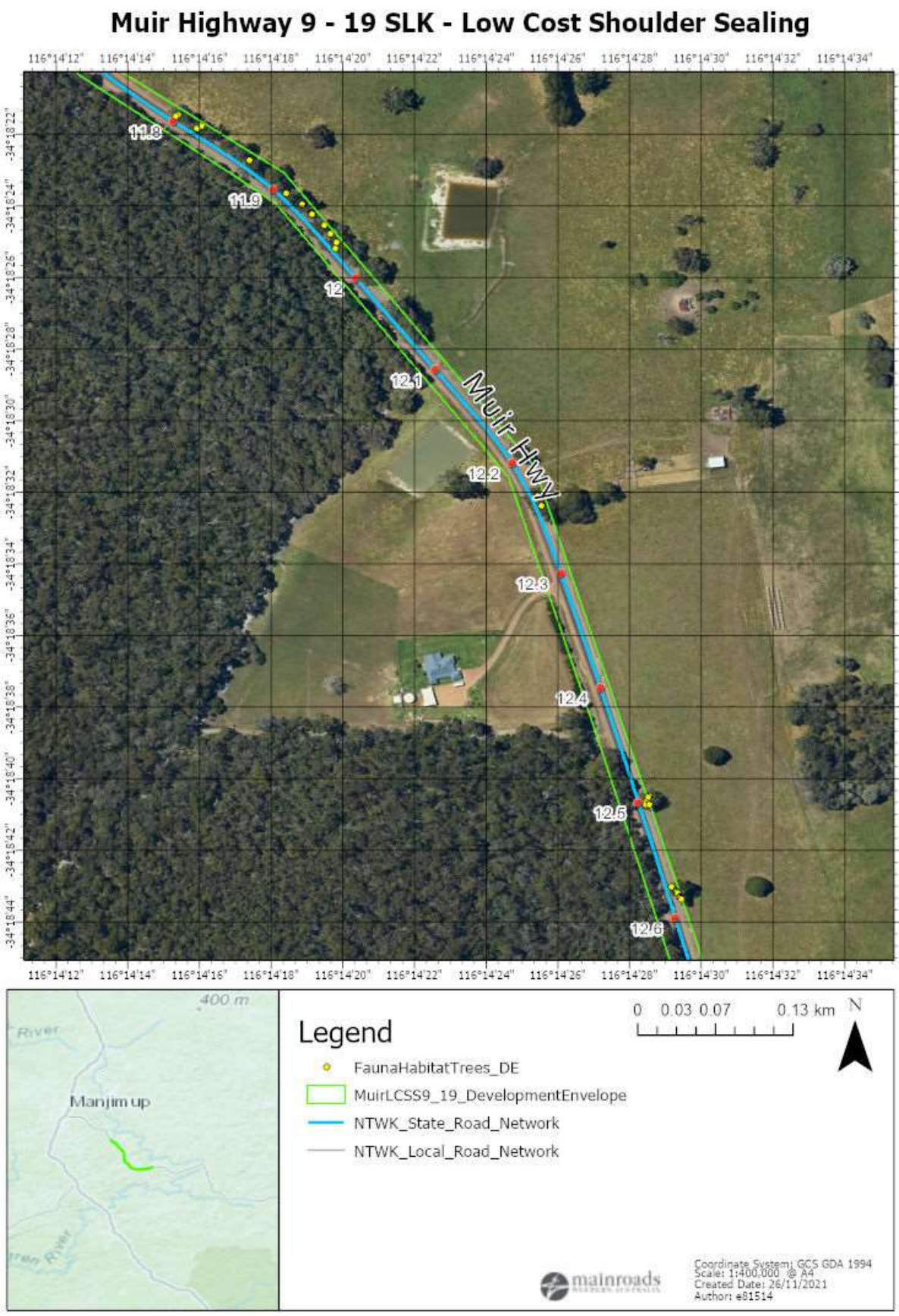
Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

† For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

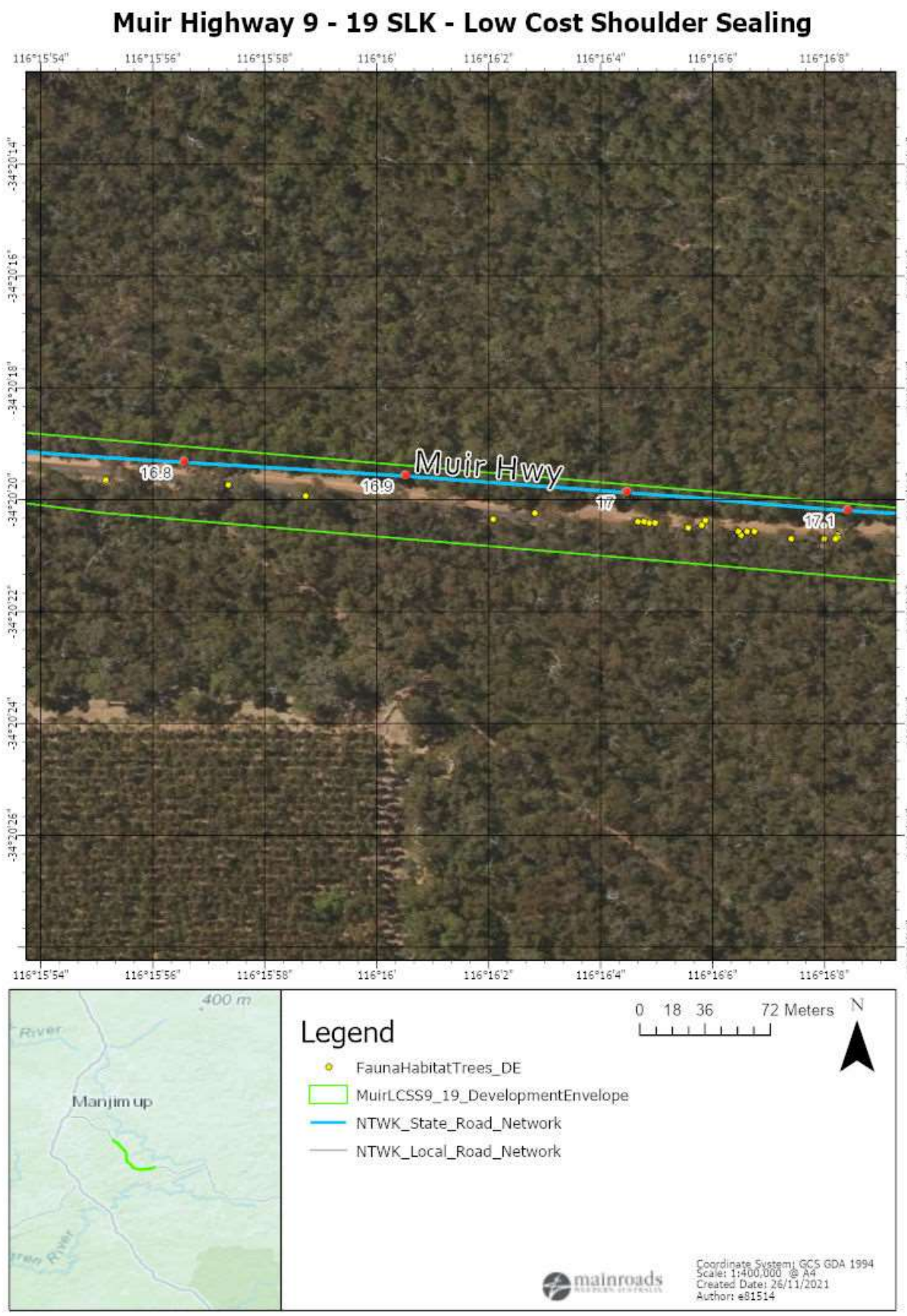
Appendix D: Black Cockatoo Breeding Habitat Mapping



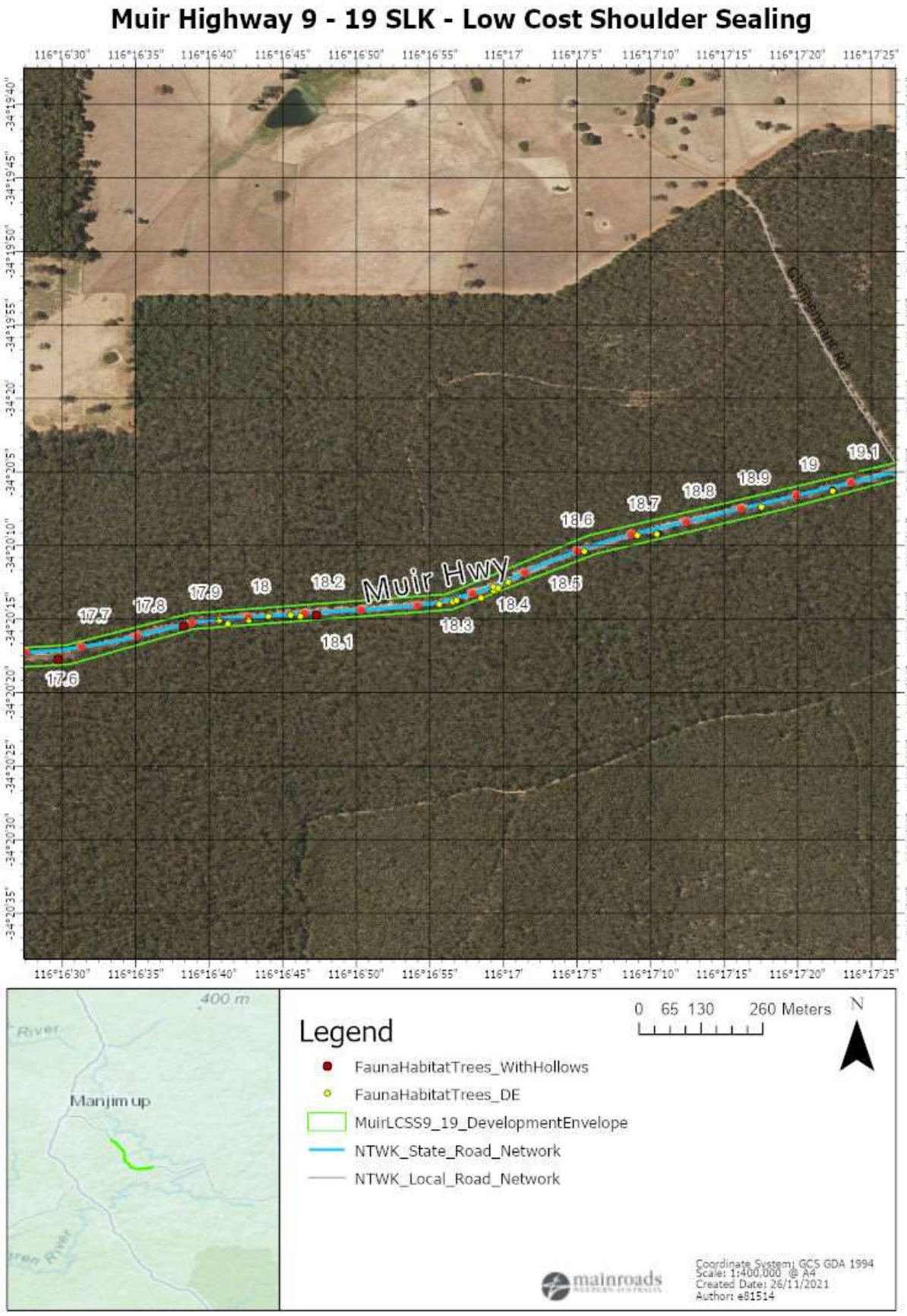
Black Cockatoo Assessment Overview Map



Black Cockatoo Assessment Map 1



Black Cockatoo Assessment Map 2



Black Cockatoo Assessment Map 3

Appendix E: Dieback Assessment

Department of Biodiversity, Conservation and Attractions

PARKS AND WILDLIFE SERVICE

We're working for Western Australia.

CONSERVATION AND ECOSYSTEM MANAGEMENT DIVISION
FOREST MANAGEMENT BRANCH

MEMO

Friday, 17 December 2021

TO: Environment Officer – South West Region Subject: Muir

Highway sections LSW9-19/57-75SLK_570

Linear Dieback Assessment Report

Assessment Code: Muir Highway LSW9-19/57-75SLK_570

Disturbance Activity: Culvert extensions and shoulder widening

Registered Dieback Interpreters: Jeff Boulton and Danelle Manning

Assessment completion date: 13 December 2021

Previous assessments: Some previous hygiene information for parts of the assessment area where available but not specific to the highway

Corridor width: 40 m

Section LSW9-19

Occurrence category distribution

The section between Black Georges Road and Glennpenant Road was predominately unprotectable uninterpretable due to the lack of suitable indicators to assess for the presence or absence of *Phytophthora cinnamomi (P.c)*. Areas of infestation were mapped where indicator species deaths indicated the presence of *P.c.* Two areas of protectable uninfested were identified, the first is located between Peppermint Grove Road and Shermans Loop. The second area is located just to the east of Wheatly Coast Road. These areas were deemed protectable due to being upslope of the road shoulder and only pertain to the south side of the highway. Where uninterpretable adjoins uninfested the boundary is demarcated with pink and black striped flagging tape with knots facing uninterpretable. Where infested adjoins uninfested the boundary is demarcated with day-glo pink flagging tape with knots facing infested. Areas of farmland along this section have been mapped Excluded and unprotectable. The Excluded category is for areas of long-term disturbance where natural vegetation has been cleared.

Section LSW9-19 Occurrence category area statement:

Primary Categories	Area Ha	Unprotectable	Predicted High Impact	Very High Impact
Infested	8.7			
Uninfested	5.6	2.5		
Uninterpretable	19	19		
Unmappable				
Temporarily Uninterpretable	0	0		
Assessed Area	41.8	21.5	0.0	0
Excluded	8.5	8.5		
Project Area	41.8			

Forest Management Branch
1 Brain St, Manjimup, Western Australia 6258
Phone: (08) 9771 7963
dbca.wa.gov.au

Two Protectable Areas maps have been produced for the area. The map references are:
MuirLSW9_19_Map1_Prot
MuirLSW9_19_Map2_Prot

The maps expiry date is: 13/12/2022
The assessment expiry date is: 13/12/2024

Section LSW9-19 and Section 57-75SLK_570

Disease Expression
Subtle to obvious

Dead and dying indicator species
Banksia grandis, Patersonia sp., Podocarpus drouynianus, Xanthorrhoea gracilis, Xanthorrhoea preissii.

Recommendations
Infested and unprotectable uninterpretable boundaries were not demarcated in the field as they can be managed as one unit in dry soil conditions.

Dry soil activities are recommended to minimise soil movement in any proposed shoulder upgrade.

Minimise machine activity in undisturbed vegetation where possible.

Source certified gravel for use adjacent areas of protectable uninfested.

The Forest Management Branch Manjimup has supplied comprehensive level occurrence information which can be used as the basis for a Dieback management plan. It is recommended a comprehensive Dieback Management Plan for disturbance activities associated with the assessment is developed. Please contact the local district Sustainable Forest Management Coordinator to schedule a Dieback Management Plan meeting for the activity.

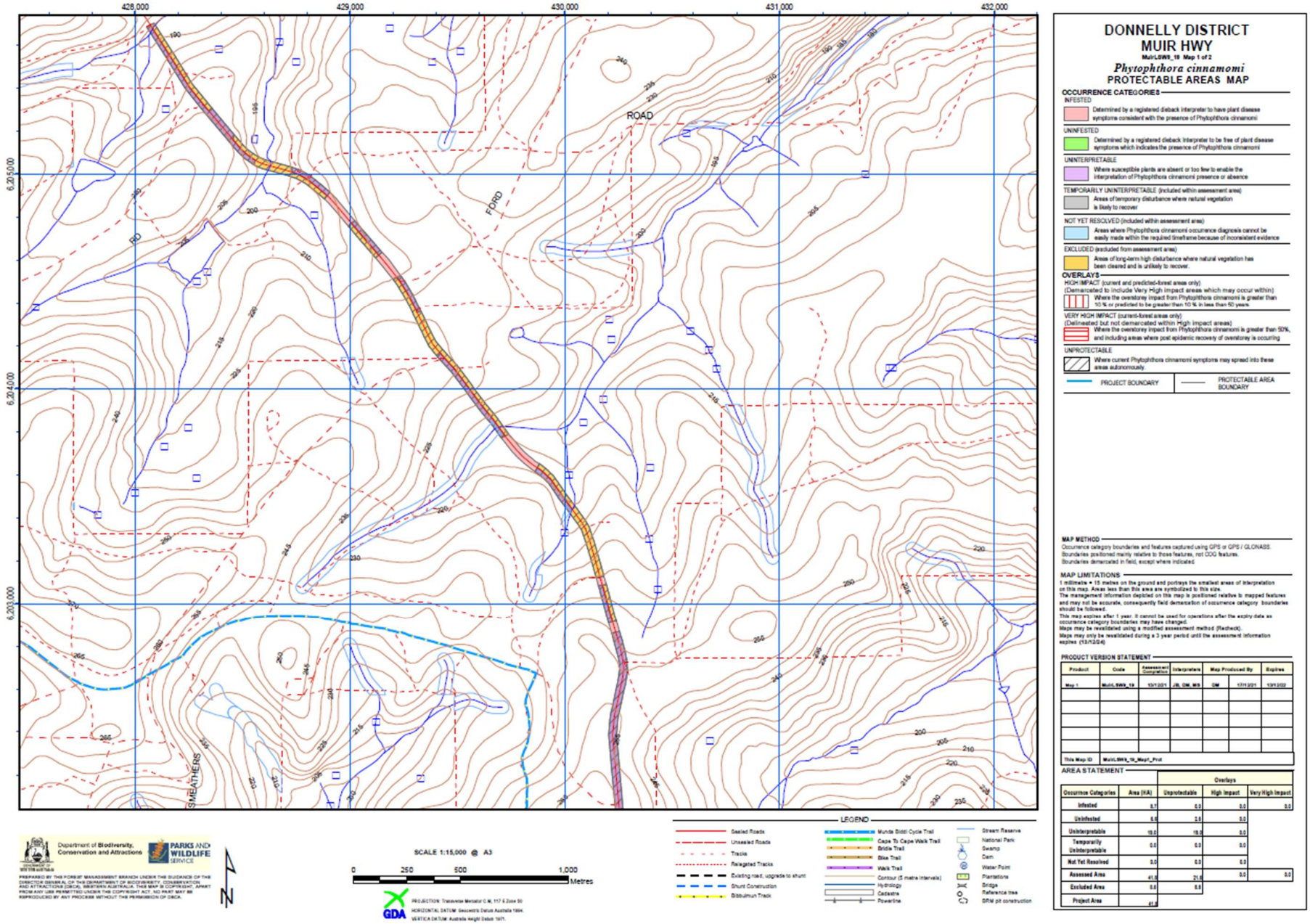
Thank you for your interest in *Phytophthora* dieback management.

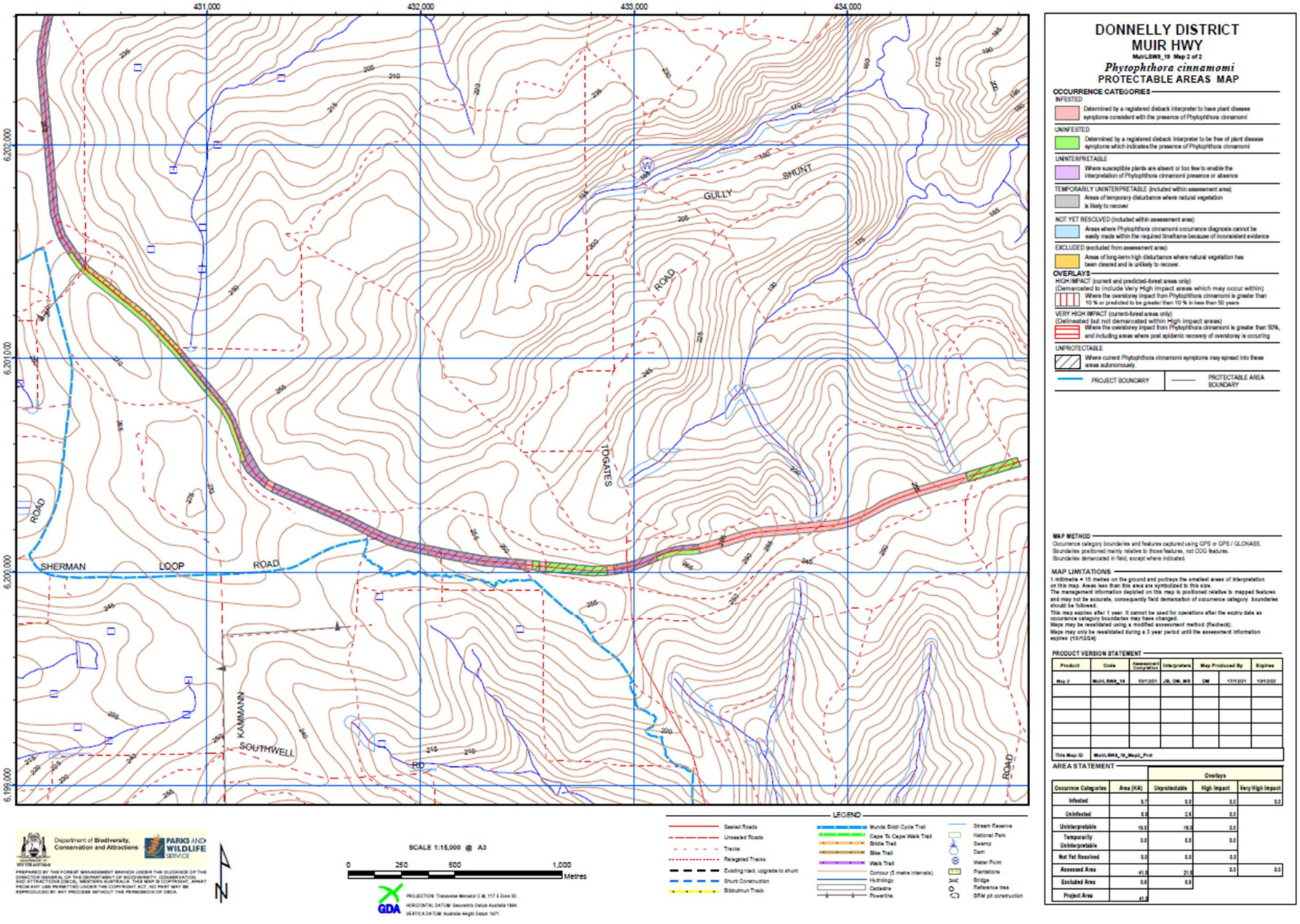
Yours sincerely

Jeff Boulton and Danelle Manning

Disease Hygiene Coordinator/Officer
Forest Management Branch, Manjimup

3


428,000
429,000
430,000
431,000
432,000
6,205,000
6,204,000
6,203,000
ROAD
FORD
RD
SMEATHERS
DONNELLY DISTRICT
MUIR HWY
MuirLSW9_19 Map 1 of 2
Phytophthora cinnamomi
PROTECTABLE AREAS MAP
OCCURRENCE CATEGORIES
INFESTED
Determined by a registered dieback interpreter to have plant disease symptoms consistent with the presence of Phytophthora cinnamomi
UNINFESTED
Determined by a registered dieback interpreter to be free of plant disease symptoms which indicates the presence of Phytophthora cinnamomi
UNINTERPRETABLE
Where susceptible plants are absent or too few to enable the interpretation of Phytophthora cinnamomi presence or absence
TEMPORARILY UNINTERPRETABLE (included within assessment area)
Areas of temporary disturbance where natural vegetation is likely to recover
NOT YET RESOLVED (included within assessment area)
Areas where Phytophthora cinnamomi occurrence diagnosis cannot be easily made within the required timeframe because of inconsistent evidence
EXCLUDED (excluded from assessment area)
Areas of long-term high disturbance where natural vegetation has been cleared and is unlikely to recover.
OVERLAYS
HIGH IMPACT (current and predicted-forest areas only)
(Demarcated to include Very High impact areas which may occur within)
Where the overstorey impact from Phytophthora cinnamomi is greater than 10 % or predicted to be greater than 10 % in less than 50 years.
VERY HIGH IMPACT (current-forest areas only)
(Delineated but not demarcated within High impact areas)
Where the overstorey impact from Phytophthora cinnamomi is greater than 50%, and including areas where post epidemic recovery of overstorey is occurring
UNPROTECTABLE
Where current Phytophthora cinnamomi symptoms may spread into these areas autonomously
PROJECT BOUNDARY
PROTECTABLE AREA BOUNDARY
MAP METHOD
Occurrence category boundaries and features captured using GPS or GPS / GLONASS.
Boundaries positioned mainly relative to those features, not COG features.
Boundaries demarcated in field, except where indicated.
MAP LIMITATIONS
1 millimetre = 15 metres on the ground and portrays the smallest areas of interpretation on this map. Areas less than this area are symbolized to this size.
The management information depicted on this map is positioned relative to mapped features and may not be accurate, consequently field demarcation of occurrence category boundaries should be followed.
This map expires after 1 year. It cannot be used for operations after the expiry date as occurrence category boundaries may have changed.
Maps may be revalidated using a modified assessment method (Recheck).
Maps may only be revalidated during a 3 year period until the assessment information expires (13/12/24)
PRODUCT VERSION STATEMENT
Product | Code | Assessment Completed | Interpreters | Map Produced By | Expires
Map 1 | MuirLSW9_19 | 13/1/2021 | JB, DM, MS | DM | 17/1/221 | 13/1/202
This Map ID | MuirLSW9_19_Map1_Prod
AREA STATEMENT
Occurrence Categories | Area (HA) | Overlays: Unprotectable | High Impact | Very High Impact
Infested | 8.7 | 0.0 | 0.0 | 0.0
Uninfested | 6.8 | 2.8 | 0.0
Uninterpretable | 19.0 | 19.0 | 0.0
Temporarily Uninterpretable | 0.0 | 0.0 | 0.0
Not Yet Resolved | 0.0 | 0.0 | 0.0
Assessed Area | 41.5 | 21.8 | 0.0 | 0.0
Excluded Area | 0.0 | 0.0
Project Area | 41.5
Department of Biodiversity, Conservation and Attractions
PARKS AND WILDLIFE SERVICE
PREPARED BY THE FOREST MANAGEMENT BRANCH UNDER THE GUIDANCE OF THE DIRECTOR GENERAL OF THE DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS (DBCA), WESTERN AUSTRALIA. THIS MAP IS COPYRIGHT. APART FROM ANY USE PERMITTED UNDER THE COPYRIGHT ACT, NO PART MAY BE REPRODUCED BY ANY PROCESS WITHOUT THE PERMISSION OF DBCA.
SCALE 1:15,000 @ A3
0 250 500 1,000 Metres
GDA
PROJECTION: Transverse Mercator C.M. 117 E Zone 50
HORIZONTAL DATUM: Geocentric Datum Australia 1994.
VERTICAL DATUM: Australia Height Datum 1971.
LEGEND
Sealed Roads
Unsealed Roads
Tracks
Relegated Tracks
Existing road, upgrade to shunt
Shunt Construction
Bibbulmun Track
Munda Biddi Cycle Trail
Cape To Cape Walk Trail
Bridle Trail
Bike Trail
Walk Trail
Contour (5 metre intervals)
Hydrology
Cadastre
Powerline
Stream Reserve
National Park
Swamp
Dam
Water Point
Plantations
Bridge
Reference tree
DRM pit construction


431,000
432,000
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6,199,000
SHERMAN
LOOP
ROAD
SOUTHWELL
KAMMANN
RD
TOGATES
ROAD
GULLY
SHUNT
ROAD
ROAD
DONNELLY DISTRICT
MUIR HWY
MuirLOWR_19 Map 2 of 2
Phytophthora cinnamomi
PROTECTABLE AREAS MAP
OCCURRENCE CATEGORIES
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Determined by a registered dieback interpreter to have plant disease symptoms consistent with the presence of Phytophthora cinnamomi
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Determined by a registered dieback interpreter to be free of plant disease symptoms which indicates the presence of Phytophthora cinnamomi
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(Demarcated to include Very High impact areas which may occur within)
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PROTECTABLE AREA BOUNDARY
MAP METHOD
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MAP LIMITATIONS
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Maps may be revalidated using a modified assessment method (Reshieck).
Maps may only be revalidated during a 3 year period until the assessment information expires (13/12/24)
PRODUCT VERSION STATEMENT
Product
Code
Assessment Completion
Interpreters
Map Produced By
Expires
Map 2
MuirLOWR_19
13/1/2021
JB, DM, MS
DM
17/1/2021
13/1/2022
This Map ID
MuirLOWR_19_Map2_Prod
AREA STATEMENT
Occurrence Categories
Area (HA)
Overlays
Unprotectable
High Impact
Very High Impact
Infested
8.7
0.0
0.0
0.0
Uninfested
6.8
2.9
0.0
Uninterpretable
19.0
19.0
0.0
Temporarily Uninterpretable
0.0
0.0
0.0
Not Yet Resolved
0.0
0.0
0.0
Assessed Area
41.9
21.8
0.0
0.0
Excluded Area
0.0
0.0
Project Area
41.9
LEGEND
Sealed Roads
Unsealed Roads
Tracks
Relegated Tracks
Existing road, upgrade to shunt
Shunt Construction
Bibbulmun Track
Munda Biddi Cycle Trail
Cape To Cape Walk Trail
Bridle Trail
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Contour (5 metre intervals)
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Cadastre
Powerline
Stream Reserve
National Park
Swamp
Dam
Water Point
Plantations
Bridge
Reference tree
BRM pit construction
Department of Biodiversity, Conservation and Attractions
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SCALE 1:15,000 @ A3
0
250
500
1,000
Metres
GDA
PROJECTION: Transverse Mercator G.M. 117 E Zone 50
HORIZONTAL DATUM: Geocentric Datum Australia 1994.
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