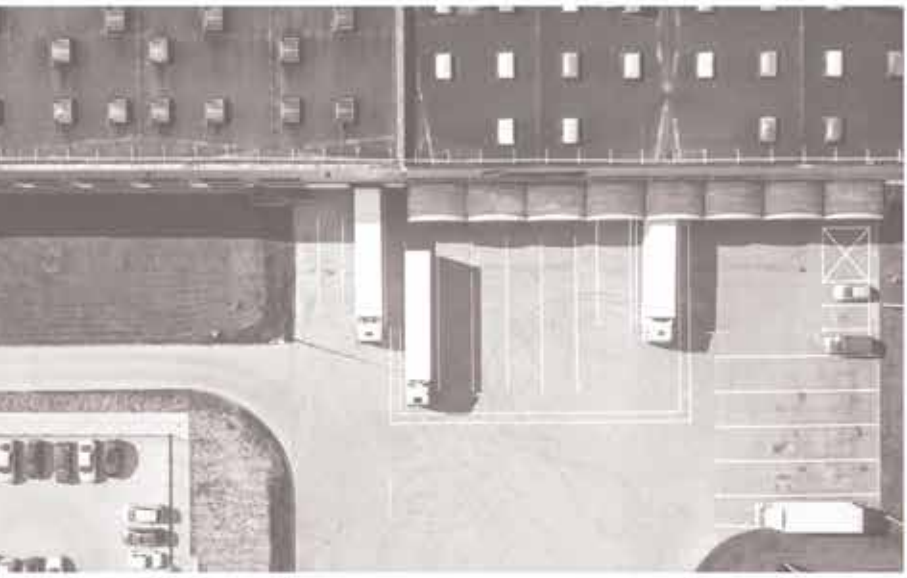
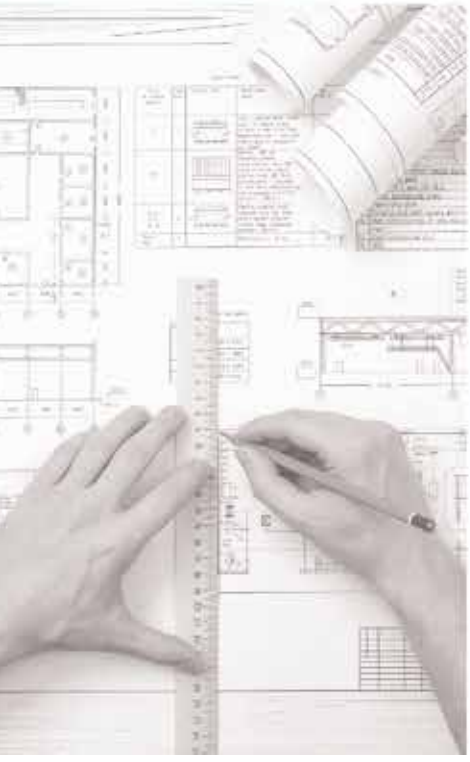
Appendix A

Biodiversity assessment





Flora and Fauna Constraint Assessment

Area 1 of Narran-Warrambool Reserve

Prepared for DRNSW
March 2022

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Flora and Fauna Constraint Assessment

Area 1 of Narran-Warrambool Reserve

Report Number

J210043 RP4

Client

DRNSW

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Version

v1 Final

Prepared by

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31 March 2022

Approved by

Sarah Perry
Associate Ecologist
31 March 2022

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1 Introduction

1.1 Project background

The Department of Regional NSW (DRNSW) commissioned EMM Consulting Pty Limited (EMM) to prepare a Review of Environmental Factors (REF) as an internal assessment tool for activities associated with opal prospecting and opal mining in Area 1 of the Narran-Warrambool Reserve (NWR) (Figure 1.1).

The biodiversity assessment is based on certain assumptions and therefore has certain important limitations including:

- a specific proposed activity currently the subject of an application for a licence or a lease is not assessed in this report, but rather it assumes that such applications may be received by DRNSW in the future; and
- the scope of the assessment is limited to the most common methods of opal prospecting and mining likely to be used by applicants, should a licence or lease be granted. Activities outside that set of common methods cannot fully rely on this assessment and may require a specific biodiversity assessment.

1.2 Description of the activity

There are numerous methods used for opal prospecting and mining. There are two principal activities assessed:

- opal prospecting - four standard methods of opal prospecting are considered (refer to Section 1.2.1); and
- opal mining, specifically underground mining.

In areas of multiple proposed opal prospecting/mining claims it is important to be aware of the combined effects, or cumulative impacts of multiple activities on the environment. Generally mineral claims adjoin so whilst one mineral claim is small in size (generally 50 m x 50 m), the majority of mining takes place in clusters which increases the impact footprint. These clusters have the potential to create cumulative environmental impacts on the surrounding environment and should be considered when assessing any new mining activity. The Minerals Council of Australia '*Cumulative Environmental Impact Assessment Industry Guide, 2015*' can assist when assessing cumulative impacts of opal prospecting/mining clusters.

1.2.1 Opal

Prospecting methods generally impact up to 0.25 hectares (ha) and include:

- shaft sinking – this method includes sinking a shaft to intersect the claystone;
- auger drilling – this method includes the introduction of the 230 mm diameter auger drill;
- percussion drilling - smaller-diameter (>120 mm); and
- SIROTEM – a geophysical method – this method uses electrical current to measure the varying resistance of the underlying rocks, and in doing so, provides information that can be readily interpreted to indicate where sandstone, claystone and faults are likely to exist.

1.2.2 Underground opal mining

Underground mining and associated mining purposes are conducted on mineral claims granted by Mining, Exploration and Geoscience (MEG). By virtue of the grant of a mineral claim, mining using shaft sinking methods, and some mining purposes, are approved under the Mining Act for specific classes of mineral claims without the requirement for further approvals. There are seven classes of mineral claims and are described in the REF (EMM 2022) with the largest area impacted 2 ha.

Please refer to Section 4 of the REF for further information on potential impacts associated with opal prospecting or opal mining for specific environmental aspects.

1.3 Legislative context

This project has been assessed against key biodiversity legislation and government policy, including:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *Environmental Planning and Assessment Act 1979* (EP&A Act);
- State Environmental Planning Policies;
- *Biodiversity Conservation Act 2016* (BC Act);
- *Fisheries Management Act 1994* (FM Act); and
- *Biosecurity Act 2015* (BS Act).

An assessment of the project against relevant legislation is provided in Section 5.

1.4 Biodiversity assessment pathway

The EP&A Act is the primary statutory instrument for the management and regulation of land use and development in NSW. Part 5 of the EP&A Act broadly deals with two circumstances:

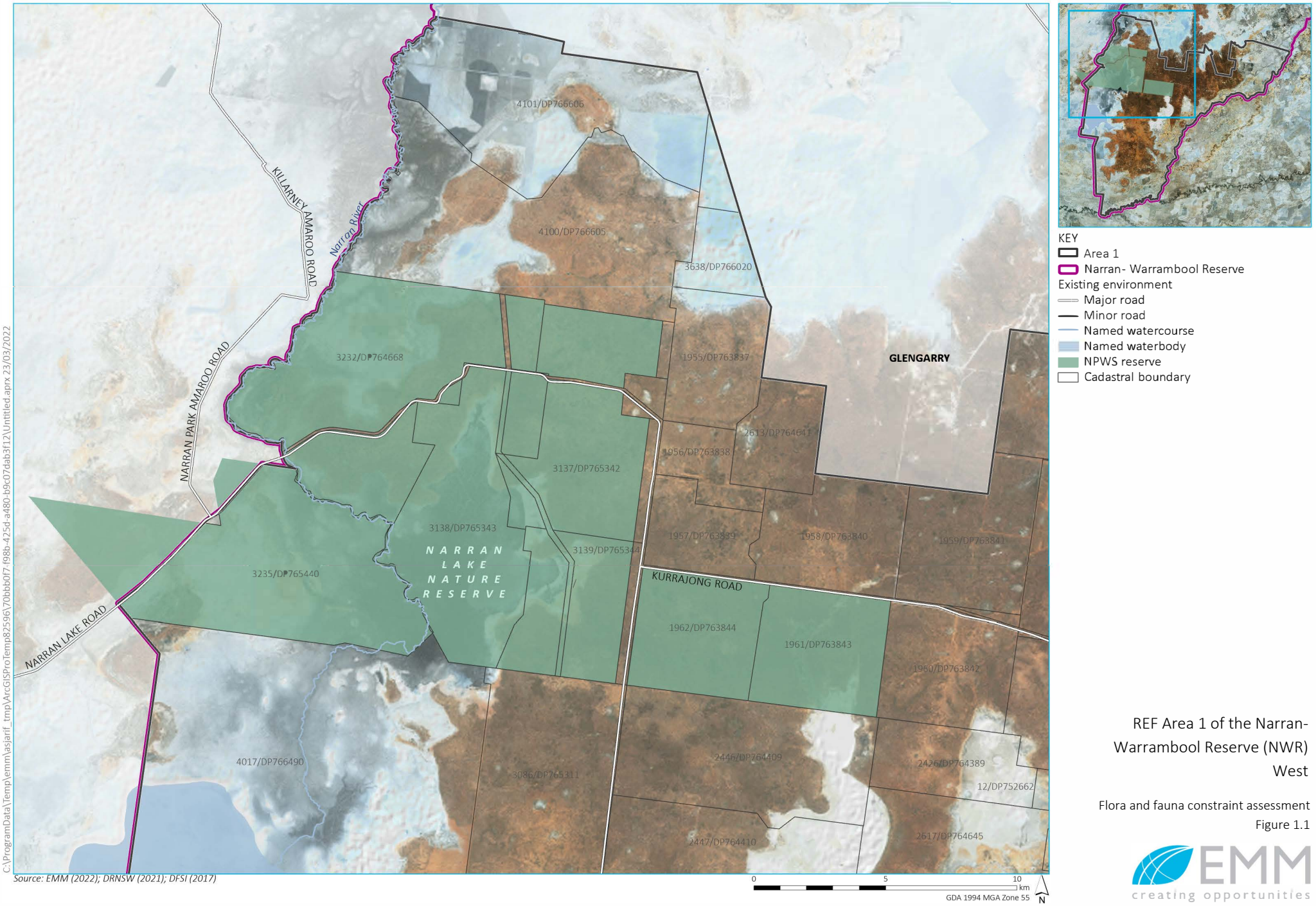
- where a public authority is the proponent for a development; and
- where a third party is the proponent for a development which is *permitted without consent,* but that same development nevertheless requires the proponent to obtain a permit, licence or other statutory authorisation from a public authority.

In accordance with Section 5.5 of the EP&A Act DRNSW is the *determining authority* and is required to consider the environmental impact of a proposed activity. The conventional means by which a determining authority discharges those duties is by considering a REF.

The BC Act is responsible for the conservation of biodiversity in NSW. The BC Act, together with the NSW Biodiversity Conservation Regulation 2017, establishes the Biodiversity Offsets Scheme (BOS), the Biodiversity Assessment Method (the BAM) and a method for determining if developments are likely to significantly affect threatened species, ecological communities or their habitats.

The requirement for assessment under the BOS is dependent on a series of thresholds. EMM has assessed the project against these thresholds (refer to Section 5.3.1) and found that the BOS is not triggered and a biodiversity development assessment report (BDAR) is not required.

The proposed activity will not be undertaken in a declared area of outstanding biodiversity value. The remainder of this report provides a description and assessment of the likely impacts of the proposed activity on threatened species and communities, and their habitats and assesses the significance of the predicted impacts.



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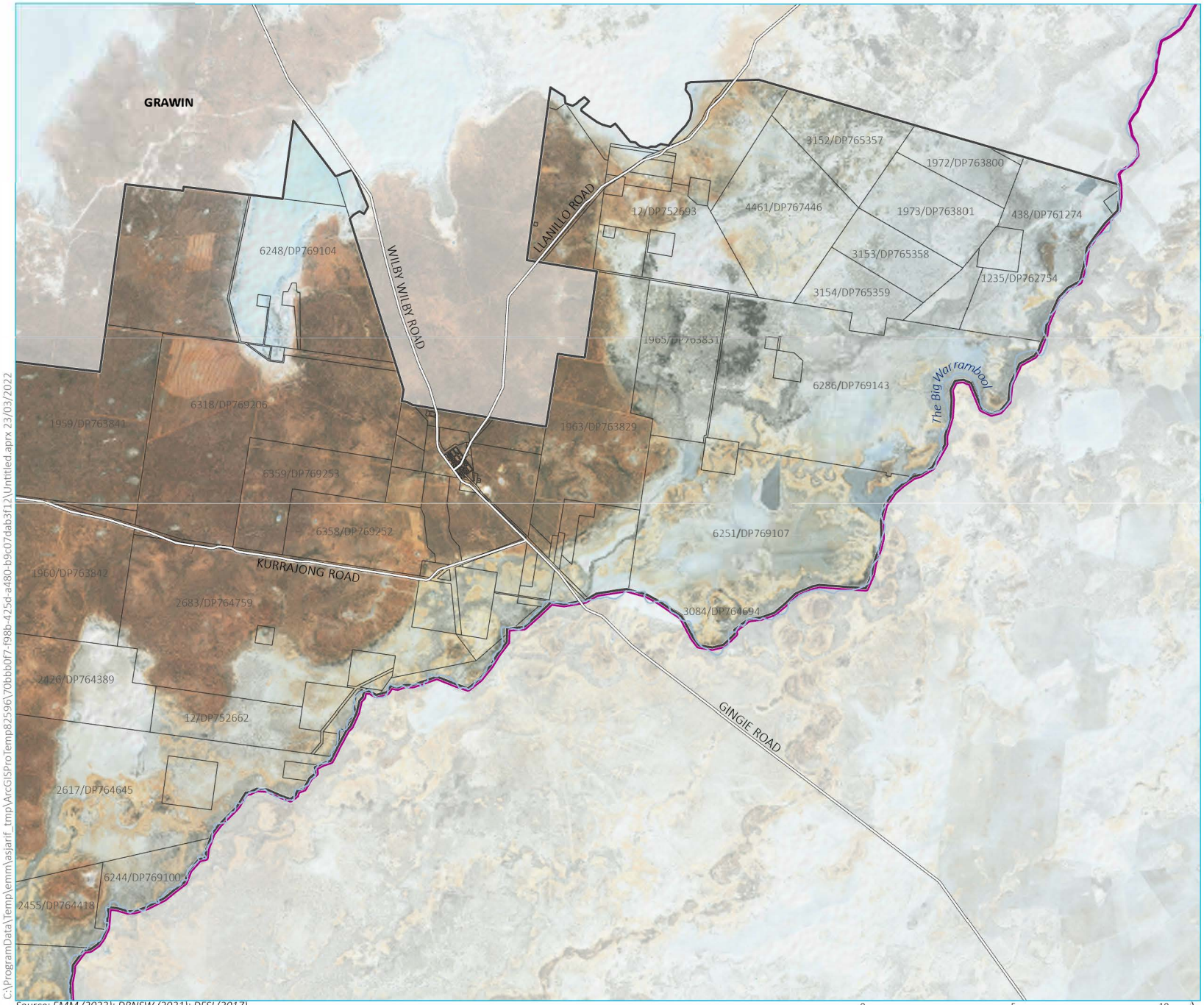
Source: EMM (2022); DRNSW (2021); DFSI (2017)

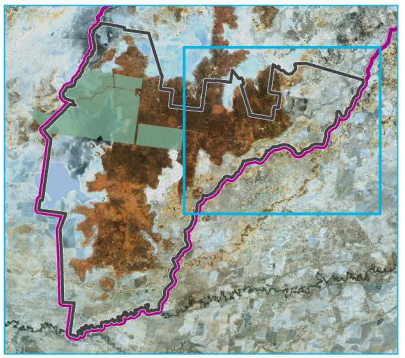
REF Area 1 of the Narran-Warrambool Reserve (NWR) West

Flora and fauna constraint assessment

Figure 1.1

EMM creating opportunities





KEY

Area 1

Narran- Warrambool Reserve

Existing environment

Major road

Minor road

Named watercourse

Named waterbody

NPWS reserve

Cadastral boundary

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Source: EMM (2022); DRNSW (2021); DFSI (2017)

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GDA 1994 MGA Zone 55

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REF Area 1 of the Narran-Warrambool Reserve (NWR) East

Flora and fauna constraint assessment

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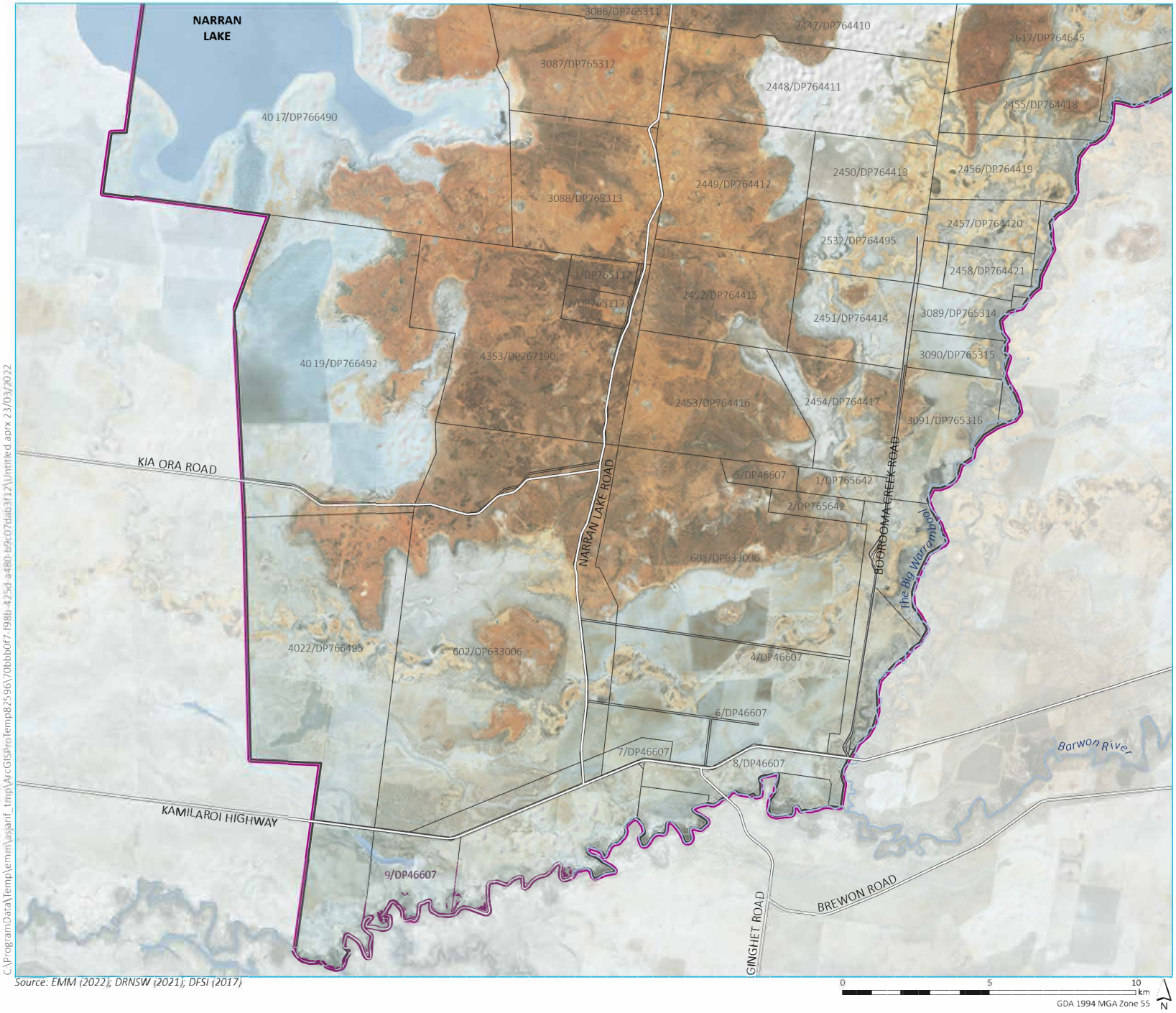
EMM creating opportunities



KEY

- Area 1
- Narran- Warrambool Reserve

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- Cadastral boundary

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Source: EMM (2022); DRNSW (2021); DFSI (2017)

REF Area 1 of the Narran-Warrambool Reserve (NWR) South

Flora and fauna constraint assessment

Figure 1.1

EMM creating opportunities

2 Methods

2.1 Desktop assessment

Prior to undertaking the field investigation, a desktop assessment was undertaken to determine the biodiversity values that are known or potentially present across Area 1. The desktop assessment comprised database searches (conducted March 2022) and review of relevant information, including:

- a search using the Protected Matters Search Tool, managed by (Department of Agriculture Water and Environment (DAWE)), for matters protected by the EPBC Act (Appendix A);
- a search of the BioNet Atlas of NSW Wildlife within 10 km of the study area, managed by the Biodiversity Conservation Division (BCD) of Department of Planning, Industry and Environment (DPIE), for threatened species and communities listed under the BC Act and EPBC Act;
- a review of regional vegetation mapping, including State Vegetation Type Map, managed by DPIE;
- a review of NSW Vegetation Information System (VIS), managed by BCD, to review plant community types (PCTs) that may occur;
- a review of the NSW Weedwise website to determine priority weeds for the region; and
- a review of aerial imagery for the survey area and locality.

This desktop assessment was used to inform the field investigation.

2.2 Field investigation

The field investigation was undertaken by two ecologists on Thursday 18 through to Monday 22 November 2021 and included:

- rapid vegetation mapping and condition assessment; and
- habitat assessments for threatened species.

The survey methods are outlined below.

2.2.1 Vegetation mapping and assessment

The survey area (where access allowed) was traversed on foot and by vehicle and included rapid confirmation of PCTs. Where there was some uncertainty about correct PCT alignment, or to justify PCT alignment, a series of rapid vegetation assessments (RVAs) were undertaken, with the three dominant species in the overstorey, midstory and groundcover recorded. This data was assessed against data held in the VIS to confirm PCT alignment. Vegetation extent was mapped in the field using GPS-enabled tablet computers using Collector for ArcGIS™. Any obvious differentiation in vegetation condition was also noted including:

- integrity of the native vegetation structure (DPIE 2021a), noting the structure of each stratum for the relevant PCT (canopy, shrub and groundcover), percentage weed cover, disturbance (clearing, roads, over grazing), native flora diversity;
- presence of High Threat Weeds (DPIE 2021b) and weeds of National significance (WONs) (DPI); and

- current and previous land use including agriculture (cropping or pasture), roads, infrastructure and reserves.

2.2.2 Habitat assessment

Concurrent with the vegetation assessment, a habitat assessment was undertaken seeking to identify the following fauna habitat features within the survey area:

- habitat trees including large hollow-bearing trees and nests;
- availability of flowering shrubs and feed tree species;
- waterway condition;
- quantity of ground litter and logs; and
- incidental evidence of fauna.

2.2.3 Constraints assessment

The criteria for assessing biodiversity constraints within Area 1 are described in Table 2.1.

Table 2.1 Constraints criteria

Biodiversity constraint	Constraint definition
High	Intact native vegetation, minimal disturbance, potential habitat features for threatened species/communities, riparian corridors, potential presence of GDE and potential presence of serious and irreversible impacts (SAII).
Moderate	Native vegetation with minor disturbances of clearing or weeds and potential habitat features for threatened species/communities.
Low	Land contains native vegetation with: • high percentage of weed cover, and/or • some stratum is missing or in poor condition.
Negligible	Vegetation, if present, contains largely non-native species ie agriculture, infrastructure, cleared, highly disturbed, dominated by weeds

2.3 Likelihood of occurrence assessment

The criteria for assessing likelihood of occurrence for threatened species, used to inform the assessments in Appendix A, is listed in Table 2.2.

Table 2.2 Likelihood of occurrence criteria

Likelihood	Description	Further assessment conducted?
Negligible	• The potential for the species to occur is considered so unlikely as to not be worth considering.	No
Low	• Based on data collected during field investigations it was considered that the species was unlikely to occur in the study area or use habitats in the study area. A species may utilise the study area on rare occasions. • Species is considered vagrant in the bioregion and is thus considered unlikely to occur in the study area.	No
Moderate	• The species is known to occur in the bioregion and the study area provides some habitat value for the species. Habitat values are somewhat degraded and considered suboptimal.	Yes
High	• The species is known to occur in the bioregion and the study area supports optimal habitat features for the species.	Yes
Recorded	• The species was recorded during site visit.	Yes

2.4 Limitations

While the biodiversity assessments outlined above provide a comprehensive assessment of the biodiversity values, the assessment is subject to a number of limitations outlined below. In many cases these limitations do not represent a significant limitation on the conclusions drawn throughout the assessment:

- the biodiversity assessment included rapid vegetation assessment and habitat assessments for threatened species only. No detailed or targeted surveys have been undertaken. This was considered suitable considering that a conservative approach to assuming the presence of threatened species and ecological communities that has been taken;
- while some species have been assessed as having a low likelihood of occurrence, it is acknowledged that this does not indicate the species will never occur. Rather, it means that based on data collected during field investigations it was considered that the species was unlikely to occur in the study area or use habitats in the study area. A species may utilise the study area on rare occasions;
- denied permission to access landholder lots. If possible, lots with restricted access were assessed visually from public roads. This affected several large properties including, Corrie Downs, East Mullane, and Kurrajong. For lots with no access the desktop assessment has not been ground truthed. The impact of this limitation is not considered significant due to the conservative approach to assuming the presence of threatened species and ecological communities; and
- at times where access was granted, physical access was not possible due to locked gates, access was only via lots where access had not been granted (Lot 2613 DP764641 Blowhard), and inaccessible roads after heavy rains and localised flooding.

Table 2.3 Access constrained lots

Lot number	Lot name	Access
Lot 2453 DP764416	Amooroob	No access. Owner unable to be present during survey period. No access without owner presence. Observed from access track in SW corner.
Lot 1960 DP763842	Barfield	No access.
Lot 2613 DP764641	Blowhard	Owner not present. No access.
Lot 1963 DP763829	Brookhill	Access.
Lot 2446 DP764409, Lot 2447 DP764410, Lot 2454 DP764417, Lot 3086 DP765311	Corrie Downs	No access.
Lot 1957 DP763839	East Mullane	No access.
Lot 4022 DP766495	Glengai	Access.
Lot 1965 DP763831	Guiseley	No access.
Lot 6319 DP769207	Karingle	Access.
Lot 12 DP752741, Lot 17 DP752679, Lot 1964 DP763830, Lot 6251 DP769107	Kigwigil	No access. Access constraint due to weather. Only assessed from sealed road outside property frontage.
Lot 1958 DP763840	Kurrajong	No access. Assessed from road.
Lot 3886 DP766359, Lot 4362 DP767199	Llanillo	Access.
Lot 2456 DP764419, Lot 3082 DP765307	Lyndon	No access. Unable to access due to rain flooding access Booroomba Creek Road.
Lot 2532 DP 764495	Milrea	No access. Due to farming activities.
Lot 4100 DP766605	Mooredale	No access. Due to Narran Lake Road being flooded. Partial access from SE corner of property.
Lot 1955 DP763837, Lot 4101 DP766606	Mureabun	No access. Due to Narran Lake Road being flooded.
Lot 4353 DP767190, Lot 4017 DP766490	Narran Lake	Access.
Lot 2452 DP764415	Oban	No access. Unable to access due to rain flooding access Booroomba Creek Road.
Lot 3087 DP765312, Lot 2448 DP764411	Remington	Access.
Lot 14 DP752679, Lot 5 DP752679	Summer Hill	Access.

Lot number	Lot name	Access
Lot 2449 DP764412, Lot 3088 DP765313	Westleigh	Access.
Lot 2617 DP 764645	Wilkie	No access. No access due to flooding of roads.

3 Results

3.1 Landscape context

The Area 1 study area (hereafter, the 'study area') is located north-west of Walgett and south of the Lightning Ridge township, in central northern NSW (refer to Figure 1.1). It is bounded by the Narran River to the north-west and the Barwon River to the south, which form part of the Murray-Darling River Basin. The study area contains the south-eastern edge of the Great Artesian Basin. The Narran Lake Nature Reserve, is within the study area and is considered a Wetland of International Importance (RAMSAR). Narran Lake Nature Reserve covers part of a large terminal wetland of the Narran River in NSW at the end of the Condamine River system which flows from Queensland. The Narran River lies within the Murray-Darling Basin.

The study area predominantly occurs within the Brigalow Belt South Interim Biogeographic Regionalisation for Australia (IBRA) region but also occurs within the Darling Riverine Plain IBRA region (Table 3.1). The study area is part of a floodplain landscape featuring the alluvial fans and channels of the Barwon and Narran rivers and the Narran Lake wetland complex. Soils and vegetation reflect past patterns of sedimentation and deposition of sandy soils and heavy dark clays.

Table 3.1 IBRA regions IBRA sub-regions (DAWE 2012)

IBRA REGION	IBRA SUBREGION	Proportion of study area
Brigalow Belt	Narrandool	70%
Darling Riverine Plain	Castlereagh-Barwon	11%
	Culgoa-Bokhara	2%
	Warrambool-Moonie	16%

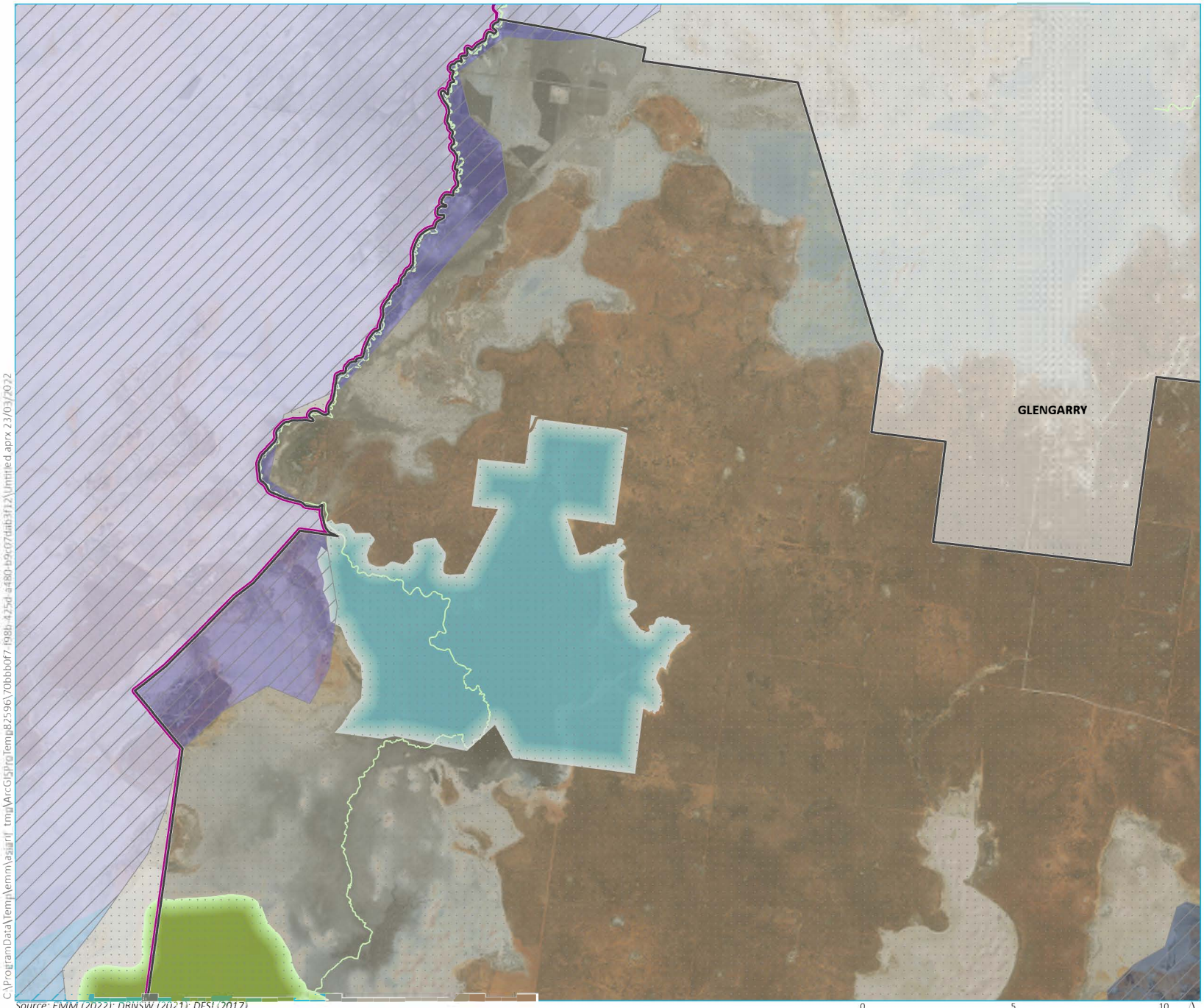
The Mitchell landscapes present within the study area (detailed in Table 3.2) reflect the riverine floodplain regions with vegetation changes due to soil type and moisture.

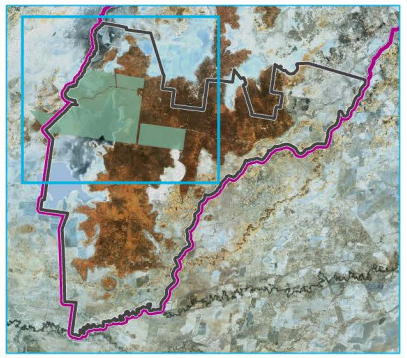
Table 3.2 Mitchell Landscapes (DECC 2002)

Landscape	Description
Barwon Alluvial Plains	Landscape: Highly channelised floodplain with small-scalded areas, relief to 1 m. Level and slightly elevated floodplains of Holocene alluvium of the Marra Creek Formation with shallow discontinuous drainage lines and small low sandy rises, relief to 3 m. Areas of associated sand hills and hummocks interspersed with depressions, relief to 8 m. Soils: Grey clays on plains, with brown texture-contrast soils on rises. Sands interspersed with yellow texture-contrast soils, grey clays in sand hill areas. Vegetation: Myall, Rosewood, Coolibah, Belah, Wilga, Bimble Box, Whitewood, Leopardwood, Gidgee, Thorny Saltbush, Mueller's Saltbush, Wild Orange, Buck Bush, Warrior Bush, Budda, Nepine, Mitchell grasses, Neverfail, Goathead Burr, Copperburr, and Warrego Summer-Grass, on lower clay plains and drainage lines. Coolibah, Black Box, River Cooba, Eurah, and Flowering Lignum in depressions and channels. Dense to moderate White Cypress Pine, Bimble Box, Leopardwood, Belah, Wilga, Sandplain Wattle, Prickly Wattle, Budda, Quinine Bush, Sandhill Riceflower and grasses on sandy rises.
Barwon Channels and Floodplains	Landscape: Floodplains of perennial and ephemeral tributaries of the Barwon River. Holocene alluvium of the channel and meander plains of the Marra Creek Formation. Channels in defined drainage lines with levees and swamps incised to 2-15 m into alluvium. Soils: Deep grey cracking clays, with minor areas of red-brown texture-contrast soils on slight elevations. Vegetation: Narrow fringing River Red Gum and Coolibah forests along deeper main channels. Floodplains with scattered to moderate Coolibah, Black Box, Whitewood, isolated Rosewood, Belah, River Cooba, Eurah, Lignum, Nitre Goosefoot, Neverfail, Warrego Summer-Grass, Windmill grasses, Sclerolaena sp. and forbs. Sparse Gidgee on elevated areas.
Culgoa-Narran Alluvial Plains	Landscape: Level and slightly elevated floodplains on Quaternary alluvium interspersed with broad looping migrating drainage channels and low sandy rises. Poorly defined drainage lines and swamps, associated sandhills and hummocks. Relief 1-8 m. Soils: Brown non-cracking clays with areas of grey cracking clay depressions, and red-brown or yellow texture contrast soils on the rises. Sandhills are yellow sands, yellow texture-contrast soils interspersed with grey clays. Vegetation: Dense clumps of Gidgee, Leopardwood, Rosewood and Myall, Scattered Warrior Bush, Nepine, Wild Orange, Thorny Saltbush, Buck Bush, Neverfail Grass. Large areas of open Mitchell Grass with occasional Gidgee, Whitewood, Coolibah Black Box, River Cooba Eurah and Saltbushes on grey clays in channels and channelled floodplains. Dense White Cypress Pine, Bimble Box, Leopard wood, Belah, Wilga Sandplain Wattle, Quinine Bush., and grasses on the sandy rises
Culgoa-Narran Channels and Floodplains,	Landscape: Highly-channelised floodplains with some scalded areas, level and slightly undulating Quaternary alluvium. Poorly defined minor drainage lines, small-elevated areas and sand dunes within channel loops, relief 1-8 m. Soils: Deep cracking, grey clays, isolated areas of yellow and red-brown texture-contrast and compact clay soils. Higher ground of sands and red earths with extensive scalds. Vegetation: Open plains with scattered clumps of Coolibah, Black Box, isolated Rosewood, Leopardwood, occasional Gidgee, Whitewood, Eurah, lignum, and Nitre Goosefoot. Ground cover of Neverfail Grass, Warrego summer-grass, Scleroleana sp., annual Saltbushes, and forbs. Sandy areas with Bimble Box, Wilga, Needlewood, White Cypress Pine, Budda, Nepine, Prickly Wattle, and Warrior bush. Grey clays in depressions and pans with Coolibah, Bimble Box, Eurah, lignum and grasses. Moderate to dense Coolibah, River Red Gum, Black Box, River Cooba, Eurah, and lignum on main channels.
Lightning Ridge Tablelands and Downs	Landscape: Gravelly red ridges, sandy plateaus, slopes and dendritic drainage lines on Cretaceous claystone, siltstone, and sandstone. Relief to 20 m. Soils: Shallow to moderately deep red earths with sandy or gibber surfaces. Small depressions of grey-brown non-cracking clays. Vegetation: Dense to moderate stands of White Cypress Pine, Western Bloodwood, Mulga, Bimble Box, Silver-leaved Ironbark with Wilga, Ironwood, Budda, Wild Lemon, Emu Bushes, Silver Cassia and Hop-bush. General groundcovers of Sclerolaena, Wanderrie Grass, Rock Fern and Bandicoot Grass.

Landscape	Description
Narran Lakes	Landscape: Extensive lakebeds and terminal wetlands with associated discontinuous lunettes and sandy levee, drainage depressions and isolated salina, periodically inundated by Narran River. Relief to 5m. Includes level low-lying backplains of Quaternary alluvium, usually surrounded by red country; depressed to 3m. Soils: Grey cracking clays with yellow, red and brown texture-contrast soils on lunettes and levees, non-cracking clays in depressions and salinas. Vegetation: Isolated Coolibah, River Red Gum, River Cooba and Eurah, around the lake. Dense clumps of Lignum, Rat's-Tail Couch, sedges, Neverfail, and Warrego Summer Grass on the lakebed. Treeless levee and lunette with Old Man Saltbush, Dillon Bush, Miljee, Budda, Saltbushes, Sclerolaena, grasses and forbs. Samphire, Poverty Bush, Parakeelya with Saltbushes on salinas.

Based on current knowledge, the study area does not include land that is constrained by BioBanking or Stewardship agreements established under the repealed NSW *Threatened Species Conservation Act 1995* (TSC Act) or the NSW *Biodiversity Conservation Act 2016* (BC Act) (DPIE 2021a).





KEY

- Area 1
- Narran- Warrambool Reserve

Interim Biogeographic Regionalisation for Australia (IBRA) region

- Brigalow Belt South (BBS)
- Darling Riverine Plains (DRP)

IBRA sub-region

- BBS | Narrandool
- DRP | Castlereagh-Barwon
- DRP | Culgoa-Bokhara
- DRP | Warrambool-Moonie

Biodiversity values

- Riparian corridors
- Ramsar Wetlands
- Threatened species or communities with potential for serious and irreversible impacts

Source: EMM (2022); DRNSW (2021); DFSI (2017)

0 5 10 km

GDA 1994 MGA Zone 55

N

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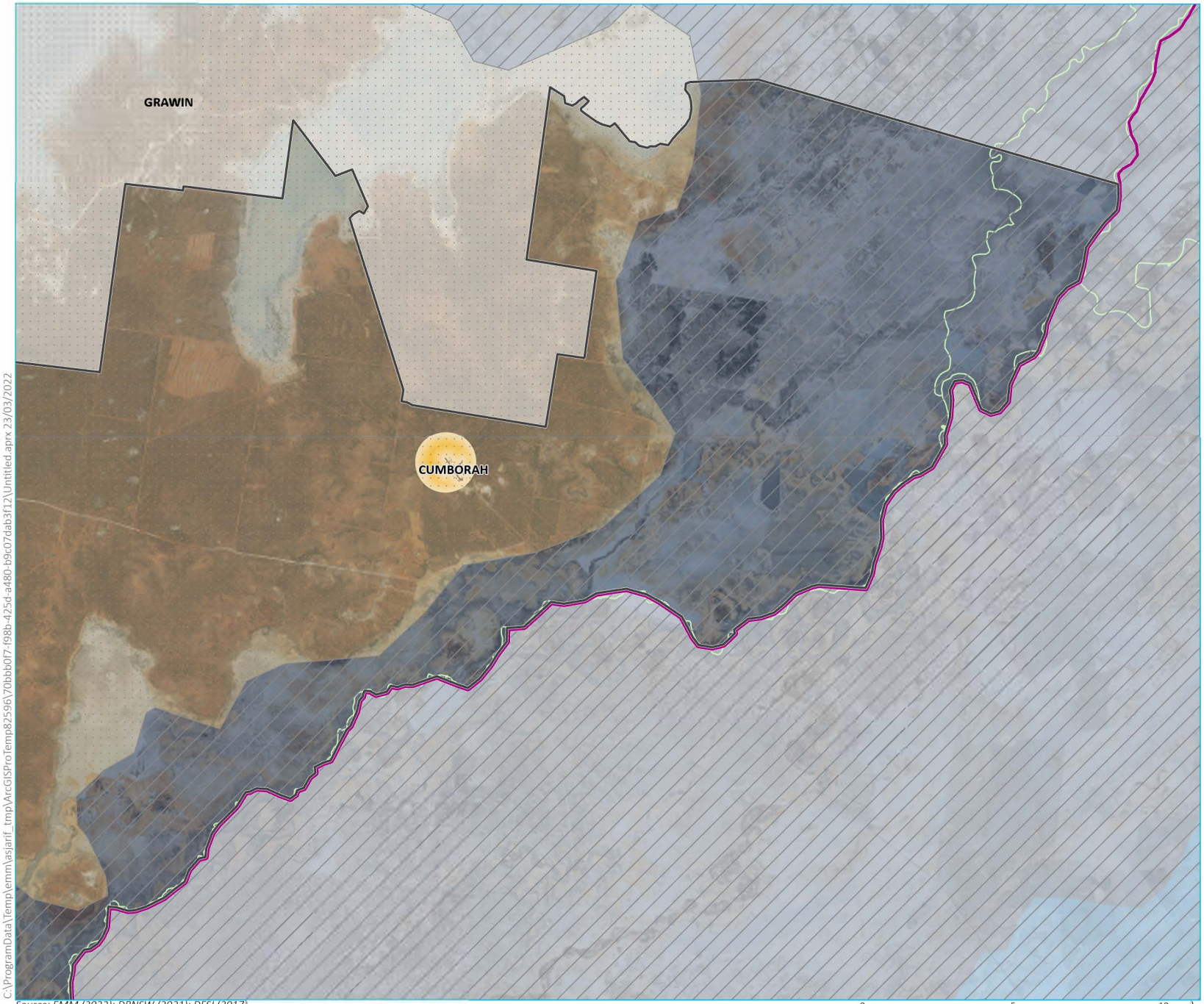
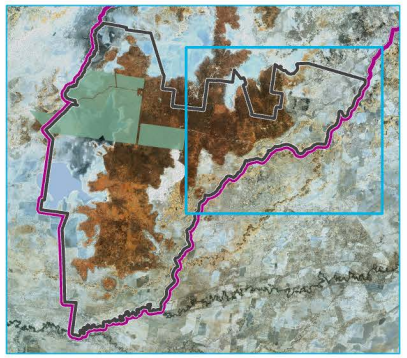
REF Area 1 landscape context West

Flora and fauna constraint assessment

Figure 3.1

EMM creating opportunities





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Source: EMM (2022); DRNSW (2021); DFSI (2017)

0 5 10 km

GDA 1994 MGA Zone 55

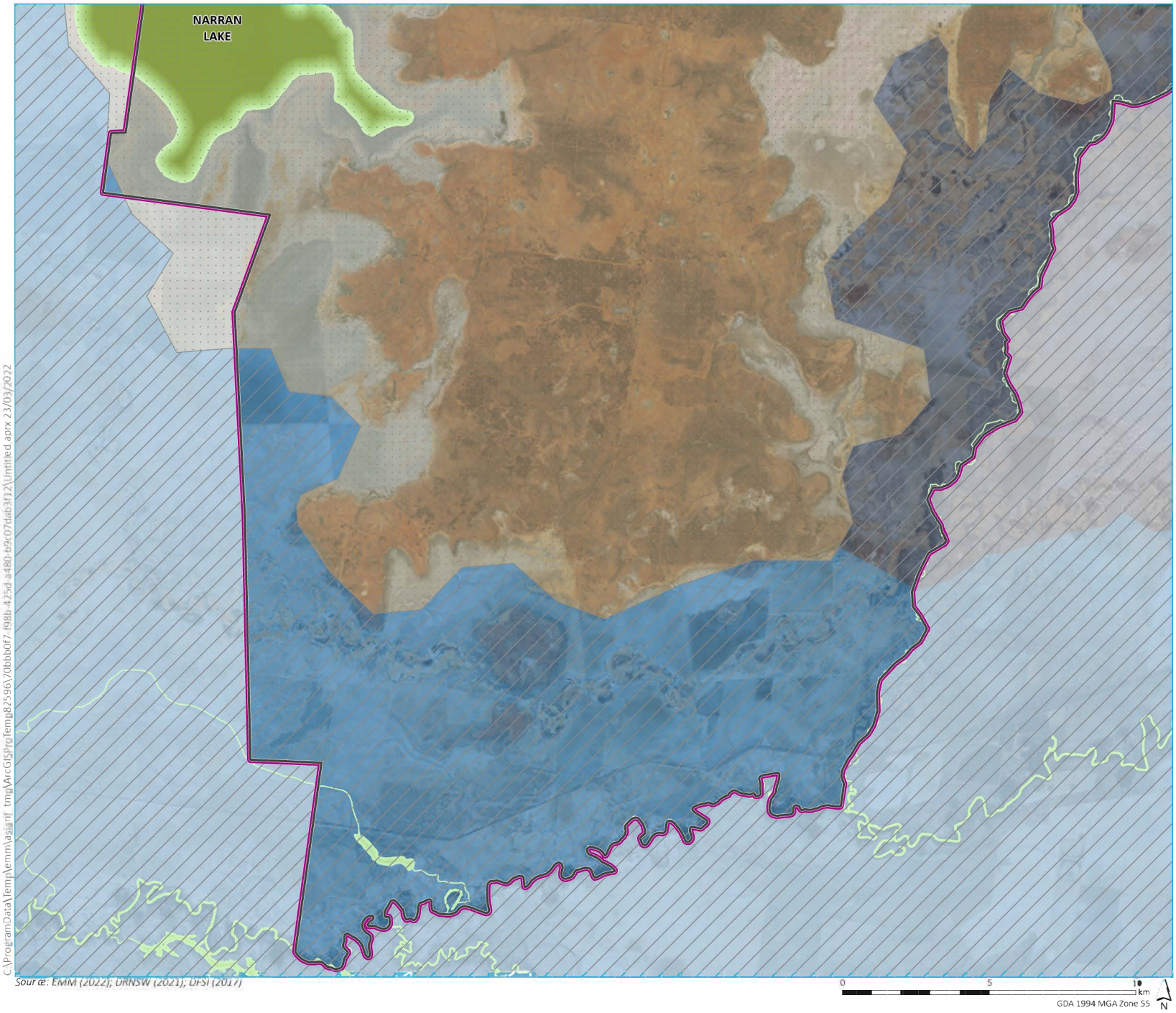
N

REF Area 1 landscape context East

Flora and fauna constraint assessment

Figure 3.1

EMM creating opportunities



REF Area 1 landscape context South

Flora and fauna constraint assessment

Figure 3.1

EMM
creating opportunities

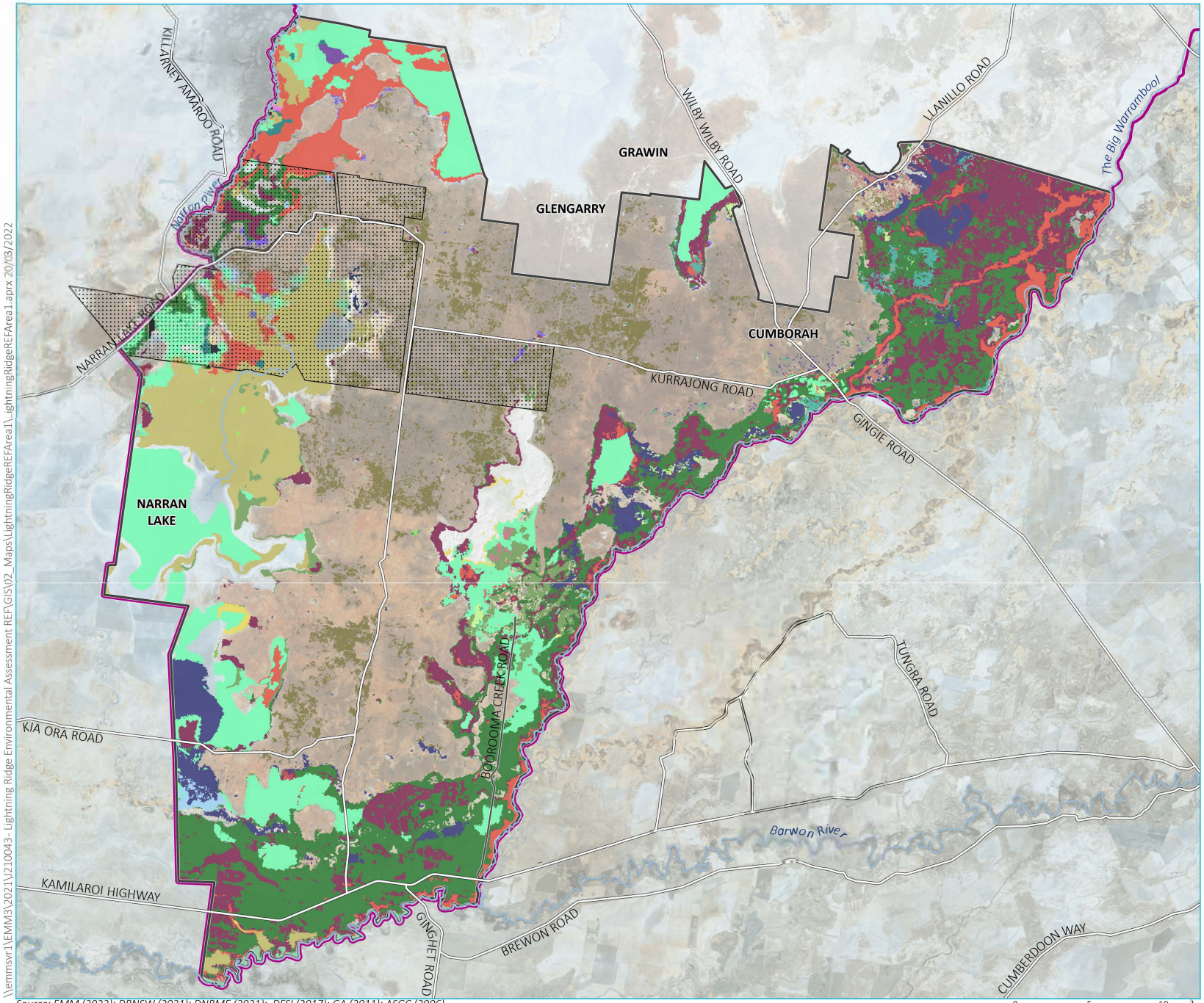
3.2 Terrestrial values

3.2.1 Vegetation

State Vegetation Type Mapping (SVTM – VIS_ID 4492) for the Western region (DPIE, 2018) predicts that there are 48 PCTs present within the study area (refer to Appendix B), conforming to 18 different vegetation classes and comprising more than 75% of the total study area (refer to Table 3.3). Of these, Western Peneplain Woodlands (60,188 ha), North-west Floodplain Woodlands (54,541 ha), and Semi-arid Floodplain Grasslands (19,512 ha) are the most extensive, demonstrating a range of habitat types across the study area.

Table 3.3 Vegetation classes within the study area (DPIE 2018)

Vegetation class	Number of vegetation communities (PCTs) mapped	Area (ha)
Floodplain Transition Woodlands	2	182.08
Gibber Chenopod Shrublands	1	1.84
Gibber Transition Shrublands	1	466.48
Inland Floodplain Shrublands	4	12,846.89
Inland Floodplain Swamps	3	262.59
Inland Riverine Forests	1	640.61
Inland Saline Lakes	3	7,052.58
North-west Alluvial Sand Woodlands	2	3,140.25
North-west Floodplain Woodlands	7	54,541.88
North-west Plain Shrublands	2	759.92
Riverine Chenopod Shrublands	7	5,358.57
Riverine Plain Woodlands	1	5,143.99
Sand Plain Mulga Shrublands	3	214.29
Semi-arid Floodplain Grasslands	3	19,512.35
Semi-arid Sand Plain Woodlands	1	392.34
Stony Desert Mulga Shrublands	1	10,526.99
Subtropical Semi-arid Woodlands	3	15,870.23
Western Peneplain Woodlands	3	60,188.58
Non-native vegetation	-	192.52
TOTAL	48	197,295



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Predicted or known distribution of GDEs across REF Area 1

Flora and fauna constraint assessment

Figure 3.2

EMM creating opportunities

Eight threatened ecological communities listed under the BC Act and four also listed under the EPBC Act (Table 3.4 and Figure 3.2) are known or predicted to occur within Area 1. The PCTs associated with these TECs are distributed evenly throughout the study area (DPIE 2018).

Two TECs are listed as entities at risk of Serious and Irreversible Impacts (SAII), these are:

- Artesian Springs Ecological Community in the Great Artesian Basin (*Endangered*); and
- Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions (*Endangered*).

SAII entities can be communities or species, but are identified as those at risk of serious and irreversible impact as assessed against the principles set out in clause 6.7 of the Biodiversity Conservation Regulation 2017 (BC Regulation). Under the guiding principles of SAII, the impacts from development or similar activities are likely to contribute significantly to the risk of extinction of a threatened species or ecological community, and require further assessment in accordance with Section 9.1 of the BAM (DPIE 2020) as part of a biodiversity impact assessment.

Table 3.4 PCT associations with threatened ecological communities

Listing under the BC Act	Listing under the EPBC Act	Likely presence within study area	Associated PCTs
Acacia loderi shrublands (Endangered)	Not Listed	Not known or predicted to occur in study area	59, 118, 120, 125, 134, 139
Artesian Springs Ecological Community in the Great Artesian Basin (*Endangered*)[1]	Not listed	The known and predicted distribution occurs within the study area	24, 27, 36, 37, 39, 40, 43, 49, 53, 56, 87, 144, 158, 163, 168, 181, 195, 211, 212, 214, 238, 241, 244, 247
Native Vegetation on Cracking Clay Soils of the Liverpool Plains (*Endangered*)	Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (*Critically Endangered*)	Not known or predicted to occur in study area	214
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (*Endangered*)	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (*Critically Endangered*)	Not known or predicted to occur in study area	27, 37, 49
Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions (*Endangered*)	Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions (*Endangered*)	The known and predicted distribution occurs within the study area	37, 39, 40, 55
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions (*Endangered*)	Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions (*Endangered*)	Not known or predicted to occur in study area	55
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions (*Endangered*)[1]	Not listed	The known and predicted distribution occurs within the study area	56, 87, 244

Listing under the BC Act	Listing under the EPBC Act	Likely presence within study area	Associated PCTs
Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions (*Endangered*)	Not listed	The known and predicted distribution occurs within the study area	56

[1] TECs are listed as entities at risk of Serious and Irreversible Impacts (SAII)

3.2.2 Threatened terrestrial fauna

Threatened flora and fauna predicted or known to occur within a 10 km buffer of the study area are summarised in Table 3.5. These species were those collated from the BioNet records (OEH 2022a), species associated with the PCTs present on site (OEH 2022b), the Protected Matters Search Tool (DAWE 2021), and any species records from the available literature. A low number of existing records were recorded within the study area; this is likely to reflect an absence of records rather than a true reflection of species absence. The threatened species that were recorded within 10 km of the Area 1 are concentrated around Narran Lake Nature Reserve (and associated Narran River), and the riparian zone of the Barwon River.

The predicted and known threatened fauna assemblage is dominated by bird species, with the highest number of sightings represented by bird species, including species associated with wetlands, woodlands, and grasslands (OEH 2022).

There are three threatened fauna species likely to occur within the study area that are SAII entities (Table 3.5):

- Squatter Pigeon (southern subspecies) (*Geophaps scripta scripta*);
- Thick-billed Grasswren (central NSW subspecies) (*Amytornis modestus inexpectatus*); and
- Pale Imperial Hairstreak (*Jalmenus eubulus*).

Table 3.5 Threatened fauna species known or predicted to occur within 10 km of the study area

Common name	Scientific name	BC Act status	EPBC Act status	SAII entity
Amphibians				
Sloane's Froglet	*Crinia sloanei*	V	E	-
Birds				
Australasian Bittern	*Botaurus poiciloptilus*	E	E	-
Australian Bustard	*Ardeotis australis*	E	-	-
Australian Painted Snipe	*Rostratula australis*	E	E	-
Barking Owl	*Ninox connivens*	V	-	-
Black Falcon	*Falco subniger*	V	-	-
Black-breasted Buzzard	*Hamirostra melanosternon*	V	-	-
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*	V	-	-
Black-necked Stork	*Ephippiorhynchus asiaticus*	E	-	-
Black-tailed Godwit	*Limosa limosa*	V	M	-

Common name	Scientific name	BC Act status	EPBC Act status	SAII entity
Blue-billed Duck	*Oxyura australis*	V	-	-
Brolga	*Grus rubicunda*	V	-	-
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	V	-	-
Bush Stone-curlew	*Burhinus grallarius*	E	-	-
Caspian Tern	Hydroprogne caspia	-	Mi	-
Common Greenshank, Greenshank	Tringa nebularia	-	Mi	-
Common Sandpiper	Actitis hypoleucos	-	Mi	-
Curlew Sandpiper	*Calidris ferruginea*	E	CE	-
Diamond Firetail	*Stagonopleura guttata*	V	-	-
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V	-	-
Eastern Grass Owl	Tyto longimembris	V	-	-
Flame Robin	Petroica phoenicea	V	-	-
Flock Bronzewing	Phaps histrionica	E	-	-
Fork-tailed Swift	*Apus pacificus*	-	M	-
Freckled Duck	*Stictonetta nervosa*	V	-	-
Gilbert's Whistler	*Pachycephala inornata*	V	-	-
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V	-	-
Grey Falcon	*Falco hypoleucos*	E	-	-
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	V	-	-
Gull-billed Tern	*Gelochelidon nilotica*	-	Mi	-
Hall's Babbler	*Pomatostomus halli*	V	-	-
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*	V	-	-
Latham's Snipe	*Gallinago hardwickii*	-	Mi	-
Little Eagle	*Hieraaetus morphnoides*	V	-	-
Magpie Goose	*Anseranas semipalmata*	V	-	-
Major Mitchell's Cockatoo	*Lophochroa leadbeateri*	V	-	-
Masked Owl	*Tyto novaehollandiae*	V	-	-
Painted Honeyeater	*Grantiella picta*	V	V	-
Pectoral Sandpiper	*Calidris melanotos*	-	Mi	-
Pied Honeyeater	*Certhionyx variegatus*	V	-	-
Red-tailed Black-Cockatoo (inland subspecies)	*Calyptorhynchus banksii samueli*	V	-	-
Scarlet Robin	*Petroica boodang*	V	-	-

Common name	Scientific name	BC Act status	EPBC Act status	SAII entity
Sharp-tailed Sandpiper	*Calidris acuminata*	-	Mi	-
Speckled Warbler	*Chthonicola sagittata*	V	-	-
Spotted Harrier	*Circus assimilis*	V	-	-
Square-tailed Kite	*Lophoictinia isura*	V	-	-
Squatter Pigeon (southern subspecies)	*Geophaps scripta scripta*	CE	V	✓
Superb Parrot	*Polytelis swainsonii*	V	V	-
Thick-billed Grasswren (central NSW subspecies)	*Amytornis modestus inexpectatus*	Ex	-	✓
Turquoise Parrot	*Neophema pulchella*	V	-	-
Varied Sittella	*Daphoenositta chrysoptera*	V	-	-
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	V	-	-
White-fronted Chat	*Epthianura albifrons*	V	-	-
White-throated Needletail	*Hirundapus caudacutus*	-	V	-
Yellow Wagtail	*Motacilla flava*	-	Mi	-
Mammals				
Bristle-faced Free-tailed Bat	*Setirostris eleryi*	E	-	-
Forrest's Mouse	*Leggadina forresti*	V	-	-
Koala	*Phascolarctos cinereus*	V	V	-
Kultarr	*Antechinomys laniger*	E	-	-
Little Pied Bat	*Chalinolobus picatus*	V	-	-
Long-haired Rat	*Rattus villosissimus*	V	-	-
Northern Free-tailed Bat	*Ozimops lumsdenae*	V	-	-
Spotted-tailed Quoll	*Dasyurus maculatus*	V	E	-
Stripe-faced Dunnart	*Sminthopsis macroura*	V	-	-
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V	-	-
Reptiles				
Leopard Ctenotus	*Ctenotus pantherinus ocellifer*	E	-	-
Pale-headed snake	*Hoplocephalus bitorquatus*	V	-	-
Woma	*Aspidites ramsayi*	V	-	-
Insects				
Pale Imperial Hairstreak	*Jalmenus eubulus*	CE	-	✓
Fish				

Common name	Scientific name	BC Act status	EPBC Act status	SAII entity
Macquarie Perch	*Macquaria australasica*	-	E	-
Murray Cod	*Maccullochella peelii*	-	V	-
Trout Cod	*Maccullochella macquariensis*	-	E	-

Key: V = Vulnerable, E = Endangered, EP = Endangered population, CE = Critically endangered, M = Migratory
Data source: BioNet and PMST

3.2.3 Threatened terrestrial flora

There are 15 flora species predicted or known to occur within 10 km of Area 1 (refer to Table 3.6). Flora species such as Winged Peppercress and Slender Darling Pea (*Swainsona murrayana*) are typical species associated with floodplain habitats.

There are four threatened flora species likely to occur within the study area that are an SAII entity:

- Yetman Wattle (*Acacia jucunda*);
- Bindweed (*Convolvulus tedmoorei*);
- Desert Cow-Vine (*Ipomoea diamantinensis*); and
- Braid Fern (*Platyzoma microphyllum*) (Table 3.6).

Table 3.6 Threatened flora species known or predicted to occur within 10 km of the study area

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	SAII
Trees					
Capparaceae	*Capparis loranthifolia* var. *loranthifolia*	Narrow-leafed Bumble	E	-	-
Shrubs					
Fabaceae	*Acacia jucunda*	Yetman Wattle	E	-	✓
Malvaceae	*Sida rohlenae*	Shrub Sida	E	-	-
Euphorbiaceae	*Phyllanthus maderaspatensis*	Phyllanthus	E	-	-
Forbs and grasses					
Brassicaceae	*Lepidium monoplocoides*	Winged Peppercress	E	E	-
Convolvulaceae	*Convolvulus tedmoorei*	Bindweed	E	-	✓
Fabaceae	*Swainsona murrayana*	Slender Darling Pea	V	V	-
Fabaceae	*Swainsona sericea*	Silky Swainson-pea	V	-	-
Fabaceae	*Swainsona recta*	Small Purple-pea	E	E	-
Poaceae	*Homopholis belsonii*	Belson's Panic	E	V	-

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	SAII
Poaceae	*Digitaria porrecta*	Finger Panic Grass	E	-	-
Polygalaceae	*Polygala linariifolia*	Native Milkwort	E	-	-
Climbers					
Convolvulaceae	*Ipomoea diamantinensis*	Desert Cow-Vine	E	-	✓
Fabaceae	*Desmodium campylocaulon*	Creeping Tick-trefoil	E	-	-
Ferns					
Platyzomataceae	*Platyzoma microphyllum*	Braid Fern	E	-	✓

Key: V = Vulnerable, E = Endangered, EP = Endangered population, CE = Critically endangered
Data source: BioNet, PMST and available literature

3.3 Aquatic values

3.3.1 Threatened fish distributions

The distributions of the following threatened species listed under the NSW *Fisheries Management Act 1994* (FM Act) are mapped within the study area (NSW DPI, 2021) and includes the Narran River and Barwon River catchments:

- Darling River Snail (*Notopala sublineata*) - critically endangered species;
- Silver Perch (*Bidyanus bidyanus*) – vulnerable species; and
- Olive Perchlet (*Ambassis agassizii*) – endangered population.

Additional freshwater fish species listed under the EPBC Act are predicted to occur in catchments in the locality (DAWE 2021). These include:

- Murray Cod (*Maccullochella peelii)* - vulnerable species;
- Trout Cod (*Maccullochella macquariensis)* - endangered species; and
- Macquarie Perch (*Macquaria australasica*) – endangered species.

No threatened aquatic ecological community or other threatened fish species listed under the FM Act and EPBC Act, are relevant to the study area (DPI 2021).

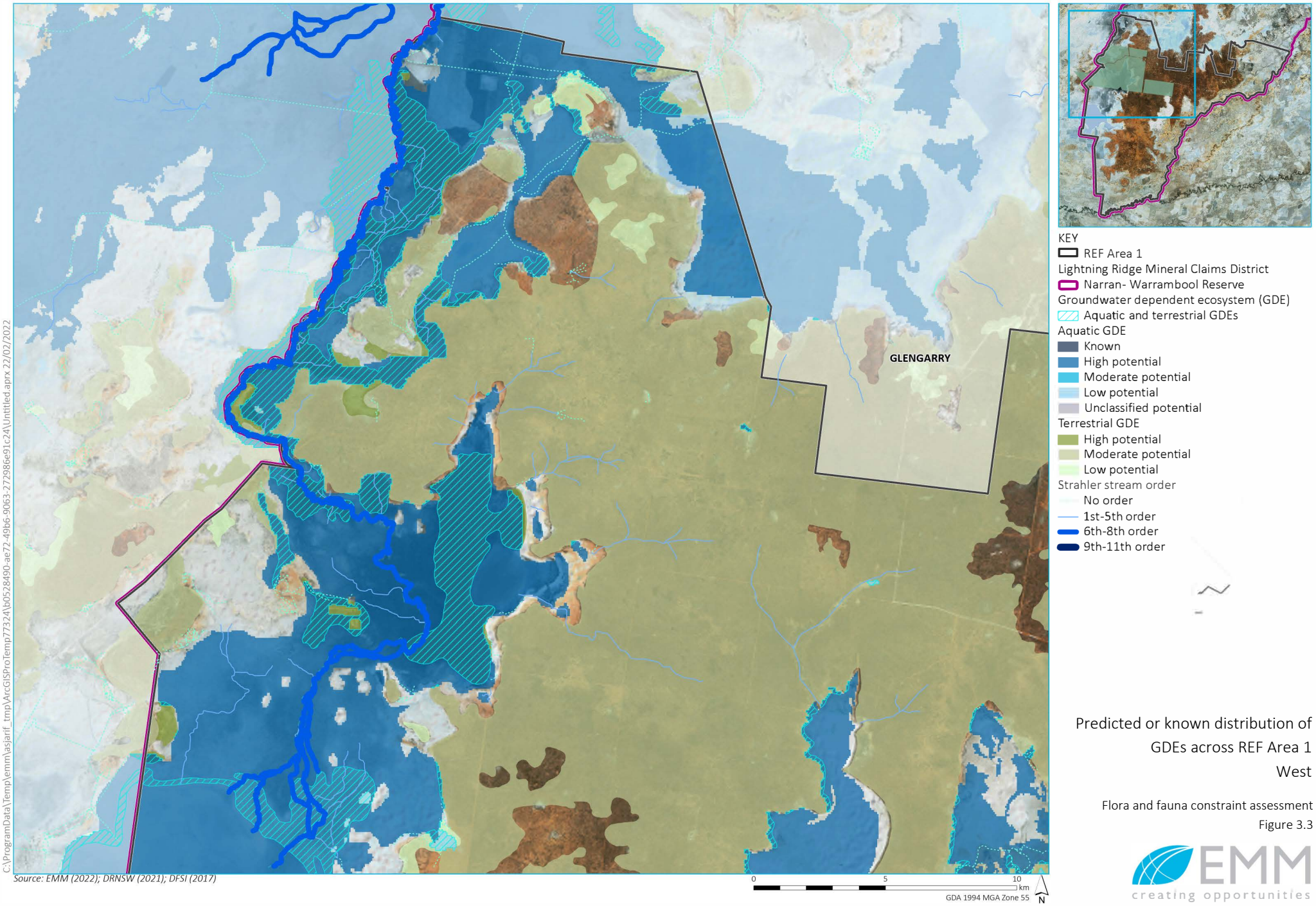
3.3.2 Key fish habitat

The majority of the Narran Lake wetland complex within the study area is mapped as Key Fish Habitat as defined and mapped by the NSW Department of Primary Industries (DPI 2021), as too are the Narran River, Barwon River and parts of The Big Warrambool (tributary to Barwon River). The study area occurs within the broader Murray-Darling Basin – North Key Fish Habitat area (DPI, 2021).

3.4 Groundwater dependent ecosystems

Groundwater Dependent Ecosystems (GDEs) are mapped within the study area including high potential terrestrial ecosystems (Figure 3.3), such as low lying stony plains and low flat-topped hills surrounding the Narran Lake wetland complex and Barwon River flat areas, dominated by Coolibah (*Eucalyptus coolabah*) (BoM 2021). Moderate and low potential GDEs comprise a large area in the north of the study area and comprise low-lying stony plains and mesas with Bimble Box (*Eucalyptus populnea*) (BoM 2021). The dependence of native plant community types and streams within the study area on both groundwater, and from the Great Artesian Basin would require further assessment for a future development application, supported by a groundwater assessment, if groundwater resources are to be intersected.

There are High potential aquatic GDEs mapped within the study area, predominantly around Narran Lake complex and the multi-channelled floodplain of the Barwon River (Figure 3.3). These areas contain ecosystems that rely on surface expression of groundwater (BoM 2021).



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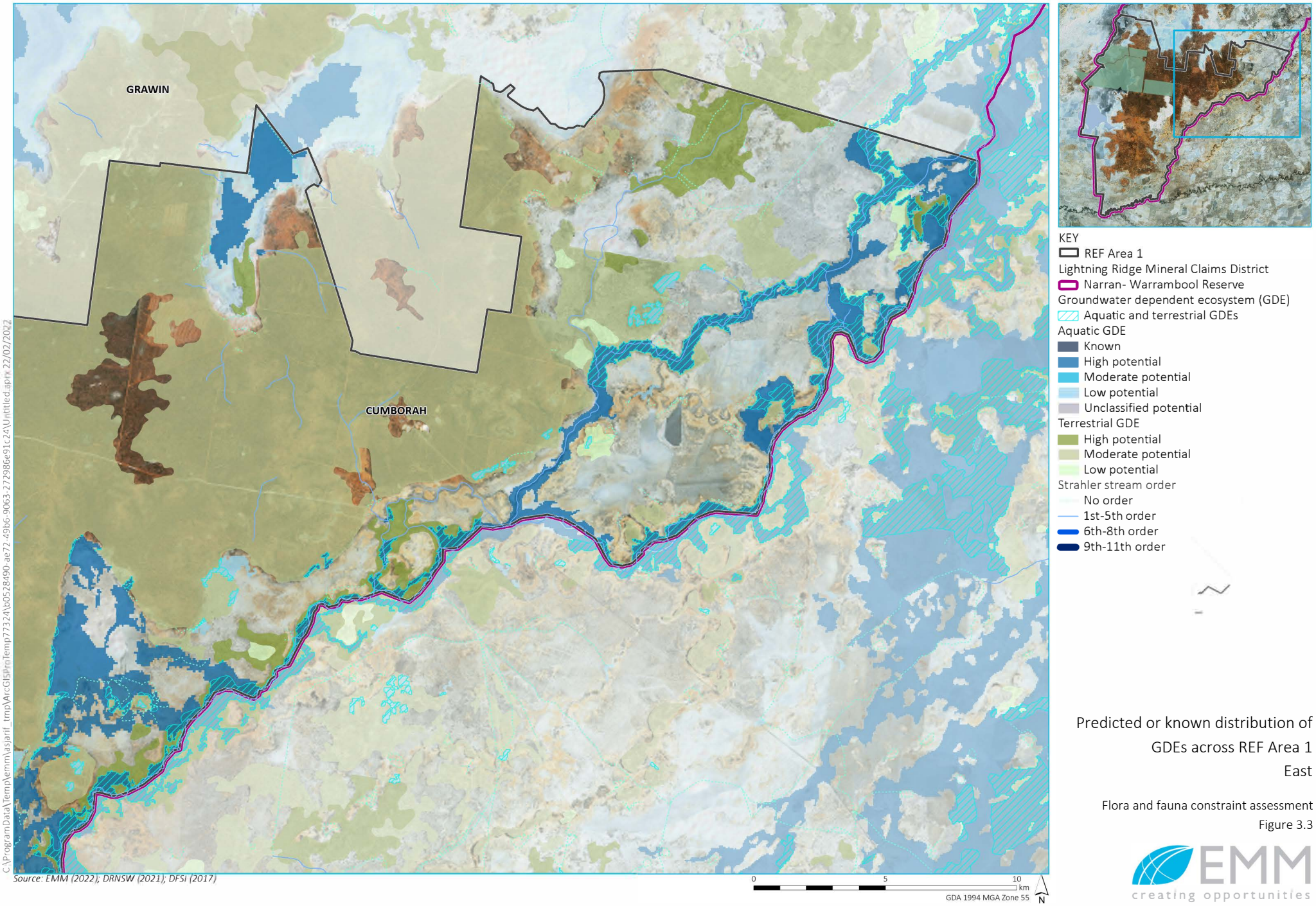
Source: EMM (2022); DRNSW (2021); DFSI (2017)

Predicted or known distribution of GDEs across REF Area 1 West

Flora and fauna constraint assessment

Figure 3.3

EMM creating opportunities

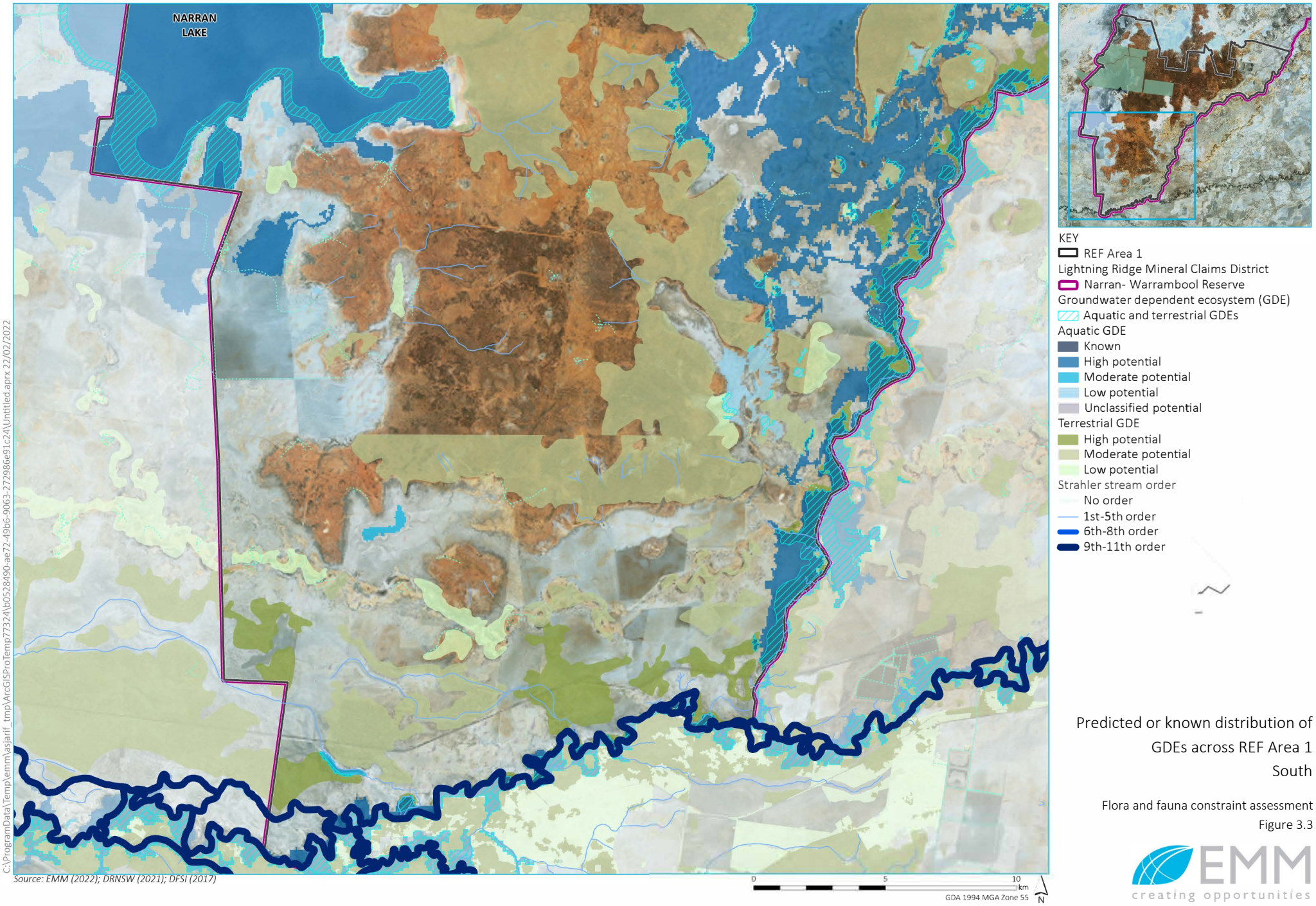


Predicted or known distribution of GDEs across REF Area 1 East

Flora and fauna constraint assessment

Figure 3.3

EMM
creating opportunities



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Source: EMM (2022); DRNSW (2021); DFSI (2017)

Predicted or known distribution of GDEs across REF Area 1 South

Flora and fauna constraint assessment

Figure 3.3

EMM creating opportunities

3.4.1 Nationally important wetlands

Narran Lakes (No. NSW011) is listed on the Directory of Nationally important Wetlands (DoEE 2018). It is also listed as a RAMSAR wetland (refer to Section 3.5.1) (Figure 3.1).

3.5 Matters of National Environmental Significance

3.5.1 RAMSAR wetlands

Narran Lake Nature Reserve is classified as a RAMSAR wetland with the associated tributaries classified as Protected Riparian Land. Narran Lake Nature Reserve is located approximately 70 kilometres south west of Lightning Ridge, 75 km north west of Walgett and 50 km east of Brewarrina (refer to Figure 3.1). The site is located on the terminal wetland system of the Narran River in the Murray Darling Basin. The site was listed as a RAMSAR wetland in 1999 covering an area of 5,343 ha. In 2011 an extension of the site was proposed to capture additional waterbird breeding and foraging habitat adding a further 3,104 ha.

The RAMSAR site contains two open water areas, Clear Lake and Back Lake. Annual inflows to the Narran wetlands are highly variable and is considered a boom-and-bust wetland in a semi-arid environment. Narran Lake Nature Reserve supports a significant number of migratory bird species including those listed under international migratory species treaties and those which are migratory within Australia. The site also supports substantial numbers of breeding waterbirds (Butcher et al 2011).

3.5.2 Threatened ecological communities and species

The following TECs were listed in the protected Matters Search as having the potential to occur in the study area:

- Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions - Endangered Community;
- Poplar Box Grassy Woodland on Alluvial Plains - Endangered Community;
- The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin - Endangered Community; and
- Weeping Myall Woodlands - Endangered Community.

Threatened flora and fauna species listed in the Protected Matters Search listed four TECs, six birds, three aquatic species, three mammals, four flora, one reptile and eight migratory/marine bird species. These species are included in sections 3.2.2, 3.2.3 and 3.5.3.

3.5.3 Migratory species

There are a number of migratory species listed under international bilateral migratory agreements (Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA), and Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA)) utilising the riparian and lake areas, especially in the RAMSAR listed Narran Lakes Nature Reserve, Narran River, and Barwon River (DAWE 2021).

There are eight migratory species predicted or known to occur with the study area as summarised in Table 3.7.

Table 3.7 Terrestrial and wetland migratory species known or predicted to occur within 10 km of the study area (DAWE 2021)

Common name	Scientific name	NSW Status	EPBC Status
Terrestrial			
Yellow Wagtail	*Motacilla flava*		Mi
Fork-tailed Swift	*Apus pacificus*		Mi
Wetland			
Common Sandpiper	*Actitis hypoleucos*		Mi
Sharp-tailed Sandpiper	*Calidris acuminata*		Mi
Curlew Sandpiper	*Calidris ferruginea*	E	CE, Mi
Pectoral Sandpiper	*Calidris melanotos*		Mi
Latham's Snipe	*Gallinago hardwickii*		Mi
Common Greenshank	*Tringa nebularia*		Mi

Key: V = Vulnerable, E = Endangered, EP = Endangered population, CE = Critically endangered, Mi = Migratory
Data source: PMST

3.6 Summary of key biodiversity values in the study area

The key biodiversity values of the study area are summarised below:

- RAMSAR listed wetland, Narran Lakes Nature Reserve;
- potential for presence of SAII entities (threatened ecological communities and threatened species);
- threatened ecological communities that are listed under both state and Commonwealth legislation;
- aquatic and terrestrial groundwater dependent ecosystems, predominantly adjacent to riparian areas;
- riparian corridors that function as wildlife movement corridors, as well as habitat refugia during period of extreme climactic conditions; and
- habitat for a suite of wetland, woodland and grassland threatened terrestrial flora and fauna species listed under both the BC Act and EPBC Act.

3.7 Constraint assessment

Field investigation, in accordance with the methods outlined in Section 2.2, were undertaken to categorise the constraint level as per criteria set out in Table 2.1.

Table 3.8 Constraints per lot

Lot no and name	Constraints category	Land Access	Land use	PCT as mapped (emboldened if observed as present)	Weed/disturbance	Native vegetation integrity
Amooroob Lot 2453 DP764416	**High** Potential GDEs and TECs present **Moderate** Remainder of the lot	Lot not accessed. Observed from access track adjacent to SW corner of lot.	Moderate grazing	37, 40, 43, 72, **98**, 120	Lot not accessed.	The desktop study indicates the presence of several ephemeral wetlands in the western section and borders edges of floodplain in the western section. Presence of terrestrial GDE, noting presence of *Eucalyptus populnea*.
Barfield Lot 1960 DP763842	**High** for PCTs that align with TECs	Lot not accessed. Observed from Cumborah-Narran Lake Road.	Residential	27, 37, 40, 72, 98, 120, 192, 376	Aerial imagery depicts clearing around residential structures, dams and internal tracks.	Aquatic GDE in south-east corner of lot associated with floodplain of The Big Warrambool. PCTs that are associated with TECs are mapped as present (underlined). Field surveys confirmed the PCT mapping observed from road was accurate. Aerial imagery indicates moderate to high condition native vegetation continuous cover.
Blowhard Lot 2613 DP764641	**High** For PCTs that align with TECs **Moderate** Remainder of the lot	Lot not accessed.	No land use at time of survey (pers. Comm, Wills)	40, 72, 87, 98, 117, 120, 376	Aerial imagery depicts clearing associated with dam and internal tracks	PCTs that are associated with TECs are mapped as present (underlined). No aquatic GDEs mapped. Aerial imagery indicates high condition vegetation cover.
Brookhill Lot 1963 DP763829	**High** Potential GDE and TECs present **Moderate** Remainder of the lot	Lot not accessed.	Not observed	37, 40, 43, 55, 56, 69, 72, 98, 120, 192, 244, 376	Aerial imagery depicts minor clearing associated with dam and internal tracks	Small area of aquatic GDE wetland and Strahler 3 intermittent tributary associated with The Big Warrambool on eastern boundary. PCTs that are associated with TECs are mapped as present (underlined).

Lot no and name	Constraints category	Land Access	Land use	PCT as mapped (emboldened if observed as present)	Weed/disturbance	Native vegetation integrity
Corrie Downs Lot 2446 DP764409	**High** Potential TECs, aquatic and terrestrial GDEs	Lot not accessed. Observed from Narran Lake Road	No land use evident	40, 62, 72, **98**, 120	Not observed. Aerial imagery indicates minor disturbance along internal tracks.	PCTs that are associated with TECs are mapped as present (underlined). Eastern half of lot is mapped as aquatic GDE as a floodplain wetland. Terrestrial GDE of *E.populnea* stony plains community in western section. Aerial imagery indicates high condition woodland.
Corrie Downs Lot 2447 DP764410	**High** Potential TECs, aquatic and terrestrial GDEs	Lot not accessed. Observed from Narran Lake Road	No land use evident	37, 40, 43, 62, **98**, 120, 241	Not observed. Aerial imagery indicates minor disturbance along internal tracks.	PCTs that are associated with TECs are mapped as present (underlined). Eastern half of lot is mapped as aquatic GDE as a floodplain wetland. Terrestrial GDE of *E.populnea* stony plains community in western section. Aerial imagery indicates high condition woodland, with minor disturbances caused by internal tracks.
Corrie Downs Lot 3086 DP765311	**High** Potential TECs, aquatic and terrestrial GDEs	Lot not accessed. Observed from Narran Lake Road	No land use evident	69, 72, 117, 120, 247, 376, 377	Not observed. Aerial imagery indicates minor disturbance along internal tracks.	North-western corner of lot is mapped as aquatic GDE as a floodplain wetland associated with Narran Lake. Terrestrial GDE of *E.populnea* stony plains community across majority of lot. Aerial imagery indicates high condition woodland, with minor disturbances caused by internal tracks. PCTs that are associated with TECs are mapped as present (underlined).

Lot no and name	Constraints category	Land Access	Land use	PCT as mapped (emboldened if observed as present)	Weed/disturbance	Native vegetation integrity
Corrie Downs Lot 2454 DP764417,	**High** Intact vegetation associated with TECs, aquatic GDE.	Lot not accessed.	Not observed	37, 39, 40, 43, 53, 62, 72, 98, 120, 134, 241	Not observed	Mapping indicates substantial presence of floodplain communities of The Big Warrambool. Vegetation appears to be continuous structural dense. PCTs that are associated with TECs are mapped as present (underlined). Presence of aquatic GDE across approximately half of the lot, noting presence of a floodplain wetland.
East Mullane Lot 1957 DP763839	**Moderate**	Lot not accessed. Lot observed from Narran Lake Road	National Parks	69, 72, 117, 120, 376	Minor clearing around dam and internal tracks	No PCTs mapped as present are associated with TECs. No aquatic GDEs or natural waterbodies. Vegetation is in high condition and is as mapped.
Glengai Lot 4022 DP766495	**High** Yambil swamp & Barwon River riparian areas. All areas mapped as aquatic GDE. **Low** PCTs present are associated with TECs, but PCTs present are missing strata, have weed incursions and are highly fragmented and disturbed. **Negligible** Non native vegetation	Full access	Cropping and moderate grazing.	24, 27, 36, **37**, **39**, **40**, 43, **98**, 117, 118, **120**, **134**, **168**, **244**, 247, 375		Areas mapped as non native are accurate. Areas not grazed contain moderate to high condition vegetation. The Barwon River, Yambil Swamp, and The Big Warrambool are categorised as Key Fish Habitat (DPI).

Lot no and name	Constraints category	Land Access	Land use	PCT as mapped (emboldened if observed as present)	Weed/disturbance	Native vegetation integrity
Guiseley Lot 6286 DP769143	**High** For all mapped aquatic GDE and TECs **Moderate** For the areas north of the mapped tributary and uncropped areas south of the tributary. **Negligible** All non native, cropped areas	Lot not accessed.	Cropping in approximately one-third of lot	27, 37, 39, 40, 55, 59,	Large areas cleared for cropping, dams, channels and internal tracks.	Aquatic GDEs associated with The Big Warrambool form the eastern boundary. A Strahler 3 tributary runs through the middle of the block that appears on aerial imagery to have intact riparian vegetation (PCT 39). The Big Warrambool is mapped as Key Fish Habitat (DPI). PCTs that are associated with TECs are mapped as present (underlined).
Guiseley Lot 1965 DP763831	**High** For all areas mapped as aquatic GDE and TECs. **Moderate** For remaining areas.	Lot not accessed	Not observed.	37, 39, 40, 55, 72, 98, 120	Aerial imagery indicates ground disturbance form internal tracks, channels, and dams.	PCTs that are associated with TECs are mapped as present (underlined). Strahler 2 and 3 tributaries (floodplain wetlands) of The Big Warrambool are listed as aquatic GDEs.
Karingle Lot 6319 DP769207	**High** Area of SAII potential around Cumborah, 1km radius around the township. Areas of TECs **Moderate** PCTs not associated with TECs **Low** South of Kurrajong Road.	Full access.	Grazing, mining related activities	27, 37, 39, 40, 43, 55, 56, 59, 69, 72, 98, 120, 144, 192, 244, 376	The northern section of the lot and areas around the township of Cumborah shows large areas of ground disturbance and small cleared areas for dams. Hudson pear and other weed species were present in significant numbers in disturbed areas.	The southern portion of the lot south of Kurrajong Road shows low vegetation density and thinning of canopy species. Poor condition vegetation was observed throughout with weed incursions and loss of native vegetation stratum PCTs that are associated with TECs are mapped as present (underlined) Strahler 4 stream associated with The Big Warrambool in section south of Kurrajong Road. No associated aquatic GDEs. Area of SAII potential around Cumborah, 1km radius around the township

Lot no and name	Constraints category	Land Access	Land use	PCT as mapped (emboldened if observed as present)	Weed/disturbance	Native vegetation integrity
Kigwigil Lot 17 DP752679	**High** For mapped aquatic GDE and TECs. **Low** In remaining areas	Land not accessed due to flooding. Observed from Gingie Road	Grazing	37, 39, 40, 43, 59, 144	Groundcover pasture weeds present.	Small area of aquatic GDE in south-east corner of lot, associated with the floodplain of The Big Warrambool. Strahler 4 runs intermittently through northern section into The Big Warrambool. The Big Warrambool is mapped as Key Fish Habitat (DPI). Vegetation observed from Gingie Road was highly compromised by grazing. Woodland PCTs in low to moderate condition. PCTs that are associated with TECs are mapped as present (underlined)
Kigwigil Lot 12 DP752741, Lot 1964 DP763830	**High** For mapped aquatic GDE and TECs **Low** In all remaining areas **Negligible** In all cropped areas.	Land not accessed due to flooding. Observed from Gingie Road.	Lot 12: Grazing, Lot 1964: grazing, cropping	27, 36, 37, 39, 43, 59, 98, 72, 120, 144, 244, 376	Floodplain areas are used for cropping.	The Big Warrambool forms the south-eastern boundary of the lot, with a Strahler order 4 tributary running through lot 1964. Vegetation (PCT 39) immediately surrounding The Big Warrambool and its tributary were observed to be in moderate to good condition are associated with a TEC. The Big Warrambool is mapped as Key Fish Habitat (DPI). Lot 12 in aerial imagery appears to have moderate vegetation integrity with minor disturbance associated with internal tracks. Lot 1964 is highly disturbed with cleared areas for cropping and farm infrastructure, dams and internal tracks. The northern section of this lot has remnant vegetation of unknown condition. Potential TECs as associated PCTs are mapped as present (underlined)

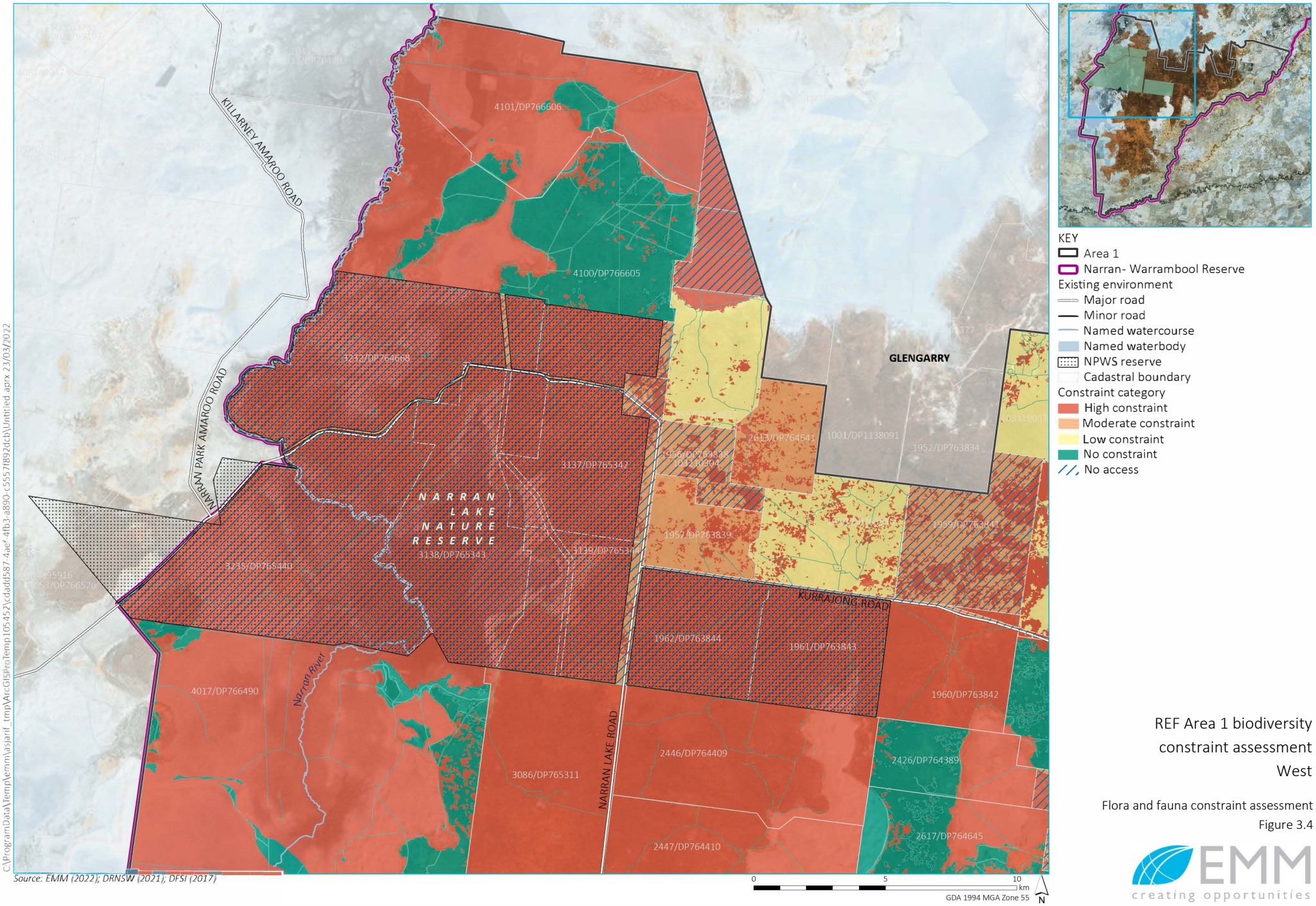
Lot no and name	Constraints category	Land Access	Land use	PCT as mapped (emboldened if observed as present)	Weed/disturbance	Native vegetation integrity
Kigwigil Lot 6251 DP769107	**High** For potential aquatic GDE and TECs. **Low** In all remaining areas. **Negligible** for cropped areas.	Land not accessed due to flooding.	Grazing, dam channels, cropping	27, 37, 39, 40, 55, 59, 98, 144, 244	Not observed	Aquatic GDEs: The Big Warrambool forms the southern and eastern boundary of the lot, with a Strahler order 3 tributary running through the north-western corner. Aerial imagery indicates that vegetation (PCT 39) immediately surrounding The Big Warrambool and its tributary to be in moderate to good condition. The Big Warrambool is mapped as Key Fish Habitat (DPI). Potential TECs as associated PCTs are mapped as present (underlined)
Kurrajong Lot 1958 DP763840	**High** For potential TECs. **Low** In all remaining areas	Lot not accessed. Observed from Kurrajong Road.	Residential	36, 37, 40, 43, 69, 72, 87, 98, 117, 120, 376	Patches of clearings around dams. Low vegetation density indicates historic clearing.	No aquatic GDEs or natural waterbodies present. Potential TECs as associated PCTs are mapped as present (underlined).
Llanillo Lot 3886 DP766359, Lot 4362 DP767199	**High** Potential TECs **Negligible** Grazing and cropped areas	Full access	Grazing, cropping on Lot 3886	27, 37, 39, 40, 43, 72, 87, 98, 118, 120, 144, 192, 244, 247, 376	Small clearings associated with agricultural activities, internal tracks, and dams. Minor groundcover weeds present.	Vegetation present was observed to be in high condition, with small areas of moderate condition associated with groundcover disturbances. Large tracts contained high condition diverse vegetation communities and habitat diversity. Potential TECs as associated PCTs are mapped as present (underlined). No aquatic GDEs present.

Lot no and name	Constraints category	Land Access	Land use	PCT as mapped (emboldened if observed as present)	Weed/disturbance	Native vegetation integrity
Lyndon Lot 2456 DP764419, Lot 3082 DP765307	**High** In areas of aquatic GDE and TECs. **Moderate** In all remaining areas	Lot not accessed.	Not observed	27, 37, 39, 40, 55, 72, 98, 134, 212	Not observed. Aerial imagery indicates disturbances to vegetation density, clearing for dams and internal tracks.	Presence of aquatic GDE across majority of site as a Floodplain wetland. Floodplain areas appear to be of low to moderate condition in aerial imagery. The Big Warrambool is an Area of Outstanding Biodiversity Value (AOBV) IN Lot 2456. Potential TECs as associated PCTs are mapped as present (underlined)
Milrea Lot 2532 DP 764495	**High** In areas of aquatic GDE and TECs. **Moderate** In all remaining areas	Lot not accessed for assessment.	Not observed	37, 39, 40, 43, 59, 62, 72, 168, 212, 241	Not observed. Aerial imagery indicates disturbances to vegetation density, clearing for dams and internal tracks.	Presence of floodplain wetland GDE over approximately half of lot. Aerial imagery indicates low density vegetation that may suggest clearing of native vegetation and lower vegetation integrity. Potential TECs as associated PCTs are mapped as present (underlined)
Mooredale Lot 4100 DP766605	**High** In areas of aquatic GDE and TECs. **Low** In remaining vegetated areas **Green** In cropped areas	Lot not accessed.	Cropped areas.	36, 37, 39, 40, 43, 49, 72, 87, 98, 120, 146, 212, 241, 247, 376, 377	More than 20% of lot cleared for cropping. Further substantive clearing for dams, farm infrastructure and internal tracks.	Presence of Narran River and associated floodplain and intermittent tributaries are aquatic GDEs in western portion. Potential TECs as associated PCTs are mapped as present (underlined). Remaining remnant native vegetation appears compromised by disturbance to undergrowth, and fragmentation.

Lot no and name	Constraints category	Land Access	Land use	PCT as mapped (emboldened if observed as present)	Weed/disturbance	Native vegetation integrity
Mureabun Lot 1955 DP763837, Lot 4101 DP766606	**High** In areas of TECs and GDEs **Low** In remaining vegetated areas and Narran River floodplain and entirety of lot 1955. **Negligible** In current cropped areas, roads and farm infrastructure areas.	Lot not accessed.	Cropping, grazing, residential.	39, 43, 87, 98, 117, 118, 139, 166, 241, 247,	More than 20% of lot cleared for cropping. Clearing for dams, farm infrastructure and internal track evident.	Potential TECs as associated PCTs are mapped as present (underlined). Most of Lot 4101 is mapped as aquatic GDE as a floodplain wetland. Remnant vegetation may be regrowth form historic clearing or cropping, as observed in aerial imagery.
Narran Lake Lot 4353 DP767190, Lot 4017 DP766490	**High** Eastern section contains intact vegetation potentially associated with TECs. Western section contains Narran Lake, Narran River and associated floodplains that contains areas with disturbed groundcover and weed incursions.	Full access	Eastern section: light grazing. Western section: Moderate Grazing with groundcover disturbed.	27, 37, 39, 40, 43, 69, 72, **98**, 117, **120**, **212**	1-5% patchy occurrences of exotic groundcover	Heavily impacted and bare areas in western portion. Eastern section in high to moderate condition, with native groundcover intact. Western section on floodplain is moderately impacted by grazing and weed incursions. Potential TECs as associated PCTs are mapped as present (underlined).
Oban Lot 2452 DP764415	**Moderate** Land contains high condition vegetation not associated with TECs.	Lot not accessed. Observed from north and western boundaries.	Not known	37, 40, **72,** 98, 117, 120	Less than 1%.	Terrestrial GDE of *Eucalyptus populnea* on stony plains.
Remington Lot 3087 DP765312, Lot 2448 DP764411	**High** Potential TECs.	Full access	Native pasture improvement and light grazing in NE corner of lot. Residential.	**24**, 37, 39, 40, **43,** 53, 62**, 98**, 117, **120**, 195, **212,** 241, **377**	Less than 1%.	High condition *E.populnea* (Poplar Box) grassy woodland. Western boundary includes high water line of Narran Lake Potential TECs as associated PCTs are mapped as present (underlined).

Lot no and name	Constraints category	Land Access	Land use	PCT as mapped (emboldened if observed as present)	Weed/disturbance	Native vegetation integrity
Springvale Lot 2426 DP764389	**High** Potential TECs and GDEs.	Lot not accessed for assessment.	Not observed	37, 39, 40, 43, 56, 72, 98, 120, 376	Aerial imagery indicates minor clearing associated with dam and internal tracks	Aquatic GDE present as floodplain wetland. Potential TECs as associated PCTs are mapped as present (underlined). Aerial imagery indicates moderate to good vegetation integrity throughout.
Springvale Lot 2683 DP764759	**High**	Lot not accessed. Observed from Kurrajong Road.	Not observed	27, 37, 40, 56, 69, 72, 87, 98, 120, 144, 192, 244, 376	Aerial imagery indicates minor clearing associated with dam and internal tracks	Aquatic GDE present as a floodplain wetland of The Big Warrambool. Aerial imagery indicates moderate to good vegetation integrity throughout. Potential TECs as associated PCTs are mapped as present (underlined).
Summer Hill Lot 5 DP752679 Lot 14 DP752679	**Moderate**	Lot not accessed. Lot 14 observed from Cumborah cemetery.	Not observed	72, 98, 120, 192	Aerial imagery indicates minimal disturbance associated with internal tracks. No weeds observed form boundary.	Strahler class 1 stream in south-eastern corner of Lot 5. No PCTs mapped that are associated with TECs. Aerial imaging indicates moderate to good vegetation integrity
Wee Warra Lot 6248 DP 769104 Lot 6318 DP 769206	**Moderate** Southern half of lot 6318 **Low** In all remaining areas **Negligible** In all cropped areas.	Limited access.	Grazing, mining, cropping in eastern portion of lot	27, 36, 37, 39, 40, 55, 59, 62, 69, 72, 87, 98, 117, 120, 192, 376,	High levels of disturbance related to cropping, irrigation channels, internal track networks and historic ground disturbance related to mining activities. Hudson Pear observed in northern sections.	Potential TECs as associated PCTs are mapped as present (underlined). Cropping occurring in Aquatic GDE areas in Lot 6248. Observed vegetation was in poor to moderate condition and fragmented by numerous internal tracks and historic mining impacts. Moderate condition vegetation observed in lower portion of Lot 6318.
Westleigh Lot 2449 DP764412, Lot 3088 DP765313	**High** Contains diverse native vegetation in high-medium condition with minimal disturbance. Potential TECs.	Full access	Light grazing	**27, 37, 39, 40, 43,** 53, 62, **98,** 117, **120, 212, 238, 377.**	Less than 1%. Groundcover weeds less than 5% in Coolibah woodland patch.	High condition *E.populnea* (Poplar Box) grassy woodland. Western boundary includes high water line of Narran Lake Small patch of Coolabah woodland around small dam near Narran Lake. Potential EPBC & BC listed Artesian Springs Ecological Community in the Great Artesian Basin.

Lot no and name	Constraints category	Land Access	Land use	PCT as mapped (emboldened if observed as present)	Weed/disturbance	Native vegetation integrity
Wilkie Lot 2617 DP 764645	**High** All areas mapped as aquatic GDE and TECs. **Moderate** In all other areas **Negligible** In cropped areas in central north section of lot.	Lot not accessed.	Cropping in eastern section	27, 37, 39, 40, 43, 55, 56, 59, 62, 69, 72, 98, 120, 241	Minor clearing associated with dams, channels and internal tracks	Eastern two-thirds of lot and western boundary is mapped as aquatic GDE associated with The Big Warrambool. Potential TECs as associated PCTs are mapped as present (underlined). Aerial imagery indicates moderate to good condition vegetation integrity.
National Parks Lot 1961 DP 763843 Lot 1962 DP 763844 Lot 3139 DP 765344 Lot 3138 DP 765343 Lot 3137 DP 765342 Lot 3232 DP 764668 Lot 3235 DP 765440	**High** All areas containing aquatic GDE, and high condition vegetation with TECs potentially present	Lot not accessed. Observed from boundaries.	National Parks reserve	36, 38, 39, 40, 43, 62, 69, 72, 98, 117, 118, 120, 144, 168, 181, 198, 212, 238, 241, 247, 376, 377	None observed. Minor internal tracks	Native vegetation was observed to be in high condition. Narran Lake, Narran River, and floodplain/wetland areas are classified as aquatic GDEs. Potential TECs as associated PCTs are mapped as present (underlined).



KEY

- Area 1
- Narran- Warrambool Reserve

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- Cadastral boundary

Constraint category

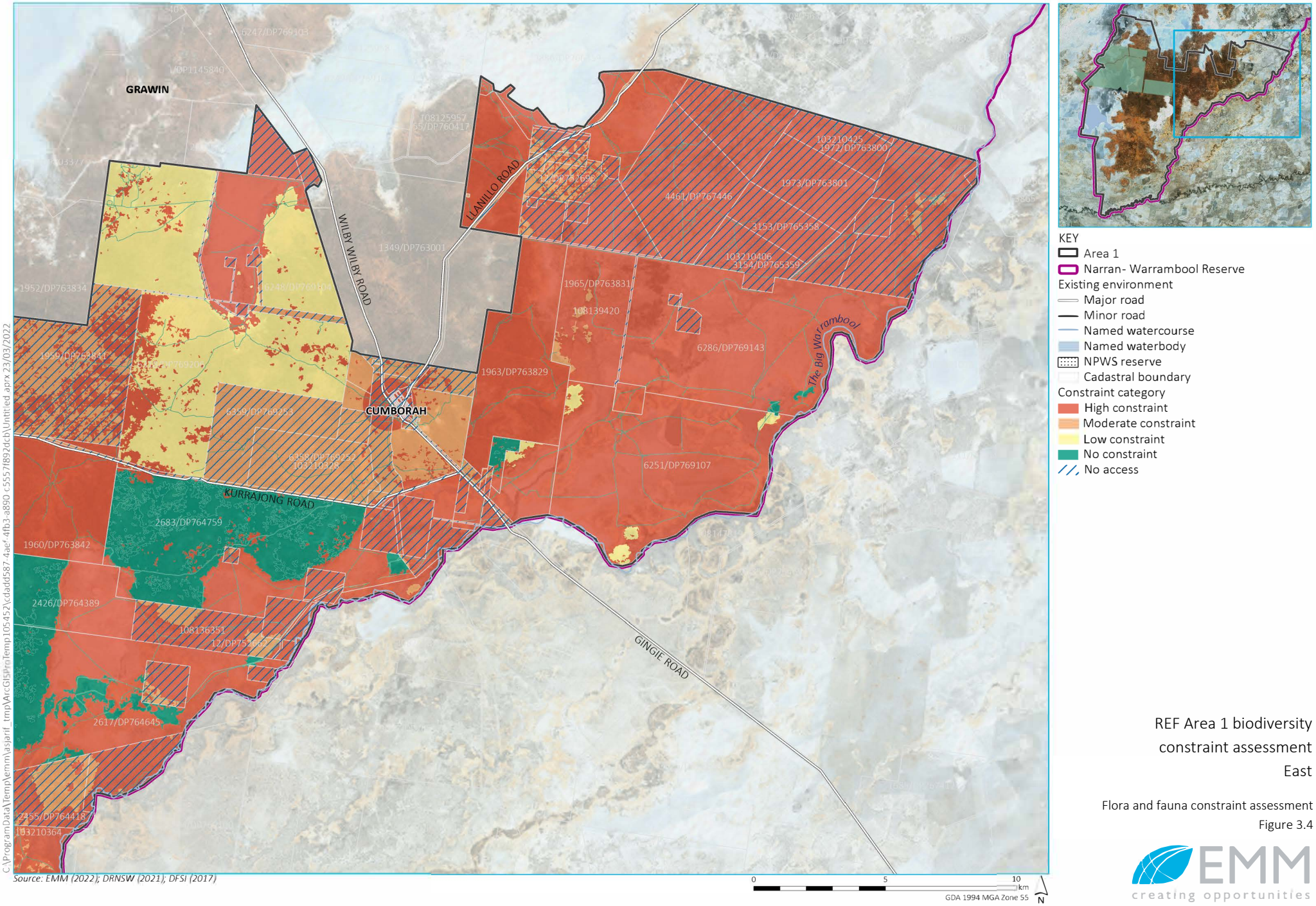
- High constraint
- Moderate constraint
- Low constraint
- No constraint
- No access

REF Area 1 biodiversity constraint assessment West

Flora and fauna constraint assessment

Figure 3.4

EMM creating opportunities



KEY

Area 1

Narran- Warrambool Reserve

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- Cadastral boundary

Constraint category

- High constraint
- Moderate constraint
- Low constraint
- No constraint
- No access

Source: EMM (2022); DRNSW (2021); DFSI (2017)

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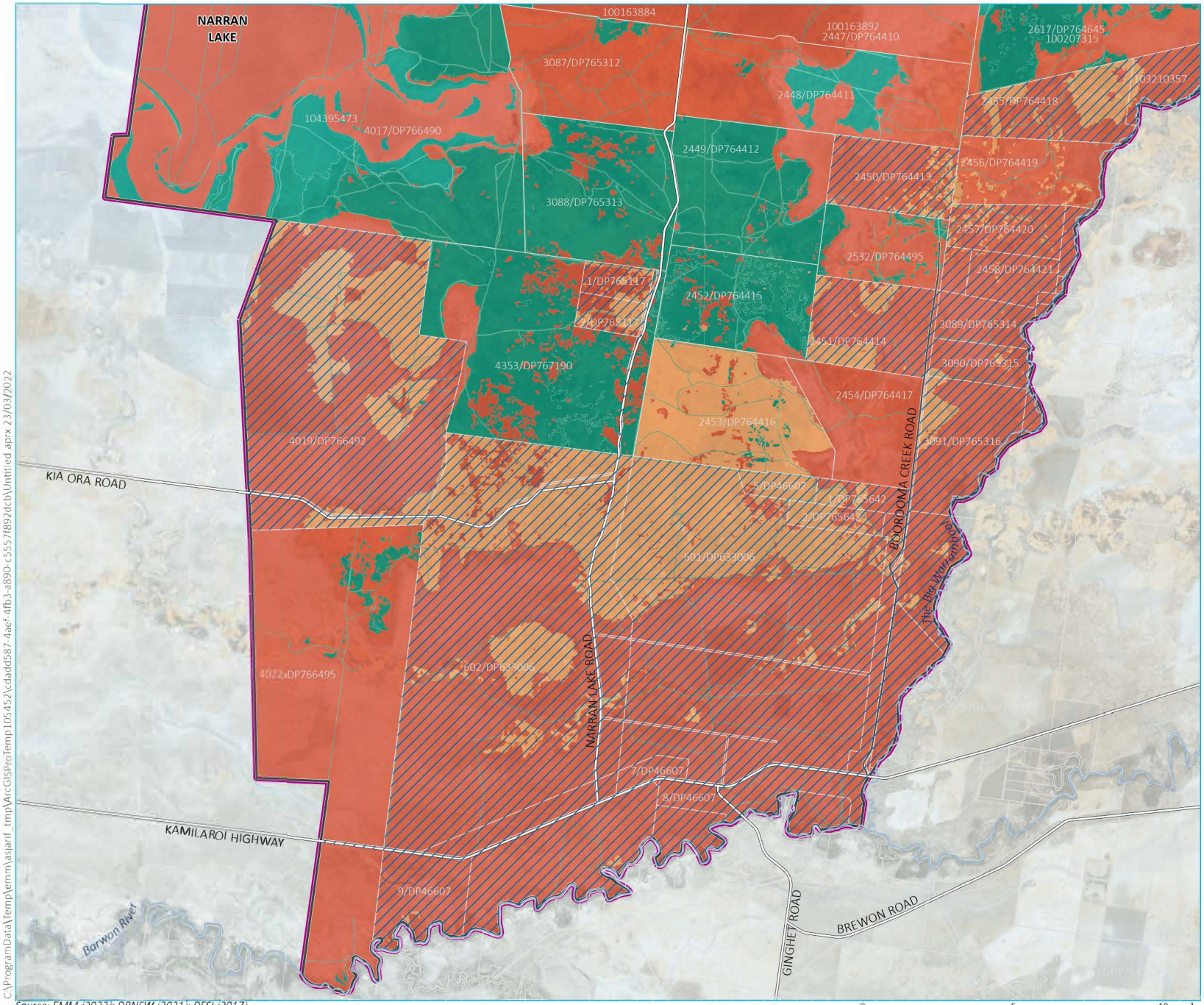
REF Area 1 biodiversity constraint assessment East

Flora and fauna constraint assessment

Figure 3.4

EMM creating opportunities



KEY

- Area 1
- Narran- Warrambool Reserve

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- Cadastral boundary

Constraint category

- High constraint
- Moderate constraint
- Low constraint
- No constraint
- No access

REF Area 1 biodiversity constraint assessment South

Flora and fauna constraint assessment

Figure 3.4

EMM creating opportunities

4 Impact assessment and mitigation measures

4.1 Avoidance, minimisation and mitigation

The hierarchy of avoid, minimise and mitigate has been used in the development of the subject site. This has included avoidance (wherever feasible) of key biodiversity values identified during the field investigations and desktop study.

The measures outlined in Table 4.1 have been incorporated into the proposed activity to avoid, minimise and mitigate impacts.

Table 4.1 Measures to avoid, minimise and mitigate impacts

Step	Measure	Responsibility
Avoid and minimise	Avoid granting mining claims in areas of high biodiversity constraints as outlined in Table 3.8 and Figure 3.4, unless a specific biodiversity assessment is carried out that concludes impacts are not significant.	DRNSW
	Avoid undertaking activities within areas that have high biodiversity constraints, including: • threatened ecological communities; • 40 m of an aquatic habitat or riparian corridor; • terrestrial and aquatic GDEs; and • SAII habitat.	DRNSW and proponent
	Minimise potential impact by adjusting the project design to occur in existing cleared areas (existing access track) where possible.	Proponent
	Avoid removal of habitat trees, ie dead and hollow bearing trees. If necessary, removal should avoid breeding season for arboreal mammals, birds and / or bats (September through until January) and the cooler months when some species may be in torpor (May through to July)	
	Avoid the removal of habitat features such as bush rock, and fallen logs. These provide habitat for a range of fauna species. If these features can't be avoided the feature should be pushed to the side and replaced when the activities are complete.	
	Pre-clearance inspection to be conducted by proponent to identify and avoid the following habitat features: • identify habitat features prior to removal (including hollow bearing trees); and • identify weeds.	
Mitigate	Clearing is to be limited to the minimum extent necessary and clearing limits to be defined using some type of barrier, such as flagging. This should be maintained and checked throughout prospecting and mining activities.	Proponent
	Installation of temporary fencing around the mineral claim and work sites should be employed to prevent fauna from accessing open and unattended auger holes and mine shafts and causing potential harm to fauna.	
	Sediment controls, including fencing and sediments traps, should be installed in any areas where works will occur in proximity to low lying vegetation.	

Step	Measure	Responsibility
	All weeds should be appropriately removed prior to clearing. Weeds are to be stockpiled appropriately prior to removal from site to avoid the spread of seed and other propagules. Where feasible it is recommended weeds are cut and roots remain insitu to minimise erosion.	
	Retain all cleared vegetation in stockpiles and spread after mining activities are complete to encourage site rehabilitation, assist to minimise erosion, to encourage moisture retention and provide habitat features for fauna.	
	Ensure works vehicles are washed down prior to entering the works area and moving to another area.	
	Avoid importing stockpiles and vegetation from other sites.	
	Dust suppression implemented such as wetting down dirt roads or reducing vehicle speeds.	
	Topsoil should be stockpiled to respread across the completed operation to encourage vegetation to re-establish quickly and thereby reduce erosion impacts.	
	Mullock should be stockpiled separately from topsoil and should not be spread across the completed operation as this has the potential to inhibit vegetation from re-establishing.	
	All proponents would be made aware of ecologically sensitive areas and the need to avoid impacts. This includes adjacent native vegetation.	DRNSW

4.2 Residual impacts

The residual impacts of the assessed activities, after application of the hierarchy of avoid, minimise and mitigate, are described here.

Clearing of native vegetation can result in a range of direct and indirect impacts including:

- reduction in the extent of vegetation communities;
- loss of local populations of species;
- fragmentation of remnants of vegetation communities or local populations of individual species;
- increased edge effects and habitat for invasive species;
- reduction in the viability of ecological communities resulting from loss or disruption of ecological functions (eg increased desiccation, light penetration, increased herbivore activity, weed invasion, increased predation, and loss of animals that are seed dispersers and pollinators);
- destruction of flora and fauna habitat and associated loss of biological diversity (habitat removal may include removal of hollow bearing trees, loss of leaf litter layer, and resultant changes to soil biota); and
- soil exposure and altered water flow patterns resulting in increased erosion and sedimentation.

These direct and indirect impacts are discussed below.

4.2.1 Direct impacts

The direct impacts of the assessed activities, following the implementation of avoidance, minimisation and mitigation measures outlined in Table 4.1. Direct impacts for the assessed activities comprise of:

- removal of up to 2 ha of native vegetation per lease/licence. Noting that activities associated with prospecting are restricted to 0.25 ha however, multiple adjacent claims can cumulatively increase the area;
- loss and degradation of up to 2 ha a of native fauna habitats per lease/licence;
- process of clearing, prospecting and mining has potential to result in injury or mortality of native fauna species; and
- removal of habitat resources for threatened fauna.

Land use across Area 1 is varied and includes the Brewarrina Local Government Area (LGA) and Walgett LGA. Land within Area 1 is zoned under Brewarrina LEP and Walgett LEP as RU1 Primary Production, E1 National Parks and Nature Reserves (for Narran Lake Nature Reserve) and SP1 Special Activities (mining).

i Impacts on threatened ecological communities and GDEs

The constraints assessment has recommended no clearing take place in areas of high biodiversity constraint, ie where threatened ecological communities and GDEs are potentially present. A specific biodiversity assessment would be required to conclude the significance of the assessed activities on threatened ecological communities and GDEs.

ii Impacts on threatened species

With the implementation of avoidance and mitigation measures outlined within Table 4.1 it is predicted that the assessed activities would not result in a significant impact to any of the species likely to be present in Area 1 (Appendix A).

4.2.2 Indirect impacts

This section outlines the assessed activities indirect impacts, following the implementation of avoidance, minimisation and mitigation measures outlined in Table 4.1. Indirect impacts relating to the assessed activities comprise:

- erosion and sedimentation;
- weed introduction and spread;
- potential inadvertent disturbance of retained habitats; and
- increased noise and dust levels resulting in disturbance of fauna species, and consequent abandonment of habitat, or changes in behaviour (including breeding behaviour).

i Erosion and sedimentation

Excavations and earthmoving may lead to erosion and sedimentation, reduction in water quality and changes to water flows. During the proposed activity, sediment may be mobilised and transported by surface water during rainfall events, and potentially discharged into watercourses and drainage lines thereby reducing water quality in downstream aquatic habitats. Increased suspended sediments can reduce light penetration into the water column, reducing photosynthesis of aquatic macrophytes, and decreasing dissolved oxygen levels.

Erosion and sedimentation has been assessed in the REF, with mitigation measures recommended to minimise the impact of erosion and sedimentation of watercourses.

ii Weeds

The assessed activities have the potential to facilitate dispersal of weed species to previously unimpacted areas. Uncontrolled movement of vehicles, equipment and personnel throughout the subject site is the key vector of transmission, in particular vehicles and equipment sourced from regions beyond the subject site which may introduce new species. Many weed species thrive on ground disturbance and will rapidly colonise disturbed areas in advance of native species recolonisation.

Increased pest flora abundance has adverse impacts on native vegetation and biodiversity, as well as potential negative economic effects on local land uses.

Weed impacts will be mitigated during the proposed activity and includes measures such as wash down protocols and weed containment measures (Table 4.1).

iii Disturbance

Noise generation from the assessed activities may adversely affect fauna by interfering with communication (eg territorial bird song), masking the sound of predators and prey, causing avoidance reactions and displacement from habitat. Noise will be generated by the proposed activity through the use of equipment and vehicles and will vary from short intermittent noise from plant and equipment.

Increased dust from vegetation clearing and vehicle movements have the potential to temporarily and locally impact flora and fauna values in the vicinity of the subject site. Excess generation of dust and subsequent deposition on leaves can impair plant photosynthesis and productivity (also resulting in reduced habitat quality for fauna) and impact on respiratory systems of fauna.

Potential noise and dust impacts will be temporary as they will only be evident during the activity. Noise and dust impacts and mitigation measures are outlined within the REF.

5 Assessment against key legislation and policy

5.1 Environment Protection and Biodiversity Conservation Act 1999

An assessment of the impacts of the proposed activity on MNES was undertaken to determine whether referral of the proposed activity to the Commonwealth Minister for the Environment is required. MNES relevant to the proposed activity are summarised in Table 5.1. In determining the significance of impact associated with the proposed activity, the relevant criteria listed in the Matters of National Environmental Significance – Significance Impact Guidelines 1.1 (DoE 2013b) were applied.

Table 5.1 Assessment of the proposed activity against the EPBC Act

MNES	Activity specifics	Potential for significant impact
Threatened species	Six birds, three aquatic fish, three mammals, four flora, and one reptile species have the potential to occur within Area 1 (Section 3.5)	A significant impact is unlikely to result from the proposed activity on threatened species due to the measures outlined in Table 4.1.
Threatened ecological communities (TECs)	Four TECs have the potential to occur within Area 1 (Section 3.5).	A significant impact is unlikely to result, as the assessed activities will not take place within these communities.
Migratory species	Eight migratory bird species have the potential to occur within Area 1 (Section 3.5)	A significant impact is unlikely to result, as the assessed activities will not take place within habitats that these species rely upon.
Wetlands of international importance	The subject site contains Narran Lake Nature Reserve a RAMSAR wetland. (Section 3.5)	A significant impact is unlikely to result, as the assessed activities will not take place within the wetland or in close proximity.

5.2 Environmental Planning and Assessment Act 1979

5.2.1 State Environmental Planning Policy (Biodiversity and Conservation) 2021

The new State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) incorporates, amongst other things, the previous State Environmental Planning Policy (Koala Habitat Protection) 2021 (Koala SEPP 2021).

Chapter 4 of the new Biodiversity and Conservation SEPP applies to specified local government areas (LGAs) which are listed in Schedule 2 of the Biodiversity and Conservation SEPP.

Schedule 2 includes Walgett LGA and Brewarrina LGA. Chapter 2 of the Biodiversity and Conservation SEPP aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline.

Section 4.4 of the Biodiversity and Conservation SEPP provides (at subsection4.4(3)(d)) that the SEPP does not apply to:

- land in the following land use zones, or an equivalent land use zone, unless the zone is in a local government area marked with an * in Schedule 1—

    i) Zone RU1 Primary Production,

    ii) Zone RU2 Rural Landscape,

    iii) Zone RU3 Forestry.

Brewarrina and Walgett LGAs are not marked with an asterisk in the Schedule 2 list of LGAs, and therefore, Chapter 2 of the Biodiversity and Conservation SEPP does not apply to the land use zones RU1, RU2 or RU3 as noted above.

5.3 Biodiversity Conservation Act 2016

The constraints assessment outlines areas of high and moderate biodiversity value and therefore areas to avoid. In addition, with measures detailed in Table 4.1 to avoid, mitigate and minimise impacts, it is determined that the assessed activities will not result in a significant effect on threatened species or communities.

As outlined in Section 2.3, the proposed activity will not significantly affect threatened species or communities and thus preparation of an SIS or BDAR is not required.

5.4 Fisheries Management Act 1994

Given mitigation measures to avoid all aquatic habitats and riparian corridors (refer Table 4.1), the assessed activities associated with opal mining are unlikely to result in any indirect impacts to aquatic habitat, and therefore, the proposed activity is unlikely to result in any impacts, direct or indirect, to threatened aquatic species, populations, communities, habitats.

5.5 Biosecurity Act 2015

Given mitigation measures will be implemented for the activity (refer Table 4.1), the proposed activity is unlikely to result in any indirect impacts to aquatic habitat, and therefore, the proposed activity is unlikely to result in any impacts, direct or indirect, to threatened aquatic species, populations, communities, habitats.

5.6 Water Management Act 2000

As part of mitigation measures (refer Table 4.1) for riparian habitats and species the proposed activity will not occur within 40 m of a riverbank, creek, lake, wetland or estuary therefore a controlled activity permit is not required.

6 Conclusion

This biodiversity assessment has been completed to assess the level of biodiversity constraint across Area 1 and determine the potential impacts of the assessed activities on species and communities listed under the BC Act and EPBC Act. The assessed activities of prospecting and underground mining must avoid high constraints areas and follow the measures set out in Table 4.1 to avoid and/or minimise the impacts on threatened communities, GDEs, threatened species and their habitats. Residual impacts arising from the proposed activity, following all measures to avoid, minimise and mitigate impacts, include:

- impact (direct and indirect) to native vegetation and flora and fauna habitat; and
- indirect impacts to adjacent vegetation and fauna habitat.

The assessed activities will impact (directly and indirectly) native vegetation however, with measures in place that mitigate these impacts further, the impacts are not considered to be significant to threatened communities, threatened species or their habitats.

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Appendix A

Likelihood of occurrence

Table A.1 Likelihood of occurrence assessment

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Amphibian		*Crinia sloanei*	Sloane's Froglet	V	E	Yes	-	PCT associations	-	It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.	Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales. At a number of sites where records are verified by museum specimens, the species has not been subsequently detected during more recent frog surveys in the vicinity (eg Holbrook, Nyngan, Wagga Wagga and Tocumwal).	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Botaurus poiciloptilus*	Australasian Bittern	E	E	Yes	-	Bionet; PMST	2008	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes Typha spp. and spike rushes (*Eleocharis spp*.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects, and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely vegetated wetlands on a platform of reeds.	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Ardeotis australis*	Australian Bustard	E	-	Yes	-	Bionet	2020	Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams.	The Australian Bustard mainly occurs in inland Australia and is now scarce or absent from southern and south-eastern Australia. In NSW, they are mainly found in the north-west corner and less often recorded in the lower western and central west plains regions. Occasional vagrants are still seen as far east as the western slopes and Riverine plain. Breeding now only occurs in the north-west region of NSW.	Known
Bird		*Rostratula australis*	Australian Painted Snipe	-	E	Yes	-	PMST	-	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella.	High

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Ninox connivens*	Barking Owl	V	-	Yes	-	Bionet	2007	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (eg western NSW) due to the higher density of prey found on these fertile riparian soils. and fledging in November.	The Barking Owl is found throughout continental Australia except for the central arid regions. Although still common in parts of northern Australia, the species has declined greatly in southern Australia and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests.	Known
Bird		*Falco subniger*	Black Falcon	V	-	Yes	-	Bionet	2003	The Black Falcon are highly mobile, commonly travelling hundreds of kilometres. The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring.	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. In New South Wales there is assumed to be a single population that is continuous with a broader continental population.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Hamirostra melanosternon*	Black-breasted Buzzard	V	-	Yes	-	Bionet	2003	Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat.	The Black-breasted Buzzard is found sparsely in areas of less than 500 mm rainfall, from north-western NSW and north-eastern South Australia to the east coast at about Rockhampton, then across northern Australia south almost to Perth, avoiding only the Western Australian deserts.	Known
Bird		*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	V	-	Yes	-	Bionet	1992	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*).	The Black-chinned Honeyeater has two subspecies. In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, though it is very rare in the latter.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Ephippiorhynchus asiaticus*	Black-necked Stork	E	-	Yes	-	Bionet	2021	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries floodplain habitat).	In Australia, Black-necked Storks are widespread in coastal and subcoastal northern and eastern Australia, as far south as central NSW (although vagrants may occur further south or inland, well away from breeding areas). In NSW, the species becomes increasingly uncommon south of the Clarence Valley, and rarely occurs south of Sydney. Since 1995, breeding has been recorded as far south as Buladelah.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Limosa limosa*	Black-tailed Godwit	V	Mi	Yes	-	Bionet	1999	Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflat, muddy lakes and swamps. Individuals have been recorded in wet fields and sewerage treatment works. Forages for insects, crustaceans, molluscs, worms, larvae, spiders, fish eggs, frog eggs and tadpoles in soft mud or shallow water.	The Black-tailed Godwit is a migratory wading bird that breeds in Mongolia and Eastern Siberia and flies to Australia for the southern summer, arriving in August and leaving in March. Records in western NSW indicate that a regular inland passage is used by the species, as it may occur around any of the large lakes in the western areas during summer, when the muddy shores are exposed. The species has been recorded within the Murray-Darling Basin, on the western slopes of the Northern Tablelands and in the far north-western corner of the state.	Known
Bird		*Oxyura australis*	Blue-billed Duck	V	-	Yes	-	Bionet	2020	The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed but prefers to dive if approached.	The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Grus rubicunda*	Brolga	V	-	Yes	-	Bionet	2021	Though Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged.	The Brolga was formerly found across Australia, except for the south-east corner, Tasmania and the south-western third of the country. It is still abundant in the northern tropics, but very sparse across the southern part of its range.	Known
Bird		*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V	-	Yes	-	Bionet	2004	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses.	The eastern subspecies lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys. The population density of this subspecies has been greatly reduced over much of its range, with major declines recorded in central NSW and the northern and southern tablelands. Declines have occurred in remnant vegetation fragments smaller than 300 hectares, that have been isolated or fragmented for more than 50 years.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Burhinus grallarius*	Bush Stone-curlew	E	-	Yes	-	Bionet	2021	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber.	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range.	Known
Bird		*Hydroprogne caspia*	Caspian Tern	-	Mi	Yes	-	Bionet	2020	Migratory wetland bird	Migratory wetland bird	High
Bird		*Tringa nebularia*	Common Greenshank Greenshank	-	Mi	Yes	-	PMST	-	Migratory wetland bird	Migratory wetland bird	High
Bird		*Actitis hypoleucos*	Common Sandpiper	-	Mi	Yes	-	PMST	-	Migratory wetland bird	Migratory wetland bird	High

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Calidris ferruginea*	Curlew Sandpiper	E	Mi, CE	Yes	-	Bionet; PMST	2000	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	The Curlew Sandpiper is distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. The Curlew Sandpiper breeds in Siberia and migrates to Australia (as well as Africa and Asia) for the non-breeding period, arriving in Australia between August and November, and departing between March and mid-April.	Known
Bird		*Stagonopleura guttata*	Diamond Firetail	V	-	Yes	-	Bionet	1992	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum (*Eucalyptus pauciflora*) Woodlands.	The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V	-	Yes	-	Bionet	2018	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and groundcover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Primarily eats invertebrates and occasionally feed on nectar, fruit and seeds. Their nest sites vary greatly, but generally occur in shrubs or low trees, living or dead, horizontal or upright forks in branches, spouts, hollow stumps or logs.	Dusky woodswallows are widespread in eastern, southern and south western Australia. The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Tyto longimembris*	Eastern Grass Owl	V	-	Yes	-	PCT associations	-	Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains. They rest by day in a 'form' - a trampled platform in a large tussock or other heavy vegetative growth. Nests are found in trodden grass, and often accessed by tunnels through vegetation. Breeding season is highly variable and dependent on environmental conditions.	Eastern Grass Owls have been recorded occasionally in all mainland states of Australia but are most common in northern and north-eastern Australia. In NSW they are more likely to be resident in the north-east. Eastern Grass Owl numbers can fluctuate greatly, increasing especially during rodent plagues.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Petroica phoenicea*	Flame Robin	V	-	Yes	-	PCT associations	-	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The ground layer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands. Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. Birds forage from low perches, from which they sally or pounce onto small invertebrates which they take from the ground or off tree trunks, logs and other coarse woody debris.	The Flame Robin is endemic to south eastern Australia, and ranges from near the Queensland border to south east and South Australia and also in Tasmania. In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. It is likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Phaps histrionica*	Flock Bronzewing	E	-	Yes	-	PCT associations	-	Observed in a variety of vegetation types, including grassy plains, saltbush, spinifex and open mulga. Its preferred habitat is tussock grassland, particularly Mitchell grassland. They need to drink daily and may be seen adjacent to water, e.g. at stock tanks, bore drains and pools in water courses.	Patchily distributed and rarely observed in NSW. It is likely to occur north of Broken Hill and west of Cobar when conditions are right. The extensive Mitchell grasslands around Brewarrina and Goodooga should also provide suitable habitat.	Moderate
Bird		*Apus pacificus*	Fork-tailed Swift	-	Mi	Yes	-	PMST	-	Migratory bird	Migratory bird	High
Bird		*Stictonetta naevosa*	Freckled Duck	V	-	Yes	-	Bionet	2021	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Feed on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates. Nests are usually located in dense vegetation at or near water level.	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The Freckled duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Pachycephala inornata*	Gilbert's Whistler	V	-	Yes	-	PCT associations	-	The Gilbert's Whistler occurs in a range of habitats within NSW, though the shared feature appears to be a dense shrub layer. It is widely recorded in mallee shrublands, but also occurs in box-ironbark woodlands, Cypress Pine and Belah woodlands.	The Gilbert's Whistler is sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, from the western slopes of NSW to the Western Australian wheatbelt. The eastern population extends from the central NSW mallee (Yathong, Nombinnie and Round Hill NRs), south and east through the Cocoparra Range to Pomingalama Reserve (near Wagga Wagga) then north through the South West Slopes east as far as Cowra and Burrendong Dam, to the Goonoo reserves (with scattered records as far north as Pilliga). Occasional records are also made of this species in the Capertee Valley. The species is also recorded in River Red Gum forests along the Murray River valley between Mathoura and Wentworth, with the eastern populations (between Mathoura and Barham).	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V	-	Yes	-	PCT associations	-	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, (*Allocasuaraina diminuta)*, and Belah (*A. gymnathera*.) is also utilised and may be a critical food source for some populations.	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Falco hypoleucos*	Grey Falcon	-	V	Yes	-	PMST	-	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, and can feed on reptiles and mammals. It utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse.	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. There are possibly less than 5,000 individuals left. Population trends are unclear, though it is believed to be extinct in areas with more than 500 mm rainfall in NSW.	High

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V	-	Yes	-	Bionet	2019	Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Live in family groups that consist of a breeding pair and young from previous breeding seasons. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses. Nests are usually located in shrubs or sapling eucalypts. Breed between July and February.	The Grey-crowned Babbler has two distinctive subspecies that intergrade to the south of the Gulf of Carpentaria. In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands.	Known
Bird		*Gelochelidon nilotica*	Gull-billed Tern	-	Mi	Yes	-	Bionet	2020	Migratory wetland bird	Migratory wetland bird	High

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Pomatostomus halli*	Hall's Babbler	V	-	Yes	-	PCT associations	-	Inhabits dry *Acacia* scrub, mainly Mulga, with a grassy understorey including spinifex, on ridges and plains with either sandy or stony soils. Hall's Babblers construct neat spherical dome nests, each with a side entrance, from twigs within the outer branches of acacias, in the upright forks of mulgas Appear to occur in very localised patches. They feed mostly on the ground in grassy areas, they also glean and probe on trunks and branches. Diet includes insects (especially beetle pupae and caterpillars), spiders and seeds.	It occurs in central-eastern Australia, from Cobar north into south-western Queensland, particularly along or west of the Warrego River. These birds have been recorded from the White Cliffs area through to the Culgoa River, Nocoleche Nature Reserve, Sturt National Park and Mutawintji National Park. Recently recorded in Mulga groves near Ledknapper Creek (1993) and near Mt Gunderbooka (1994).	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V	-	Yes	-	Bionet	2020	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. May breed any time between July and November, often rearing several broods. The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1 m to 5 m above the ground.	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. It is considered a sedentary species, but local seasonal movements are possible. The south-eastern form (subspecies *cucullate*) is found from Brisbane to Adelaide and throughout much of inland NSW, with the exception of the extreme north-west.	Known
Bird		*Gallinago hardwickii*	Latham's Snipe	-	Mi	Yes	-	PMST	-	Migratory wetland bird	Migratory wetland bird	High

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Hieraaetus morphnoides*	Little Eagle	V	-	Yes	-	Bionet	2021	Occupies open eucalypt forest, woodland or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW.	Known
Bird		*Anseranas semipalmata*	Magpie Goose	V	-	Yes	-	Bionet	1998	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW.	The Magpie Goose is still relatively common in the Australian northern tropics, but had disappeared from south-east Australia by 1920 due to drainage and overgrazing of reed swamps used for breeding. Since the 1980s there have been an increasing number of records in central and northern NSW. Vagrants can follow food sources to south-eastern NSW.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	V	-	Yes	-	Bionet	2020	Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Nesting, in tree hollows, that are at least 1 km apart, with no more than one pair every 30 square kilometres.	Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that.	Known
Bird		*Tyto novaehollandiae*	Masked Owl	V	-	Yes	-	Bionet	1985	Lives in dry eucalypt forests and woodlands from sea level to 1,100 m. Often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Grantiella picta*	Painted Honeyeater	V	V	Yes	-	Bionet; PMST	2001	Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution.	Known
Bird		*Calidris melanotos*	Pectoral Sandpiper	-	Mi	Yes	-	PMST	-	Migratory wetland bird	Migratory wetland bird	High

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Certhionyx variegatus*	Pied Honeyeater	V	-	Yes	-	PCT associations	-	Inhabits wattle shrub, primarily Mulga (*Acacia aneura*), mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering; feeds on nectar, predominantly from various species of emu-bushes (*Eremophila* spp.); also, from mistletoes and various other shrubs (eg *Grevillea* spp.); also eats saltbush fruit, berries, seed, flowers and insects. Constructs a relatively large cup-shaped nest, usually robust, although occasionally loose, constructed of grasses and fine twigs.	Widespread throughout acacia, mallee and spinifex scrubs of arid and semi-arid Australia. Occasionally occurs further east, on the slopes and plains and the Hunter Valley, typically during periods of drought.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Calyptorhynchus banksii samueli*	Red-tailed Black-Cockatoo (inland subspecies)	V	-	Yes	-	Bionet	2018	Red-tailed Black-Cockatoos are found in a wide variety of habitats. Prefer *Eucalyptus* forest and woodlands, particularly River red gum and coolabah lined water courses. In the arid zone usually occur mainly near eucalypts along larger watercourses and associated *Acacia* and *Casuarina* woodlands nearby. Also utilise grasslands, scrublands, wetlands and vegetation on floodplains.;1|	The Red-tailed Black-Cockatoo is the most widespread of the Black-Cockatoos, ranging broadly across much of northern and western Australia as well as western Victoria. The Red-tailed Black-Cockatoo (inland subspecies) is known to occur around watercourses and overflows of the Darling, Paroo, Bogan, Macquarie and Barwon Rivers extending in an arc along the Darling River from Wentworth (though rare south of Menindee) in the south to Bourke and thence through to Brewarrina in the north. It extends east to Walgett and perhaps Boggabilla on the Barwon and south through to the Macquarie Marshes.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Petroica boodang*	Scarlet Robin	V	-	Yes	-	PCT associations	-	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. Breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions. Birds forage from low perches, fenceposts or on the ground, from where they pounce on small insects and other invertebrates. Nest in an open cup made of plant fibres and cobwebs and is built in the fork of tree.	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter.	Moderate
Bird		*Calidris acuminata*	Sharp-tailed Sandpiper	-	Mi	Yes	-	PMST	-	Migratory wetland bird	Migratory wetland bird	High

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Chthonicola sagittata*	Speckled Warbler	V	-	Yes	-	PCT associations	-	The Speckled Warbler lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant.	The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100 ha survive.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Circus assimilis*	Spotted Harrier	V	-	Yes	-	Bionet	2021	Occurs in grassy open woodland including *Acacia* and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. Preys on terrestrial mammals (eg bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion.	The Spotted Harrier occurs throughout the Australian mainland, except in densly forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Lophoictinia isura*	Square-tailed Kite	V	-	Yes	-	PCT associations	-	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Breeding sites generally located along or near watercourses, in a fork or on large horizontal limbs.	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March.	Moderate
Bird		*Geophaps scripta scripta*	Squatter Pigeon (southern subspecies)	CE	V	Yes	✓	PCT associations	-	Grassy woodlands and plains, preferring sandy areas and usually close to water. Feed on the ground, on seeds of grasses, herbs and shrubs, as well as insects. Nest on the ground.	Found from north Queensland to the North West Slopes of NSW and extending down to the Liverpool Plains and Dubbo. Today they are very rare in the southern parts of their range.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Polytelis swainsonii*	Superb Parrot	V	V	Yes	-	Bionet; PMST	2001	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. May forage up to 10 km from nesting sites, primarily in grassy box woodland. Diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain.	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. It is estimated that there are less than 5000 breeding pairs left in the wild.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Amytornis modestus inexpectatus*	Thick-billed Grasswren (central NSW subspecies)	Ex	-	Yes	✓	PCT associations	-	Habitats occupied by this long extinct population have not been confidently determined but were probably chenopod or Nitrebush (*Nitraria billardierei*) shrublands or low shrublands. Also occurs along watercourses in clumps of Canegrass; when disturbed, individuals take refuge in any available cover, including piles of old flood debris along dry sandy watercourses and down rabbit burrows. Forages on the ground and under or around bushes for a wide variety of seeds, berries and invertebrates.;4|	Formerly occurred in central and western NSW, from the lower reaches of the Namoi River, south to Mossgiel. Considered extinct.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Neophema pulchella*	Turquoise Parrot	V	-	Yes	-	PCT associations	-	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Forages quietly and may be quite tolerant of disturbance. Nests in tree hollows, logs, or posts.	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Daphoenositta chrysoptera*	Varied Sittella	V	-	Yes	-	Bionet	2012	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy.;2|Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy.	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades.	Known
Bird		*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V	-	Yes	-	Bionet	2021	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
										saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches. Nests are large structures built from sticks and lined with leaves or grass. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion.		

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Bird		*Epthianura albifrons*	White-fronted Chat	V	-	Yes	-	Bionet	2021	Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground. Nests are usually built about 23 cm above the ground (but have been found up to 2.5 m above the ground). Birds can breed at one year of age and are estimated to live for five years.	The White-fronted Chat is found across the southern half of Australia, from southernmost Queensland to southern Tasmania, and across to Western Australia as far north as Carnarvon. Found mostly in temperate to arid climates and very rarely sub-tropical areas.	Known
Bird		*Hirundapus caudacutus*	White-throated Needletail	-	V	Yes	-	PCT associations	-	Migratory and usually seen in eastern Australia from October to April. Breeds in forests in south-eastern Siberia, Mongolia, the Korean Penninsula and northern Japan June-August. Most often seen in eastern Australia before storms, low pressure troughs an	Migratory and usually seen in eastern Australia from October to April. Breeds in forests in south-eastern Siberia, Mongolia, the Korean Penninsula and northern Japan June-August. Most often seen in eastern Australia before storms, low pressure troughs an	Moderate
Bird		*Motacilla flava*	Yellow Wagtail	-	Mi	Yes	-	PMST	-	Migratory bird	Migratory bird	High

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Mammal		*Setirostris eleryi*	Bristle-faced Free-tailed Bat	E	-	Yes	-	PCT associations	-	Knowledge of the ecology of the Hairy-nosed Freetail Bat is limited, however evidence suggests that the species depends on hollows and tree fissures for roosting sites. All other Australian species from the same family generally roost in tree hollows and fissures. Appears to be extremely rare throughout its range. Nationally, it has been recorded from only 15 locations.	Distributed from the southern half of the Northern Territory to central Queensland and north-western NSW. In NSW, the species has been recently recorded from only three disjunct locations: thirteen individuals from Gundabooka National Park, south of Bourke; one individual from Dhinnia Dthinawan Nature Reserve (formerly Bebo State Forest), north of Warialda two individuals near Bonshaw.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Mammal		*Nyctophilus corbeni*	Corben's Long-eared Bat	-	V	Yes	-	PMST	-	Inhabits a variety of vegetation types, including mallee, bulloke (*Allocasuarina* leuhmanni) and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark. Slow flying agile bat, utilising the understorey to hunt non-flying prey - especially caterpillars and beetles.	Overall, the distribution of the south eastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species.	Possible

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Mammal		*Leggadina forresti*	Forrest's Mouse	V	-	Yes	-	PCT associations	-	Forrest's Mouse occurs in arid and semi-arid plains habitats, especially tussock grassland and chenopod shrubland. They also occur within mulga or savannah woodlands, claypans and sandy ridges. This animal shelters during the day in nests in shallow burrows and cracks in the soil. They feed on seeds, arthropods, and green leaves & stems and, like other well-adapted desert rodents.	Forrest's Mouse is sparsely distributed across arid and semi-arid inland Australia. In north west NSW, it has been recorded from Sturt National Park, Tibooburra, Fowler's Gap, Mutawintji National Park (as subfossil remains), and from near Wilcannia. The species has also recently been recorded from Ledknapper Nature Reserve, and Culgoa National Park near Weilmoringle.	Moderate
Mammal		*Phascolarctos cinereus*	Koala	V	E	Yes	-	Bionet, PMST	2015	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than 2 ha to several hundred hectares in size.	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Mammal		*Antechinomys laniger*	Kultarr	E	-	Yes	-	PCT associations	-	A terrestrial insectivore that inhabits open country, especially claypans among *Acacia* woodlands. Nocturnal, sheltering by day in hollow logs or tree-stumps, beneath saltbush and spinifex tussocks, in deep cracks in the soil and in the burrows of other animals. Populations appear to fluctuate seasonally in response to environmental stresses, including declines following periods of drought and intensive flooding.	Widespread across arid and semi-arid NSW but present in very low numbers. Records typically derive from captures by domestic cats or are collected after falling into steep-sided holes. Recent records have come primarily from the Cobar and Brewarrina region.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Mammal		*Chalinolobus picatus*	Little Pied Bat	V	-	Yes	-	Bionet	2011	Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. Can tolerate high temperatures and dryness but need access to nearby open water. Feeds on moths and possibly other flying invertebrates.	The Little-Pied Bat is found in inland Queensland and NSW (including Western Plains and slopes) extending slightly into South Australia and Victoria.	Known
Mammal		*Rattus villosissimus*	Long-haired Rat	V	-	Yes	-	Bionet	1973	Eats roots, stems and leaves of grasses and herbs, especially the more succulent species. Seeds, flowers and insects (eg locust) which become available in better seasons stimulate reproduction. Sustained in mesic, densely vegetated sites. During plagues can be found in virtually all inland habitats. Nocturnal, sheltering during the day in complex burrow systems or in a shallow temporary burrow.	The species has been recorded over vast areas of western NSW. Strongholds are north-west of NSW, with plagues spreading south and east along river channels. Otherwise, the species is found in scattered localities in low numbers.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Mammal		*Ozimops lumsdenae*	Northern Free-tailed Bat	V	-	Yes	-	PCT associations	-	A range of vegetation types in northern Australia, from rainforests to open forests and woodlands, and are often recorded along watercourses. They can also occur in towns and cities. Roost mainly in tree hollows but relatively large colonies have been found under house roofs in urban areas in Queensland.	Widely distributed across northern Australia from Western Australia to Queensland, extending south to the north-east corner of NSW. The only confirmed record in NSW is of a colony found in the roof of a house in Murwillumbah, however, calls have been detected from a few other locations in the far northeast of the State.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Mammal		*Dasyurus maculatus*	Spotted-tailed Quoll	V	E	Yes	-	Bionet, PMST	2006	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath, and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles, and insects. Also eats carrion and takes domestic fowl. Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4,000 ha.	The range of the Spotted-tailed Quoll has contracted considerably since European settlement. It is now found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania. Only in Tasmania is it still considered relatively common.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Mammal		*Sminthopsis macroura*	Stripe-faced Dunnart	V	-	Yes	-	PCT associations	-	Native dry grasslands and low dry shrublands, often along drainage lines where food and shelter resources tend to be better. They shelter in cracks in the soil, in grass tussocks or under rocks and logs. Co-occupies areas with the more common Fat-tailed Dunnart, but prefers relatively ungrazed habitats with greater diversity and healthier understorey vegetation.	Throughout much of inland central and northern Australia, extending into central and northern NSW, western Queensland, Northern Territory, South Australia and Western Australia. They are rare on the NSW Central West Slopes and North West Slopes with the most easterly records of recent times located around Dubbo, Coonabarabran, Warialda and Ashford.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Mammal		*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V	-	Yes	-	Bionet	2006	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born.	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Reptile		*Anomalopus mackayi*	Five-clawed Worm-skink	-	V	Yes	-	PMST	-	Close to or on the lower slopes of slight rises in grassy White Box woodland on moist black soils, and River Red Gum-Coolibah-Bimble Box woodland on deep cracking loose clay soils. May also occur in grassland areas and open paddocks with scattered trees. Live in permanent deep tunnel-like burrows and deep soil cracks, coming close to the surface under fallen timber and litter, especially partially buried logs.	Patchy distribution on the North West Slopes and Plains of north-east NSW and south-east Queensland, from the Ashford area west to Mungindi and Walgett in NSW and north to Dalby in Queensland.	Possible
Reptile		*Ctenotus pantherinus ocellifer*	Leopard Ctenotus	E	-	Yes	-	PCT associations	-	Single specimen form spinifex, *Triodia mitchelli,* habitat upon which it appears to rely. This habitat typically occurs on red sand country. Very little is known about the ecological requirements of this subspecies. |	In NSW, the subspecies is known from a single specimen collected west of Goodooga.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Reptile		*Hoplocephalus bitorquatus*	Pale-headed Snake	V	-	Yes	-	PCT associations	-	The Pale-headed Snake is a highly cryptic species that can spend weeks at a time hidden in tree hollows. Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. In drier environments, it appears to favour habitats close to riparian areas/ Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees. The main prey is tree frogs although lizards and small mammals are also taken. The Pale-headed Snake is relatively unusual amongst elapid snakes in that it is well adapted to climbing trees. |	A patchy distribution from north-east Queensland to the north-eastern quarter of NSW. In NSW it has historically been recorded from as far west as Mungindi and Quambone on the Darling Riverine Plains, across the north west slopes, and from the north coast from Queensland to Sydney. A small number of historical records are known for the New England Tablelands from Glenn Innes and Tenterfield; however, the majority of records appear to be from sites of relatively lower elevation. Although the Pale-headed snake distribution is very cryptic, it now appears to have contracted to a patchy and fragmented distribution.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Reptile		*Tiliqua occipitalis*	Western Blue-tongued Lizard	V	-	Yes	-	Bionet	1993	Diurnally forages for insects, snails, native vegetation and carrion. Inhabits plains, swales, ranges and sometimes dunes of loamy or clayey/sandy soils vegetated by woodlands, especially mallee, shrublands (including chenopods), heaths or hummock grasslands. Preferred vegetation type appears to be mixed mallee/*Triodia* communities. Terrestrial, and known to utilise rabbit warrens for shelter.	Scattered records across central western and western NSW. No observations from north west NSW to date.	Possible

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Reptile		*Aspidites ramsayi*	Woma	V	-	Yes	-	PCT associations	-	Terrestrial, inhabiting subtropical to temperate deserts and sandy plains, as well as dunefields and deep cracking black soil plains in semi-arid areas. Occurs in hummock grasslands, shrublands or woodlands and shelters in animal burrows, hollow logs or under grass hummocks. Feeds at night on lizards, snakes, birds and small mammals. Actively forages on the ground, in animal burrows and in trees.	The Woma occurs in north-western NSW, east to about Louth and Bourke. In was last recorded in these eastern districts in the late 1890s, and in 1983 from the Tibooburra region. Its range and abundance in south-eastern Australia is considered to be undergoing serious decline.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Insect		*Jalmenus eubulus*	Pale Imperial Hairstreak	CE	-	Yes	✓	PCT associations	-	Only known to breed in old-growth forest or woodland and does not appear to colonise regowth habitats following clearing or other major disturbance. Suitable habitat is dominated by brigalow, (*Acacia harpophylla*) and Buloke, (*Casuarina cristata*) on clay soils on flat to gently undulating plains, usually with scattered emergent euclypts such as Poplar Box, (*Eucalyptus populnea*) and low trees of Wilga (*Geijera parviflora*).	*Jalmenus eubulus* is found in Queensland and NSW. In Queensland it is restricted to the seasonally sub-humid central and southern areas of the state. In NSW it is found only in brigalow-dominated open forests and woodlands in northern areas of the state.	Moderate
Fish		*Macquaria australasica*	Macquarie Perch	-	E	Yes	-	PMST	-	Aqautic species	#N/A	Moderate
Fish		*Maccullochella peelii*	Murray Cod	-	V	Yes	-	PMST	-	Aqautic species	#N/A	Moderate
Fish		*Maccullochella macquariensis*	Trout Cod	-	E	Yes	-	PMST	-	Aqautic species	#N/A	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Trees	Capparaceae	*Capparis loranthifolia var. loranthifolia*	Narrow-leafed Bumble	E	-	Yes	-	PCT associations	-	Throughout its range, found in mixed soft-wood forest in fine red soil, and in brown silty clay-loam near creeks. It is sometimes incorrectly regarded as a weed in cleared areas and is recorded as abundant in the NSW population, and rare and scattered to locally frequent interstate. Associated species include *Eucalyptus* populnea, *E. melanophloia*, *E. microtheca*, *E. crebra*, *Geijera parviflora*, *Acacia aneura*, *Acacia oswaldii*, *Acacia harpophylla*, *Acacia catenulata*, *Eremophila mitchellii*. Plants form low, stunted trees to very bushy, ground-hugging shrubs with a deep green appearance. Flowers in spring.	Recorded in the north-western plains of NSW, from near Weilmoringle north of Brewarrina. Several populations have recently been found in Culgoa NP. The species is relatively common in western Qld.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Shrubs	Chenopodiaceae	*Maireana lanosa*	-	Ex	-	Yes	-	Bionet	1900	Maireana lanosa are found in red sand or loam on saline flats or floodplains.	This species is presumed to be extinct in NSW. Its distribution is known to widespread but uncommon. It is currently distributed throughout Queensland, Western Australia, South Australia and the Northern Territory.	Known in 1900, considered extinct
Shrubs	Malvaceae	*Sida rohlenae*	Shrub Sida	E	-	Yes	-	PCT associations	-	Shrub Sida has been observed growing on flood-out areas, creek banks and at the base of rocky hills. NSW specimens have been found along roadsides in hard red loam to sandy-loam soils but has also been recorded on grey clays. The species can become locally abundant and is often more common in disturbed sites. Flowers appear in spring and summer.	Shrub Sida has a limited distribution in Queensland, the Northern Territory, South Australia and Western Australia. In NSW it has been recorded south of Enngonia, south of Bourke, west of Wee Waa and north-west of Coonamble with one collection north of Bourke which is likely to have been transported from Queensland.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Shrubs	Fabaceae (Mimosoideae)	*Acacia jucunda*	Yetman Wattle	E	-	Yes	✓	PCT associations	-	*Acacia jucunda* abundance in populations has been recorded as locally occasional, locally common and frequent, with one population noted as being about one acre in extent. Mainly restricted to dry eucalypt woodland communities on sandy to sandy-loam soils. In Queensland, the species is found in dry ranges on loams or clay-loams in eucalypt communities. Associated species at the NSW sites include *Acacia polybotrya* and *Callitris endlicheri*. Known to reproduce by free-suckering. Flowers from July to September and fruits two to three months later.	Yetman Wattle is found in the Yetman district near the Queensland border on the North West Slopes of NSW. It also occurs in Queensland where it is reasonably common.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Shrubs	Phyllanthaceae	*Phyllanthus maderaspatensis*	-	E	-	Yes	-	Bionet	2001	Grows in floodplain areas on heavy soils and may rely on appropriate and intermittent rainfall and flooding events for its survival. The species is described as being a summer-growing annual and is thus dependent on seasonal conditions. Often associated with open grasslands and eucalypt woodlands in or near creek beds, and grassy flats and levees near watercourses. Flowering time is spring to summer, and the species is a summer-growing annual. Seeding is recorded in March. Occurs after summer rains and readily drops its leaves as it dries off. Plants are usually infrequent in abundance but have been recorded as common in disturbed areas.	Recorded for the Brewarrina and Collarenebri districts in the north-western plains of NSW. Very widely distributed across the tropics of Qld, the NT, and WA, with additional records from SA.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Forbs and grasses	Chenopodiaceae	*Atriplex infrequens*	-	-	V	Yes	-	PMST	-	Flowering time has not been recorded, however seeding is recorded in December. Population structure and disturbance regimes are not known. *Atriplex infrequens* is associated with broad drainage tracts, clay flats and possibly occasionally inundated habitats. Very little ecological information is available for this species so its critical habitat components can only be speculated as relatively undisturbed and ungrazed drainage lines and flats.	Confined to the NSW far western plains. North western records recorded from east of Tibooburra, south east of Brewarrina and near Wilcannia with isolated collections from the Pooncarie area in the south. Also recorded in 1917 in South Australia.	Possible
Forbs and grasses	Poaceae	*Homopholis belsonii*	Belson's Panic	E	V	Yes	-	PCT associations	-	Grows in dry woodland (eg Belah) often on poor soils, although sometimes found in basalt-enriched sites north of Warialda and in alluvial clay soils. Habitat and ecology appear to be poorly known.	It occurs on the northwest slopes and plains of NSW, mostly between Wee Waa, Goondiwindi and Glen Innes. It also occurs in mainly in the Brigalow Belt South bioregion.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Forbs and grasses	Convolvulaceae	*Convolvulus tedmoorei*	Bindweed	E	-	Yes	✓	PCT associations	-	*Convolvulus tedmoorei* is a perennial forb. Grows in self-mulching grey clay soils on the floodplains of the Darling and Murrumbidgee Rivers. Flowering specimens of *Convolvulus tedmoorei* were collected in late winter (August) and early spring (September). Disturbance regimes are not known, although the species may require periodic flooding of its habitat to maintain the wet conditions suitable for seed set and germination.	This species has been recorded from northern inland areas of South Australia, south-western Queensland and western NSW. There are few known records from NSW: two areas on the Murrumbidgee and Darling River floodplains in central-western NSW (from Toganmain Station, Darlington Point, and from a locality 8km and north-west of Louth); and two other records from east of Broken Hill on the road to Wilcannia, and from the Menindee Road, Scarsdale.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Forbs and grasses	Chenopodiaceae	*Maireana cheelii*	Chariot Wheels	-	V	Yes	-	PMST	-	Usually found on heavier, grey clay soils with Atriplex vesicaria (Bladder Saltbush). Recorded on the Hay Plain in Atriplex vesicaria, Maireana aphylla and Acacia homalophylla shrublands. Soils include heavy brown to red-brown clay-loams, hard cracking red clay, other heavy texture-contrast soils. Tends to grow in shallow depressions, often on eroded or scalded surfaces, and does not extend to the higher soils in the habitat. Associated species include *Atriplex vesicaria*, *Maireana pentagona*, *M. excavata*, *M. ciliata*, *Cressa cretica*, *Avena fatua, Acacia homalophylla*. Flowering time is mostly spring to summer. Bears fruits mostly from September to November.	Restricted to the southern Riverina region of NSW, mainly in the area between Deniliquin and Hay. Also has a limited distribution in Victoria where very rare. NSW collections have mainly been from the Moulamein, Deniliquin and Hay districts, including Tchelery and Zara Stations. There is an outlying record from "Wangareena east of Wanaaring".	Possible

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Forbs and grasses	Fabaceae (Faboideae)	*Desmodium campylocaulon*	Creeping Tick-trefoil	E	-	Yes	-	PCT associations	-	Creeping Tick-Trefoil is confined to clay soils, usually with *Astrebla* and *Iseilema* species. In NSW *Desmodium campylocaulon* grows on cracking black soils in the Narrabri, Moree and Walgett local government areas. Associated species include *Acacia harpophylla*, *Astrebla pectinate* and *Sorghum, Dichanthium* and Panicum species. Flowers summer and autumn. Plants are recorded as uncommon, occasional, common, and frequent in populations.	Occurs chiefly in the Collarenebri and Moree districts in the north-western plains of NSW. Also occurs in the NT and Darling Downs district of south-eastern Queensland.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Forbs and grasses	Convolvulaceae	*Ipomoea diamantinensis*	Desert Cow-Vine	E	-	Yes	✓	PCT associations	-	Grows on clay soils on floodplains, often in shallow water and mud on cracking grey clay. Interstate habitats include low-lying grasslands with scattered *Atalaya hemiglauca*, *A. georgensis*, gums and boxes, swamp margins and billabongs, a small floodway with *A. stenophylla*, and the water surface of a watercourse with other aquatic plants. Associated species include *Astrebla squarrosa*, *Astrebla elymoides*, *Eremophila bignoniiflor* and *Muehlenbeckia cunninghamii*. Flowers mainly summer to autumn. Plants often grow in mud with stems trailing out and over the water.	Occurs north from near Goodooga, in the north-western slopes and plains of NSW. Localities include Narran River and Inverell. The species is distributed widely across northern Australia in Qld, SA, the NT and WA.	Moderate

Forbs and grasses	Poaceae	*Digitaria porrecta*	Finger Panic Grass	E	-	Yes	-	PCT associations	-	In NSW, the most frequently recorded associated tree species are *Eucalyptus alben* and *Acacia pendula* Common associated grasses and forbs in NSW sites include *Austrostipa aristiglumis*, *Enteropogon acicularisi, Cyperus bifax*, *Hibiscus trionum* and *Neptunia gracilis*. Flowering season is summer or late summer from mid-January to late February, with seeds maturing and falling from the plant soon after. Native grassland, woodlands or open forest with a grassy understorey, on richer soils. Often found along roadsides and travelling stock routes where there is light grazing and occasional fire, *Digitaria porrecta* is a perennial tussock-forming grass that can vegetatively reproduce. Fire, livestock grazing and trampling, and physical disturbance of habitat by road and farm machinery are types of disturbances known to occur in *Digitaria porrecta* sites. Field observations indicate that the grass does	Finger Panic Grass occurs in NSW and Queensland. In NSW it is found on the North West Slopes and Plains, from near Moree south to Tambar Springs and from Tamworth to Coonabarabran. It largely occurs on private land.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
										continue to persist in such habitats but the effect of the disturbances on the long term capability of the species to maintain a viable population is unknown.		
Forbs and grasses	Polygalaceae	*Polygala linariifolia*	Native Milkwort	E	-	Yes	-	PCT associations	-	Sandy soils in dry eucalypt forest and woodland with a sparse understorey. The species has been recorded from the Inverell and Torrington districts growing in dark sandy loam on granite in shrubby forest of *Eucalyptus caleyi, Eucalyptus dealbata* and *Callitris*, and in yellow podsolic soil on granite in layered open forest. In the Pilliga area, this species has been recorded in Fuzzy Box woodland, White Cypress Pine-Bulloak - Ironbark woodland, Rough-barked Apple riparian forb-grass open forest, and Ironbark - Brown Bloodwood shrubby woodland. Other associated species include *Eucalyptus trachyphloia*, *Eucalyptus sphaerocarpa*, *Angophora floribunda, Angophora*	North from Copeton Dam and the Warialda area to southern Queensland; also found on the NSW north coast near Casino and Kyogle, and there is an isolated population in far western NSW near Weebah Gate, west of Hungerford. This species also occurs in Western Australia.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
										leiocarpa, *Lophostemon suaveolens*, *Corymbia henryi*, *Allocasuarina torulosa* and *Wahlenbergia* species in the understorey. Flowers from spring to summer. Recent surveys in the Pilliga area observed significant declines in populations over autumn and winter, apparently the result of *P. linariifolia* increasing with the previous summer's high rainfall then declining under below-average conditions.		
Forbs and grasses	Fabaceae (Faboideae)	*Swainsona sericea*	Silky Swainson-pea	V	-	Yes	-	PCT associations	-	Found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes. Sometimes found in association with cypress-pines *Callitris* spp. Habitat on plains unknown. Regenerates from seed after fire.	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland.	High

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Forbs and grasses	Fabaceae (Faboideae)	*Swainsona murrayana*	Slender Darling Pea	V	V	Yes	-	PCT associations	-	Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with *Maireana* species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated. Plants produce winter-spring growth, flower in spring to early summer and then die back after flowering. They re-shoot readily and often carpet the landscape after good cool-season rains. The species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated.	Found throughout NSW, it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Forbs and grasses	Fabaceae (Faboideae)	*Swainsona recta*	Small Purple-pea	E	E	Yes	-	PCT associations	-	Before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum (*Eucalyptus blakelyi*),Yellow Box (*E. melliodora*), Candlebark Gum *E. rubida* and Long-leaf Box *E.* goniocalx. Grows in association with understorey dominants that include Kangaroo Grass *Themeda australis*, poa tussocks *Poa spp.* and spear-grasses *Austrostipa spp*. Plants die back in summer, surviving as a rootstocks until they shoot again in autumn. Flowers throughout spring, with a peak in October. Seeds ripen at the end of the year. Individual plants have been known to live for up to 20 years. Generally tolerant of fire, which also enhances germination by breaking the seed coat and reduces competition from other species.	Small Purple-pea was recorded historically from places such as Carcoar, Culcairn and Wagga Wagga where it is probably now extinct. Populations still exist in the Queanbeyan and Wellington-Mudgee areas. Over 80% of the southern population grows on a railway easement. It is also known from the ACT and a single population of four plants near Chiltern in Victoria.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Forbs and grasses	Brassicaceae	*Lepidium monoplocoides*	Winged Peppercress	E	E	Yes	-	Bionet; PMST	1999	Occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Predominant vegetation is usually an open woodland dominated by Bulloak (*Allocasuarina luehmannii*) and/or eucalypts, particularly Black Box (*Eucalyptus largiflorens*) or Poplar Box (*Eucalyptus populnea*). The field layer of the surrounding woodland is dominated by tussock grasses. Recorded in a wetland-grassland community comprising *Eragrostis australasicus*, *Agrostis avenacea*, *Austrodanthonia duttoniana*, *Homopholis proluta*, *Myriophyllum crispatum*, *Utricularia dichotoma* and *Pycnosorus globosus*, on waterlogged grey-brown clay. Flowers from late winter to spring, or August to October. The species is highly dependent on seasonal conditions. The	Widespread in the semi-arid western plains regions of NSW. Collected from widely scattered localities, with large numbers of historical records but few recent collections. There is a single collection from Broken Hill and only two collections since 1915, the most recent being 1950. Also previously recorded from Bourke, Cobar, Urana, Lake Cargelligo, Balranald, Wanganella and Deniliquin. Recorded more recently from the Hay Plain, south-eastern Riverina, and from near Pooncarie.	Known

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
										number of plants at each site varies greatly with seasonal conditions, but sites tend to be small in area with local concentrations of the plant. Has been recorded as uncommon to locally common with hundreds of plants at sites.		

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Epiphytes and Climbers	Apocynaceae	*Tylophora linearis*	-	-	E	Yes	-	PMST	-	Grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of *Eucalyptus fibrosa*, *Eucalyptus sideroxylon*, *Eucalyptus albens*, *Callitris endlicheri*, *Callitris glaucophylla* and *Allocasuarina luehmanni.* Also grows in association with *Acacia hakeoides*, *Acacia lineata*, *Melaleuca uncinata*, *Myoporum* species and Casuarina species. Flowers in spring, with flowers recorded in November or May and is suspected to be related to rainfall, with fruiting probably 2 to 3 months later. Altitudes are generally in the range of 300 - 400 m a.s.l.	Occurs from southern Queensland into central NSW, as far south near Temora with the majority of records occurring in the central western region. Records from Goonoo, Pillaga West, Pillaga East, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie NR, Goobang NP and Beni SCA. Also has been recorded in the Hiawatha State Forest near West Wyalong in the south and there are old records as far north as Crow Mountain near Barraba and near Glenmorgan in the western Darling Downs.	Possible

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
Ferns and Cycads	Platyzomataceae	*Platyzoma microphyllum*	Braid Fern	E	-	Yes	✓	PCT associations	-	Grows in sandy or swampy soils, or in clay soils adjacent to streams and lagoons and subject to periodic flooding. Recorded in NSW at Bruxner Highway growing as one localised patch in deep sandy soil, with *Leptospermum* species, *Brachyloma daphnoides* and *Lomandra* species. The fern was growing at Bebo State Forest in *Angophora* and *Callitris* woodland in sandy soil, and a very open sunny position also in sandy soil. Other associated species include *Hakea dactyloides*, *Brachyloma daphnoides*, *Jacksonia scoparia*, *Xylomelum cunninghamii* and *Calytrix tetragona*. Grows in Qld in deep sandy soils over clay where there is periodic marked increase in the level of the water table, or sometimes in clay beside streams or lagoons where the ground is subject to periodic, prolonged inundation by water.	Recorded in NSW only in the Yetman district. The species is widespread across northern Australia, from WA to the NT, eastern Qld and just into central-northern NSW.	Moderate

Class	Family (plants only)	Scientific name	Common name	BC Act listing	EPBC Act listing	Threatened?	SAII	Data source	Last recorded	Species info	Distribution	Likelihood of occurrence
										Fertile plants of *Platyzoma microphyllum* have been recorded throughout most of the year. Populations can form tussocks or colonies up to several metres across; in NSW the fern forms very localised and clumped populations. |		

Appendix B

PCTs and threatened ecological communities

B.1 PCTs and Threatened Ecological Communities Associations

Table B.1 PCTs and threatened ecological community associations

PCTID	PCT Name	Threatened Ecological Community Status (NSW)	Threatened Ecological Community Status (Commonwealth)
24	Canegrass swamp tall grassland wetland of drainage depressions, lakes and pans of the inland plains	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
27	Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered) Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered)
36	River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
37	Black Box woodland wetland on NSW central and northern floodplains including the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions (Endangered) Artesian Springs Ecological Community in the Great Artesian Basin (Endangered) Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered)	No associated TEC
38	Black Box low woodland wetland lining ephemeral watercourses or fringing lakes and clay pans of semi-arid (hot) and arid zones	No associated TEC	No associated TEC
39	Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion	Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions (Endangered) Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
40	Coolabah open woodland wetland with chenopod/grassy ground cover on grey and brown clay floodplains	Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions (Endangered) Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC

PCTID	PCT Name	Threatened Ecological Community Status (NSW)	Threatened Ecological Community Status (Commonwealth)
43	Mitchell Grass grassland - chenopod low open shrubland on floodplains in the semi-arid (hot) and arid zones	Native Vegetation on Cracking Clay Soils of the Liverpool Plains (Critically Endangered) Artesian Springs Ecological Community in the Great Artesian Basin (Endangered) Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered)	No associated TEC
49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered) Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered)	No associated TEC
53	Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
55	Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions (Endangered) Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered) Native Vegetation on Cracking Clay Soils of the Liverpool Plains (Endangered) Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions (Endangered)	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered) Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions (Endangered) Listed EPBC Act,CE: Native Vegetation on Cracking Clay Soils of the Liverpool Plains (Critically Endangered) Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions (Endangered);
56	Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered) Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions (Endangered) Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions (Endangered) ;	No associated TEC
59	Belah/Black Oak - Western Rosewood - Leopardwood low open woodland on sandplain and sandy flats in semi arid (hot) and arid climate zones	*Acacia loderi* shrublands (Endangered)	No associated TEC

PCTID	PCT Name	Threatened Ecological Community Status (NSW)	Threatened Ecological Community Status (Commonwealth)
62	Samphire saline shrubland/forbland wetland of lake beds and lake margins in the arid and semi-arid (hot) zones	No associated TEC	No associated TEC
69	White Cypress Pine - Mulga shrubland on plains and sandplains in the arid and semi-arid (hot summer) climate zones.	No associated TEC	No associated TEC
72	White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion	No associated TEC	No associated TEC
87	Poplar Box - Coolabah floodplain woodland on light clay soil mainly in the Darling Riverine Plains Bioregion	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered) Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions (Endangered)	No associated TEC
98	Poplar Box - White Cypress Pine - Wilga - Ironwood shrubby woodland on red sandy-loam soils in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	No associated TEC	No associated TEC
117	Buck Spinifex shrubby hummock grassland / Coolabah Apple - Silver-leaved Ironbark open woodland on deep sand in the Enngonia to Cumborah regions, north western NSW	No associated TEC	No associated TEC
118	Gidgee chenopod woodland on red-brown clays in the semi-arid (hot) climate zone mainly in the Mulga Lands Bioregion.	*Acacia loderi* shrublands (Endangered)	No associated TEC
120	Mulga shrubland on stony rises in the arid and semi-arid climate zones, mainly in the Mulga Lands Bioregion	*Acacia loderi* shrublands (Endangered)	No associated TEC
125	Mulga - Ironwood shrubland on loams and clays mainly of the Cobar Peneplain Bioregion	*Acacia loderi shrubland* (Endangered)	No associated TEC
134	Ironwood woodland of the semi-arid plains	*Acacia loderi shrubland* (Endangered)	No associated TEC
139	Prickly Wattle tall open shrubland of dunes and sandplains of semi-arid and arid regions	*Acacia loderi* shrublands (Endangered)	No associated TEC
143	Narrow-leaved Hopbush - Scrub Turpentine - Senna shrubland on semi-arid and arid sandplains and dunes.	*Acacia loderi* shrublands (Endangered)	No associated TEC
144	Leopardwood low woodland mainly on clayey soils in the semi-arid zone	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC

PCTID	PCT Name	Threatened Ecological Community Status (NSW)	Threatened Ecological Community Status (Commonwealth)
146	Whitewood low open woodland of the Brigalow Belt South Bioregion and north-eastern Darling Riverine Plains Bioregion	No associated TEC	No associated TEC
150	Bottlewasher - Copperburr grassland of the arid zone	No associated TEC	No associated TEC
158	Old Man Saltbush - mixed chenopod shrubland of the semi-arid hot (persistently dry) and arid climate zones (north-western NSW)	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
163	Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
166	Disturbed annual saltbush forbland on clay plains and inundation zones mainly of south-western NSW	No associated TEC	No associated TEC
168	Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
181	Cumbungi rushland wetland of shallow semi-permanent water bodies and inland watercourses	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
192	Silver-leaved Ironbark - Poplar Box +/- Ironwood shrub - grass woodland on rises in the north-western plains of NSW	No associated TEC	No associated TEC
195	Bladder Saltbush chenopod shrubland on alluvial plains mainly in the Darling Riverine Plain Bioregion	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
211	Slender Saltbush - samphire - Copperburr low open shrubland wetland on irregularly inundated floodplains mainly in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
212	Chenopod low open shrubland - ephemeral partly derived forbland saline wetland on occasionally flooded pale clay scalds in the NSW North Western Plains	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
214	Native Millet - Cup Grass grassland of the Darling Riverine Plains Bioregion	Native Vegetation on Cracking Clay Soils of the Liverpool Plains (Critically Endangered Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
238	Permanent and semi-permanent freshwater lakes wetland of the inland slopes and plains	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC

PCTID	PCT Name	Threatened Ecological Community Status (NSW)	Threatened Ecological Community Status (Commonwealth)
241	River Coobah swamp wetland on the floodplains of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
244	Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered) Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions (Endangered)	No associated TEC
247	Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion	Artesian Springs Ecological Community in the Great Artesian Basin (Endangered)	No associated TEC
375	Budda Pea - Channel Millet ephemeral reedland wetland on floodplains in north-western NSW	No associated TEC	No associated TEC
376	Mixed scrub low open woodland on sand rises and dunes on floodplains in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	No associated TEC	No associated TEC
377	Copperburr low open shrubland on loam - clay flats and playas, western Brigalow Belt South Bioregion and northern Darling Riverine Plains Bioregion	No associated TEC	No associated TEC