
Biodiversity assessment

Lot 2 DP 842047, No 7 Wemyss
Road, Mulwala

Proposed works: Mulwala Waters Solar Farm



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Attachment A: BOS Entry Threshold Map

Attachment B: EPBC Act Protected Matters Report

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1. Introduction

Mulwala is located in the Riverina Bioregion which extends from Ivanhoe in the Murray Darling Depression Bioregion south to Bendigo, and from Narrandera in the east to Balranald in the west. The Murray and Murrumbidgee Rivers and their major tributaries, the Lachlan and Goulburn Rivers, flow from the highlands in the east, westward across the Riverina plain. The Riverina Bioregion is home to rich and diverse ecological groups including many threatened species and endangered ecological communities.

The proposed development comprises a solar farm and ancillary facilities with a DC capacity of 6.05MWp and an AC output of 5.0MW at Lot 2 DP 842047, No 7 Wemyss Road, Mulwala, NSW. It is located approximately 5 kilometres north-west of the town centre of Mulwala and is an irregular shape with a total area of 26.23 hectares. The solar farm will occupy approximately 15.7 hectares of the total site and is proposed to be placed within the western section of Lot 2.

There are proposed to be 14,500 solar modules installed on about 200 mounting structures running north to south. There is approximately 6 metres spacing between each row. Each row of PV modules will rotate to track the sun across the sky from east to west each day. The hub height of each tracker is 1.7 metres with the peak of the modules reaching an approximate height of 2.5 metres when the array is fully tilted to 60 degrees from horizontal, i.e. in the early morning and late evening. Two 2.5MW AC inverter stations and a transformer will be installed at the solar farm. These inverters are to be located within the array and are each mounted on a 6 metre (20 foot) long skid. Each of these inverter stations incorporate high and medium voltage switchgear. Each will connect by way of underground cables to connect to the a 22kV feeder line that transects the development site within an easement to inject power to the electricity grid at Mulwala Zone Substation.

2. Methodology

A desktop biodiversity assessment has been carried out to determine the potential impact on any threatened species and endangered ecological communities that are present on the development site and in the vicinity of the site. This is supported by a site inspection carried out in August 2019. The following sources of information and data have been used to determine whether any threatened species or endangered ecological communities are likely to occur on or near the site:

- SIX Maps aerial imagery,
- *Corowa Local Environmental Plan 2012*,
- NSW BioNet Species Sightings records,
- Mapping by the NSW Office of Environment and Heritage (State vegetation type map - Riverina, Native Vegetation Regulatory Map, Biodiversity Values Map)
- Schedules to the *Biodiversity Conservation Act 2016*, and
- Protected Matters Report of the *Environment Protection and Biodiversity Act 1999*.



Figure 1: Aerial image of the development site. Source: SIX Maps

3. Corowa LEP 2012

The terrestrial biodiversity map that accompanies *Corowa LEP 2012* indicates there are areas of environmental sensitivity along the southern and eastern boundaries of the development site. Clause 7.4 Terrestrial biodiversity therefore applies to any development on the site. Figure 2 below indicates the approximate footprint of the proposed solar farm within the development site.

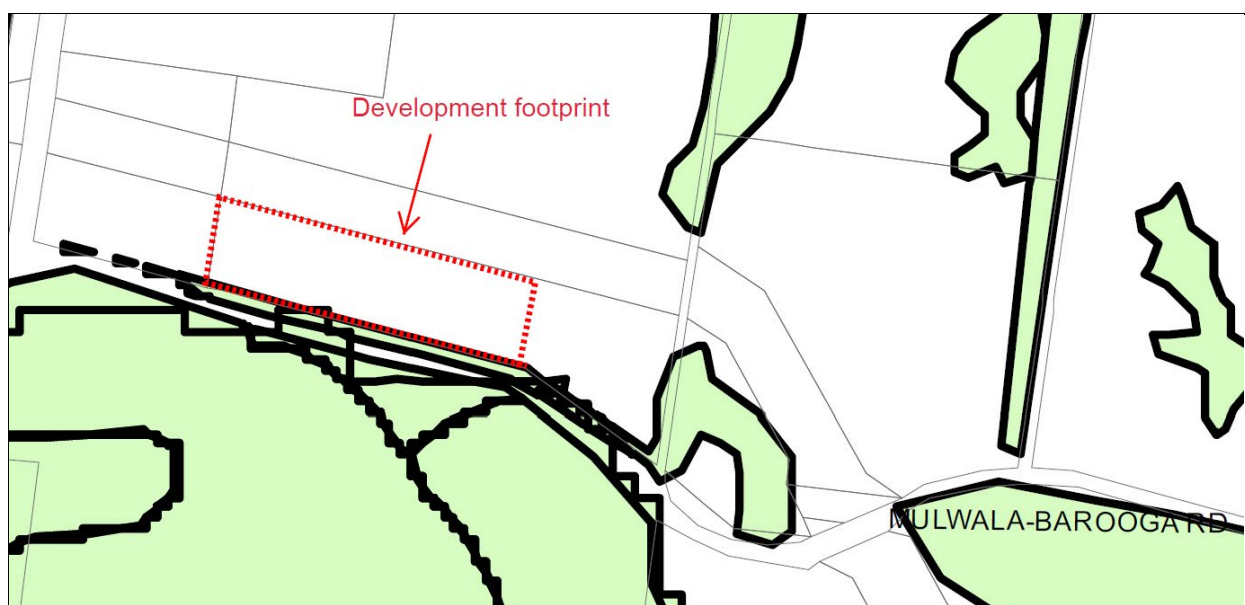


Figure 2: Extract from Terrestrial Biodiversity Map Sheet BIO_003. Source: Corowa LEP 2012

The objective of clause 7.4 is to maintain terrestrial biodiversity by protecting native fauna and flora, and the ecological processes necessary for their continued existence, and conserving and restoring native fauna and flora and their habitats. The consent authority is required to consider the following matters in determining a DA on land affected by biodiversity:

- *any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and*
- *any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and*
- *any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and*
- *any adverse impact on the habitat elements providing connectivity on the land, and*
- *any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.*

The vegetation along the southern boundary is located in the road reserve of Tocumwal Road and the development site has been cleared to that boundary for the purpose of an internal access track surrounding the crop plantings. Similarly, vegetation to the east is predominantly on the road reserve of Wemyss Road although some trees remain in the vicinity of the dwelling and sheds.

The wetlands map of *Corowa LEP 2012* indicates that the wetlands of Murray Valley Regional Park which is located to the south encroach into the site at certain points along the southern boundary.

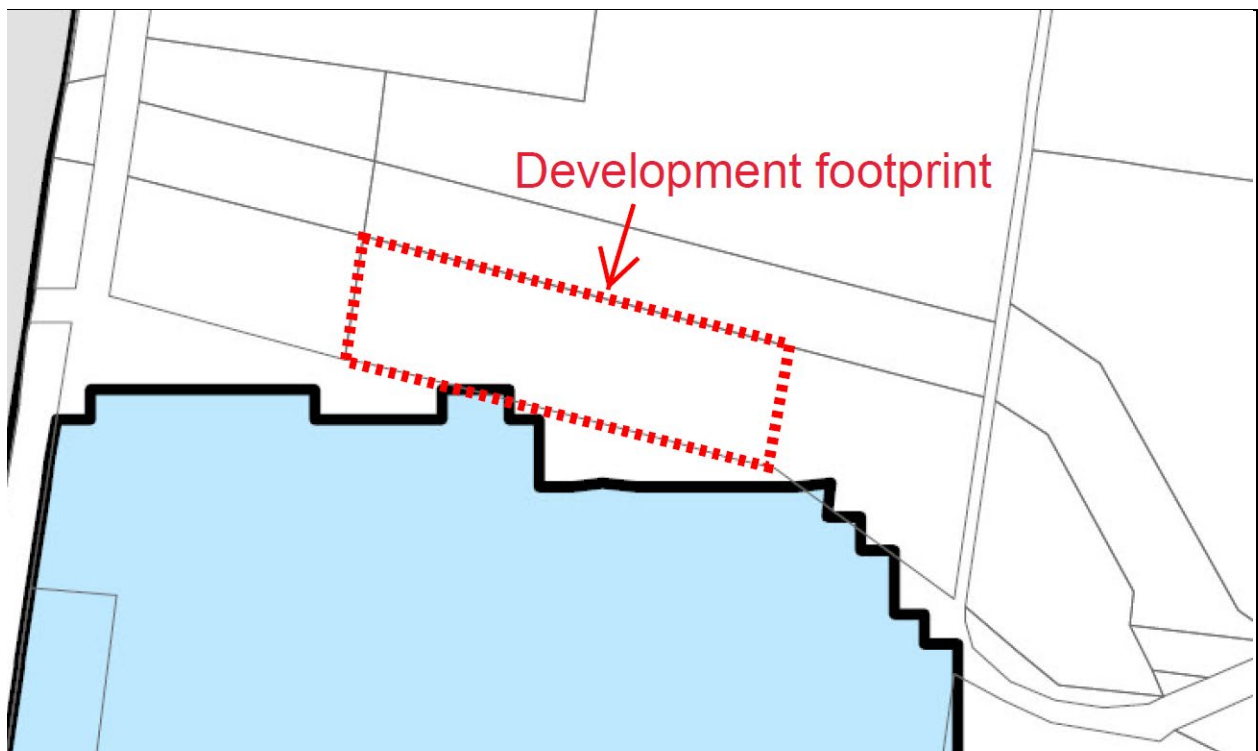


Figure 3: Extract from Wetlands Map Sheet Wet_003. Source: Corowa LEP 2012

Wetlands are mapped to be present along the southern boundary of the site. The development site has been cleared to the southern boundary and a 1.2 metre high barbed wire fence is located along the boundary. It is proposed to replace the existing boundary fence with a security fence and the array is to be a further 6 metres from the security fence. The edge of the wetland is not visible within the site and its encroachment into the site on the wetlands map is likely due to the imprecision of LEP mapping.



Plate 1: The southern boundary of the Lot 2 DP 842047

4. Significant flora

4.1 Native vegetation/ecological communities

Twenty-eight threatened species from the Riverina Bioregion are listed in the schedules of the *Biodiversity Conservation Act 2016*. Twelve of these are listed as endangered, 15 are listed as vulnerable and one species is considered extinct in the bioregion (Department of Planning, Industry and Environment website <https://www.environment.nsw.gov.au/bioregions/Riverina-Biodiversity.htm>). A search of the Bionet Atlas listed five endangered ecological communities found within a 100 square kilometre area surrounding the development site. These are:

- Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression Bioregions
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions

- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes Bioregions
- *Acacia melvillei* Shrubland in the Riverina and Murray- Darling Depression bioregions
- Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions

All of these are included in Schedule 2 of the *Biodiversity Conservation Act 2016* and the first three are also listed as endangered in the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

The native vegetation map below indicates that there are two communities present on the site. A small patch of PCT 76 Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions is mapped as present on the northern boundary adjacent the Mulwala Channel. The vegetation formation is 'Grassy Woodlands' and the vegetation class is 'Floodplain Transition Woodlands'.

PCT 5 River Red Gum herbaceous-grassy very tall open forest wetland on inner floodplains in the lower slopes sub-region of the NSW South Western Slopes Bioregion and the eastern Riverina Bioregion is mapped as being present along the southern and eastern boundaries. This coincides with the terrestrial biodiversity map of *Corowa LEP 2012*. The vegetation formation is 'Forested Woodlands' and the vegetation class is 'Inland Riverine Forests'. This community is not listed as an EEC in the *Biodiversity Conservation Act 2016 nor the EPBC Act 1999*. This community is widespread in the Murray Valley Regional Park to the south.

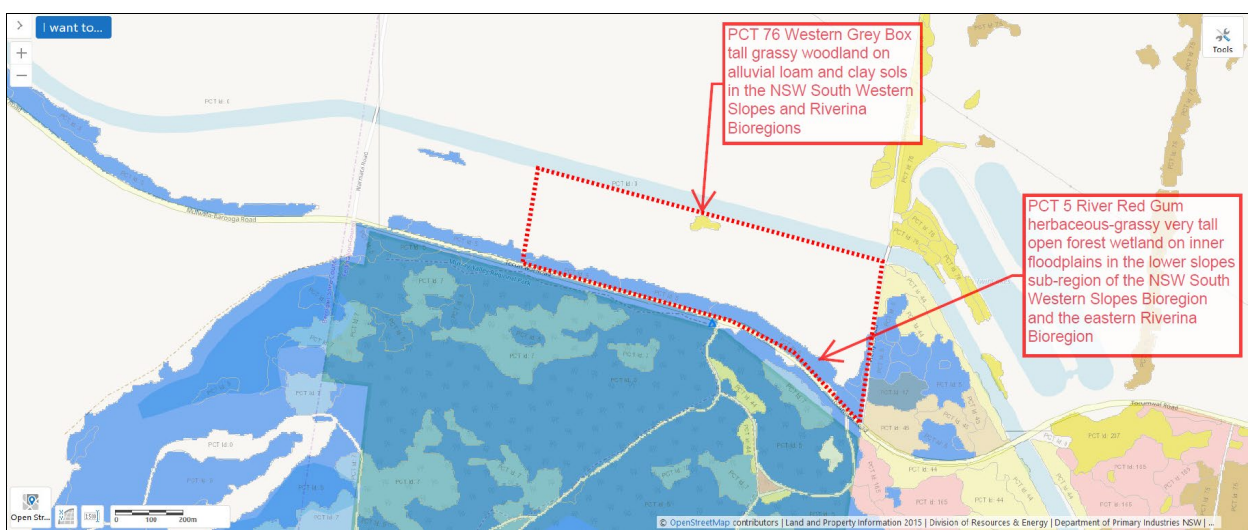


Figure 4: Native vegetation map. Source: DPIE 2020

Ground truthing of the DPIE vegetation map during the current assessment found that the linear patch of vegetation between Tocumwal Road and the development footprint best fits PCT 76, rather than PCT 5, as

mapped by DPIE, as it occurs above the floodplain-proper and is dominated by box species including Grey Box.

Conservation status of PCT 76

The PCT 76 community is listed as an EEC in the *Biodiversity Conservation Act 2016* and in the *Environment Protection & Biodiversity Conservation Act 1999*. All patches of PCT 76 in or adjacent to the development footprint are representative of the endangered ecological community (EEC) *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penneplain, Nandewar and Brigalow Belt South Bioregions protected under the Biodiversity Conservation Act 2016*.

The linear patch of PCT 76, between Tocumwal Road and the development footprint, meets the *Environment Protection & Biodiversity Conservation Act 1999* condition criteria for this EEC, being greater than 2 ha in area and having at least 20 live trees per hectare with a diameter greater than 12 cm at 1.3 metres above ground level (Dawe, 2012, *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia, a guide to the identification, assessment and management of a nationally threatened ecological community*. Commonwealth Department of Agriculture, Water and the Environment, Canberra).

The isolated patches (northern boundary and within the paddocks) do not meet the EPBC Act condition criteria, being less than 0.5 hectares in area. The patch adjacent to the northern boundary does not meet the condition thresholds included for this community under the *Commonwealth EPBC Act 1999* as it comprises an isolated patch of less than 2.0 hectares in area.

4.2 Development footprint

The development footprint comprises land that has been cleared and used for the cultivation of crops. The site had been recently planted with barley at the time of the site visit. There are no signs of native grasses within the cultivated area.

The land at the eastern end of the site has also been subject to cultivation, based on air photo patterns (see SIX Maps image) and is, therefore, likely to be dominated by exotic groundcover species.

The photographs below indicate the condition of the site and the ground surface. There are several paddock trees (river red gums) including a cluster of these trees located to the east of the development footprint. The patch of western grey box is also located outside the development footprint. It is proposed to remove a single grey box to enable the development.



Plate 2: Looking west across the development footprint



Plate 3: Looking west along the northern boundary



Plate 4: Looking east across the development site



Plate 5: Recently planted barley on the development site

4.3 Off site

Cleared land on the remainder of the development site and on adjoining properties that are used for agricultural purposes is of similar cover, condition and land use to that within the development footprint. Remnant native vegetation in the immediate vicinity of the proposal comprises river red gum in the road reserve of Tocumwal Road mapped by DPIE (PCT 5 River Red Gum herbaceous-grassy very tall open forest wetland on inner floodplains in the lower slopes sub-region of the NSW South Western Slopes Bioregion and the eastern Riverina Bioregion). This community and PCT 76 Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions which are mapped as present on the development site also occur off site on adjacent land. Other vegetation communities mapped as existing on adjacent land but not on land adjoining the development site are:

- PCT 44 Forb-rich Speargrass – Windmill Grass – White Top grassland of the Riverina Bioregion
- PCT 7 River Red Gum – Warrego Grass – herbaceous riparian tall open forest wetland mainly in the Riverina Bioregion
- PCT 17 Lignum Shrubland wetland of the semi-arid (warm) plains (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
- PCT 45 Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
- PCT 165 Derived corkscrew grass grassland/forbland on sandplains and plains in the semi-arid (warm) climate zone



Plate 6: Looking east along the southern boundary

The property is fully cleared along the southern boundary although some branches overhang the boundary. It is proposed that the security fence be installed to replace the existing boundary fence and there may need to be targeted pruning of overhanging branches. Any hollow bearing limbs would not be trimmed or pruned.



Plate 7: Entry to Murray Valley Regional Park off Tocumwal Road

5. Significant fauna

Significant fauna known to occur in the riverine forests of the Riverina Bioregion include the superb parrot, sugar glider, feathertail glider, squirrel glider, brush-tailed phascogale, koala, carpet python, freckled duck and peregrine falcon.

Given that the part of the site to be developed as a solar farm has been fully cleared and used for the cultivation of crops for many years it is not likely that any endangered, vulnerable or threatened species occur on the site. As shown in Figure 5 the map of the Bionet Atlas search indicates a vulnerable species, the Dusky Woodswallow, has been recorded on the site. Given that no habitat for this species is present on site, this record was likely recorded during flyover only, as suitable habitat occurs nearby in the riparian habitat of the Murray Valley Regional Park. Species of frogs have not been recorded in the vicinity and the only potential habitat for them on site comprises a farm dam, isolated from other suitable habitat by cleared cropland.

Black box woodlands provide significant habitat to a diversity of bird species including the bush thickknee and the superb parrot, which will only nest where box woodland occurs within 10 km of selected nest trees usually river red gum (Department of Planning, Industry and Environment website <https://www.environment.nsw.gov.au/bioregions/Riverina-Biodiversity.htm>).

Figure 5 below shows the search results from the NSW Bionet Species Sightings map maintained by DPIE. Species records of koalas, superb parrots and other general sightings were used. The map indicates that one vulnerable species, the Dusky Woodswallow, has been recorded on the site. This lack of fauna species is likely due to the extensive clearing and cultivation of crops that has fragmented the landscape.

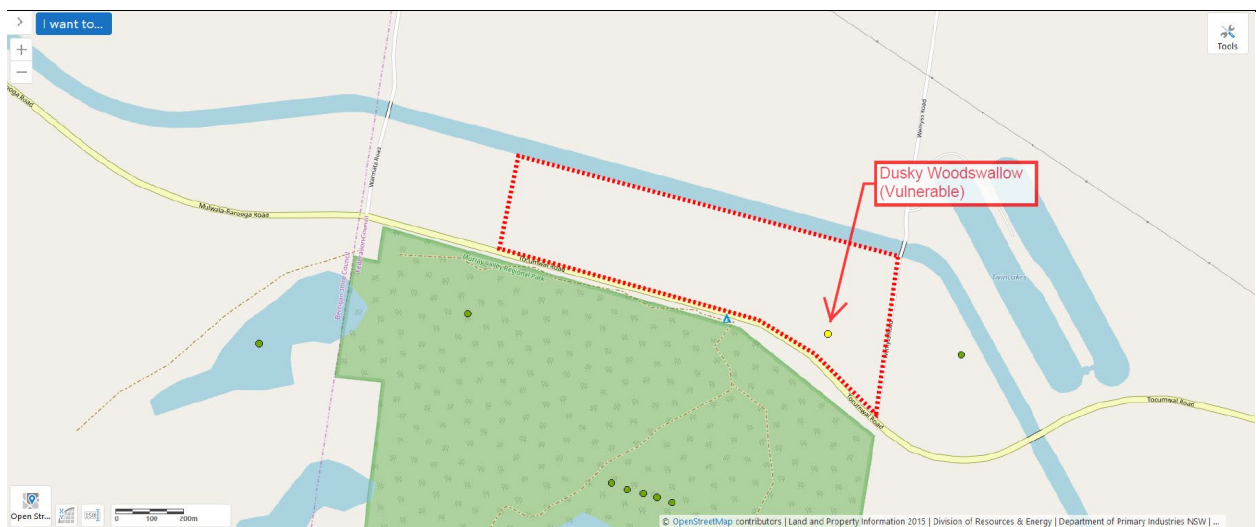


Figure 5: Species sightings and vegetation map. Source: DPIE, 2019

5.1 Threatened Fauna - NSW BioNET Search

Consultation with NSW BioNet: The website for the Atlas of NSW Wildlife returned 16 Vulnerable, 3 Endangered and 1 Critically Endangered listed species previously recorded within 10km of the site. **Table 8** considers their likelihood of occurring at the site. **Table 1** only species considered Critically Endangered, Endangered, Vulnerable and or with a Sensitivity Class rating. All native species are protected but have not been included in this table.

Table 1: BioNet Atlas of NSW Wildlife – Fauna

Species	Preferred Habitat	NSW Status	Likelihood ¹
Amphibian			
Southern Bell Frog - <i>Litoria raniformis</i>	Typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.	Endangered	No – No suitable habitat on site for the species
Birds			
Grey-crowned Babbler - <i>Pomatostomus temporalis temporalis</i>	Open forests and woodlands, favouring inland plains with an open shrub layer, little ground cover and plenty of fallen timber and leaf litter.	Vulnerable	No – No suitable habitat on site for the species

Little Eagle - <i>Hieraaetus morphnoides</i>	Open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands	Vulnerable	No – No suitable habitat on site for the species
Scarlet Robin - <i>Petroica boodang</i>	Dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs	Vulnerable	No – No suitable habitat on site for the species
Spotted Harrier - <i>Circus assimilis</i>	Grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe	Vulnerable	No – No suitable habitat on site for the species
White-bellied Sea-Eagle - <i>Haliaeetus leucogaster</i>	Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest	Vulnerable	Unlikely – One roosting tree exists, but more connected vegetation is closer to the Murray River.
Latham's Snipe – <i>Gallinago hardwickii</i>	Freshwater swamps and marshes as well as salt marshes and mud flats.	Migratory	No – No suitable habitat on site for the species
Swift Parrot - <i>Lathamus discolor</i>	Forests and woodlands dominated by winter flowering eucalypts.	Endangered	Unlikely – One roosting tree exists, but more connected vegetation is closer to the Murray River.
Barking Owl <i>Ninox connivens</i>	Open forest and woodlands, near water courses and foothills.	Vulnerable	No. No suitable habitat.
Brown Treecreeper (eastern subspecies) <i>Climacteris picumnus victoriae</i>	Inhabits dry eucalypt woodland and adjoining vegetation, though absent from degraded woodlands and steep rocky hills	Vulnerable	Unlikely – One roosting tree exists, but more connected vegetation is closer to the Murray River.
Speckled Warbler <i>Chthonicola sagittata</i>	Dry sclerophyll forests and woodlands (woodlands have fewer trees than forests) dominated by eucalypts.	Vulnerable	Unlikely. Lack of foraging resources and 'rough-barked' species on site.
Black-chinned Honeyeater (eastern subspecies) <i>Melithreptus gularis gularis</i>	Found in the upper levels of open eucalypt forests and woodlands dominated by box and ironback eucalypts.	Vulnerable	Unlikely. Lack of foraging resources and 'rough-barked' species on site.
Dusky Woodswallow <i>Artamus cyanopterus cyanopterus</i>	Open forests and woodlands, and may be seen along roadsides and on golf courses.	Vulnerable	Potential – Previously recorded east of the site in a remnant patch.
Flame Robin <i>Petroica phoenicea</i>	Open forests and woodlands, also open habitats such as grasslands and will be seen in farmland and urban parks and gardens.	Vulnerable	Potential – Site contains potential foraging resources in and around the road -side vegetation adjacent to site.
Diamond Firetail <i>Stagonopleura guttata</i>	Found in open grassy woodland, heath and farmland or grassland with scattered trees.	Vulnerable	Potential – Site contains potential foraging resources in and around the road -side vegetation adjacent to site.
Mammalia			
Squirrel Glider - <i>Petaurus norfolcensis</i>	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest.	Vulnerable	Unlikely – One roosting tree exists, but more connected vegetation is closer to the Murray River.
Koala - <i>Phascolarctos cinereus</i>	Eucalypt woodlands and forests	Vulnerable	No. No suitable habitat.
Yellow-bellied Sheath-Tailed Bat - <i>Saccolaimus flaviventris</i>	Tree hollows and buildings; in treeless areas they are known to utilise mammal burrows	Vulnerable	No. No suitable habitat.

¹ Five categories for the 'likelihood of occurrence' of species has been used. The categories are based on recorded sightings listed in credible databases, the presence or absence of suitable habitat, other features of the site, results of the field survey and professional judgement. The 5 categories are:

- 'Yes'** The species/community was or has been observed on the site.
- 'Likely'** A medium to High probability that a species uses the site
- 'Potential'** A suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as 'likely' or 'unlikely' to occur.
- 'Unlikely'** A Very Low to Low probability that a species uses the site.
- 'No'** Habitat on the site and in the vicinity is unsuitable for the species.

6. Likelihood of occurrence assessment

6.1 Potential direct impacts

The proposal, including access, requires the removal of a river grey box. The cluster of grey box at the northern boundary and vegetation in the adjacent road reserve is to be retained. The access road and security fence are outside the drip line of the grey box trees at the northern boundary.

6.2 Potential indirect impacts

Access to the site will be from a new entry off Wemyss Road, parallel to the northern boundary and then into the centre of the panel arrays.

Typical potential indirect impacts include noise and light disturbance, introduction of weeds and soil compaction. These factors are already in existence due to ongoing agricultural land use.

There is potential for noise and physical disturbance to the adjacent roadside vegetation along the southern boundary of the site, mainly in the short-term during construction, as addressed in the test of significance. Safeguards have been developed to mitigate against any impacts (see section 11 *Mitigation measures* below).

7. Biodiversity Values Map

The Biodiversity Offset Scheme Entry Threshold Map is provided as Attachment A. This map identifies land with high biodiversity value as defined by clause 7.3(3) of the *Biodiversity Conservation Regulation 2017*. The Biodiversity Offsets Scheme applies to all clearing of native vegetation and other biodiversity impacts prescribed by the regulation on land identified on the map.

The Biodiversity Offsets Scheme is used to determine whether the Biodiversity Assessment Method is to be used to assess the impacts of a development proposal and applies to local development. The scheme is triggered based on threshold levels of clearing comprising the land area to be cleared and whether the area is mapped on the Biodiversity Values Map. In this case the development site is not mapped as being of high biodiversity value.

A minimum lot size of 250 hectares applies to the development site. The threshold for clearing of native vegetation above which the Biodiversity Assessment Method applies is 0.5 hectares or more. It is not proposed to clear the land of any native vegetation other than a single grey box paddock tree, therefore, the area clearing threshold of 0.5 hectares has not been reached. It is not necessary to engage an accredited assessor to determine the offsets required to enable the project to proceed.

A test of significance under section 7.3 of the *Biodiversity Conservation Act 2016* may be carried out for local development proposals that do not exceed the Biodiversity Offsets Scheme threshold. This test determines whether the potential impacts of development are likely to significantly affect threatened species, ecological communities, and their habitats. Potential threats to biodiversity are already in existence due to continuing agricultural land use, however, a significance assessment is required due to the vulnerable species that has been recorded on the site and the proposed removal of a grey box.

8. Physical & chemical impacts

8.1 Is the proposal likely to impact on soil quality or land stability?

Soil Quality – No.

Land Stability - Yes. There is likely to be mobilisation of some soil given the nature of the proposal (construction). The site is susceptible to compaction by traffic immediately after periods of heavy rainfall. Mitigation measures are to extend (but not be limited to) the following:

- An Erosion and Sedimentation Control Plan developed and progressively implemented.
- Vehicle movements around the site will be restricted to clear areas and away from any existing trees and flagging exclusion fencing to be installed.
- When rain is predicted, an assessment will be made prior to works beginning. If heavy rain is predicted, work will not commence.
- No stockpiles will be established under native vegetation in any area on site or in within the study area.
- Maintenance and checking of the erosion and sedimentation controls will need to be undertaken on a regular basis. Sediment will be cleared from behind barriers on a regular basis and all controls will be managed in order to work effectively at all times.
- Rehabilitation of any disturbed areas should be completed as soon as possible after completion of works where practical to do so.

8.2 Is the activity likely to affect a waterbody, watercourse or wetland or natural drainage system?

No. Development footprint is small and if ESCP controls are implemented and length of slope guidelines are adhered to, then the risk to Murray River water quality is extremely low.

8.3 Is the activity likely to change flood or tidal regimes, or be affected by flooding?

No.

8.4 Does the proposal involve the use, storage or transport of hazardous substances or the use or generation of chemicals which may build up residues in the environment?

No. Some diesel will be stored in 'slip-on' tanks in the back of utility vehicles and they will not be left on-site outside of working hours.

8.5 Does the activity involve the generation or disposal of gaseous, liquid or solid wastes or emissions?

Yes. However only the operation of machinery should produce emissions, no further disposal of liquids, gases or solid wastes is expected.

8.6 Will the activity involve the emission of dust, odours, noise, vibration, or radiation in the proximity of residential/urban areas or other sensitive locations?

Yes. The project may emit some dust and noise, but this is expected to be minimal and the time period short. Given the current level of disturbance and providing the recommendations contained within this report are adhered to, it is unlikely that the proposal will result in extensive or harmful outcomes regarding these activities.

9. Biological impacts

9.1 Is any vegetation to be cleared or modified?

Yes. One (1) large (90cm DBH) Grey Box is to be lost. The remaining of the site is exotic grass & crops.

9.2 Is the activity likely to have a significant effect on threatened flora or fauna species, populations, or their habitats, or critical habitat; or an endangered ecological community or its habitat?

No. The works are limited to the cleared areas dominated by exotic grass and crops. There will be no removal of significant native vegetation from the site therefore the development will not endanger or have a significant effect on any existing native vegetation or habitats within the site. The site is not part of an endangered EEC or 'Declared Area of Outstanding Biodiversity Value' or 'Biodiversity Value' on the OEH mapping system. This project will not displace any rare or threatened species.

9.3 Does the activity have the potential to endanger, displace or disturb fauna (including fauna of conservation significance) or create a barrier to their movement?

Endanger – No.

Displace – No.

Disturb – Yes. Threatened and declining woodland dependent birds may be using the area opportunistically during winter, hence the construction activities may prove to disturb foraging activities for a short period. The construction activities will avoid all existing native vegetation onsite.



Plate 8: Tree designated for removal

9.4 Is the activity likely to impact on an ecological community of conservation significance?

No. The site to be developed is not part of an ecological community of conservation significance. There are two mapped polygons of PCT 76 Western Grey Box tall grassy woodland within the site, however neither of which will be harmed by the activity. The proposed works will not endanger any areas adjacent to the site, including the relatively well-connected strip of PCT 76 outside the project boundary along Tocumwal Road. No trimming of hollow-bearing limbs (that might extend into the site on the southern boundary) will

be undertaken without first consulting a suitably qualified ecologist and only undertaken outside Spring months.

9.5 Is the activity likely to cause a threat to the biological diversity or ecological integrity of an ecological community?

No. The current site has an extensive history of disturbance and is highly modified. Furthermore, any areas of native vegetation that offer true harbor and feeding opportunities, will be un-affected by the works.

9.6 Is the activity likely to introduce noxious weeds, vermin, feral species or genetically modified organisms into an area?

Vermin – No.

Feral Species – No.

Noxious Weeds - Possible.

The movement of vehicles, plant, equipment and people on and off the subject site/s has the potential to introduce noxious weeds to the area. The area is also impacted by several pasture grass weed species. Wherever possible, removal of weeds should be undertaken prior to seed developing, which for most species occurs during the warmer months (i.e. summer). Additionally, the following strategies are to apply to weed management within the site:

- Minimal impact techniques are to be used, ensuring no native species are damaged during weed control activities.
- Soil disturbance by vehicle and pedestrian access is to be kept to a minimum outside the construction footprint.
- Herbicide application is to be administered by authorised personnel only (e.g. ChemCert Accreditation– AQF 3), in accordance with the directions on the container (application rates, MSDS requirements) and any applicable Workcover requirements.
- All machinery used within the site is to be thoroughly cleaned by removing all plant material, dust or soil, and any accumulation of grease from the machine prior to the commencement of the construction.
- Any weeds removed (particularly those bearing seeds) are to be disposed of appropriately at the nearest waste management facility.
- If required, only topsoil from areas with no noxious or highly invasive weed species should be re-used in rehabilitation (it is generally assumed that if there is no evidence of noxious or invasive weeds in an area, the topsoil in this area is not contaminated with the seeds of such weeds).

10. Test of Significance

The following section assesses whether the proposal (as discussed and reviewed in this assessment) is likely to have a significant effect on threatened biodiversity¹ by addressing the Parts (a), (b) and (c) of the test of significance applied to species and ecological communities listed in Schedules 1 and 2 to the BC Act and under s.111 of the EP&A Act. It is important to note that under the *Biodiversity Conservation Act 2016* and the *Environmental Planning and Assessment Act 1979 no 203* (2018) s. 111; the factors to be considered when determining whether an action, development or activity is likely to significantly affect threatened species, populations or ecological communities, or their habitats (known previously as the '7-part test'), have been revised under the BC Act.

The revised factors maintain the same intent under the new ('5 part test') but better focus consideration of likely impacts in the context of the local rather than the regional environment as the long-term loss of biodiversity at all levels arises primarily from the accumulation of losses and depletions of populations at a local level. It also requires the identification on the potential impacts to/or on any areas declared to be of outstanding biodiversity value under Part 3 of the BC Act. When applying each factor, the following sections have considered all perceived likely direct and indirect impacts of the Proposal as outlined by previous sections of this document.

- *Direct impacts* are those that directly affect the habitat of species and ecological communities and of individuals using the study area. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat. When applying each factor, consideration must be given to all of the likely direct impacts of the proposed activity or development. When applying each factor, both long-term and short-term impacts are to be considered
- *Indirect impacts* occur when project-related activities affect species or ecological communities in a manner other than direct loss within the subject site. Indirect impacts may sterilise or reduce the habitability of adjacent or connected habitats. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, reduction in viability of adjacent habitat due to edge effects, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, noise, light spill, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas. As with direct impacts, consideration must be given, when applying each factor, to all of the likely indirect impacts of the proposed activity or development. When applying each factor, both long-term and short-term impacts are to be considered.

¹ Species considered collectively as "Woodland Birds" include the Diamond Firetail (*Stagonopleura guttata*), Scarlet Robin (*Petroica boodang*) and Dusky Woodswallow (*Artamus cyanopterus cyanopterus*). Koala has also been considered given. These species have been recorded in the OEH managed NSW Wildlife Atlas for the period 5/10/1978 to 19/11/2020 and under the EPBC Act within 10km of the site and their likelihood of using the site was rated as 'Potential' in section 5.

A test of significance under section 7.3 of the *Biodiversity Conservation Act 2016* is required to be carried out for local development proposals that do not exceed the Biodiversity Offsets Scheme threshold. This test determines whether the potential impacts of development are likely to significantly affect threatened species, ecological communities, and their habitats. Below are the results of the test of significance for the proposed solar farm.

- (a) *in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

Woodland Birds

The site has been cleared and farmed for many years and is not known to be inhabited by any threatened species although the Bionet Atlas contains a records of a sighting of a vulnerable species, the Dusky woodswallow, on the property which is likely to have been flying over given that the site does not contain any foraging or nesting habitat for bird species. Superior and extensive habitat for all faunal groups known from the region occurs along the nearby Murray River riparian habitat.

Koala

A sighting of a koala has been recorded on the property to the north of Mulwala Canal in 2004. The sighting is mapped as being approximately 685 metres north of the development site. A koala population has not been recorded within the immediate locality since that sighting.

- (b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*
- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
 - (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Mapping of vegetation communities indicates that there is an endangered ecological community located at the northern boundary of the site being PCT 76 Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions. This vegetation community is listed as an EEC in both the *Biodiversity Conservation Act 2016* and the *Environment Protection and Biodiversity Conservation Act 1999*. The vegetation patch at the northern boundary is not within the development footprint and will not be impacted by the development.

PCT 5 River Red Gum herbaceous-grassy very tall open forest wetland on inner floodplains in the lower slopes sub-region of the NSW South Western Slopes Bioregion and the eastern Riverina Bioregion is mapped as being present along the southern and eastern boundaries between Tocumwal Road and the development footprint and west of Wemyss Road. This coincides with the terrestrial biodiversity map of

Corowa LEP 2012. However, this vegetation more closely aligns with PCT 76. It is recommended that the following mitigation measures be implemented to ensure the ongoing integrity of this vegetation community:

- any vegetation planted to screen the development and any grasses planted to bind the soil following construction of the solar farm be native species endemic to the area
- access to the site is to be limited to that point shown on development plans and within the development footprint
- storage of materials is to be carried out wholly within the development footprint.

(c) *in relation to the habitat of a threatened species or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,*

The proposed solar farm will occupy 60% of the total site. The remaining land will continue to be used for cropping or retention of native vegetation. The EEC at the northern boundary including eight or so paddock trees, with the exception of a grey box, will be retained and protected. Habitat for threatened species and ecological communities will not be adversely affected by the development as superior and extensive habitat for all faunal groups known from the region occurs along the nearby Murray River.

Proposed minor clearing of paddock trees will not cause isolation or fragmentation of habitat. The habitat to be removed is not considered to be of importance for any threatened species or ecological community as it comprises isolated paddock trees within a heavily modified landscape, and extensive areas of habitat occur adjacent and beyond within Murray Valley Regional Park.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

The site is not mapped as being of high biodiversity value on the Biodiversity Values Map. The development of a solar farm is not likely to have any adverse effect on areas of outstanding value.

(e) *whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

The development of a solar farm, including the installation of solar PV panels and ancillary facilities, is not listed as a key threatening process in Schedule 4 of the *Biodiversity Conservation Act 2016*.

Key threatening processes listed in the Act include bushrock removal, clearing of native vegetation, alteration of habitat, loss of hollow bearing trees, predation and invasion by feral animals and plant communities, and removal of dead wood and dead trees.

In this case, exotic plant species are already prevalent in the area and therefore the proposal is unlikely to introduce any more weeds to the locality. No bushrock, dead wood and dead trees, or hollow bearing trees are proposed to be removed. Native vegetation is proposed to be removed, however, this represents approximately 10% of trees existing on the property and is not likely to affect the distribution or representativeness of the vegetation community.

10.1 Summary

In summary, the development proposal is to occur on cleared and cultivated farmland, which lacks any habitat connectivity. The site would be used only be used as flyover by threatened and migratory bird species and bats. Similarly, frogs and arboreal mammals would only be transiting the site if at all due to the lack of cover. Substantial amounts of superior and connected habitat occurs adjacent the site to the south and beyond. It is considered that the proposed solar farm will not have a significant impact on threatened species, endangered ecological communities or habitat therefore a BDAR is not required.

11. Native Vegetation Regulatory Map

The Native Vegetation Regulatory Map covers rural land in NSW and categorises land where management of native vegetation can occur without approval or where management of native vegetation may be carried out in accordance with Part 5A Land Management (native vegetation) of the *Local Land Services Act 2013*.

The categories are Category 1 (unrestricted management where clearing is exempt from the *LLS Act*), Category 2 is regulated land where the *LLS Act* applies to clearing as either code based, vulnerable or sensitive, and Excluded Land which is not regulated by the *LLS Act*.

The Native Vegetation Regulatory Map for the development site is given as Figure 6 below. The land is shaded grey indicating that the land is excluded from the *LLS Act*.

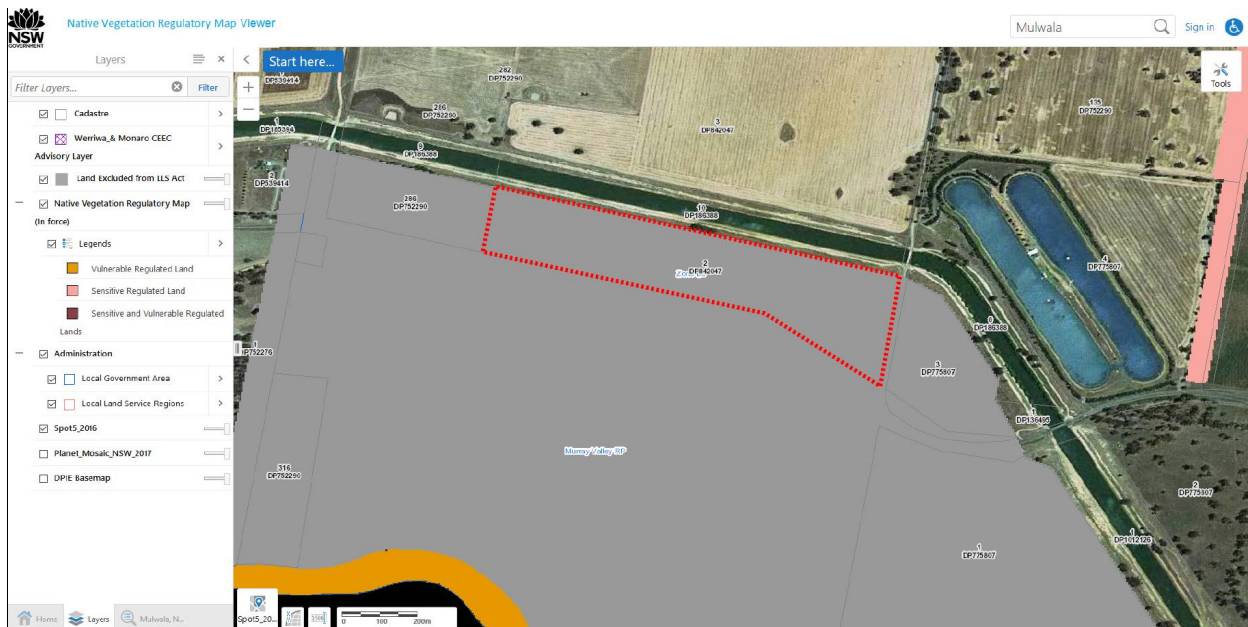


Figure 6: Native Vegetation Regulatory Map. Source: OEH, 2019

12. EPBC Protected Matters Report

The *Environment Protection and Biodiversity Conservation Act 1999* affords protection for seven matters of national environmental significance. These matters are world heritage properties, national heritage places, wetlands of national importance, listed threatened species and ecological communities, migratory species, commonwealth marine areas and nuclear actions including uranium mines. Actions that have, or are likely to have, a significant impact on a matter of national environmental significance require the approval of the Australian Government Minister for the Environment and Energy.

Actions include but are not limited to construction, expansion, alteration or demolition of buildings, structures, infrastructure or facilities; storage or transport of hazardous materials; waste disposal;

earthworks; impoundment, extraction and diversion of water; research activities; vegetation clearance; military exercises and use of military equipment; and sale or lease of land.

It is the responsibility of the Minister to decide whether assessment and approval is required under the *EPBC Act*. There are potentially 5 listed threatened ecological communities, 25 listed threatened species of flora and fauna, and 11 listed migratory species of flora and fauna protected under the *EPBC Act* within the surrounding locality.

The provisions of the *Environment Protection and Biodiversity Conservation Act 1999* may apply to the development of a solar farm. The search of the NSW Bionet Species Sightings map indicates that there has been a sighting of a dusky woodswallow on the site, however, this bird is not listed as a threatened species in the EPBC Act.

A threatened ecological community with the status of endangered (Grey box grassy woodlands and derived native grasslands of south-eastern Australia) is also mapped as being present on the development site to the north of the PV arrays and is likely to be present within the Tocumwal Road reserve. This vegetation community will not be affected by the development. The EPBC Protect Matters Report is appended as Attachment B.

The area to be developed as solar farm is cleared and has been intensively used for cropping. There are no wetlands or threatened species listed under the EPBC Act likely to occur on the site. The endangered Grey box grassy woodlands and derived native grasslands of south-eastern Australia is present on the site, however, the development is not likely to have a significant impact on this matter of national environmental significance. Referral to the Commonwealth Government is not considered necessary.

13. Mitigation measures

In summary, the development site is mapped as affected on the Terrestrial Biodiversity Map and the Wetlands Map of *Corowa LEP 2012*. However, the development site is not mapped on the biodiversity values map, the clearing of native vegetation is not above the threshold based on minimum lot size, and a test of significance has found that there will be no significant impact on the ecological integrity of the property. A biodiversity development assessment report is therefore not required and the biodiversity offsets scheme does not apply.

However, it is recommended that any vegetation planted to screen the development and any grasses planted to bind the soil following construction of the solar farm be native species endemic to the area. Access to the site is to be limited to that point shown on development plans and within the development footprint. Storage of materials is to be carried out wholly within the development footprint.

Biodiversity Offset Scheme (BOS) Entry Threshold Map



0.5 0 0.23 0.5 Kilometers

GCS_GDA_1994

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

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NSW Environment & Heritage

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	29/07/2019 10:47 AM	BDAR Required*
Total Digitised Area	19.85 ha	
Minimum Lot Size Method	Lot size	
Minimum Lot Size	14.62 ha	
Area Clearing Threshold	0.5 ha	
Area clearing trigger Area of native vegetation cleared	Unknown [#]	Unknown [#]
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no	no
Date of the 90 day Expiry	N/A	

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to <https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor> to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is "likely to significantly affect threatened species" as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BOSET user guide for how to do this.

On and after the 90 day expiry date a BDAR will be required.

Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Office of Environment and Heritage and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies with all aspects of the *Biodiversity Conservation Act 2016*.

The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

Acknowledgement

I as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature _____ Date: 29/07/2019 10:47 AM



EPBC Act Protected Matters Report

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

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

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 18/02/20 15:35:00

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

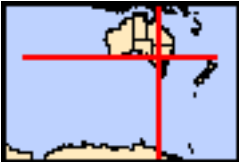
[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	7
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	25
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	1
Listed Marine Species:	18
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	27
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name	Proximity	
Banrock station wetland complex	500 - 600km upstream	
Barmah forest	40 - 50km upstream	
Gunbower forest	100 - 150km upstream	
Hattah-kulkyne lakes	300 - 400km upstream	
Nsw central murray state forests	50 - 100km upstream	
Riverland	400 - 500km upstream	
The coorong, and lakes alexandrina and albert wetland	500 - 600km upstream	

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

Name	Status	Type of Presence
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Natural Grasslands of the Murray Valley Plains	Critically Endangered	Community may occur within area
Weeping Myall Woodlands	Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species	[Resource Information]
---------------------------	--------------------------

Name	Status	Type of Presence
Birds		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta		
Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat likely to occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Breeding likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		
Craterocephalus fluviatilis Murray Hardyhead [56791]	Endangered	Species or species habitat may occur within area
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat likely to occur within area
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat likely to occur within area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat likely to occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Crinia sloanei Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat known to occur within area
Brachyscome muelleroides Mueller Daisy [15572]	Vulnerable	Species or species habitat may occur within area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
[Resource Information]		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land

[Resource Information]

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

Name
Commonwealth Land -

Commonwealth Heritage Places

[Resource Information]

Name	State	Status
Historic		
Mulwala Homestead Precinct	NSW	Listed place

Listed Marine Species

[Resource Information]

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

Name	Threatened	Type of Presence
Birds		

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Murray Valley	NSW

Invasive Species

[Resource Information]

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk,		Species or species

Name	Status	Type of Presence
Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-35.955791 145.966066,-35.955826 145.966109,-35.954367 145.964264,-35.953498 145.96259,-35.953012 145.961217,-35.951483 145.954307,-35.949086 145.954951,-35.951761 145.966796,-35.955791 145.966066

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

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

Please feel free to provide feedback via the [Contact Us](#) page.