Supporting information: Threatened species impact assessment

Background

This impact assessment was prepared to support the Zemira 3D Seismic Survey EPBC Referral. The assessment focusses on species listed as Matters of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) identified in desktop assessments as potentially occurring within the Zemira 3D Seismic Survey project area (the survey area), located in the northern Perth Basin of Western Australia. This includes threatened flora and fauna as well as fauna species listed as migratory under the EPBC Act. No other MNES, such as threatened ecological communities, wetlands of national importance, world heritage or national heritage places, occur in the survey area.

A Protected Matters Search Tool (PMST) report was generated for the Zemira 3D Seismic Survey area, including a 20 km buffer, on 27 February 2020 (Appendix 1). The list of species generated in this report was compared with the results of desktop assessments and on-ground surveys undertaken for the project by Strategen-JBS&G (2020) and Bancroft and Bamford (2020).

Each species was assessed to determine whether it was likely to occur on the site, based on known distribution, current and historic records and habitat requirements. The likelihood assessment also looked at whether the species could be avoided during seismic line planning. This means that species potentially occurring within the project area boundary (an area of approximately 970,000 ha) are unlikely to occur within the vegetation clearing footprint (an area of up to 1000 ha).

Species that were assessed as known, likely to occur or possibly occurring on site were then subject to an impact assessment. The impact assessment looked at whether the species is likely to be affected by temporary clearing of native vegetation, the potential significance of such impacts and its ability to recover or regenerate.

Likelihood assessment

Flora

A total of 48 threatened flora species have potential to be present in the survey area, based on desktop assessments and the 2019 flora survey (Table 1). Nine of these have been recorded in the survey area, either historically or in the 2019 survey:

- *Daviesia speciosa* (EN)
- *Eleocharis keigheryi* (VU)
- *Eremophila glabra* subsp. *chlorella* (EN)
- *Eucalyptus crispata* (VU)
- *Hemiandra gardneri* (EN)
- *Leucopogon obtectus* (EN)

- *Paracaleana dixonii* (EN)
- *Styphelia longissima* (CR)
- *Thelymitra stellata* (EN).

Four species (*Daviesia bursarioides, Eucalyptus subarea, Roycea pycnophylloides,* and *Symonanthus bancroftii*) are believed unlikely to be present based on the regional distribution. These species are not known to occur in the local area. One species (*Eremophila viscida*) is unlikely to be present due to a lack of suitable habitat. The remaining 34 threatened flora species have not been recorded in the survey area but are considered possibly present based on habitat preferences.

Fauna

A total of 38 threatened and migratory fauna species have potential to be present in the survey area, based on desktop assessments and the 2019 flora survey (Table 2). Most (34) of these are birds, of which 23 are listed threatened species (including some that are also listed as migratory) and the remainder listed as migratory. In addition to birds, there were also two mammals, one reptile and one spider identified in the desktop assessments. Marine mammals, turtles, seals and sharks were excluded from the results.

Many (18) of the bird species that appeared in the PMST search results are marine species (such as albatross and petrels) and would not be expected to utilise the project area at all; these were assessed as not occurring within the project area. Another five species prefer coastal habitats and are similarly not expected to utilise the project area; therefore, were assessed as unlikely to occur. These marine and coastal species likely appeared in the PMST search results because a 20 km buffer was applied to the project area; a conservative approach used to ensure that all possible species are captured in the assessment.

Three species, the Western Ground Parrot, the Chuditch and the Dibbler, are considered extinct in the local area.

Wetland bird species are not expected to utilise the project area in any material way. There are no permanent wetlands in the project area, although there are several seasonally wet claypans, and the Arrowsmith River and some smaller creeklines pass through the project area. The larger claypans are inside Beekeeper's Nature Reserve and will not be affected by the project as there will be no vegetation clearing in this area. All of the remaining claypans, and the rivers and creeklines, will be avoided during seismic line planning and will not be impacted by the project.

Although Malleefowl are known from the wider region, no evidence has been found of them within the project area during multiple visits to the site, and if they are present, it is likely only as an irregular visitor. Malleefowl nests are large, distinctive structures that are easily recognisable within the landscape; therefore, if they are utilising the project area, their presence should be evident.

The Western Spiny-tailed Skink is found in isolated stands of granite and other rocky areas. There are no known populations within the survey area with the nearest known records occurring in the low inland ranges to the east (ALA 2020). It is questionable whether suitable habitat for this species would occur here. The most favourable areas are likely to be isolated rocky outcrops in the northern part of the project area, which will be avoided during survey line preparation, so this species would be unlikely to occur within the project's clearing footprint.

The Shield-backed Trapdoor Spider (*Idiosoma nigrum*) inhabits rocky habitats of the Midwest region, preferring gullies, drainage lines and southern facing slopes where moisture is retained. It shelters in a deep burrow (SPRAT 2020). This species spends a large portion of its lifetime underground, with males emerging from the burrow to find females in autumn, and young dispersing from the mother's burrow in early winter.

There are no known populations in the survey area although there are records from near Eneabba to the south, around Geraldton to the north and inland to the east (ALA 2020). However, a recent re-evaluation of this species (Rix et al 2018 in Bamford 2020), divided *Idiosoma nigrum* into a number of additional species of lower conservation significance. According to this assessment, *I. nigrum* is restricted to a small area of the central wheatbelt and is still considered threatened. However, it is unlikely to be present within the survey area. The only related species known from the project area is *I. kwongan*, which has been recorded just south of the project area and is listed as a Priority 1 species.

Carnaby's Cockatoo has been recorded within the survey area and known to forage within the region.

Mitigation measures

Detailed botanical surveys

All seismic lines will be inspected by experienced botanists prior to clearing. This involves undertaking targeted searches for threatened species considered potentially present within the survey area based on historic records and an understanding of species' preferred habitats. All seismic lines will be surveyed by botanists undertaking targeted searches for conservation significant species, either completed as part of the 2019 survey or in future surveys taking place during the project planning phase.

Beach will avoid all known locations of threatened flora species during seismic line planning.

Protecting sensitive habitats

Many threatened flora species are restricted to highly specific habitat types. In the Geraldton Sandplains region, lateritic breakaways and ridgelines are known to support high levels of biodiversity, including several threatened species. Similarly, claypans, creeklines and winter-wet depressions are also zones of high sensitivity, supporting many threatened flora species These wetter habitats potentially also support migratory birds, particularly during unusually wet years. These habitats are highly restricted and easily identified through satellite imagery and vegetation mapping, which means that by mapping these habitats early during the seismic line planning process, impacts to restricted habitats (and the species they support) can be avoided entirely.

Consequently, Beach has committed to avoiding lateritic breakaways, claypans, creeklines, wetlands and winter-wet depressions where practicable during seismic line planning.

Seismic line planning

Seismic line planning is an iterative process and with modern technology can be highly flexible and adaptive. Lines do not need to align in a strict grid-form but have some latitude for deviations around obstacles and sensitive areas. Receivers can be hand-carried through the most sensitive areas, avoiding the need for vegetation clearing. This allows the seismic plan to be informed by the ecological surveys and input from technical specialists to minimise impacts to conservation significant species and sensitive habitats as far as practicable, without compromising seismic data quality.

Species that grow in tree-form, such as the eucalypts (including Mallee species), larger banksias, and Woody Pear (*Xylomelum angustifolium*) will be preferentially avoided by seismic crews by virtue of their size, as larger species are more difficult to clear using low-impact methods. In addition, difficult terrain such as wet areas (creeks and wetlands) and ridgelines will also be avoided due to operational restrictions. Existing access tracks will be used where practicable, and in highly fragmented areas of native vegetation on private properties and road reserves, small remnants will be avoided entirely.

Low-impact clearing methods

Low impact clearing methods will be used to prepare seismic lines to facilitate vehicle access. This means that there will be no ground disturbance, leaving root-bases, lignotubers and the soil seed bank intact. In addition, vegetative material from the clearing process will be left in situ, providing protection for the soil surface and preventing erosion, as well as contributing to the seed bank, providing habitat for small animals, preventing weed incursion, retaining soil moisture, and protecting seedlings as natural regeneration occurs.

The low impact clearing methods have the additional benefit of leaving many smaller species intact as they are below the height of the clearing machinery. Some species, such as many of the orchids, retreat to a bulbous base through parts of the year and have no surface expression, so would be entirely unaffected by temporary clearing during this period. Annual species that die off during the dry season would likewise be unaffected. Although some compression of small plants may occur when the lines are accessed by vehicles, vehicle access will be limited as much as possible to minimise such impacts. Standard hygiene procedures will be used to prevent introduction or spread of weeds and plant pathogens.

All native vegetation will be allowed to naturally regenerate following completion of the project. Signs will be used to prevent third-party access to seismic lines where appropriate. Annual monitoring during spring will assess the success of revegetation, and highlight areas potentially requiring active rehabilitation to improve success.

Preliminary impact assessment

Flora – Sandplain Duck-orchid

Using detailed botanical surveys, and sensitive habitat mapping, most threatened flora considered potentially present within the survey area can be avoided through careful seismic line planning. This means that although some species potentially occur within the wider survey area, they are unlikely to be present within the project footprint, defined as a 3.5 m corridor along seismic lines where vegetation clearing will occur.

The only species for which the above method is considered impractical is the Sandplain Duck-orchid, *Paracalaena dixonii*. The Sandplain duck-orchid is endemic to Western Australia where it occurs in small, isolate colonies on sandy soils, occasionally over laterite. It has been recorded on numerous occasions within the survey area, including in the most recent assessment in 2019.

This species is widespread and numerous within the survey area and can be difficult to identify in the field given the short duration of flowering and cryptic appearance. It is dormant between December and late April, where the plant retreats to a tuber below the ground. Threats to this species include inappropriate fire regimes (particularly during the plant's growing period), and land clearing.

As vegetation clearing will occur while the Sandplain Duck-orchid is dormant (i.e. seasonal retreat to underground tuber), with no ground disturbance required, it is likely that potential impacts to this species can be avoided. Consequently, the project is unlikely to result in a significant impact to this species.

Fauna – Carnaby's Cockatoo

Bird species identified as marine or coastal are not likely to utilise the project area. Likewise, wetland bird species are not expected to utilise the project area in any material way as there are no significant or permanent wetlands in the project area. Therefore, further impact assessment is not required for these species.

No impact assessment was undertaken for the fauna species identified as locally extinct (Western Ground Parrot, Western Quoll and Dibbler) or considered unlikely to occur in the project area (Western Spiny-tailed Skink and the Shield-backed Trapdoor Spider).

Carnaby's Cockatoo (listed as Endangered under state and federal legislation) occurs across southwest WA, from Kalbarri in the north, inland to Merredin and along the southern coastline to Cape Arid. It is uncommon to common in the wetter parts of its range, scarce and patchily distributed in driest parts. Breeding mainly occurs in the wheatbelt but wandering flocks forage in coastal areas outside of the breeding season (Johnstone 2010).

While breeding, black cockatoos generally forage within 6-12 km of their nest site. Outside of the breeding season, foraging usually occurs within about 6 km of a roosting site (DSEWPaC 2012). Carnaby's Cockatoo prefers to roost in or near to riparian environments, including artificial water sources. Preferred foraging habitat is native shrubland, kwongan heathland and woodland dominated by proteaceous plant species such as Banksia, Hakea, and Grevillea species (DSEWPaC 2012).

A recovery plan has been prepared for Carnaby's Cockatoo (DPaW 2013). The primary cause of decline in populations of Carnaby's Cockatoo is loss and degradation of breeding, roosting and foraging habitat. Loss of habitat remains a key threat to this species, including a lack of trees suitable for breeding in (i.e. old enough to have large enough hollows). This is exacerbated by competition for nest hollows with both native and introduced birds as well as European honeybees.

Habitat for Carnaby's Cockatoo is under threat from continued clearing pressure as well as salinity, plant disease and climate change. Other threats to Carnaby's Cockatoo include illegal shooting and taking of birds, vehicle strike, and disease (DPaW 2013).

Carnaby's Cockatoo is considered a regular migrant to the survey area (Bancroft and Bamford 2020) and is known to forage in the local remnant native vegetation. A black-cockatoo habitat assessment undertaken for the project area found that vegetation in the west of the project area was generally of moderate to high value for foraging, with over 36,000 ha of such vegetation mapped in the project area. Extensive similar foraging habitat is present west of the project area. The most highly desirable habitat for Carnaby's Cockatoo lies along drainage systems and around wetlands, areas that will be avoided during seismic line planning.

No evidence of breeding or roosting was found on site, although roosting is known to occur within the region. Carnaby's Cockatoo has highly specific requirements for breeding and roosting sites, and most of the survey area would be unsuitable, with the possible exception of larger trees along drainage systems and around wetlands. Given that creeklines and wetlands will be avoided during seismic line planning and there will be no clearing of large trees, the project is not likely to impact the roosting or breeding habitat of this species.

Remnant vegetation along creeks, fences and roadsides is important as movement corridors, providing islands of habitat within a largely cleared landscape (DSEWPaC 2012). This is particularly true of vegetation within the eastern portion of the survey area. Seismic line planning will avoid these remnants as much as possible, so as not to affect movement corridors which provide important habitat for Carnaby's Cockatoos migrating from inland breeding areas to the coastal heath to forage.

Temporary clearing of up to 1000 ha of native vegetation (not all of which would be considered high-quality cockatoo foraging habitat) may affect the availability of foraging habitat for Carnaby's Cockatoo, although the area impacted is relatively limited within the context of the whole project area. Within the seismic project area, 1000 ha of clearing represents a maximum of 2.8% impact to the 36 000 ha of moderate to high quality foraging habitat mapped within the project area. The EPBC Act Referral Guidelines for three threatened black

cockatoo species (DSEWPaC 2012) state that clearing of more than one hectare of quality foraging habitat is a trigger for referral under the EPBC Act.

Table 1: Threatened flora species potentially present in the survey area

Species	Status	Description and habitat	Likelihood of occurrence
Acacia recurvata FABACEAE	EN	A dense, dome shaped, viscid shrub from, 0.6-2.5 m high, with yellow flowers. This species flowers in July and prefers sandy clay or granitic clay loam in or on creeklines, plains, breakaways or low hills.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Acacia wilsonii FABACEAE	EN	A prostrate shrub, usually from 0.2-0.3(0.5) m high with yellow flowers and erect, terete phyllodes. Prefers lateritic soils on hill slopes. This species flowers mainly from October to mid-November, but also in early December and in March.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Andersonia gracilis ERICACEAE	EN	A slender shrub up to 50 cm tall with few, spreading branches. Pink to pale mauve flowers are clustered in ovoid or oblong groups of 4 to 14 on terminal heads. Occurs on seasonally damp, black sandy clay flats near or on the margins of swamps, often on duplex soils supporting low open heath vegetation.	No current or historic records from the survey area. The seismic lines will be deviated to avoid claypans, creeklines and seasonally wet areas and therefore this species is **unlikely to occur** within the project footprint.
Banksia catoglypta PROTEACEAE	VU	A shrub to 1 m tall and 1 m wide, without a lignotuber. Golden yellow flower heads, 7-8cm across, terminal on short branchlets. This species is found in white sand over gravel in close proximity to, or on top of, laterite breakaways (TSSC 2018).	No current or historic records from the survey area. Seismic lines will be deviated to avoid laterite breakaways and all known locations of this species. All seismic lines will be inspected by experienced botanists prior to clearing; therefore, this species is **unlikely to occur** within the project footprint.

Species	Status	Description and habitat	Likelihood of occurrence
Banksia serratuloides subsp. *perissa* PROTEACEAE	CR	A compact shrub to 1m tall and 1.2m across, with crowded leaves on erect branches. The flower heads are held in the leaf axils. The yellow flowers, about 2.5 cm long, have a silky hairy perianth. Occurs in lateritic gravel and brown loam on ridge tops and slopes or in red brown sand on lower areas. This subspecies favours areas of low dense heath but can also be found in low open woodland.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Caladenia hoffmanii ORCHIDACEAE	EN	Spider orchid that grows to 30 cm tall, with a leaf 8–15 cm long and 0.5–1 cm wide. Each plant has 1–3 flowers each 3–7 cm long and 3– 5 cm wide, with sepals to 3 cm long terminating in abbreviated glandular 'tails'. The tapering labellum (lip) has a deep red apex and is curled only at the very tip. It has a long, red fringe and dark red calli (glands). Habitat preference for clay, sandy clay or clay loam with laterite on rocky hillsides and ridges, or in winter-wet flats.	No current or historic records from the survey area. The seismic lines will be deviated to avoid laterite and winter-wet areas; therefore, this species is **unlikely to occur** within the project footprint.
Chorizema humile FABACEAE	EN	Sprawling, prostrate or decumbent shrub with yellow & red/brown flowers which appear from July to September. Found in clay/clay loams, on plains. Associated species include *Allocasuarina campestris*, *Hypocalymma angustifolium* and several Acacia species.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Conostylis dielsii subsp. *teres* HAEMODORACEAE	EN	A low, perennial monocot with terete leaves from 60-160 mm long and 0.5-1 mm wide. Short bristles of 0.8-1 mm long are present on the leaf margin and hairs on the leaf surface. Creamy yellow flowers appear from July to August. Occurs on sand/gravel.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.

Species	Status	Description and habitat	Likelihood of occurrence
Conostylis micrantha HAEMODORACEAE	EN	A low, perennial monocot with terete leaves from 70-145 mm long and 0.8-1 mm wide. Bristles of 8-10.5 mm length are present on the leaf margin, but the leaves are otherwise hairless. Yellow flowers appear from July to August. This species occurs in sandy areas.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Dasymalla axillaris LAMIACEAE	CR	Low, diffuse shrub that can grow to 0.3 m high. The flowers are red to yellowish-scarlet, and vivid in appearance. The species is thought to be a disturbance opportunist as it has only been located in areas of recent disturbance and appears to decline in numbers quite rapidly after the initial disturbance.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Daviesia bursarioides FABACEAE	EN	A prostrate, spindly, broom-like shrub up to 2 m high, with terete, spiny stems. Yellow, pink and red/brown flowers appear in August. This species prefers gravelly lateritic soils on slopes.	Not known to occur in the Geraldton Sandplains bioregion. **Unlikely to be present** in the survey area based on regional distribution.
Daviesia speciosa FABACEAE	EN	A low shrub with terete, pungent branchlets, that has a leafless appearance and red flowers that appear from April to May. Found in gravelly lateritic soils, undulating plains and rises.	Previously recorded in the survey area but not recorded in 2019 survey of seismic lines. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Eleocharis keigheryi CYPERACEAE	VU	A rhizomatous, clumped, perennial sedge growing to 0.4 m high. Green flowering stalks appear from August to November. This species is a water plant which appears in creeks and claypans.	Previously recorded in the survey area but not recorded in 2019 survey of seismic lines. Known locations will be avoided during seismic line planning, The seismic lines will be deviated to avoid claypans, creeklines and seasonally wet areas and therefore this species is **unlikely to be present** within the project footprint.

Species	Status	Description and habitat	Likelihood of occurrence
Eremophila glabra subsp. *chlorella* SCROPHULARIACEAE	EN	A prostrate and spreading or sprawling shrub to 1 m high. Green-yellow flowers appear from July to November. This species prefers winter wet depressions.	Previously recorded in the survey area but not recorded in 2019 survey of seismic lines. Known locations will be avoided during seismic line planning. The seismic lines will be deviated to avoid claypans, creeklines and seasonally wet areas and therefore this species is **unlikely to be present** within the project footprint.
Eremophila nivea SCROPHULARIACEAE	EN	White/grey, tomentose shrub, 1-2 m high with blue-purple-violet flowers. Occurs on undulating plains and road verges in sandy clay, clay loam.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Eremophila subangustifolia (listed as *Eremophila* sp. Narrow Leaves (J.D. Start D12-150) on PMST and SPRAT) SCROPHULARIACEAE	CR	An erect to spreading, much-branched shrub from 1–2.5 m high and 2–4 m wide when mature, with narrow, more or less terete leaves 0.5–1 mm wide and emitting a strong, slightly offensive odour. Flowers are a pale lilac colour and appear from July to September. This species grows on slightly saline, pale brown sandy clay on the margins of seasonally wet flats and lakes.	No current or historic records from the survey area. The seismic lines will be deviated to avoid claypans, creeklines and seasonally wet areas and therefore this species is **unlikely to be present** within the project footprint.
Eremophila viscida SCROPHULARIACEAE	EN	The varnish bush is a large, erect shrub 2 – 6 m tall with sticky, shiny, brown hairless branches, and hairless to finely glandular-hairy leaves 5 –10 cm long by 1 cm wide. Flowers area green white-yellow. Preferred habitat is brown, sandy-loam or red brown clay-loam soils, in open woodland and prefers areas associated with granite and salt lake systems.	Preferred habitat does not occur in the survey area. **Unlikely to be present** in the survey area based on habitat preferences

Species	Status	Description and habitat	Likelihood of occurrence
Eucalyptus absita MYRTACEAE	EN	A mallee to 4 m tall, which may be either smooth-stemmed or rough-barked at the base, with fibrous grey brown to yellowish, box-type bark for up to 2 m. Above this the bark is smoother, with coloration ranging from grey over copper or greenish above, sometimes with entirely smooth green upper stems. The white flowers occur from April to July. They seem to be associated with minor drainage lines flowing downhill from upper catchment areas. These populations occur on white sands with some lateritic gravel and on clayey sand on sandy flats where they are lower in the landscape.	No current or historic records from the survey area. As a small tree, this species would stand out in the landscape and would be preferentially avoided by line clearing crews. In addition, all seismic lines will be assessed by botanists prior to clearing with lines to be deviated if necessary. Therefore, this species is **unlikely to occur** within the project footprint.
Eucalyptus x *balanites* MYRTACEAE	EN	Robust tree mallee, 5-8 metres tall and up to 15 metres wide. It is a sprawling tree with rough flaky grey bark up to the branchlets. Occurs on light coloured sandy soils with much surface laterite. It grows in gently sloping heathlands in open low mallee woodland.	No current or historic records from the survey area. As a small tree, this species would stand out in the landscape and would be preferentially avoided by line clearing crews. In addition, all seismic lines will be assessed by botanists prior to clearing with lines to be deviated if necessary. Therefore, this species is **unlikely to occur** within the project footprint.
Eucalyptus crispata MYRTACEAE	VU	A lignotuberous mallee from 3-7 m high, with rough bark on the trunk, in partly decorticated curls. Yellow-cream flowers appear from March to June. Prefers lateritic soils.	Previously recorded in the survey area but not recorded in 2019 survey of seismic lines. As a small tree, this species would stand out in the landscape and would be preferentially avoided by line clearing crews. In addition, all seismic lines will be assessed by botanists prior to clearing with lines to be deviated if necessary. Therefore, this species is **unlikely to occur** within the project footprint.
Eucalyptus impensa MYRTACEAE	EN	A straggly mallee, to 1.5 m tall, with smooth bark. Pink flowers with hemispherical fruit. Occurs on grey-yellow gravelly sand on undulating lateritic plains and low breakaway slopes.	No current or historic records from the survey area. As a small tree, this species would stand out in the landscape and would be preferentially avoided by line clearing crews. In addition, all seismic lines will be assessed by botanists prior to clearing with lines to be deviated if necessary. Therefore, this species is **unlikely to occur** within the project footprint.

Species	Status	Description and habitat	Likelihood of occurrence
Eucalyptus johnsoniana MYRTACEAE	VU	Lignotuberous mallee from 1-3.5 m tall, with flaky bark at the base of the trunk, then smooth. Creamy white flowers appear from July to August. Prefers lateritic soils.	No current or historic records from the survey area. As a small tree, this species would stand out in the landscape and would be preferentially avoided by line clearing crews. In addition, all seismic lines will be assessed by botanists prior to clearing with lines to be deviated if necessary. Therefore, this species is **unlikely to occur** within the project footprint.
Eucalyptus lateritica MYRTACEAE	VU	An erect, lignotuberous mallee up to 3m tall with rough greybrown bark at the base. Flowers are white and appear from April to October. Known from 13 small, isolated populations occurring over a range of approximately 30 km in the Gairdner Range, Mount Lesueur, and the Coomallo Hill area (TSSC 2008).	**Unlikely to be present** in the survey area based on regional distribution.
Eucalyptus leprophloia MYRTACEAE	EN	Lignotuberous mallee from 2-5(-8) m high with rough, loose & flaky bark to 1 m. Creamy white flowers appear from August to October. Occurs on a variety of soils.	Previously recorded in the survey area but not recorded in 2019 survey of seismic lines. As a small tree, this species would stand out in the landscape and would be preferentially avoided by line clearing crews. In addition, all seismic lines will be assessed by botanists prior to clearing with lines to be deviated around known locations. Therefore, this species is **unlikely to occur** within the project footprint.
Eucalyptus rhodantha var. *rhodantha* MYRTACEAE	VU	A lignotuberous mallee from 1.5-4 m high with smooth bark and distinctive glaucous leaves and branchlets. Red-pink-cream-white flowers appear in July, or from September to December or January. Prefers grey/yellow/red sand over laterite in undulating country or on hillslopes.	No current or historic records from the survey area. As a small tree, this species would stand out in the landscape and would be preferentially avoided by line clearing crews. In addition, all seismic lines will be assessed by botanists prior to clearing with lines to be deviated if necessary. Therefore, this species is **unlikely to occur** within the project footprint.

Species	Status	Description and habitat	Likelihood of occurrence
Eucalyptus subarea MYRTACEAE	VU	A mallee from 1-4 m high with rough and flaky bark. Its white flowers appear from November to January. It prefers grey sand near or on lateritic breakaways. Known populations are restricted to a small area south of Eneabba (ALA 2020).	**Unlikely to be present** in the survey area based on regional distribution.
Gastrolobium hamulosum FABACEAE	EN	A small, erect, and straggly shrub that can grow to 45 cm tall. Flowers are yellow, orange, red and purple. It grows on pale yellow clay loam with some sand and gravel on clay flats. It also grows in white and grey sand or sandy clay. It sometimes occurs in disturbed ground with other colonising shrubs, such as in low heath.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Grevillea althoferorum subsp. *Althoferorum* PROTEACEAE	CR	A compact shrub with trailing stems up to 3 m long, and angular branchlets covered with very fine, long, soft hairs. The leaves have twice divided lobes and are broadly triangular with recurved sharp points. The cream flowers appear from August to October. Found on sand.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Grevillea christineae PROTEACEAE	EN	An erect, rounded shrub up to 1 m tall, with wiry, zig-zagging branches and creamy-white flowers. Often occurs on narrow, weed infested road verges, which in many places are almost the only surviving representatives of the natural vegetation in those areas. Prefers moist areas such as drainage lines or outcropping granite.	No current or historic records from the survey area. The habitat preferences of this species limit potential distribution to granite outcropping (not present in the survey area) and drainage lines; which would be preferentially avoided by seismic line preparation crews due to operational requirements. Consequently, this species is **unlikely to be present** within the project footprint.
Grevillea curviloba subsp. *Incurve* PROTEACEAE	EN	A vigorous, sprawling shrub to 2.5 m high and wide, with greyish-green leaves and creamy white flowers. The habit of this subspecies ranges from prostrate to erect. It grows in open heath in winter-wet areas on sand over limestone, or over ironstone at sites with a high water-table.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.

Species	Status	Description and habitat	Likelihood of occurrence
Grevillea humifusa PROTEACEAE	EN	The spreading grevillea is a prostrate shrub with a lignotuber, trailing stems to 3 m long and angular branchlets with long soft hairs. Orange, red or pink flowers at the end of the branches. Occurs on undulating plains of gravelly loam (.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Grevillea phanerophlebia PROTEACEAE	CR	A low, spreading shrub 0.9-1.5 m high. The bright green, glossy leaves are divided into three broadly linear segments, which are usually divided again. The ultimate segments end in a sharp point. The slender, white flowers are produced in spring in delicate terminal or axillary racemes. Each white flower is held on a long, threadlike stalk and the small perianth tube is tipped with a green, globular knob in bud. The linear segments fold back symmetrically to reveal the short style and cone-shaped stigma. Occurs on white or yellow sandy or gravelly loam soil in open scrub or heath. It is likely that it is a short-lived disturbance opportunist and regenerates from seed after fire.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Gyrostemon reticulatus GYROSTEMONACEAE	CR	A shrub to 1 m tall with terete leaves reminiscent of thorns, that may only appear after fire. Its habitat and flowering period are unknown, but it is thought to appear in burned areas 1-5 years post fire.	No current or historic records from the survey area; considered locally extinct due to long periods of absence from records. This species is **unlikely to occur** within the project footprint.
Hakea megalosperma PROTEACEAE	VU	A spreading, lignotuberous shrub from 1-2 m high. White-cream/pink flowers appear from May to June, nuts are retained year-round. Occurs on grey sand, loam, lateritic hills and rocks.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.

Species	Status	Description and habitat	Likelihood of occurrence
Hemiandra gardneri LAMIACEAE	EN	A prostrate perennial shrub that forms a mat up to 15 cm high and 2 m in diameter. Its primary stems are usually up to 40 cm long. The dark red to pink flowers are clustered towards the end of the stems. Both leaves and calyxes are covered with short hairs giving the plant a grey appearance. Occurs on grey or yellow sand, or clayey sand in sandplains.	Previously recorded in the survey area but not recorded in 2019 survey of seismic lines. **Known present** in the survey area.
Hypocalymma angustifolium subsp. Hutt River (S. Patrick 2982) MYRTACEAE	EN	A very large shrub, with slender leaves normally more than 40mm long. Grows in permanently damp springs and swamps, in low heath and sedges.	No current or historic records from the survey area. The seismic lines will be deviated to avoid claypans, creeklines and seasonally wet areas and therefore this species is **unlikely to be present** within the project footprint.
Leucopogon marginatus ERICACEAE	EN	A dwarf shrub 40-60 cm tall with smooth, young growth and erect, smooth stems. This species is distinguished from others by the crisp, undulate and membranous margins of the leaf, and the white bearded flowers that appear in the upper leaf axils in groups of one to three per stalk. The lance-like pointed leaves are dark green, overlapping and embrace the stem. Found on white, pale yellow or grey brown sand over laterite.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Leucopogon obtectus (recently renamed to *Styphelia obtecta*) ERICACEAE	EN	A spindly erect shrub from 0.5-1.7 m high, with leaves which closely clasp the stem, obscuring the ends of branchlets. Tiny white to creamy yellow flowers appear in the leaf axils from August to October. Occurs on grey sands.	Historic records within survey area; recorded in 2019 survey of seismic lines. Seismic lines will be deviated to avoid laterite breakaways and all known locations of this species. All seismic lines will be inspected by experienced botanists prior to clearing; therefore, this species is **unlikely to be present** within the project footprint.
Paracaleana dixonii ORCHIDACEAE	EN	A tuberous perennial orchid from 90-200 mm high, with a single, small basal leaf. Brown yellow-green-red flowers in the shape of a duck appear from October to December or January. Found in grey sand over granite.	Historic records within survey area; recorded in 2019 survey of seismic lines. **Known present** in the survey area, widespread and numerous.

Species	Status	Description and habitat	Likelihood of occurrence
Roycea pycnophylloides CHENOPODIACEAE	EN	A perennial herb which forms densely branched, silvery mats to 1 m wide. Flowers appear in September. It is not known to occur in or near the Geraldton Sandplains bioregion. It prefers sandy soils and clay on saline flats.	Not known to occur in the Geraldton Sandplains bioregion. **Unlikely to be present** in the survey area based on regional distribution.
Schoenia filifolia subsp. *Subulifolia* ASTERACEAE	EN	An erect, annual herb to 30 cm high, with yellow flowers and terete leaves. It differs from the typical subspecies in having larger flower heads and with a hemispherical involucre. Occurs in heavy soils on swampy flats, breakaways and crabholes, known to occur around *Eucalyptus loxophleba*.	No current or historic records from the survey area. The seismic lines will be deviated to avoid claypans, creeklines and seasonally wet areas and therefore this species is **unlikely to be present** within the project footprint.
Spirogardnera rubescens SANTALACEAE	EN	An erect, open plant to 1.6 m tall, with succulent, light green flowering branches which twist in a spiral shape. The flowers are white and arranged in sessile clusters. It prefers clay-loams and lateritic soils.	No current or historic records from the survey area. Seismic lines will be deviated to avoid laterite breakaways. All seismic lines will be inspected by experienced botanists prior to clearing; therefore, this species is **unlikely to occur** in the project footprint.
Styphelia longissimi ERICACEAE	CR	A small, erect shrub to around 70 cm high, with very long pungent mucros at the ends of leaves. The white flowers appear from May to June. Occurs in sand among *Allocasuarina campestris* heath.	Previously recorded in the survey area but not recorded in 2019 survey of seismic lines. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Symonanthus bancroftii SOLANACEAE	EN	A low, many-stemmed herbaceous undershrub to 25 cm. Plants are dioecious (male and female flowers on separate plants). Flowers are white in colour, small, hairy and streaked with violet inside. The leaves are more or less spreading, hairy, somewhat warty and rolled over at the margins. The fruit is a nearly globular capsule. An aroma of tobacco emanates from Charles Gardner's 75-year-old collection; however, this has not been evident from freshly collected material. Known only from degraded areas near Bruce Rock.	Not known to occur in the Geraldton Sandplains bioregion. **Unlikely to be present** in the survey area based on regional distribution.

Species	Status	Description and habitat	Likelihood of occurrence
Tetratheca nephelioides ELAEOCARPACEAE	CR	A densely tufted, brush-like, low shrub to 0.3 m high. Leaves tiny or absent, falling early. Purple/mauve/magenta flowers appear in September. Found on white-grey sand, yellow brown clayey sand, gravel and laterite on outcrops, undulating hills and ridges.	No current or historic records from the survey area. Seismic lines will be deviated to avoid laterite breakaways and all known locations of this species. All seismic lines will be inspected by experienced botanists prior to clearing; therefore, this species is **unlikely to be present** within the project footprint.
Thelymitra stellata ORCHIDACEAE	EN	A tuberous, perennial orchid from 150-250 mm high. Its yellow and brown flowers appear from October to November. Occurs on sand, gravel and lateritic loam.	Previously recorded in the survey area but not recorded in 2019 survey of seismic lines. Seismic lines will be deviated to avoid laterite breakaways and all known locations of this species. This species is **unlikely to be present** within the project footprint.
Verticordia albida MYRTACEAE	EN	A medium to tall shrub 0.3-2 m high with small, elliptic leaves 2-4.5 mm wide and 3-6 mm long. Its white-cream-pink flowers appear from November to December or January. Found in grey-yellow sand near roads.	No current or historic records from the survey area. All seismic lines will be inspected by experienced botanists prior to clearing. The seismic lines will be deviated to avoid all known locations; therefore, this species is **unlikely to occur** within the project footprint.
Wurmbea tubulosa COLCHICACEAE	EN	A cormous, perennial herb growing at ground level, from 10-30 mm tall with only three leaves, two of them larger. White-pink flowers appear from June to August. Found in clay and loam on riverbanks and seasonally wet places.	No current or historic records from the survey area. The seismic lines will be deviated to avoid claypans, creeklines and seasonally wet areas; therefore, this species is **unlikely to be present** within the project footprint.

Source: description and habitat and likelihood of occurrence from Strategen-JBS&G unless otherwise indicated.

Table 2: Threatened and migratory fauna species potentially present in the survey area

Species	Status	Description and habitat	Likelihood of occurrence
Actitis hypoleucos Common Sandpiper	Migratory Wetland	A small sandpiper 19-21cm long with a long tail, short legs and medium length bill. Dark brown plumage above and white underneath, while cap, hindneck and mantle feathers have a greenish gloss. Found all along the coastlines of Australia, widespread in small numbers. Utilises a wide range of coastal wetlands and some inland wetlands, mostly found around muddy margins or rocky shores.	This is a wetland species that would be expected to occur in the project area only when conditions are favourable, such as occur after considerable rainfall (Bancroft and Bamford 2020). **Unlikely to occur** other than as a vagrant or irregular visitor.
Anous stolidus Common Noddy	Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Anous tenuirostris melonops Australian Lesser Noddy	VU, Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Apus pacificus Fork-tailed Swift	Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Ardenna carneipes Flesh-footed Shearwater	Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Calidris acuminata Sharp-tailed Sandpiper	Migratory Wetland	A small-medium wader 17-22cm long, rounded with a pot belly, small flat head on a short neck and short, slightly decurved bill. Non-breeding in Australia, widespread in inland and coastal locations in freshwater and saline habitats. Prefers muddy edges of shallow fresh or brackish wetlands.	This is a wetland species that would be expected to occur in the project area only when conditions are favourable, such as occur after considerable rainfall (Bancroft and Bamford 2020). **Unlikely to occur** other than as a vagrant or irregular visitor.
Calidris canutus Red Knot, Knot	EN, Migratory Wetland	A small to medium bird 23-25cm long weighing 120g. A short neck and robust body with a short, straight bill, long wings and short legs. Common in coastal habitats of Australia, typically found in intertidal mudflats, sheltered beaches, estuaries, inlets and lagoons.	No current or historic records from the survey area. Preferred habitat does not occur in the survey area, so it is **unlikely to be present.**

Species	Status	Description and habitat	Likelihood of occurrence
Calidris ferruginea Curlew Sandpiper	CE, Migratory Wetland	A small, slim sandpiper 18-23cm long weighing 57g. It has long legs, neck and bill, with chestnut brown plumage on the head, neck and underbody with narrow black bars on the belly and flanks. Widespread on coastal and subcoastal plains form Cape Arid to the southwest Kimberley. This species prefers intertidal mudflats and coastal areas, as well as inland wetlands and lakes.	This is a wetland species that would be expected to occur in the project area only when conditions are favourable, such as occur after considerable rainfall (Bancroft and Bamford 2020). **Unlikely to occur** other than as a vagrant or irregular visitor.
Calidris melanotos Pectoral Sandpiper	Migratory Wetland	A small-medium sandpiper 19-24cm long, characterised by a flat back and plumpish body with a small round head on a long neck. Widely distributed across Australia, although rarely recorded with Western Australia. This species prefers shallow fresh to saline wetlands.	This is a wetland species that would be expected to occur in the project area only when conditions are favourable, such as occur after considerable rainfall (Bancroft and Bamford 2020). **Unlikely to occur** other than as a vagrant or irregular visitor.
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo	EN	A large cockatoo 53-58cm long and wingspan of 100cm. Plumage mostly brownish-black to greyish black with narrow off-white margins on the feathers. Endemic to and widespread within the southwest of Western Australia.	**Known to occur** as a regular migrant to the area, although unlikely to breed within the survey area. There is no evidence for roosting in the survey area although some roosting sites are known nearby (Bancroft and Bamford 2020).
Diomedea amsterdamensis Amsterdam Albatross	EN, Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Diomedea epomorphora Southern Royal Albatross	VU, Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Diomedea exulans Wandering Albatross	VU, Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Diomedea sanfordi Northern Royal Albatross	EN, Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Hydroprogne caspia Caspian Tern	Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.

Species	Status	Description and habitat	Likelihood of occurrence
Leipoa ocellata Malleefowl	VU	A large, ground-dwelling bird known for its ability to build enormous nesting mounds. Widely distributed across southern arid Australia.	No evidence of Malleefowl have been found in the project area during multiple visits to the site, and it is likely present only as an irregular visitor (Bancroft and Bamford 2020); therefore, it is **unlikely to occur**.
Limosa lapponica baueri Western Alaskan Bar-tailed Godwit *Limosa lapponica menzbieri* Northern Siberian Bar-tailed Godwit *Limosa lapponica* Bar-tailed Godwit	VU CE Migratory Wetland	A large wader, 37-39cm long, with a long neck and a very long upturned bill. A widespread coastal species preferring intertidal sandflats, banks, mudflats, estuaries, inlets and bays.	No current or historic records from the survey area. Preferred habitat does not occur in the survey area, so it is **unlikely to be present.**
Pezoporous flaviventris Western Ground Parrot	CE	A medium-sized, slender, long-tailed parrot about 30cm long. This species once occurred on the coastal plains between Israelite Bay and Dongara, north of Perth, but survives now only just east of Esperance (Bancroft and Bamford 2020)	This species has historic distribution within the survey area, but the only known populations exist on the southern coast of Western Australia. An unconfirmed record from 1992 north of Arrowsmith River created some interest in the area, but repeated surveys (2008 and 2012) have failed to find any evidence that Western Ground Parrots persist in the region. As a result, this species is **presumed locally extinct**.
Pterodroma mollis Soft-plumaged Petrel	VU	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Macronectes giganteus Southern Giant Petrel	EN	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Macronectes halli Northern Giant Petrel	VU	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.

Species	Status	Description and habitat	Likelihood of occurrence
Motacilla cinereal Grey Wagtail	Migratory Terrestrial, Migratory Marine	This species prefers fast-flowing mountain streams and rivers with riffles and exposed rocks or shoals, often in forested areas. It is also found in more lowland watercourses, even canals, where there are artificial waterfalls, weirs, millraces or lock gates.	This is a wetland species that would be expected to occur in the project area only when conditions are favourable, such as occur after considerable rainfall. **Unlikely to occur** other than as a vagrant or irregular visitor.
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew	CE, Migratory Wetland	The largest migratory shorebird in the world, wingspan of 110cm, with a primarily coastal distribution. They are rarely recorded inland and prefer sheltered coasts with large intertidal mudflats or sandflats.	No current or historic records from the survey area. Preferred habitat does not occur in the survey area, so it is **unlikely to be present.**
Pandion haliaetus Osprey	Migratory Wetland	A medium-sized raptor, mainly dark-brown to blackish-brown above and white below. Occurs in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. Mostly found in coastal areas but occasionally travel inland along major rivers.	This is a wetland species that would be expected to occur in the project area only when conditions are favourable, such as occur after considerable rainfall (Bancroft and Bamford 2020). **Unlikely to occur** other than as a vagrant or irregular visitor.
Rostratula australis Australian Painted Snipe	EN	A stocky wading bird around 220-250mm long with a long pinkish bill. It generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans.	This is a wetland species that would be expected to occur in the project area only when conditions are favourable, such as occur after considerable rainfall (Bancroft and Bamford 2020). **Unlikely to occur** other than as a vagrant or irregular visitor.
Sterna dougallii Roseate Tern	Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Sternula nereis nereis Australian Fairy Tern	VU	A small, fish-eating bird 22-27cm long, with a bulky, round body and grey-white plumage with black markings. This is a coastal species that prefers sandy beaches, estuarine and wetland habitats.	No current or historic records from the survey area. Preferred habitat does not occur in the survey area, so it is **unlikely to be present.**
Thalassarche carteri Indian Yellow-nosed Albatross	VU, Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.

Species	Status	Description and habitat	Likelihood of occurrence
Thalassarche cauta cauta Shy Albatross	VU, Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Thalassarche cauta steadi White-capped Albatross	VU, Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Thalassarche impavida Campbell Albatross	VU, Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Thalassarche melanophris Black-browed Albatross	VU, Migratory Marine	This species is exclusively marine and would not utilise terrestrial habitats.	This marine species **does not occur** in the project area.
Tringa nebularia Common Greenshank, Greenshank	Migratory Wetland	A heavily built, elegant wader, 30-35cm in length. This species has a long, slightly upturned beak with long, yellowish-green legs. Usually seen singly or in small to large flocks in a variety of coastal and inland wetlands.	This is a wetland species that would be expected to occur in the project area only when conditions are favourable, such as occur after considerable rainfall (Bancroft and Bamford 2020). **Unlikely to occur** other than as a vagrant or irregular visitor.
Dasyurus geoffroii Chudditch, Western Quoll	VU	A carnivorous marsupial about the size of a small domestic cat, with white spotted pelage, large rounded ears and pointed muzzle. Although once widespread across Australia, this species is currently restricted to southwest WA (DEC 2012).	Although the Protected Matters Search Tool indicates that this species or species habitat may occur within area (PMST 2020), the fauna assessment found that this species is considered **locally extinct** (Bancroft and Bamford 2020).
Parantechinus apicalis Dibbler	EN	A carnivorous marsupial weighing 75-100g with brownish-grey freckled fur above and greyish-white tinged with yellow below. Although formerly widely distributed across southwestern Australia, it is believed to be restricted to the coastline near Jurien and three offshore islands. Additional unknown populations may also persist between Lancelin and Dongara, and on the south coast.	Although the Protected Matters Search Tool indicates that this species or species habitat may occur within area (PMST 2020), the fauna assessment found that this species is considered **locally extinct** (Bancroft and Bamford 2020).

Species	Status	Description and habitat	Likelihood of occurrence
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink	EN	Up to 194mm (snout to vent), heavily keeled scales and a short, flattish, distinctively spiny tail. Occurs in a broad semi-arid area across south-west WA between Shark Bay and Minnivale and east to Cue. The Murchison populations has been found on isolated stands of granite and other rocky areas.	No current or historic records from the survey area, and known distribution is to the east of the project area. **Unlikely to be present** in the clearing footprint as survey lines would avoid the most favourable habitat, being rocky outcrops.
Idiosoma nigrum Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider	VU	A dark brown to black spider up to 30mm long with a distinctive thick, hard cuticle on the abdomen. In the arid Midwest region, this species inhabits rocky habitats, primarily in gullies, drainage lines and on southern facing slopes. It shelters in a deep burrow.	No current or historic records from the survey area, and known distribution is to the east of the project area. **Unlikely to be present** in the survey area based on recent taxonomical re-evaluation which indicates this species is restricted to the central Wheatbelt.

Source: description, habitat and distribution from SPRAT 2020 unless otherwise indicated.

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Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

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

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

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

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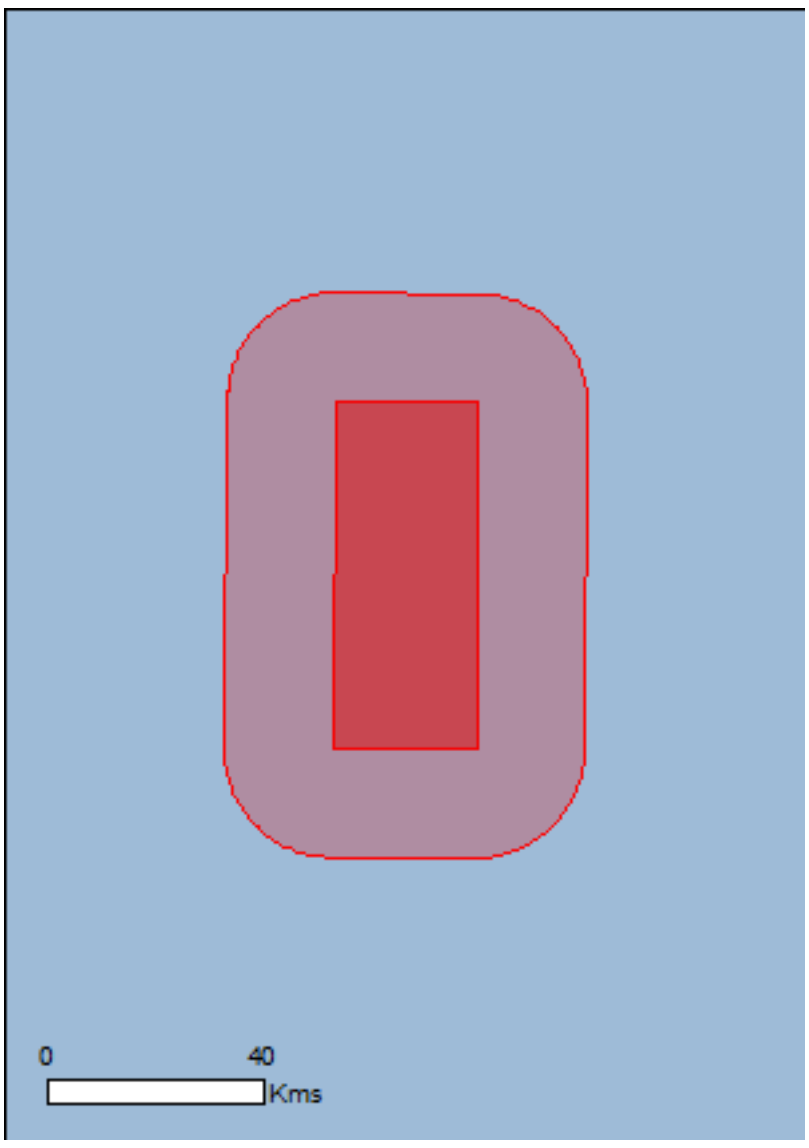

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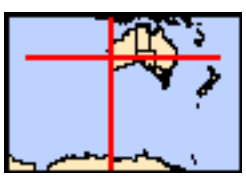

Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	80
Listed Migratory Species:	40

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	67
Whales and Other Cetaceans:	11
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:	25
Regional Forest Agreements:	None
Invasive Species:	20
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

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
Eucalypt Woodlands of the Western Australian Wheatbelt	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	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
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta cauta Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat likely to occur within area
Parantechinus apicalis Dibbler [313]	Endangered	Species or species habitat may occur within area
Other		
Idiosoma nigrum Shield-backed Trapdoor Spider, Black Rugose	Vulnerable	Species or species

Name	Status	Type of Presence
Trapdoor Spider [66798]		habitat likely to occur within area
Plants		
Acacia wilsonii Wilson's Wattle [65228]	Endangered	Species or species habitat known to occur within area
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area
Banksia catoglypta [85021]	Vulnerable	Species or species habitat likely to occur within area
Banksia serratuloides subsp. perissa Northern Serrate Dryandra [82767]	Critically Endangered	Species or species habitat may occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat may occur within area
Chorizema humile Prostrate Flame Pea [32573]	Endangered	Species or species habitat likely to occur within area
Conostylis dielsii subsp. teres Irwin's Conostylis [3614]	Endangered	Species or species habitat known to occur within area
Conostylis micrantha Small-flowered Conostylis [17635]	Endangered	Species or species habitat known to occur within area
Dasymalla axillaris Native Foxglove [38829]	Critically Endangered	Species or species habitat may occur within area
Daviesia speciosa Beautiful Daviesia [56698]	Endangered	Species or species habitat known to occur within area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat known to occur within area
Eremophila glabra subsp. chlorella [84927]	Endangered	Species or species habitat known to occur within area
Eremophila nivea Silky Eremophila [14431]	Endangered	Species or species habitat may occur within area
Eremophila sp. Narrow leaves (J.D.Start D12-150) [89307]	Critically Endangered	Species or species habitat known to occur within area
Eremophila viscida Varnish Bush [2394]	Endangered	Species or species habitat may occur within area
Eucalyptus absita Badgingarra Box [24260]	Endangered	Species or species habitat may occur within area
Eucalyptus crispata Yandanooka Mallee [24268]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus impensa Eneabba Mallee [56711]	Endangered	Species or species

Name	Status	Type of Presence
		habitat known to occur within area
Eucalyptus johnsoniana Johnson's Mallee [14516]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus lateritica Laterite Mallee [6271]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus leprophloia Scaly Butt Mallee, Scaly-butt Mallee [56712]	Endangered	Species or species habitat known to occur within area
Eucalyptus rhodantha Rose Mallee [9362]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat may occur within area
Gastrolobium hamulosum Hook-point Poison [9212]	Endangered	Species or species habitat may occur within area
Grevillea althoferorum [64906]	Endangered	Species or species habitat likely to occur within area
Grevillea christineae Christine's Grevillea [64520]	Endangered	Species or species habitat may occur within area
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat known to occur within area
Grevillea humifusa Spreading Grevillea [61182]	Endangered	Species or species habitat likely to occur within area
Hakea megalosperma Lesueur Hakea [10505]	Vulnerable	Species or species habitat known to occur within area
Hemiandra gardneri Red Snakebush [7945]	Endangered	Species or species habitat likely to occur within area
Hypocalymma angustifolium subsp. Hutt River (S.Patrick 2982) [85023]	Endangered	Species or species habitat known to occur within area
Leucopogon marginatus Thick-margined Leucopogon [12527]	Endangered	Species or species habitat likely to occur within area
Leucopogon obtectus Hidden Beard-heath [19614]	Endangered	Species or species habitat known to occur within area
Paracaleana dixonii Sandplain Duck Orchid [86882]	Endangered	Species or species habitat known to occur within area
Roycea pycnophylloides Saltmat [21161]	Endangered	Species or species habitat likely to occur within area
Schoenia filifolia subsp. subulifolia Mingenew Everlasting [63904]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Spirogardnera rubescens Spiral Bush [15667]	Endangered	Species or species habitat may occur within area
Styphelia longissima [89333]	Critically Endangered	Species or species habitat known to occur within area
Symonanthus bancroftii Bancrofts Symonanthus [12837]	Endangered	Species or species habitat may occur within area
Tetratheca nephelioides [83217]	Critically Endangered	Species or species habitat known to occur within area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat known to occur within area
Verticordia albida White Featherflower [55635]	Endangered	Species or species habitat likely to occur within area
Wurmbea tubulosa Long-flowered Nancy [12739]	Endangered	Species or species habitat known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Hydroprogne caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur

Name	Threatened	Type of Presence
		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 known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus		
Common Noddy [825]		Species or species habitat likely to occur within area
Anous tenuirostris melanops		
Australian Lesser Noddy [26000]	Vulnerable	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 known 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 known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur

Name	Threatened	Type of Presence within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area
[Catharacta skua](#) Great Skua [59472]		Species or species habitat may occur within area
[Chrysococcyx osculans](#) Black-eared Cuckoo [705]		Species or species habitat known to occur within area
[Diomedea amsterdamensis](#) Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
[Larus pacificus](#) Pacific Gull [811]		Foraging, feeding or related behaviour known to occur within area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area
[Pterodroma mollis](#) Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
[Puffinus assimilis](#) Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Aipysurus pooleorum Shark Bay Seasnake [66061]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known

Name	Threatened	Type of Presence
		to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area

Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Beekeepers	WA
Depot Hill	WA
Kadathinni - Part lot 3 on Plan 15105	WA
Lake Logue	WA
Mingenew	WA
NTWA Bushland covenant (0084)	WA
NTWA Bushland covenant (0101)	WA
South Eneabba	WA
Stockyard Gully Reserve	WA
Tathra	WA
Unnamed WA00428	WA
Unnamed WA02360	WA
Unnamed WA12705	WA
Unnamed WA25495	WA
Unnamed WA26001	WA
Unnamed WA39744	WA
Unnamed WA46982	WA
Unnamed WA46983	WA
Unnamed WA46984	WA
Unnamed WA47436	WA
Unnamed WA48098	WA
White Gums	WA
Wilson	WA
Wotto	WA
Yardanogo	WA

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Feral deer		
Feral deer species in Australia [85733]		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
Sus scrofa		
Pig [6]		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
Carrichtera annua		
Ward's Weed [9511]		Species or species habitat may occur within area
Cenchrus ciliaris		
Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Lantana camara		
Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum		
African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Solanum elaeagnifolium		
Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
Tamarix aphylla		
Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Lake Logue/Indoon System	WA

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

-29.303471 115.130996,-29.302273 115.130996,-29.304669 115.369949,-29.808779 115.365829,-29.807588 115.125503,-29.303471 115.130996

Acknowledgements

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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.

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