



MEMORANDUM

TO: Ian Gordon, Chalice Gold Mines Ltd
FROM: Gavin Edwards, Preston Consulting
FILE: WARREGO NORTH PROJECT; 2016 MINING MANAGEMENT PLAN
DATE: 29/11/2016

Chalice Gold Mines Ltd (CGM) submitted a Mining Management Plan (MMP) to the Northern Territory Department of Primary Industry and Resources (DPIR) on 4 November 2016. DPIR provided several comments on 28 November 2016, which require an amendment of the MMP.

Preston Consulting have been approached to assist in the response to DPIR's comment on Section 3 (Current Project Site Conditions) of the MMP. We have reviewed the comment and provide this memo in response. The information provided in this memo provides more detail of the potential conservation significant flora and fauna species that may be found on site and should replace the following statements in the MMP:

Information is available for rare and threatened flora species in the area of proposed drilling on the NT Environments' website. A search of this website indicates that there are not likely to be any threatened species in the area of proposed drilling.

Information is available for threatened fauna species in the area of proposed drilling on the NT Environments' website. A search of this website indicates that there are not likely to be any threatened species in the area of proposed drilling.

Potential Threatened Flora Species

CGM has conducted a search of the NT Government's Natural Resource Maps system (Department of Environment and Natural Resources, 2016) and the Commonwealth Government's Protected Matters Search Tool (PMST; Department of the Environment and Energy (DoEE), 2016) to assess the potential for the presence of significant flora on site. A 40 km search buffer was used given the low number of surveys conducted in the area. The PMST report has been attached for your reference.

No Threatened Flora were identified during the database searches, however two species classified as 'near-threatened' and three species classified as 'data deficient' were identified from the surrounding area. None of these species were identified within the Project area, however this area has not been extensively surveyed.

Potential Threatened Fauna Species

CGM also conducted a search of the NT Government's Natural Resource Maps system (Department of Environment and Natural Resources, 2016) and the Commonwealth Government's PMST (DoEE, 2016) to assess the potential for the presence of significant fauna on site. A 40 km search buffer was used given the low number of surveys conducted in the area. The PMST report has been attached for your reference.

Eight Threatened Fauna were identified as potentially occurring in the area during the database searches, although none have previously been located within the Project area. Table 1 lists the potential species, their classification, range and habitat.

Five of the Threatened Fauna species are birds, all of which have a wide range and are unlikely to be impacted by the proposed drilling activities on site, as significant habitat such as wetlands and permanent watercourses will not be disturbed.

The Greater Bilby, Brush-tailed Mulgara and Great Desert Skink may occur on site based on distribution mapping and a conservative habitat assessment. The closest Threatened Fauna record is a record of the Greater Bilby, approximately 20 km south-east of the proposed drilling (Figure 1).

The area to be disturbed for the proposed works represent an extremely small proportion of the habitat of these species and therefore the works are unlikely to impact local populations.

Five additional listed Migratory bird species were also identified as potentially occurring in the area during the database searches:

- Fork-tailed Swift (*Apus pacificus*);
- Grey Wagtail (*Motacilla cinerea*);
- Yellow Wagtail (*Motacilla flava*);
- Oriental Plover, Oriental Dotterel (*Charadrius veredus*); and
- Oriental Pratincole (*Glareola maldivarum*).

These listed Migratory bird species all have a wide range (DoEE, 2016) and are unlikely to be impacted by the proposed drilling activities on site, as significant habitat such as wetlands and permanent watercourses will not be disturbed.

Table 1: Potential Threatened Fauna species within 40 km of Project area

Species	Conservation category	Database	Distribution	Habitat
Curlew Sandpiper (<i>Calidris ferruginea</i>)	Critically Endangered, Migratory	PMST	Widespread. In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers (DoEE, 2016). In NT they mostly occur around Darwin, north to Melville Island and Cobourg Peninsula, and east and south-east to Gove Peninsula, Groote Eylandt and Sir Edward Pellew Island. They are recorded inland from Victoria River Downs and around Alice Springs (Higgins & Davies 1996).	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters (Higgins & Davies 1996).
Red Goshawk (<i>Erythrotriorchis radiatus</i>)	Vulnerable	PMST	Widespread. It is very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia. It has probably always occurred in central Australia, where three widely-spaced, recent confirmed sightings corroborate earlier, previously doubted records (T. Aumann, pers. comm. in Garnett & Crowley 2000). However, no breeding has been recorded in central Australia and these records are thought to be of dispersive individuals (Czechura 2005, pers. comm.).	In the NT and the Kimberley, WA, tall open forest and woodland, or tall fringing woodlands along rivers in grasslands, shrub-lands, and low open woodlands are preferred (Aumann & Baker-Gabb 1991).
Princess Parrot, Alexandra's Parrot (<i>Polytelis alexandrae</i>)	Vulnerable	PMST	Widespread. It is sparsely distributed from near Oodnadatta in SA, west to near Coolgardie and the east Murchison River in WA, and north to near the Fitzroy River in WA and to Howell Ponds in the NT (Baxter & Henderson 2000; Higgins 1999). It is believed that the population is mainly concentrated in the Great Sandy, Gibson, Tanami and Great Victoria Deserts, and in the central ranges (Blyth & Burbidge 1997; Carter 1993b; Higgins 1999).	The Princess Parrot inhabits sand dunes and sand flats in the arid zone of western and central Australia. It occurs in open savanna woodlands and shrublands that usually consist of scattered stands of <i>Eucalyptus</i> (including <i>E. gongylocarpa</i> , <i>E. chippendalei</i> and mallee species), <i>Casuarina</i> or <i>Allocasuarina</i> trees; an understorey of shrubs such as <i>Acacia</i> (especially <i>A. aneura</i>), <i>Cassia</i> , <i>Eremophila</i> , <i>Grevillea</i> , <i>Hakea</i> and <i>Senna</i> ; and a ground cover dominated by <i>Triodia</i> species (Allen 1987; Baxter & Henderson 2000; Carter 1993b; Ford & Sedgwick 1967; Forshaw & Cooper 2002; Garnett 1993; Johnstone & Storr 1998; Parker 1971; Pianka & Pianka 1970). It also frequents <i>Eucalyptus</i> or <i>Allocasuarina</i> trees in riverine or littoral areas (Carter 1993b; Forshaw & Cooper 2002; North 1912).
Australian Painted Snipe (<i>Rostratula australis</i>)	Endangered	PMST	Widespread. Has been recorded at wetlands in all states of Australia (Barrett et al. 2003; Blakers et al. 1984; Hall 1910b). It is most common in eastern Australia, where it has been recorded at scattered	Generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged

Species	Conservation category	Database	Distribution	Habitat
			locations throughout much of Queensland, NSW, Victoria and south-eastern SA. It has been recorded less frequently at a smaller number of more scattered locations farther west in SA, the NT and WA (Barrett et al. 2003; Blakers et al. 1984; Marchant & Higgins 1993; Rogers et al. 2005). The extent of occurrence is estimated, with low reliability, to be 4,500,000 km ² (Garnett & Crowley 2000).	grassland or saltmarsh, dams, rice crops, sewage farms and bore drains (DoEE 2016).
Grey Falcon (<i>Falco hypoleucos</i>)	Vulnerable	NR Map	Endemic to Australia and occurs very sparsely in the interior and north of the Australian mainland (Australian Wildlife Conservancy (AWC) 2016a).	It prefers timbered lowland plains (especially those that are Acacia-dominated) which are interspersed with tree-lined watercourses (AWC 2016a).
Greater Bilby (<i>Macrotis lagotis</i>)	Vulnerable	PMST, NR Map	The species occurs in two separate geographic areas; one extending from the western deserts region (Tanami, Great Sandy, Gibson) of NT and WA north to the Pilbara and Kimberley regions, the second in south-western QLD (DoEE 2016).	Greater Bilby lives in the desert and shelters during the day in a burrow. Burrows are an extensive system of tunnels and a bilby may use up to a dozen with its home range. Three major vegetation types were recognised as potential habitat: <ol style="list-style-type: none"> 1. Open tussock grassland (both grasses and forbs) growing on uplands and hills, 2. Mulga woodland/shrubland (both pure mulga and mixed stands of mulga/witchetty bush) growing on ridges and rises, and 3. Hummock grassland growing on sand plains and dunes, drainage systems, salt lake systems and other alluvial areas (Pavey, 2006).
Brush-tailed Mulgara (<i>Dasycerus blythi</i>)	Vulnerable (NT-listed only)	NR Map	The Brush-tailed Mulgara has records from the Simpson Desert, as well as the Western desert, and parts of southern NT. Historically there are widespread records across central desert regions of Australia (AWC 2016b).	Mulgaras shelter in burrows up to 50 cm deep during the day and emerge at night to hunt large invertebrates and small vertebrates, including mammals, reptiles and birds. They are found in a range of vegetation communities but the favoured habitat of Brush-tailed Mulgaras is spinifex grasslands (AWC 2016b).
Great Desert Skink, Tjakura, Warrarna, Mulyamiji (<i>Liopholis kintorei</i>)	Vulnerable	PMST	In the NT, most recent records (post-1980) come from the western deserts region from Uluru-Kata Tjuta National Park north to Rabbit Flat in the Tanami Desert (NT NRETAS 2006).	The Great Desert Skink generally occurs on red sandplains and sand ridges (Cogger et al. 1993). Vegetation usually consists of hummock grassland (<i>Triodia basedowii</i> , <i>Triodia pungens</i> and <i>Triodia schinzii</i>), with some scattered shrubs and occasional trees (e.g. <i>Acacia</i> spp., <i>Eucalyptus</i> spp., <i>Hakea</i> spp., <i>Grevillea</i> spp. and <i>Allocasuarina decaisneana</i>) (Cogger et al. 1993; McAlpin 2001). In the Tanami Desert and parts of the Great Sandy Desert, this skink also occurs on paleodrainage lines with giant termite mounds and Melaleuca shrubs.

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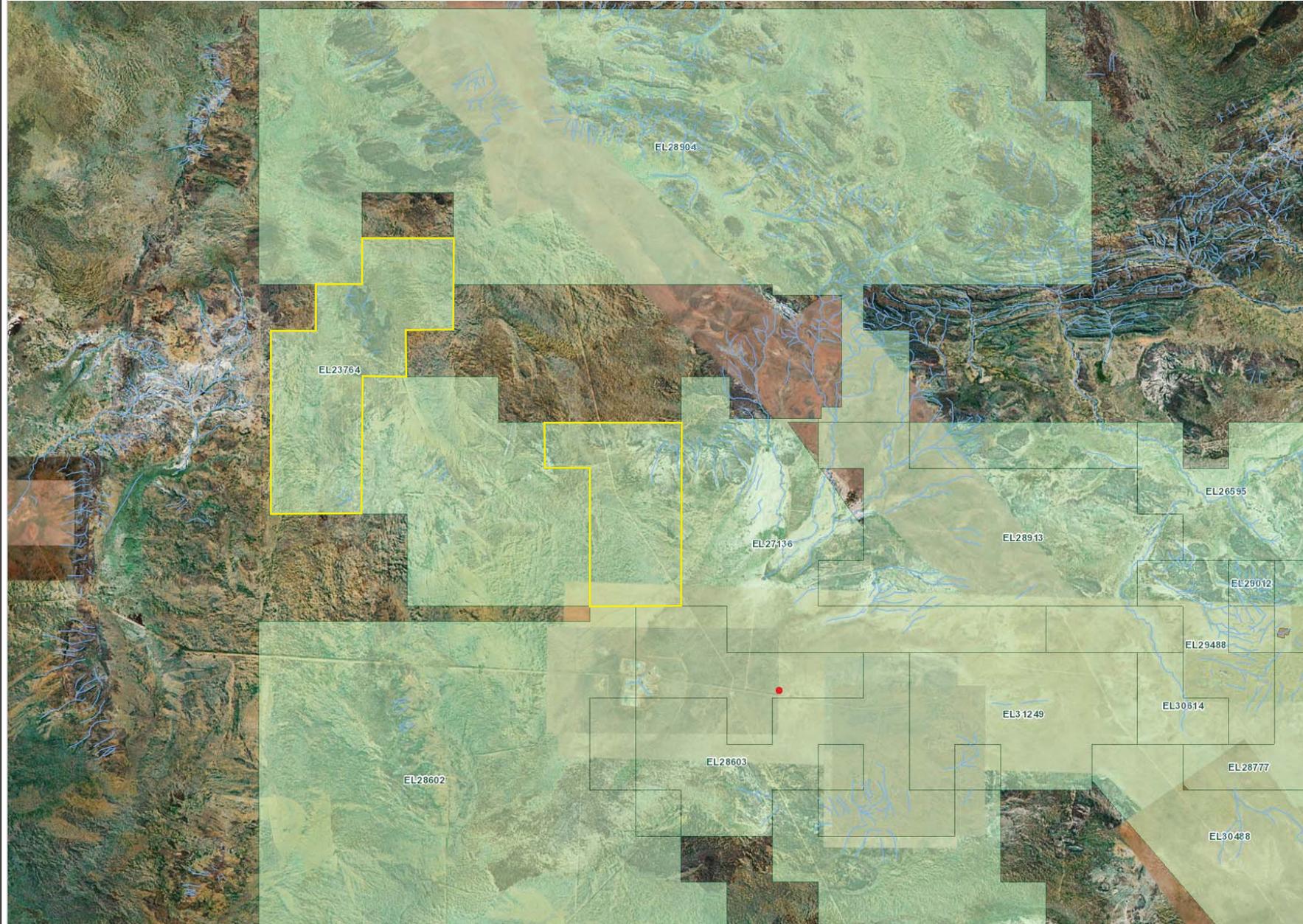
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NR MAPS

Location of Threatened Fauna



Legend

- AHGFMappedStream
 - MappedFlowSegment, Minor
 - MappedFlowSegment, Major
- AHGFMappedStreamMajor
 - AHGFMappedStream - Major, Nam
- AHGFWaterbody
 - reservoir
 - lake
 - swamp
 - AHGFWaterbody - Largest
- AHGFHydroLine
 - CliffLine
 - DamWall
 - Levee
 - RapidLine
 - Shoreline
 - ShorelineJunction
 - Spillway
 - Tunnel
- DIWA
 - DIWA
- Sites of Conservation Significance
 - International
 - National
- Sites of Botanical Significance
 - Threatened Flora
 - Threatened Fauna

Metres 2,000 4,000 6,000 8,000

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EPBC Act Protected Matters Report

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

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

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

Report created: 28/11/16 18:24:04

[Summary](#)

[Details](#)

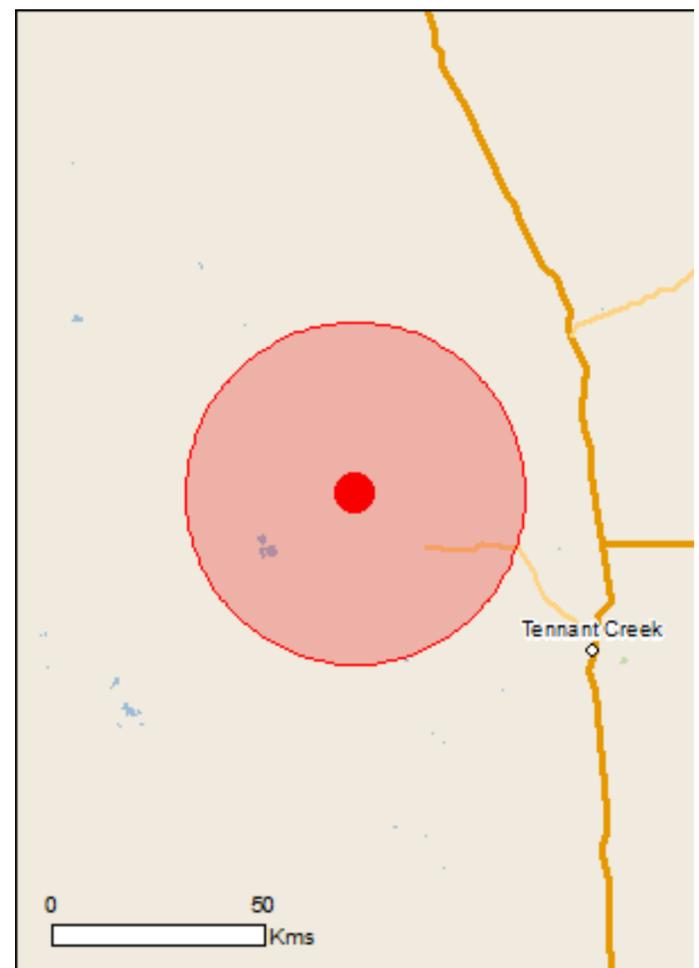
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



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

[Coordinates](#)

Buffer: 40.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	6
Listed Migratory Species:	7

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:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	11
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	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:	None
Regional Forest Agreements:	None
Invasive Species:	13
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species [\[Resource Information \]](#)

Name	Status	Type of Presence
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Birds

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area
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Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat may occur within area
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Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
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Mammals

Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat known to occur within area
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Reptiles

Liopholis kintorei Great Desert Skink, Tjakura, Warrarna, Mulyamiji [83160]	Vulnerable	Species or species habitat may occur within area
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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
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Migratory Marine Birds

Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
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Migratory Terrestrial Species

Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
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Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
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Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
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Migratory Wetlands Species

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

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		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		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
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

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 Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur

Name	Status	Type of Presence 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
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

Reptiles

Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
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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

-19.3404 133.68544

Acknowledgements

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

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

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