



JURIEN STOCKPILE AREAS

Flora and Vegetation Assessment

FINAL

December 2021



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Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Tronox Holdings plc

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1.0 Introduction

1.1 Background

Tronox Holdings plc (Tronox) conducts mining of and exploration for mineral sands on the Swan Coastal Plain and Northern Sandplains regions of Western Australia (WA). Tronox is proposing to excavate historical ore stockpiles at their Jurien tenements (hereafter referred to as the Jurien Stockpile Areas) for processing. The Jurien Stockpile Areas were excavated and stored approximately 20 -40 years ago in primarily cleared paddocks, however, some apparently natural vegetation regrowth and/or remnant native taxa are currently present in the Jurien Stockpile Areas (Tronox pers. comm. 2021).

Tronox commissioned Umwelt (Australia) Pty Limited (Umwelt) (previously Woodman Environmental Consulting Pty Ltd (Woodman Environmental)) to undertake a flora and vegetation assessment of the Jurien Stockpile Areas (as provided by Tronox), to support Tronox's mining proposal for the Jurien Stockpile Areas. This report presents the results of this assessment.

The above works are undertaken in line with the Environmental Protection Authority's (EPA) Environmental Factor Guideline – Flora and Vegetation (EPA 2016a), and the EPA's Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016b), with specific regard to the Targeted Survey guidance.

2.0 Methods

2.1 Desktop Assessment

For the purposes of conducting the desktop review, database searches were undertaken to include the Jurien Stockpile Areas with a buffer of approximately 10 km. Data sources relating to environmental values of the areas included:

- DBCA Threatened Flora databases (including the Threatened and Priority Flora (TPFL) database and the Western Australian Herbarium (WAHerb) database)
- Tronox – Iluka database, a jointly managed database containing significant flora records, covering a large portion of the Northern Sandplains region and northern Swan Coastal Plain sub-region
- Umwelt’s Significant Flora Database, an internal database containing records from surveys conducted within and in the vicinity of the Jurien Stockpile Areas and surrounds
- Aerial photography from Landgate’s SLIP database covering the Jurien Stockpile Areas
- Land tenure information from Landgate’s SLIP database
- Previous flora and vegetation survey reports relevant to the Jurien Stockpile Areas (provided by Tronox)
- DBCA Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) database
- Department of Agriculture, Water and the Environment (DAWE) list of TECs and Threatened Flora
- Spatial vegetation mapping datasets relevant to the Jurien Stockpile Areas

A formal search of DBCA’s TEC and Priority Ecological Community (PEC) database was not undertaken as part of this assessment. To determine the presence of any TECs or PECs, the Jurien Stockpile Areas and surrounds were assessed using NatureMap (DBCA 2007-), which allows records in the TEC and PEC database to be viewed. Additionally, a review of the lists of TECs (endorsed by the W.A. Minister for the Environment) (DBCA 2018) and DBCA-classified PECs (DBCA 2021) was also undertaken, to determine if any newly listed TECs or PECs could have occurrences within the Jurien Stockpile Areas and surrounds.

A formal search of DBCA’s Threatened Flora databases was also not undertaken as part of this review and risk assessment. To determine the presence of significant flora taxa within the Jurien Stockpile Areas and surrounds, NatureMap (DBCA 2007-) was utilised, which allows records in the TPFL and WAHerb databases to be viewed.

An interrogation of DAWE’s Species Profile and Threats (SPRAT) Database for matters of national environmental significance (including those listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)) was undertaken the Jurien Stockpile Areas and surrounds, using the Protected Matters Search Tool (DAWE 2021). As this search is of a general nature, the search was conducted on a polygon surrounding the Jurien Stockpile Areas, with a buffer of 3 km. The results of the of the DAWE’s SPRAT database search are presented in **Appendix A**.

A number of exploration drill line surveys have been undertaken in the vicinity of the Jurien Stockpile Areas including Woodman Environmental (2014, 2015; 2016, 2017, 2018, 2019, 2021). The associated reports were reviewed as part of the Desktop Assessment.

2.2 Personnel and Licensing Information

Table 2.1 lists the personnel involved in fieldwork for the survey. The Project Manager has extensive previous experience (> 10 years) in conducting similar flora surveys in the Swan Coastal Plain and Northern Sandplains regions, including within the Tronox Jurien tenements. All plant material was collected under the Flora Taking (Biological Assessment) licences and Authorisation to Take or Disturb Threatened Species pursuant to the Biodiversity Conservation Act 2016, sections 40, 274 and 275, as listed in **Table 2.1**.

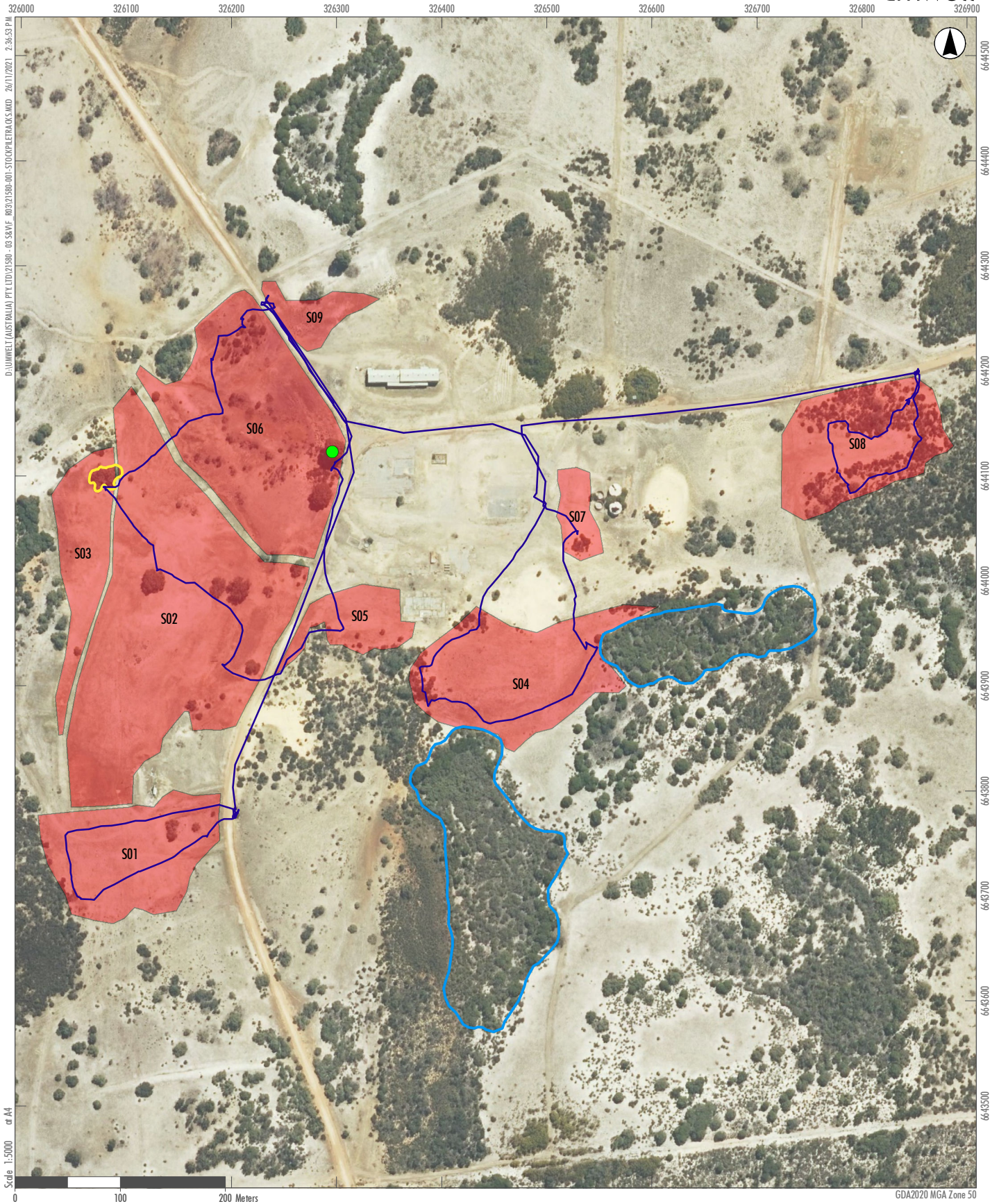
Table 2.1 Personnel and Licensing Information

Personnel	Flora Collecting Permit (BC Act/WC Act)	Role
David Coultas BSc (Environmental Biology) (Hons)	FB62000051 TFL 23-1819	Project Manager/Field manager
Taylah Hanks BSc (Environmental Science, Botany)	FB620000340	Field survey

2.3 Flora and Vegetation Field Survey Methods

The flora and vegetation survey of the Jurien Stockpiles was undertaken on 28 October 2021. Each stockpile polygon provided by Tronox (labelled as Stockpile 1 to Stockpile 8, as shown on **Figure 2.1**) was inspected on foot by the field team. Observations of the flora and vegetation present were recorded, including a brief description of the vegetation (dominant taxa only) which followed the structural vegetation classification as per EPA (2016b) and vegetation condition (using the scale for the South-West Botanical Province presented in EPA (2016)). Representative photographs were also taken. Targeted searching for significant flora taxa and significant vegetation identified during the Desktop Assessment was undertaken if any appropriate habitat was observed.

Traverses undertaken as part of the field survey in the Jurien Stockpile Areas are presented on **Figure 2.1**.



- Legend**
- Stockpile Areas
 - Field Survey Track Logs
 - Banksia Woodland (Remnant)
 - Wetland Areas
 - *Eucalyptus gomphocephala*

FIGURE 2.1

Jurien Stockpile Areas Location and Field Survey Track Logs

3.0 Results

3.1 Desktop Assessment

3.1.1 Vegetation

The Jurien Stockpile Areas are located within the Swan Coastal Plain Interim Biogeographic Regionalisation for Australia (IBRA) region, specifically within the SWA02 Perth IBRA subregion (Commonwealth of Australia 2012). The Jurien Stockpile Areas intersects two vegetation system associations as defined by Shepherd et al. (2002), (Government of Western Australia 2019).

Table 3.1 Vegetation System Associations Occurring in the Jurien Stockpile Areas

Vegetation System Association	Description	Current Extent (ha)	Percentage of Pre-European Extent Remaining	Percentage of Current Extent Protected for Conservation
Bassendean_1030	Low woodland; <i>Banksia attenuata</i> and <i>B. menziesii</i>	80,190.7	69.1 %	9.6 %
Jurien_1029	Shrublands; scrub-heath dryandra-calothamnus association with <i>Banksia prionotes</i> on limestone in the northern Swan Region	48,882.6	71.7 %	25.1 %

The interrogations of Naturemap (DBCA 2007) and a review of the most recent lists of WA TECs and PECs indicates that 2 PECs may occur in the vicinity of the Jurien Stockpile Areas, being the 'Banksia dominated woodlands of the Swan Coastal Plain' (P3) and the 'Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain' (P3) (DBCA 2021).

DAWE's SPRAT Database (DAWE 2021) returned two Commonwealth TECs known to occur within the vicinity of the Jurien Stockpile Areas; the 'Banksia Woodlands of the Swan Coastal Plain' TEC (Endangered) and the 'Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain' TEC (Critically Endangered). These are considered equivalent to the above-mentioned PECs as listed by DBCA (2021); hereafter these communities are only discussed in the context of the Commonwealth TECs.

Based on the key diagnostic characteristics (TSSC 2016), and previous observations by Woodman Environmental (2015; 2016; 2017, 2018, 2019) it is considered that the 'Banksia Woodlands of the Swan Coastal Plain' TEC occurs within the wider Jurien tenements that the Jurien Stockpile Areas are located within. This TEC is considered to be widespread in the Jurien tenements based on previous observations by Woodman Environmental.

Previous observations by Woodman Environmental (2015; 2016; 2017, 2018, 2019) indicate that the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain TEC (Critically Endangered) does not occur within the wider Jurien tenements. Tuart itself has never been observed within these tenements, with the known natural records of this species generally much closer to the coast than the Jurien tenements.

Survey by Woodman Environmental (2015) in 2014 recorded six ridges that appear to be composed of ferricrete (ironstone). Plant assemblages on ferricrete soils in the south-west of W.A. are considered to be of high conservation significance, with a number listed as TECs, at both state and federal level. The Jurien Stockpile Areas are in the vicinity of these plant assemblages based on previous observations by Woodman Environmental.

3.1.2 Significant Flora

A summary of significant flora taxa, or habitat for significant taxa, known from within the Desktop Study Area is presented in **Table 3.2**. This list has been compiled from the results of the desktop searches (including DBCA NatureMap (DBCA 2007-) and DAWE's SPRAT Database (DAWE 2021)), the Tronox – Iluka database, Umwelt's Significant Flora Database and previous survey reports (outlined in **Section 2.1**).

A total of 65 significant flora taxa are known to occur within the vicinity (within approximately 10 km) of the Jurien Stockpile Areas including 15 Threatened taxa (under the BC Act and EPBC Act) and 50 DBCA-classified Priority taxa.

Table 3.2 Significant Flora Known from the Vicinity of the Jurien Stockpile Areas

Significant Flora Taxon	Status	Habitat (WAHerb 1998-).
<i>Acacia epacantha</i>	P3	Clay soils over laterite in upland areas
<i>Acacia plicata</i>	P3	Rocky soils with Eucalyptus wandoo
<i>Acacia retrorsa</i>	P2	Grey or brown sand and sandy loam with lateritic gravel in gullies or on slopes
<i>Andersonia gracilis</i>	Threatened	White/grey sand, sandy clay, gravelly loam on winter-wet areas, near swamps
<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i>	Threatened	Grey sand, clay loam in winter-wet depressions
<i>Banksia chamaephyton</i>	P4	Grey or white sand over laterite on slopes or hilltops.
<i>Banksia dallanneyi</i> subsp. <i>pollostata</i>	P3	Grey or yellow sand on flats or slopes with laterite or limestone
<i>Banksia fraseri</i> var. <i>crebra</i>	P3	Grey or brown lateritic sandy clay on lateritic sandplains and low lateritic hills
<i>Beaufortia bicolor</i>	P3	Sandy soils over laterite in upland areas
<i>Beyeria cinerea</i> subsp. <i>cinerea</i>	P3	Brown or grey calcareous sand over limestone on slopes and hilltops
<i>Caladenia hoffmanii</i>	Threatened	Clay, loam, laterite, granite on rocky outcrops and hillsides, ridges, swamps and gullies
<i>Centrolepis milleri</i>	P3	Sandy soils on plains and in upland areas
<i>Dampiera</i> sp. Jurien (G. Lullfitz s.n. 10/7/1986)	P2	Brown or yellow sand or sandy clay over limestone in open shrubland
<i>Dampiera tephrea</i>	P2	Variable habitat, often near rivers or on limestone, occasionally laterite
<i>Drakaea elastica</i>	Threatened	White or grey sand in low-lying situations adjoining winter-wet swamps
<i>Drosera allantostigma</i>	P1	Sand or loam in low heath or along margins of winter-wet areas
<i>Eucalyptus angularis</i>	P2	Slopes and breakaways of lateritic hills

Significant Flora Taxon	Status	Habitat (WAHerb 1998-).
<i>Eucalyptus argutifolia</i>	Threatened	White or grey shallow sand over limestone on limestone ridges
<i>Eucalyptus x balanites</i>	Threatened	Sandy soils with lateritic gravel
<i>Eucalyptus x impensa</i>	Threatened	Yellow sand on lateritic hills
<i>Eucalyptus x lateritica</i>	Threatened	White or grey sand over laterite on breakaways and mesas
<i>Eucalyptus leprophloia</i>	Threatened	White or grey sand over laterite on valley slopes
<i>Eucalyptus macrocarpa</i> subsp. <i>elachantha</i>	P4	White or grey sand over laterite on hills and plains
<i>Eucalyptus pendens</i>	P4	Sand over laterite on hilltops and breakaways
<i>Eucalyptus suberea</i>	Threatened	White, grey or brown shallow sand over laterite on or near lateritic breakaways
<i>Eucalyptus zopherophloia</i>	P4	Grey or white calcareous sand over limestone on slopes
<i>Grevillea humifusa</i>	Threatened	Brown gravelly loam over laterite on slopes
<i>Grevillea olivacea</i>	P4	Coastal limestone
<i>Grevillea rudis</i>	P4	White, grey, yellow or red sand, usually with gravel over laterite on hills
<i>Grevillea saccata</i>	P4	Sand, usually with gravel and over laterite
<i>Grevillea</i> sp. Cooljarloo (B.J. Keighery 28 B)	P1	Grey or white sand or sandy clay in low flats and winter-wet areas, with nearest record occurring <i>Eucalyptus wandoo</i> woodland
<i>Guichenotia alba</i>	P3	White or grey sand or clay with gravel over laterite, on flats or lower slopes
<i>Haemodorum loratum</i>	P3	Grey or yellow gravelly sand on low plains or slopes
<i>Hakea megalosperma</i>	Threatened	White or grey gravelly sand or loam over laterite on slopes and hilltops
<i>Hakea neurophylla</i>	P4	Brown or brown gravelly sand or loam on slopes or lateritic hills
<i>Haloragis foliosa</i>	P3	White or grey sand over limestone
<i>Hemiandra gardneri</i>	Threatened	Grey or yellow sand, clayey sand on sandplains
<i>Hensmania stoniella</i>	P3	White, grey or lateritic sand, often in winter-wet areas
<i>Hibbertia propinqua</i>	P4	Grey, brown or yellow gravelly sand over laterite on breakaways and outcrops
<i>Isopogon panduratus</i> subsp. <i>palustris</i>	P3	Sand or sandy clay on low flats and in winter-wet areas
<i>Lepyrodia curvescens</i>	P2	Grey sand or clay on slopes, flats or in winter-wet areas
<i>Leucopogon foliosus</i>	P3	White to grey sand, yellow gravelly sand or brown loamy gravel over laterite, on slopes and upland areas of heath
<i>Paracaleana dixonii</i>	Threatened	Grey sand and gravel on undulating plains, flats and slopes
<i>Patersonia argyrea</i>	P3	Grey or brown sand or sandy clay with lateritic gravel on slopes and hilltops

Significant Flora Taxon	Status	Habitat (WAHerb 1998-).
<i>Persoonia rudis</i>	P3	White, yellow or grey sand, often over laterite, on flats or slopes
<i>Phlebocarya pilosissima</i> subsp. <i>pilosissima</i>	P3	White or grey sand with lateritic gravel in upland areas
<i>Phlebocarya pilosissima</i> subsp. <i>teretifolia</i>	P2	White, grey or brown sand over laterite or limestone in upland areas
<i>Platysace ramosissima</i>	P3	Yellow, brown or grey sandy soils on flats or low rises
<i>Schoenus griffinianus</i>	P4	White or grey sand, sometimes associated with laterite, on flats or low plains
<i>Stylidium hymenocraspedum</i>	P3	White or grey sand on plains and slopes
<i>Stylidium inversiflorum</i>	P4	White or grey sand over laterite on plains or slopes
<i>Stylidium maritimum</i>	P3	Grey or brown calcareous sand or loam over limestone on slopes or ridges
<i>Stylidium periscelianthum</i>	P3	Winter-wet clay soils on flats and slopes of low hills (usually granitic)
<i>Stylidium torticarpum</i>	P3	White, grey or brown sandy clay or clay loam over laterite on plains, slopes or near breakaways
<i>Synaphea endothrix</i>	P3	Gravelly loam or sand on lateritic rises
<i>Synaphea lesueurensis</i>	P2	Grey or brown gravelly sand or loam over laterite on slopes
<i>Synaphea xela</i>	P2	White or brown gravelly sand or loam over laterite on slopes
<i>Tetratheca angulata</i>	P3	White, grey or brown gravelly sand or loam over laterite on slopes or hilltops
<i>Thelymitra apiculata</i>	P4	Grey or brown sand with lateritic gravel on slopes
<i>Thelymitra pulcherrima</i>	P2	White, grey-brown gravelly sand or sandy clay on low slopes
<i>Thelymitra stellata</i>	Threatened	Grey or brown sand, gravel, lateritic loam and laterite on ridges and hillslopes
<i>Thryptomene</i> sp. Lancelin (M.E. Trudgen 14000)	P3	Grey or white calcareous sand over limestone on slopes or hilltops
<i>Thysanotus anceps</i>	P3	Grey, white or brown gravelly sand or loam over laterite on slopes
<i>Thysanotus glaucus</i>	P4	White, grey or yellow sand and sandy gravel on plains or slopes
<i>Xanthosia tomentosa</i>	P4	White, grey or brown gravelly sand or clayey sand over laterite on plains or slopes

3.2 Field Results

3.2.1 Vegetation and Flora

Table 3.3 presents a summary of observations made within each individual stockpile; detailed observations and photographs are presented in **Appendix B**. The majority of the stockpiles consisted mostly of pasture weeds with isolated native or planted trees and shrubs, and were considered to be in Completely Degraded condition. Several contain areas of regrowth of native species; these were also generally considered to be in Completely Degraded condition, although some were in Degraded condition. No areas were rated higher than Degraded.

Table 3.3 Summary of Observations within the Jurien Stockpile Areas

Location	Summary
Stockpile 1	Isolated natives over pasture weeds. Entire stockpile rated as Completely Degraded.
Stockpile 2	Isolated native trees and shrubs, and planted trees, over pasture weeds. Entire stockpile rated as Completely Degraded.
Stockpile 3	Small area of <i>Banksia</i> woodland rated as Completely Degraded, remainder of stockpile pasture weeds, rated as Completely Degraded.
Stockpile 4	Two small areas of regrowth of isolated <i>Banksia prionotes</i> over <i>Daviesia divaricata</i> over pasture weeds and occasional native herbs, both rated as Degraded. Remainder of stockpile is pasture weeds, rated as Completely Degraded. Stockpile is bordered by large wetlands on its eastern and southern boundaries.
Stockpile 5	Isolated native trees and shrubs over pasture weeds, entire stockpile rated as Completely Degraded.
Stockpile 6	Isolated planted trees (including <i>Eucalyptus gomphocephala</i> and <i>Eucalyptus camaldulensis</i>) and native shrubs (including <i>Daviesia divaricata</i>), remainder pasture weeds, entire stockpile rated as Completely Degraded.
Stockpile 7	Small area of regrowth of <i>Daviesia divaricata</i> over weeds, rated as Completely Degraded. Remainder of stockpile pasture weeds, rated as Completely Degraded.
Stockpile 8	Large proportion of stockpile is regrowth with sparse native trees and shrubs over weeds, rated as Degraded. Remainder of stockpile is pasture weeds, rated as Completely Degraded.
Stockpile 9	Pasture weeds, rated as Completely Degraded

None of the vegetation observed within the stockpiles is considered to represent significant vegetation. One small area in Stockpile 3, which is likely to be remnant rather than regrowth, does possess the key diagnostic characteristics of the 'Banksia Woodlands of the Swan Coastal Plain' TEC (presented as Banksia woodland (Remnant) on **Figure 2.1**); most pertinently, it possesses a woodland stratum dominated by *Banksia attenuata* (TSSC 2016). However, this area does not meet the patch size and condition thresholds for this TEC (TSSC 2016), as it is a very small area surrounded by paddocks, and is considered to be in Completely Degraded condition. This area therefore cannot be considered an occurrence of this TEC.

Additionally, a single *Eucalyptus gomphocephala* tree (presented on **Figure 2.1**), which has almost certainly been planted, was recorded in Stockpile 6. As it is a single tree, it cannot be considered an occurrence of the 'Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain' TEC, as occurrences must contain at least two living trees of this species (DoEE 2019).

It was also observed that Stockpile 4 borders two large wetland areas (presented on **Figure 2.1**), which possess trees of *Melaleuca raphiophylla* and *Melaleuca preissiana* over native sedges and rushes, and some weeds; these wetlands appear to be in at least Very Good condition. Although no wetland vegetation occurs within this stockpile polygon, these wetlands may require consideration during excavation activities. This is discussed further in **Section 4.0**.

No significant flora taxa were recorded in the Jurien Stockpiles Areas. In general, there was no suitable habitat present for the majority of taxa identified as part of the Desktop Assessment; either no suitable soils/topographical situations were present, or the condition of the habitat was too degraded to support such taxa. Some small areas were observed that could potentially have supported some significant taxa; however, no such taxa were recorded despite targeted survey being conducted. Although several taxa identified as part of the desktop assessment were not identifiable at the time of survey (e.g. *Thelymitra pulcherrima* (P2), *Drakaea elastica* (Threatened)), these taxa are considered unlikely to occur in the Jurien Stockpile Areas for the reasons outlined above.

3.2.2 Limitations of Survey

The survey was conducted in Spring, which is considered to be the most appropriate time of year to conduct surveys in the Swan Coastal Plain region (EPA 2016); the majority of significant flora taxa that could potentially occur in the Jurien Stockpile Areas were likely to be in flower at the time of survey. Rainfall in the usually wet 'winter' months leading up to the survey at Jurien Bay (May – September), the nearest meteorological station, was just above average for this period (426.3 mm compared to 414.6 mm) (Bureau of Meteorology 2021); the 'spring season' was therefore considered good. The survey was undertaken by adequately experienced and competent personnel. Good contextual information was available for the Jurien Stockpile Areas, particularly from previous surveys undertaken in immediately adjacent areas.

All significant flora taxa identified as part of the desktop assessment were searched for during the field survey, except several that were not identifiable at the time of survey. However, as noted in **Section 3.2.1**, no habitat for these taxa is present in the Jurien Stockpile Areas, or the habitat present is too degraded; this is therefore not considered to be a limitation of the survey.

4.0 Discussion and Conclusions

This assessment confirmed that the Jurien Stockpile Areas remain mostly cleared of native vegetation, with some small areas of native regrowth, as well as one small area that may be remnant vegetation. However, all native vegetation is highly modified, with much of the expected diversity and structure lost. No significant flora taxa were recorded, and none are expected to occur within the Jurien Stockpile Areas; none of the vegetation present is considered to be significant. It is therefore considered that the vegetation present within the Jurien Stockpile Areas has limited conservation value in a flora and vegetation context.

As noted in **Section 3.2.1**, two large wetland areas are located on the edge of Stockpile 4. These wetlands should be considered in the context of proposed future activities in the Stockpile 4 area, to ensure that potential indirect impacts to the wetlands are mitigated.

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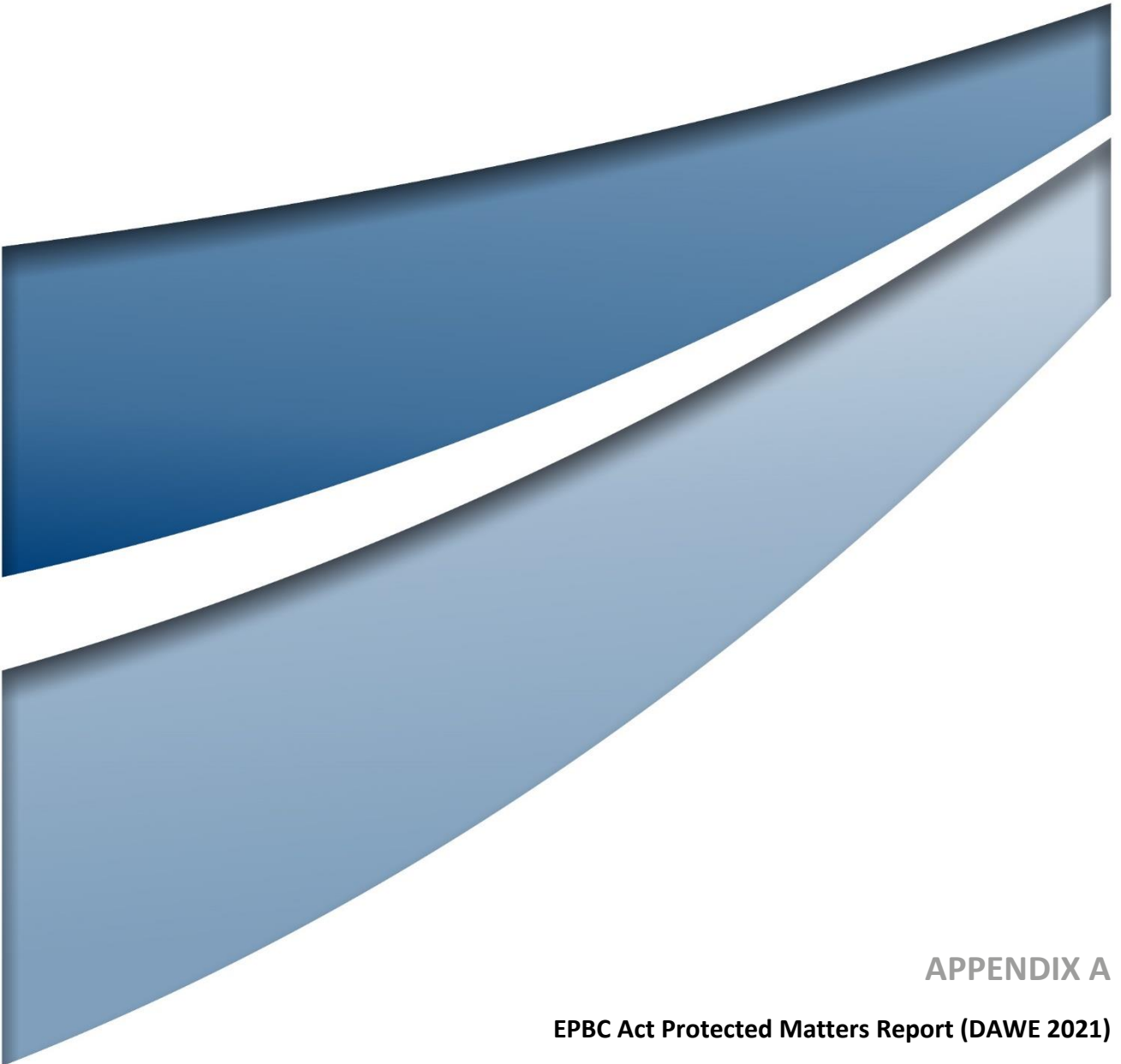
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APPENDIX A

EPBC Act Protected Matters Report (DAWE 2021)



EPBC Act Protected Matters Report

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

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

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

Report created: 18/10/21 13:24:23

[Summary](#)

[Details](#)

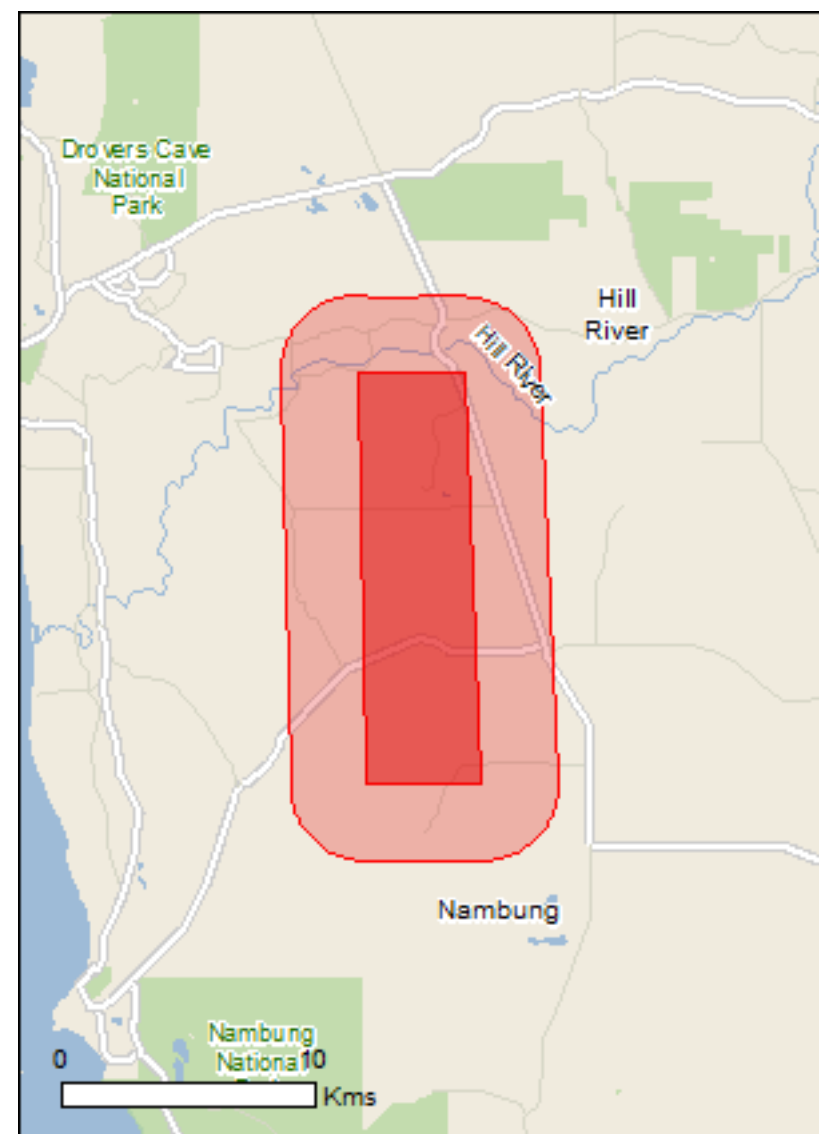
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

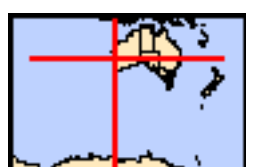
[Acknowledgements](#)



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

[Coordinates](#)

[Buffer: 3.0Km](#)



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:	2
Listed Threatened Species:	23
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	14
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	3
Regional Forest Agreements:	None
Invasive Species:	18
Nationally Important Wetlands:	None
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
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species

[[Resource Information](#)]

Name	Status	Type of Presence
------	--------	------------------

Birds

Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Mammals		
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat may occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Parantechinus apicalis Dibbler [313]	Endangered	Species or species habitat may occur within

Name	Status	Type of Presence area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area
Anigozanthos viridis subsp. terraspectans Dwarf Green Kangaroo Paw [3435]	Vulnerable	Species or species habitat likely to occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat may occur within area
Drakaea elastica Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat may occur within area
Eucalyptus argutifolia Yanchep Mallee, Wabling Hill Mallee [24263]	Vulnerable	Species or species habitat may occur within area
Eucalyptus impensa Eneabba Mallee [56711]	Endangered	Species or species habitat may occur within area
Eucalyptus leprophloia Scaly Butt Mallee, Scaly-butt Mallee [56712]	Endangered	Species or species habitat may occur within area
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat may occur within area
Grevillea humifusa Spreading Grevillea [61182]	Endangered	Species or species habitat known to occur within area
Hakea megalosperma Lesueur Hakea [10505]	Vulnerable	Species or species habitat may occur within area
Hemiandra gardneri Red Snakebush [7945]	Endangered	Species or species habitat likely to occur within area
Paracaleana dixonii Sandplain Duck Orchid [86882]	Endangered	Species or species habitat likely to occur within area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	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		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within

Name	Threatened	Type of Presence area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat 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		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area

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

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Hill River	WA
Southern Beekeepers	WA
Unnamed WA33287	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 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
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
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur

Name	Status	Type of Presence 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
Brachiaria mutica Para Grass [5879]		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
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may 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

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

-30.309258 115.165454,-30.308962 115.202876,-30.434553 115.209399,-30.434553 115.168544,-30.308666 115.165111,-30.309258 115.165454

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](#)
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- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
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- [-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.

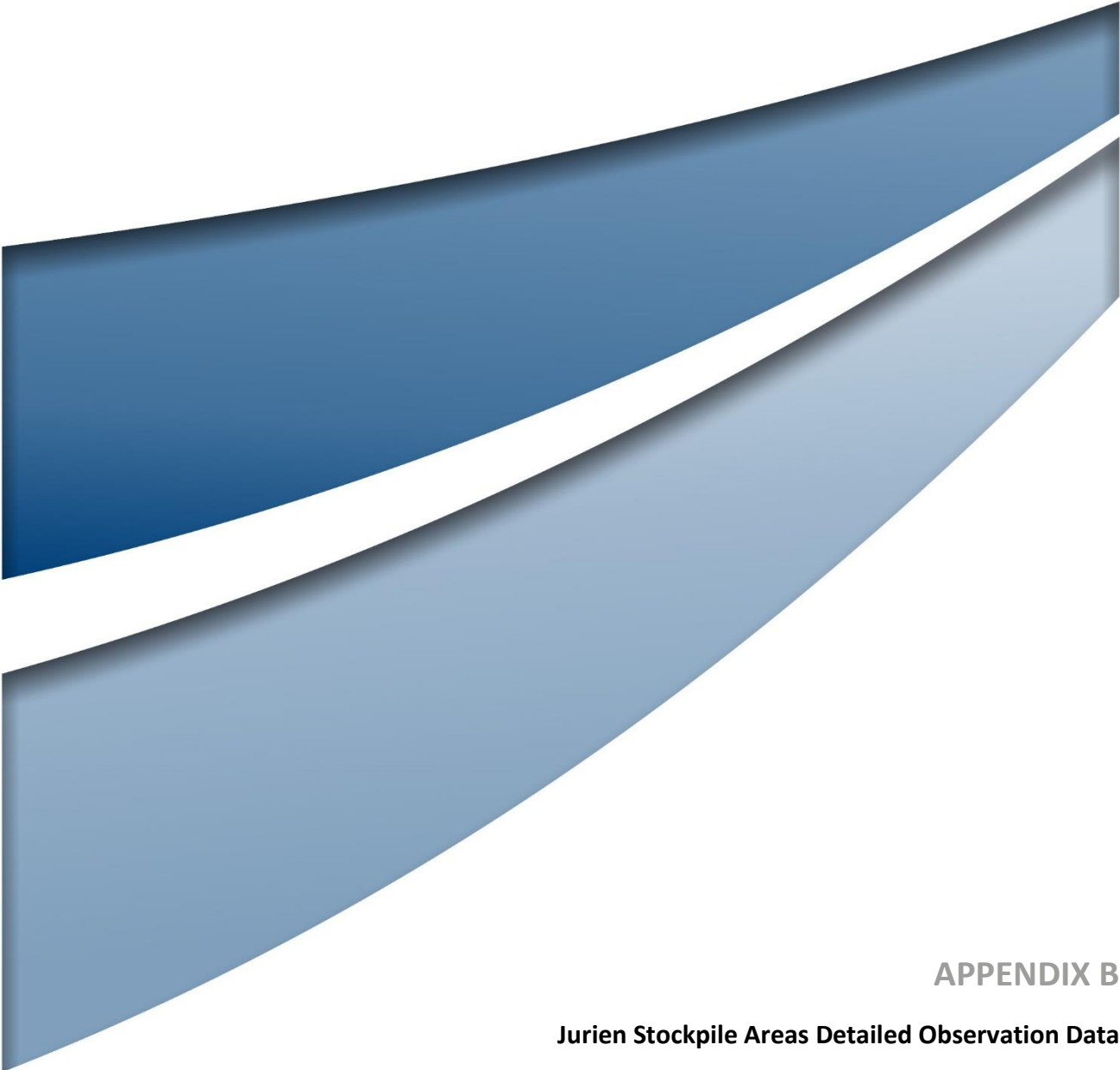
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APPENDIX B



Jurien Stockpile Areas Detailed Observation Data



Location	Notes	Photos
Stockpile 1	Vegetation primarily pasture weeds with isolated <i>Eucalyptus todtiana</i> , <i>Banksia attenuata</i> , <i>Conostylis candidans</i> , <i>Mesomelaena pseudostygia</i> , <i>Daviesia divaricata</i> , <i>Xanthorrhoea preissii</i> and <i>Petrophile macrostachya</i> . Entire stockpile rated Completely Degraded.	 <p data-bbox="1187 766 1724 790">Photo 1; co-ordinates: 326176.354, 6643756.104</p>
Stockpile 2	Isolated <i>Eucalyptus todtiana</i> , <i>Eucalyptus camaldulensis</i> , <i>Banksia prionotes</i> , <i>Adenanthos cygnorum</i> and <i>Daviesia divaricata</i> over pasture weeds. <i>Eucalyptus camaldulensis</i> appears to be planted and not naturally occurring. Entire stockpile rated Completely Degraded.	 <p data-bbox="1187 1340 1724 1364">Photo 2; co-ordinates: 326120.613, 6644036.934</p>



Location	Notes	Photos
		 <p data-bbox="1189 762 1727 791">Photo 3; co-ordinates: 326120.613, 6644036.934</p>
<p data-bbox="161 802 291 831">Stockpile 3</p>	<p data-bbox="349 802 981 1058">One small area of <i>Eucalyptus tottiana</i> and <i>Banksia attenuata</i> over <i>Ehrharta calycina</i> observed near northern edge of stockpile (Photo 4). This area is likely remnant rather than regrowth; it is considered to be in Completely Degraded condition. The remainder of the stockpile is pasture weeds with scattered <i>Xanthorrhoea preissii</i> and <i>Eucalyptus tottiana</i> (Photo 5), rated Completely Degraded.</p>	 <p data-bbox="1189 1337 1727 1366">Photo 4; co-ordinates: 326081.967, 6644089.978</p>

Location	Notes	Photos
		 <p data-bbox="1189 762 1727 791">Photo 5; co-ordinates: 326081.967, 6644089.978</p>
<p data-bbox="161 802 291 831">Stockpile 4</p>	<p data-bbox="349 802 976 1257">The majority of stockpile is pasture weeds (Photo 6), rated as Completely Degraded. There are two small areas of native regrowth consisting of isolated <i>Banksia prionotes</i> over <i>Daviesia divaricata</i> over <i>Ehrharta calycina</i>, <i>Conostylis candicans</i> and <i>Corynotheca micrantha</i> in the north and west (Photo 9) of the stockpile; these areas were rated as Degraded. The eastern (Photo 7) and southern (Photo 8) edges of the stockpile border wetland areas of <i>Melaleuca raphiophylla</i> and <i>Melaleuca preissiana</i> over native sedges and rushes; these wetlands appear to be in Very Good condition. The wetland areas are not within the boundary of the stockpile but are immediately adjacent.</p>	 <p data-bbox="1189 1332 1727 1361">Photo 6; co-ordinates: 326538.0188, 6643935.594</p>

Location	Notes	Photos
		 <p data-bbox="1182 767 1733 794">Photo 7; co-ordinates: 326538.0188, 6643935.594</p>  <p data-bbox="1182 1339 1733 1366">Photo 8; co-ordinates: 326447.6693, 6643865.307</p>

Location	Notes	Photos
		 <p data-bbox="1182 767 1733 794">Photo 9; co-ordinates: 326391.1561, 6643886.914</p>
<p data-bbox="163 804 293 831">Stockpile 5</p>	<p data-bbox="349 804 985 895">Vegetation primarily pasture weeds with very isolated <i>Banksia prionotes</i> and <i>Daviesia divaricata</i>. Entire stockpile rated as Completely Degraded.</p>	 <p data-bbox="1182 1337 1733 1364">Photo 10; co-ordinates: 326303.6509, 6643952.153</p>

Location	Notes	Photos
Stockpile 6	<p>Stockpile is primarily pasture weeds with a small area of vegetation of planted <i>Eucalyptus camaldulensis</i> and <i>Eucalyptus gomphocephala</i> over <i>Daviesia divaricata</i> and <i>Acacia cyclops</i> over <i>Ehrharta calycina</i>. Entire stockpile rated as Completely Degraded.</p>	 <p>Photo 11; co-ordinates: 326296.3488, 6644108.694</p>
Stockpile 7	<p>Small area of regrowth in the southern end of the stockpile consisting of <i>Daviesia divaricata</i> over introduced species <i>Ehrharta calycina</i> and <i>Trachyandra divaricata</i> (Photo 12), rated as Completely Degraded. The remainder of the stockpile is only introduced species (Photo 13), rated as Completely Degraded.</p>	 <p>Photo 12; co-ordinates: 326529.247, 6644045.658</p>

Location	Notes	Photos
		 <p data-bbox="1182 767 1733 791">Photo 13; co-ordinates: 326529.247, 6644045.658</p>
<p data-bbox="163 805 293 829">Stockpile 8</p>	<p data-bbox="349 805 987 1061">The northern and southern parts of the stockpile have native regrowth, with isolated <i>Eucalyptus todtiana</i>, <i>Banksia attenuata</i> and <i>Banksia prionotes</i> over <i>Daviesia divaricata</i> over introduced species <i>Ehrharta calycina</i> and *<i>Trachyandra divaricata</i> (Photo 14). These areas of regrowth were rated as Degraded. Centre of the stockpile is pasture weeds dominated by <i>Trachyandra divaricata</i> (Photo 15), rated as Completely Degraded.</p>	 <p data-bbox="1182 1340 1733 1364">Photo 14; co-ordinates: 326843.8614, 6644172.612</p>

Location	Notes	Photos
		 <p data-bbox="1176 766 1736 790">Photo 15; co-ordinates: 326768.6403, 6644130.618</p>
<p data-bbox="161 805 291 829">Stockpile 9</p>	<p data-bbox="347 805 940 861">Entire stockpile is pasture weeds, rated as Completely Degraded.</p>	 <p data-bbox="1176 1340 1736 1364">Photo 16; co-ordinates: 326240.8418, 6644260.255</p>

