



Waratah Coal Pty Ltd

China First Project

**Rail Corridor
Terrestrial Flora and Fauna
Report**

WAR003-ENV-RPT-0003

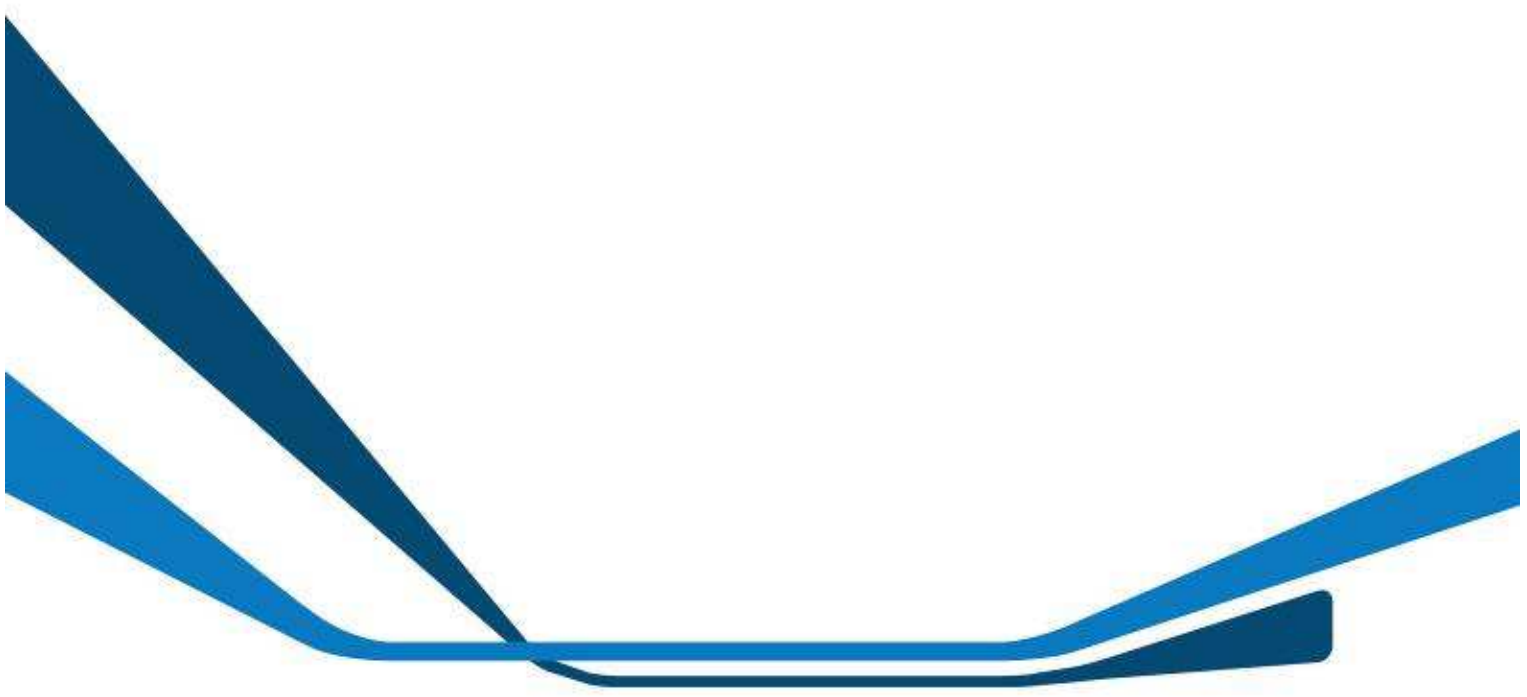


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Definitions and abbreviations

Definitions

Category X Regrowth	Regrowth over which a landholder has received Queensland Government recognition of entitlement to clear into the future. This right to clear is available no matter how mature the regrowth becomes unless otherwise revoked (e.g. through an offset covenant).
Critically Endangered	Designated as 'Critically Endangered' under the EPBC Act. Refer to definition of 'EPBC Act conservation status' for meaning of Critically Endangered under the Act
Ecological Community	An assemblage of species occupying a particular area.
Endangered	Designated as 'Endangered' under the EPBC Act, NC Act and / or VM Act. Refer to definitions of 'EPBC Act conservation status', 'NC Act conservation status' and 'VM Act conservation status' for meaning of Endangered under each Act.
EPBC Act conservation status	<p>Under the EPBC Act, listed threatened species and ecological communities are assigned a conservation status of 'extinct in the wild', 'Critically Endangered', 'Endangered' or 'Vulnerable'. Definitions of these terms under the EPBC Act areas follows:</p> <p>Extinct in the wild</p> <ul style="list-style-type: none"> it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range or it has not been recorded in its known and / or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form. <p>Critically Endangered</p> <ul style="list-style-type: none"> it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria. <p>Endangered</p> <ul style="list-style-type: none"> it is not Critically Endangered and it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria. <p>Vulnerable</p> <ul style="list-style-type: none"> it is not Critically Endangered or Endangered and it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Habitat	An area or areas permanently, periodically or occasionally occupied by a species, population or ecological community, including any and all biotic and abiotic features of the area or areas occupied.
Least Concern	Designated as 'Least Concern' under the VM Act. Refer to definition of 'VM Act status' for meaning of 'Least Concern' under the Act.
High Value Regrowth	Regrowth that has been mapped and protected from clearing as 'Regulated Regrowth' under the VM Act.
Migratory species	Species listed as 'Migratory' under the EPBC Act.

<p>NC Act conservation status</p>	<p>Under the NC Act, protected species are assigned a conservation status of 'Extinct in the wild', 'Endangered', 'Vulnerable', 'Near Threatened', or 'Least Concern'. Definitions of these terms under the NC Act are as follows:</p> <p>Extinct in the wild</p> <ul style="list-style-type: none"> • there have been thorough searches conducted for the wildlife; and, • it has not been seen in the wild over a period that is appropriate for the life cycle or form of the wildlife. <p>Endangered</p> <ul style="list-style-type: none"> • there have not been thorough searches conducted for the wildlife and the wildlife has not been seen in the wild over a period that is appropriate for the life cycle or form of the wildlife; or • the habitat or distribution of the wildlife has been reduced to an extent that the wildlife may be in danger of extinction; or • the population size of the wildlife has declined, or is likely to decline, to an extent that the wildlife may be in danger of extinction; or • the survival of the wildlife in the wild is unlikely if a threatening process continues. <p>Vulnerable</p> <ul style="list-style-type: none"> • its population is decreasing because of threatening processes or • its population has been seriously depleted and its protection is not secured or • its population, while abundant, is at risk because of threatening processes or • its population is low or localised or depends on limited habitat that is at risk because of threatening processes. <p>Near Threatened</p> <ul style="list-style-type: none"> • the population size or distribution of the wildlife is small and may become smaller or • the population size of the wildlife has declined, or is likely to decline, at a • rate higher than the usual rate for population changes for the wildlife or • the survival of the wildlife in the wild is affected to an extent that the wildlife is in danger of becoming vulnerable. <p>Least Concern</p> <ul style="list-style-type: none"> • the wildlife is common or abundant and is likely to survive in the wild. <p>Native wildlife may be prescribed as Least Concern wildlife even if:</p> <ul style="list-style-type: none"> • the wildlife is the subject of a threatening process or • the population size or distribution of the wildlife has declined or • there is insufficient information about the wildlife to conclude whether the wildlife is common or abundant or likely to survive in the wild.
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Near Threatened	Designated as 'Near Threatened' under the NC Act. Refer to definition of 'NC Act conservation status' for meaning of Near Threatened under the NC Act.
Non-remnant vegetation	Vegetation that is not mapped as remnant vegetation by DERM and / or which fails to meet DERM's criteria for 'remnant vegetation' (see definition of 'remnant vegetation', below). This includes regrowth, heavily thinned or logged vegetation and significantly disturbed vegetation that fails to meet the structural and / or floristic characteristics of remnant vegetation. It also includes urban and cropping land. Non-remnant vegetation may retain significant biodiversity values (Neldner <i>et al.</i> 2005).
Regional Ecosystem	A vegetation community, within a bioregion, that is consistently associated with a particular combination of geology, landform and soil. REs may be classified under schedules 1–3 of the <i>Vegetation Management Regulation 2000</i> as either Endangered, Of Concern or Least Concern. Refer to 'VM Act conservation status' for meaning of Endangered, Of Concern or Least Concern under the VC Act.
Regionally Significant	Refer to taxa not listed as Threatened or Near Threatened species under the EPBC Act and / or NC Act, but have been listed as non-threatened priority taxa for the Desert Uplands bioregion.
Remnant vegetation	Remnant woody vegetation is defined as vegetation where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy (Neldner <i>et al.</i> 2005).
Threatened	A term used with reference to ecological communities, REs or species that are Endangered, Vulnerable or Of Concern as listed under the NC Act, the VM Act or the EPBC Act (see NC Act conservation significance, the VM Act conservation significance and EPBC Act conservation significance for more details)

VM Act conservation status	<p>Under the VM Act, REs may be classified as either 'Endangered', 'Of Concern' or 'Least Concern'. Definitions of these terms under the VM Act are provided below.</p> <p>Endangered</p> <ul style="list-style-type: none"> less than 10% of pre-clearing extent of remnant vegetation (see following definition) exists in the bioregion, or 10 to 30% of pre-clearing extent remains and the remnant vegetation is less than 10,000 hectares. <p>In addition, for biodiversity planning purposes DERM also classifies a regional ecosystem as Endangered if:</p> <ul style="list-style-type: none"> less than 10% of its pre-clearing extent remains unaffected by severe degradation and / or biodiversity loss or 10-30% of its pre-clearing extent remains unaffected by severe degradation and / or biodiversity loss and the remnant vegetation is less than 10,000 hectares; or it is a rare regional ecosystem subject to a threatening process. <p>Of Concern</p> <ul style="list-style-type: none"> 10 to 30% of pre-clearing extent of remnant vegetation exists in the bioregion, or more than 30% of pre-clearing extent remains and the remnant vegetation is less than 10,000 hectares. <p>In addition, for biodiversity planning purposes DERM also classifies a regional ecosystem as Of Concern if:</p> <ul style="list-style-type: none"> 10-30% of its pre-clearing extent remains unaffected by moderate degradation and / or biodiversity loss. <p>Least Concern</p> <ul style="list-style-type: none"> more than 30% of pre-clearing extent of remnant vegetation exists in the bioregion, and it is greater than 10,000 hectares. <p>In addition, for biodiversity planning purposes DERM also classifies a regional ecosystem as Least Concern if the degradation criteria listed above for Endangered or Of Concern regional ecosystems are not met.</p>
Vulnerable	Designated as 'Vulnerable' under the EPBC Act and / or NC Act. Refer to definitions of 'EPBC Act conservation status' and 'NC Act conservation status' for meaning of 'Vulnerable' under these Acts.

Abbreviations

Abbreviations	Meaning
BAMM	Biodiversity Assessment and Mapping Methodology
BPA	Biodiversity Planning Assessment
Cat X	Category X Regrowth
CE	Critically Endangered
Cth	Commonwealth
CV	Curriculum Vitae
DERM	The Department of Environment and Resource Management

DSEWPC	The Department of Sustainability, Environment, Water, Population and Communities
E	Endangered
e.g.	Latin for <i>exempli gratia</i> (for example)
EHA	Queensland Essential Habitat mapping
EIS	Environmental Impact Statement
EP Act	The Queensland <i>Environmental Protection Act 1994</i>
EPA	Environmental Protection Agency
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESA	Environmentally Sensitive Areas
ESD	Ecological Sustainable Development
<i>et al.</i>	Latin for 'et alii' (masculine plural) or 'et aliae' (feminine plural) or 'et alia' (neuter plural) (and others)
GPS	Global Positioning System
Ha	Hectare
HVR	High Value Regrowth
i.e.	Latin for <i>id est</i> (that is)
Km	Kilometre
km ²	Kilometre square
Lat.	Latitude
LC	Least Concern
Long.	Longitude
LP Act	Queensland <i>Land Protection (Pest and Stock Route Management) Act 2002</i>
M	Meter
Mi	Migratory
MNES	Matters of National Environmental Significance
NC Act	Queensland <i>Nature Conservation Act 1992</i>
NOC	No Concern at Present
NT	Near Threatened
OC	Of Concern
QEPA	Former Queensland Environmental Protection Agency
Qld	Queensland
QM	Queensland Museum
RE	Regional Ecosystem
ROTAP	CSIRO Rare or Threatened Australian Plants List
SDPWO Act	The Queensland <i>State Development and Public Works Organisation Act 1971</i>
SP Act	The Queensland <i>Sustainable Planning Act 2009</i>
sp.	Species (singular)

spp.	Species (plural)
subsp.	Subspecies
TOR	Terms of Reference
V	Vulnerable
var.	Variety
VM Act	Queensland <i>Vegetation Management Act 1999</i>
WoNS	Weeds of National Significance

EXECUTIVE SUMMARY

Unidel Group was commissioned by Waratah Coal Pty Ltd to undertake a terrestrial flora and fauna assessment of the proposed railway corridor for the China First Project.

The proposed rail corridor extends approximately 447 km from the proposed mine site, located approximately 35 km north west of Alpha, to the proposed coal terminal at the Port of Abbot Point. The clearance corridor width will range from 50 m in open flat terrain to up to 150 m in areas where cross-slopes will require cutting and benching. For the purposes of this report a conservative average clearance width of 100 m has been utilised.

Desktop and field studies were used to identify, describe and assess key terrestrial flora and fauna values of the study area and potential impacts associated with the construction and operation of the rail corridor.

The terrestrial flora and fauna assessment of the proposed rail corridor was conducted by helicopter, over ten days in July 2010. A total of 57 flora and fauna habitat sites were ground truthed.

Existing Environment

Flora Environment

The proposed rail corridor is located within the Brigalow Belt North bioregion (from KP 0 to KP 376) and Desert Uplands bioregion (from KP 376 to 447).

The desktop assessment identified five Threatened Ecological Communities (TECs) that could potentially be present within the proposed rail corridor. Two were found to be present during field surveys, those being:

1. Brigalow (*Acacia harpophylla* dominant and co-dominant)
2. Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin

The DERM RE mapping identified 61 REs as occurring within the study area of the proposed Rail Corridor. This included 45 Least Concern REs, 12 Of Concern REs and 3 Endangered REs. The communities were generally found to be in good to excellent condition within the large contiguous stands of vegetation between KP 10 - 202, KP 225 - 255, KP 323 - 343 and KP 400 - 437. In other areas the communities tended to be impacted to a greater degree by grazing and / or altered fire regimes associated with Buffel Grass.

The proposed rail corridor transects numerous small patches of High Value Regrowth (HVR) as mapped by DERM (2009, 2010). The transected HVR predominantly consists of Least Concern REs but also include regrowth of three TECs / Endangered REs and eight Of Concern REs.

The flora desktop assessment identified 34 Threatened or Near Threatened plant species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and / or Queensland *Nature Conservation Act (1992)* (NC Act) that are known to occur or have ranges that overlap with the proposed rail corridor. However, only Black Ironbox (*Eucalyptus raveretiana*) was observed and recorded during the field survey.

A total of 200 Least Concern native flora species were recorded during the surveys. Additionally 16 non native flora species were identified. Of these eight are declared weeds under the *Land Protection (Pest and Stock Route Management) Act 2002* (LP Act).

Fauna Environment

Database searches identified 40 Threatened and Near Threatened fauna species listed under the EPBC Act and / or NC Act as potentially occurring in the area as well as a further 20

Migratory species listed under the EPBC Act. There were no Threatened or Near Threatened fauna species recorded during the field surveys. However, 29 species have the potential to occur within the study area based on the presence of their suitable habitat.

There are 30 fauna species that are not listed as Threatened or Near Threatened species under the EPBC Act and / or NC Act, but that have been listed as non-threatened priority taxa for the Brigalow Belt North bioregion. Of these 30 species 15 may occur in the vicinity of the proposed rail corridor. There are 46 fauna species that are not listed as Threatened or Near Threatened species under the EPBC Act and / or NC Act, but that have been listed as non-threatened priority taxa for the Desert Uplands bioregion. Of these 46 species 33 may occur in the vicinity of the proposed rail corridor.

A total of 133 vertebrate species were recorded during field surveys, including 11 Regionally Significant fauna species and 4 non native species. Two of the non native species are declared Class 2 Pests under the LP Act, Feral Cat (*Felis catus*) and Feral Pig (*Sus scrofa*).

Potential Impacts and Mitigation Measures

The footprint of the proposed rail corridor requires unavoidable clearing of approximately 2,688 ha of remnant vegetation comprising predominantly Least Concern REs (2,016 ha). An estimated 76 ha of REs listed as Endangered under the VM Act and 159 ha of Of Concern REs would be impacted.

With the implementation of appropriate mitigation measures, including undertaking detailed on-ground flora and fauna surveys through all remnant vegetation areas prior to alignment finalisation and the provision of compensatory offsets for unavoidable impacts, the proposed rail infrastructure has the potential to have Medium impacts upon:

- 3 Brigalow REs listed as Endangered under the EPBC Act and VM Act;
- 3 Natural Grassland REs listed as Endangered under the EPBC Act;
- 12 Of Concern REs;
- 45 Least Concern REs;
- Wetland habitats;
- Black Ironbox;
- 5 reptiles and 1 bird listed under the EPBC Act and / or VM Act;
- 48 regionally significant fauna species; and
- Social and economic values through spreading declared weeds.

The assessment found that the proposed rail corridor is generally well located in relation to minimising impacts on terrestrial flora and fauna values. It is likely that additional avoidance and minimisation will be achievable based on detailed on-ground surveys in specifically targeted areas.

1 Introduction

Waratah Coal is proposing to develop a new coal terminal, overlapping the Abbot Point State Development Area (APSDA), Strategic Port Land and Port Waters at the Port of Abbot Point, a new mine near Alpha in central Queensland and a new 447 km heavy haul standard gauge rail system linking the mine and coal terminal. The project is called the China First Project.

For the Project's Environmental Impact Statement (EIS) assessment, the mine development includes underground and open cut mines, coal preparation plants and supporting coal handling infrastructure through to the train loading facility. The rail component commences at the balloon loop at the mine and ends at the balloon loop adjoining the coal terminal at the APSDA, and includes the rail line. The coal terminal commences at the train unloading facility and includes infrastructure through to the ship loaders. The coal terminal includes onshore and offshore components at the APSDA and waters of the Port of Abbot Point respectively.

In preparation for the EIS, Unidel has been commissioned to undertake a study of the terrestrial flora and fauna values along the proposed rail corridor.

Figure 1 shows the location of the proposed rail corridor.

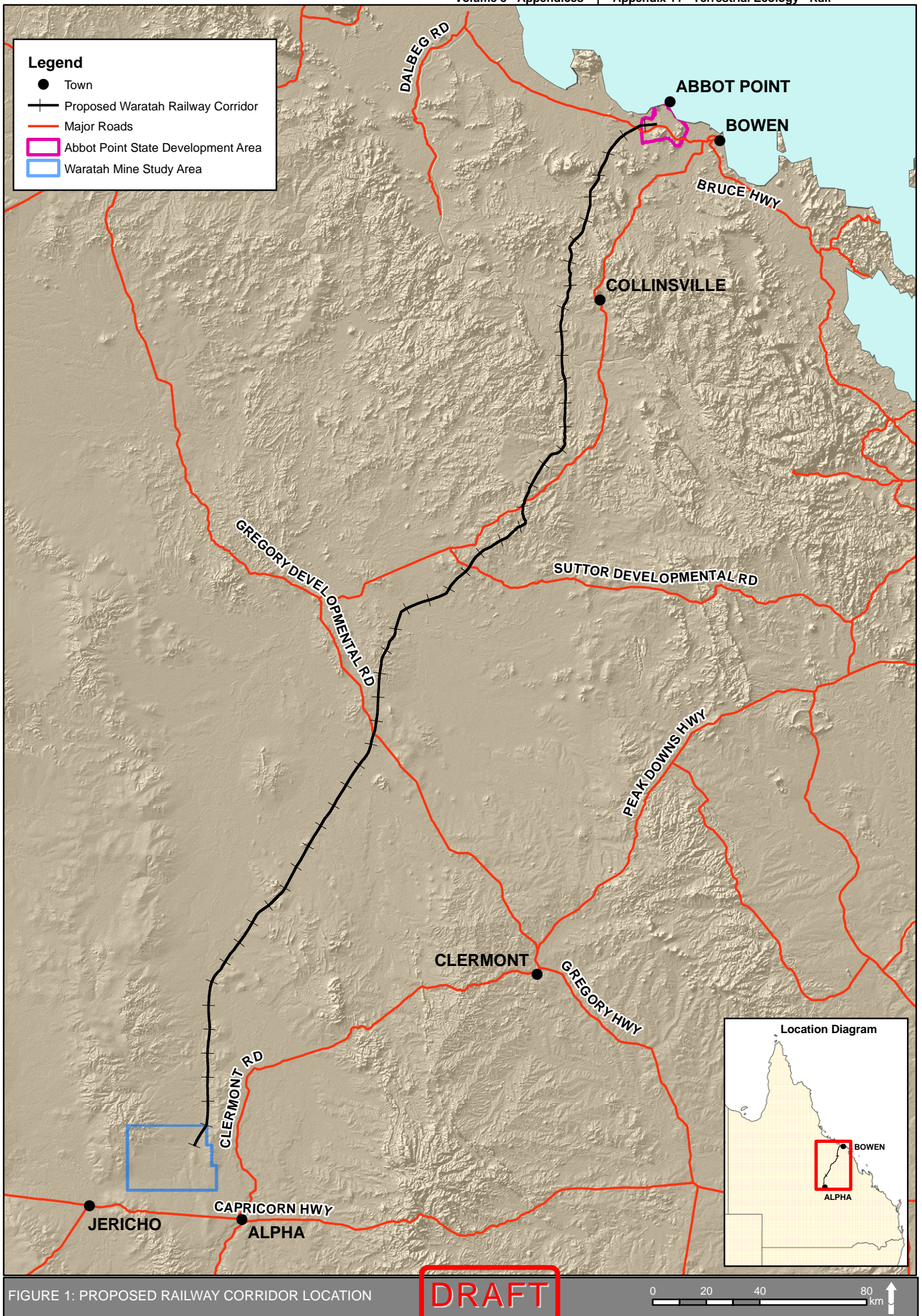


FIGURE 1: PROPOSED RAILWAY CORRIDOR LOCATION

Unidel Group Pty Ltd does not guarantee the accuracy or completeness of the map and does not make any warranty about the data. Unidel Group Pty Ltd is not under any liability to the user for any loss or damage (including consequential loss or damage) which the user may suffer resulting from the use of this map.

2 Purpose

This technical report has been developed in accordance with the Terms of Reference (TOR) for the China First Project EIS and provides specialist information for input into the EIS.

A report which specifically considers only those matters of significance under the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is provided in **Appendix 1**.

This report examines the potential and known occurrences of protected terrestrial plants, animals and communities as identified under the Australian Government's EPBC Act, the Queensland *Nature Conservation Act 1992* (NC Act) and the Queensland *Vegetation Management Act 1999* (VM Act).

This study considers regionally significant species and areas of special biodiversity value as identified in the Queensland Government's Department of Environment and Resource Management (DERM) Biodiversity Assessment and Mapping Methodology for the Brigalow Belt North Bioregion, and declared weed species under the LP Act. The assessment has considered all environmentally sensitive localities, threatened terrestrial flora and fauna communities and species, riparian vegetation, ephemeral wetlands and biodiversity corridors.

An aquatic ecology assessment has been undertaken as a separate study and is reported elsewhere in the EIS.

Finally the report discusses the nature conservation values of the areas likely to be affected by the proposed rail corridor and identifies mitigation measures to assist in avoiding or minimising impacts on environmentally sensitive localities and other areas of conservation value. Where avoidance is not possible, offset requirements and suitable options have been discussed.

3 Scope of Work

The scope of this terrestrial flora and fauna assessment is to:

- Assess the existing terrestrial flora and fauna assemblages through both desktop and field studies, including identification and description of the following key values:
 - Native vegetation communities with reference to the Australian Government's EPBC Act and Queensland Government's Regional Ecosystem (RE) classification;
 - Observed or potentially present taxa listed as Threatened and Near Threatened under the EPBC Act and / or the Queensland NC Act;
 - Observed or potentially present taxa listed as priority taxa under the EPA Biodiversity Mapping Methodology for the Brigalow Belt North and Desert Uplands bioregions;
 - General terrestrial flora and fauna values;
 - Pest flora and fauna; and
 - Wetlands and riparian areas;
- Identify potential impacts to terrestrial flora and fauna that may occur as a result of project works and evaluate the scope and nature of these impacts;
- Identify potential impacts to Environmentally Sensitive Areas (ESA's) as mapped by the Department of Environment and Resource Management (DERM); and
- Identify appropriate mitigation measures to help avoid and minimise potential impacts on the ecological features and values.

3.1 Clearance Footprint Area

The proposed rail corridor is approximately 447 km in length. The clearance corridor width will range from 50 m in open flat terrain to up to 150 m in areas where cross-slopes will require cutting and benching. For the purposes of the clearance footprints estimated in this report a conservative average width of 100 m has been utilised.

3.2 Legislative Framework

Environment Protection and Biodiversity Conservation Act 1999

Pursuant to the EPBC Act a person must not take an action that will have or is likely to have an impact on any Matters of National Environmental Significance (MNES).

MNES which trigger the jurisdiction of the Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) include:

- World heritage properties;
- National heritage places;
- Wetlands of international significance (Ramsar wetlands);
- Listed threatened species and communities;
- Commonwealth marine environment;

- Listed migratory species;
- The Great Barrier Reef Marine Park; and
- Nuclear actions.

Other matters that may trigger Commonwealth jurisdiction include actions that are located within or will affect Commonwealth lands and / or actions where Commonwealth agencies are proposing to undertake the action.

State Development and Public Works Act 1971

The *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act) enacts a range of powers and functions to facilitate the development of large projects in Queensland. These mechanisms include declarations of projects of State Significance, State Development Area and the power to compulsorily acquire land for infrastructure.

The China First Project has been declared a significant project by the Coordinator-General under the SDPWO Act. Pursuant to s 26 (1) (a) the Project is required to undertake a formal EIS process, which is to be coordinated by the Department of Infrastructure and Planning on behalf of the Coordinator-General.

Sustainable Planning Act 2009

The *Sustainable Planning Act 2009* (Qld) (SP Act) is Queensland's principle planning legislation. This legislation seeks to achieve sustainable planning by managing the process by which development takes place, managing the effects of development on the environment and continuing the coordination and integration of local, regional and State planning.

Environmental Protection Act 1994

The *Environmental Protection Act 1994* (Qld) (EP Act) sets out the regulatory framework to protect the environment in the context of Ecological Sustainable Development (ESD). This Act provides for a wide range of tools, including, Environmental Protection Policies, an environmental impact process and the establishment of general environmental duty and the duty to notify of environmental harm.

Vegetation Management Act 1999

The VM Act regulates the clearing of remnant vegetation and high value regrowth. The VM Act also provides for the preparation of mapping to identify areas of high conservation value, areas vulnerable to land degradation and remnant vegetation and sets out policies against which applications for clearing vegetation are assessed.

Nature Conservation Act 1992

The NC Act sets out the regulatory framework for the identification, gazettal and management of protected areas and the protection of native flora and fauna.

Land Protection (Pest and Stock Route Management) Act 2002

The LP Act provides for the management of pests on land and the management of the stock route network. This Act identifies State declared plants (weeds) and animal pests and the management requirements of landholders to control these species.

4 Methodology

4.1 Nomenclature

Scientific and common names for terrestrial flora and fauna are consistent with those used in the following sources:

- Bostock and Holland (2007) and botanical binomials presently accepted by the Queensland Herbarium (DERM) for flora;
- Cogger (2000) for amphibians and reptiles;
- Marcombe (2000) for birds; and
- Van Dyck and Strahan (2008) for mammals.

4.2 Flora Assessment

4.2.1 Determination of Flora Species and Ecological / Vegetation Communities Significance Level

Significant Ecological Communities / REs are listed by the EPBC Act as Critically Endangered, Endangered or Vulnerable, by the VM Act as Endangered, Of Concern and Least Concern and by DERM as Endangered, Of Concern and No Concern at Present under DERM's Biodiversity Status classifications.

Listed Threatened and Near Threatened flora species are defined as those taxa listed in the EPBC Act as Critically Endangered, Endangered or Vulnerable; and in the NC Act as Endangered, Vulnerable or Near Threatened.

Regionally Significant flora are defined as those taxa not listed as Threatened or Near Threatened species, but have been identified as being of conservation significance within the Desert Uplands Flora, Fauna and Landscape Expert Panel Report (EPA 2005), Brigalow Belt North, Flora, Fauna and Landscape Expert Panel Report (EPA 2008), Conservation of Biodiversity in the Desert Uplands Report (Morgan *et al.* 2002) and the CSIRO Rare or Threatened Plants (ROTAP) (Briggs and Leigh 1995).

All other native flora species have been designated as Least Concern.

Environmentally Sensitive Areas (ESAs) are identified by ESA mapping layers provided by DERM.

4.2.2 Determination of Weed Species Significance Level

The *Australian Weeds Strategy* identifies priorities for weed management across the nation with the aim of minimising the impact of weeds on Australia's environmental, economic and social assets. As part of this, a list of nationally agreed priority plant species (Weeds of National Significance [WONS]) has been established for control and management based on species rankings of invasiveness, potential to spread, and impact on socio-economic and environmental assets.

The LP Act also identifies target weed species that have, or may potentially have, a serious economic, environmental or social impact. Declared plants are classified into three management priorities, based on their current extent and potential to spread, including:

- **Class 1 plants:** weed species that are not commonly present in Queensland and, if introduced, would cause an adverse economic, environmental or social impact. Current infestations in Queensland are subject to eradication from the State and landowners must take reasonable steps to keep their land free of these species;

- **Class 2 plants:** weed species that are established in Queensland and have, or could have an adverse economic, environmental or social impact. Landowners must take reasonable steps to keep their land free of Class 2 plants; and
- **Class 3 plants:** weed species that are established in Queensland and have, or could potentially have, an economic, environmental or social impact. The primary objective of this listing is to prevent the sale, and therefore spread of these pests into new areas, and landholders are not required to control these species unless their land is adjacent to an environmentally significant area, such as:
 - A protected area;
 - Land dedicated as a reserve for environmental purposes under the Queensland Land Act 1994;
 - A World Heritage area listed under the World Heritage Convention;
 - An area supporting a critically endangered ecological community in the list established under the EPBC Act;
 - A declared Ramsar wetland under the EPBC Act;
 - An area of high nature conservation value under the VM Act; and
 - An area, other than State-controlled land, identified in a local government's pest management plan as an area that has special environmental significance for native wildlife.

WONS and declared plants of Queensland are considered significant weed species. Other invasive non native species are considered environmental weed species.

4.2.3 Flora Desktop Assessment

A desktop review was undertaken to identify the key flora and vegetation community values that are known or likely to occur within the broader study area. All database searches were undertaken in August 2009 and covered an area including a 50 km buffer, equating to the following coordinates: Lat. -19° 44' 28.67" to -23° 36' 43.19" and Long. 146° 16' 1.19" to 148 14' 20.4".

The flora desktop assessment included a review of:

- Queensland Herbarium RE mapping (Version 6.0, 2009) to identify mapped significant vegetation communities;
- Queensland Herbarium HERBRECS data and DERM Wildlife Online databases to identify all flora species of conservation significance known to occur within the wider study area;
- DSEWPC Protected Matters Search Tool to identify all MNES known or potentially occurring within, or close to, the study area including Ramsar-listed wetlands, critical habitat areas, threatened ecological communities and flora species and other matters including conservation areas (including National Parks, Conservation Parks and State Forests);
- DERM Property Maps of Assessable Vegetation (PMAV) to identify areas of high-value regrowth vegetation as listed under the VM Act;
- DERM Queensland Essential Habitat Area (EHA) mapping to identify essential habitat areas for Threatened listed flora species;

- DERM Desert Uplands Biodiversity Planning Assessment (BPA) to identify areas of ecological significance at the state, regional and local level;
- DERM ESA map layers to identify key ecologically sensitive areas including, wetlands, Endangered REs (Biodiversity Status) and nature refuges;
- Directory of Important Wetlands (Blackman *et al.* 1999) database;
- DERM Queensland Wetlands mapping (WetlandInfo);
- Satellite imagery to gain an appreciation of the project's proximity to sensitive areas, assess vegetation patterns and identify target areas for field investigations; and
- DERM Brigalow Belt Biodiversity Planning Assessment (BPA) to identify areas of ecological significance at the state, regional and local level.

It is recognised that the information gained from these databases have caveats attached regarding the robustness or completeness of the information. For example HERBRECS data is based almost exclusively on plant specimens actually recorded as present in the given locations. The absence of any specimen records for a particular species from an area does not imply that that species does not occur in that area. Data from the DSEWPC website is based on a combination of actual records, primarily from State Government databases, combined with modelled distributions of species according to their ecological characteristics.

Vegetation clearance calculations were based on the existing Queensland Herbarium RE mapping (which was found to be broadly accurate for the study area).

4.2.4 Flora Field Assessment

The terrestrial flora assessment of the proposed rail corridor was conducted over ten days in July 2010 by Steve Fox and Geoff Sharp (CVs are provided in **Appendix 2**).

The assessment was conducted by helicopter (for all KPs except KP 0 - 20) and included:

- Aerial observation of the entire length of the route; and
- Detailed (on-ground) flora surveys at 57 sites.

The aerial observations were conducted from between 30 - 250 m elevations and enabled obvious vegetation community characteristics to be recorded (e.g. confirmation of the presence / absence of Brigalow communities, Semi-evergreen vine thicket communities and Eucalypt forests and woodlands).

Survey sites S1 and S2, within KP 0 – 20, were accessed by vehicle and foot on 24 July 2010.

The on-ground field surveys:

- Targeted Significant Ecological Communities (SECs) / REs as well as representative REs mapped within the Study Area;
- Were assessed to the 'tertiary' level in accordance with the methodology outlined by the Queensland Herbarium (Nelder *et al.* 2005) and data collected was compatible with the Queensland Herbarium's CORVEG database;
- Included investigation of the presence / absence or likely presence / absence of Threatened and Near Threatened flora species and Significant Ecological Communities within and in the vicinity of all tertiary survey sites;

- Included investigation of the presence / absence or likely presence / absence of significant weed species; and
- Included observations on the wider environment surrounding each tertiary survey site so that potential impacts could be considered in the Local, Regional and State contexts.

Data collected at the Tertiary flora survey sites included:

- Confirmation of mapped REs;
- Description of vegetation present;
- The presence and identification of significant flora species;
- The presence and identification of significant weeds; and
- General condition of the vegetation communities present.

GPS coordinates were taken using hand held GPS (accuracy + / - 10-20 m) to identify survey site locations and to assist in validating the existing Queensland Herbarium RE mapping.

4.3 Fauna Assessment

4.3.1 Determination of Significance Level

For this study 'Threatened and Near Threatened fauna species' will be referred to and are defined as follows.

'Threatened or Near Threatened fauna species' include those taxa listed under the:

- EPBC Act as Critically Endangered, Endangered or Vulnerable; and
- NC Act as Endangered, Vulnerable or Near Threatened.

All other native fauna have been designated as Least Concern. This includes those species that have been given extra protection as Migratory and / or Marine Protected Species under the EPBC Act, but which are not Threatened or Near Threatened.

4.3.2 Fauna Desktop Assessment

The desktop assessment included review of:

- DERM Wildlife Online;
- Queensland Museum data;
- DSEWPC Protected Matters Search Tool to identify all MNES, including Conservation Areas and Threatened Species;
- Priority Taxa under the Biodiversity Assessment and Mapping Methodology (BAMM) Criteria H;
- Queensland Herbarium RE mapping; and
- DERM ESA's mapping.

4.3.3 Fauna Habitat Field Assessment

The terrestrial fauna habitat assessment of the proposed corridor was conducted over ten days in July 2010 by Bruce Thomson (CVs are provided in **Appendix 2**). The assessment was conducted by helicopter and included:

- Aerial observation of the entire length of the route; and
- Detailed (on-ground) fauna habitat surveys at 57 sites.

Data collected at each survey site included general observations of the following fauna habitat values:

- Landform;
- Structural vegetation characteristics;
- Density and nature of groundcover (e.g. rocks, logs, vegetation and leaf litter);
- Presence / abundance of hollow-bearing trees;
- Level of disturbance (including vehicular, grazing or agricultural activities);

- Degree of environmental weed infestation;
- Evidence of, and estimated time since last bushfire;
- Presence / absence of permanent or ephemeral freshwater resources and distance to riparian areas and free standing water; and
- Weather conditions.

No fauna trapping was conducted.

Using the field habitat observations and the desktop data, a determination was made on whether or not preferred habitat for Threatened and Near Threatened fauna species was present along the rail corridor. Likely impacts on those species for which preferred habitat was found to be present were analysed based on the known ecology of each species.

4.4 Assessment of Significance of Impacts

A risk assessment was undertaken to determine the significance of the potential impacts on the terrestrial ecology during the construction and operation of the proposed rail corridor (within the scope of this report). The risk assessment matrix was provided to Unidel by Waratah Coal and is based on Government definitions of likelihood and consequence.

An analysis of each risk was undertaken to determine the likelihood of occurrence and its consequences. Using the risk matrix, a five-level semi-qualitative risk assessment was conducted to calculate a 'score' for each risk. Mitigation measures were then applied and the risk assessment was conducted again. The categories of risk include extreme, high, medium, low and positive effect.

Likelihood of the Impact Occurring

Score	Descriptor	Description
5	Almost Certain	Is expected to occur
4	Likely	Will probably occur
3	Possible	Might occur
2	Unlikely	Unlikely to occur
1	Rare	May occur in exceptional circumstances

Consequence if the Impact Occurs

Score	Descriptor	Description
5	Severe	<p>Massive temporal and spatial effect.</p> <p>Extensive long term environmental harm and / or harm that is extremely widespread. Impacts unlikely to be reversible within 10 years.</p> <p>Significant non-compliance with Environmental Authority and / or other approval conditions and regulatory requirements, highly likely to result in formal enforcement action.</p> <p>Serious injury or fatality to members of the public.</p> <p>Permanent loss of protected social or cultural values (i.e. not in accordance with agreements in place).</p>

4	Major	<p>Major temporal and spatial effect.</p> <p>Major or widespread, unplanned environmental impact on or off the site. Significant resources required to respond and rehabilitate.</p> <p>Any unplanned impacts are reversible within 2-10 years.</p> <p>Non-compliance with Environmental Authority and / or other approval conditions and regulatory requirements, with potential to result in formal enforcement action.</p> <p>Degradation of overall conservation status of species or ecosystems.</p> <p>Serious disruption to residential amenity and day to day activities. Likely to give rise to significant complaints.</p> <p>Minor injury to members of the public requiring first aid or minor medical treatment.</p> <p>Loss of protected social or cultural values that may take several years or more to restore.</p>
3	Moderate	<p>Moderate temporal and spatial effect.</p> <p>Moderate, unplanned environmental impact contained within the site or minor impact that is more widespread on and off the site.</p> <p>Any unplanned impacts are typically reversible within 2 years.</p> <p>Minor non-compliance with Environmental Authority and / or other approval conditions and regulatory requirements, unlikely to result in formal enforcement action.</p> <p>Planned or unplanned impacts do not result in degradation of overall conservation status of species or ecosystems.</p> <p>Moderate disturbance to local residents or community, short to medium duration, moderate disruption to day to day activities. Some complaints may arise.</p>
2	Minor	<p>Minor temporal and spatial effect.</p> <p>Minor, unplanned localised environmental impact, contained on-site or with negligible off site effects.</p> <p>Any unplanned impacts are reversible within 6 months.</p> <p>No non-compliance with environmental Authority and / or other approval conditions and regulatory requirements.</p> <p>Planned or unplanned impacts do not result in degradation of overall conservation status of species or ecosystems.</p> <p>Some nuisance or disturbance to local residents or the community, of short duration. Normal activities are not disrupted or are not briefly disrupted.</p>
1	Negligible	<p>Slight temporal and spatial effect.</p> <p>Negligible environmental effect. Any impacts are contained on site and short term in nature. Minimal if any resources required to respond to incident.</p> <p>No non-compliance.</p> <p>Negligible impact on local residents and community.</p>
	Positive effect	A positive outcome is expected.

Potential Impact Assessment Matrix

Likelihood	Consequence					
	Severe (5)	Major (4)	Moderate (3)	Minor (2)	Negligible (1)	Positive
Almost Certain (5)	Extreme (10)	High (9)	High (8)	Medium (7)	Medium (6)	Positive effect
Likely (4)	High (9)	High (8)	Medium (7)	Medium (6)	Medium (5)	Positive effect
Possible (3)	High (8)	Medium (7)	Medium (6)	Medium (5)	Low (4)	Positive effect
Unlikely (2)	Medium (7)	Medium (6)	Medium (5)	Low (4)	Low (3)	Positive effect
Rare (1)	Medium (6)	Medium (5)	Low (4)	Low (3)	Low (2)	Positive effect

4.5 Assumptions and Limitations

In undertaking this terrestrial flora and fauna assessment the following assumptions have been applied:

- The existing DERM RE mapping of the project footprint was found, through the field survey work, to be generally accurate. It has been used as the basis for estimating areas of each REs present and proposed, to be cleared as well as for estimating the extent of these REs within a buffer area and the bioregion;
- Threatened and Near Threatened fauna species which are known or predicted to occur in the wider area, and for which suitable habitat is present within the study area, are considered to be present (i.e. the precautionary approach has been applied); and
- The helicopter is used for a broad level study to access habitat value and will be augmented by detailed assessments prior to construction.

* Includes Unavoidable.

5 Existing Environment

5.1 State, Bioregional and Local Context

The proposed rail corridor is located within the Brigalow Belt North bioregion (from KP 0 to KP 376) and Desert Uplands bioregion (from KP 376 to 445).

The Desert Uplands bioregion encompasses an area of about 70,300 km² and straddles the Great Dividing Range between Blackall and Pentland in central northern Queensland. The bioregion partly lies within the Galilee and Eromanga Basins. These Basins consist of Mesozoic to Tertiary (less than 251 million years ago) sediments including major coal and gas deposits (ANRA 2009). The vegetation of this bioregion consists predominantly of eucalypt and acacia woodlands (often with an open spinifex understorey).

The Brigalow Belt North bioregion encompasses an area of approximately 59,824 km² with landforms which vary from rugged ranges to alluvial plains. Vegetation communities are predominantly acacia open forests and eucalypt woodlands. Major population centres include Bowen and Collinsville.

As detailed in the following sections, the main ecologically significant features of the proposed rail corridor include:

- Ecological Communities protected under the EPBC Act including Brigalow communities and Natural Grasslands;
- EREs;
- OCREs;
- A number of major watercourses including Suttor River, Mistake Creek and Belyando River;
- A number of watercourses which are preferred habitat for the threatened flora species Black Ironbox (*Eucalyptus raveretiana*); and
- Areas containing high habitat values for fauna species.

At the broad scale, the proposed rail corridor transects cleared pasture lands (**Plate 1**), eucalypt and acacia woodlands (**Plate 2** and **Plate 3**), narrow strips of riparian vegetation (**Plate 4**) and small pockets of high value regrowth.

The dominant land use for the vast majority of the area transected by the proposed rail corridor is cattle grazing. A significant portion is cleared of standing timber for cattle pastures. These areas are dominated by Buffel Grass (*Pennisetum ciliare*), an introduced invasive pasture species which is well established in most areas throughout the proposed rail corridor (**Plate 1**).

Areas mapped by EPA (2005 and 2008) as being of State, Regional and Local significance are shown in **Figure 2**.

The areas of State significance transected by the proposed rail corridor identified by EPA (2005, 2008) include KP 23 to 37; KP 49 to 70; KP 97 to 200; KP 226 to 250; KP 323 to 353; KP 398 to 420. Biodiversity values within these areas include

- Special biodiversity values (Criteria I);
- Bioregional corridors;
- High quality ecosystems;

- High connectivity; and
- Buffers for endangered REs.



Plate 1 Typical Buffel Grass pasture



Plate 2 Typical example of Brigalow (Endangered Ecological Community) intersected by the proposed rail corridor



Plate 3 Typical acacia woodland transected by the proposed rail corridor

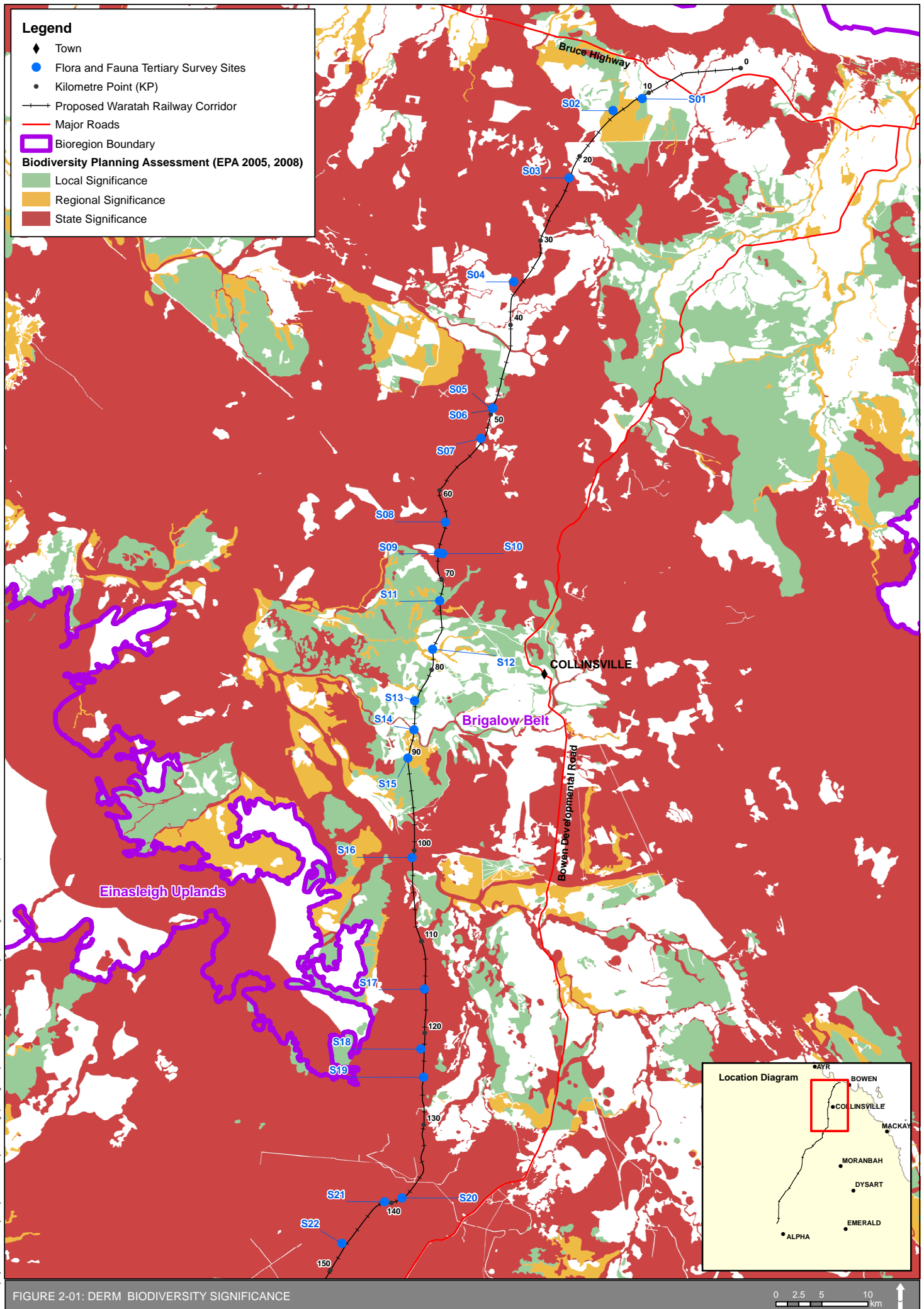


FIGURE 2-01: DERM BIODIVERSITY SIGNIFICANCE

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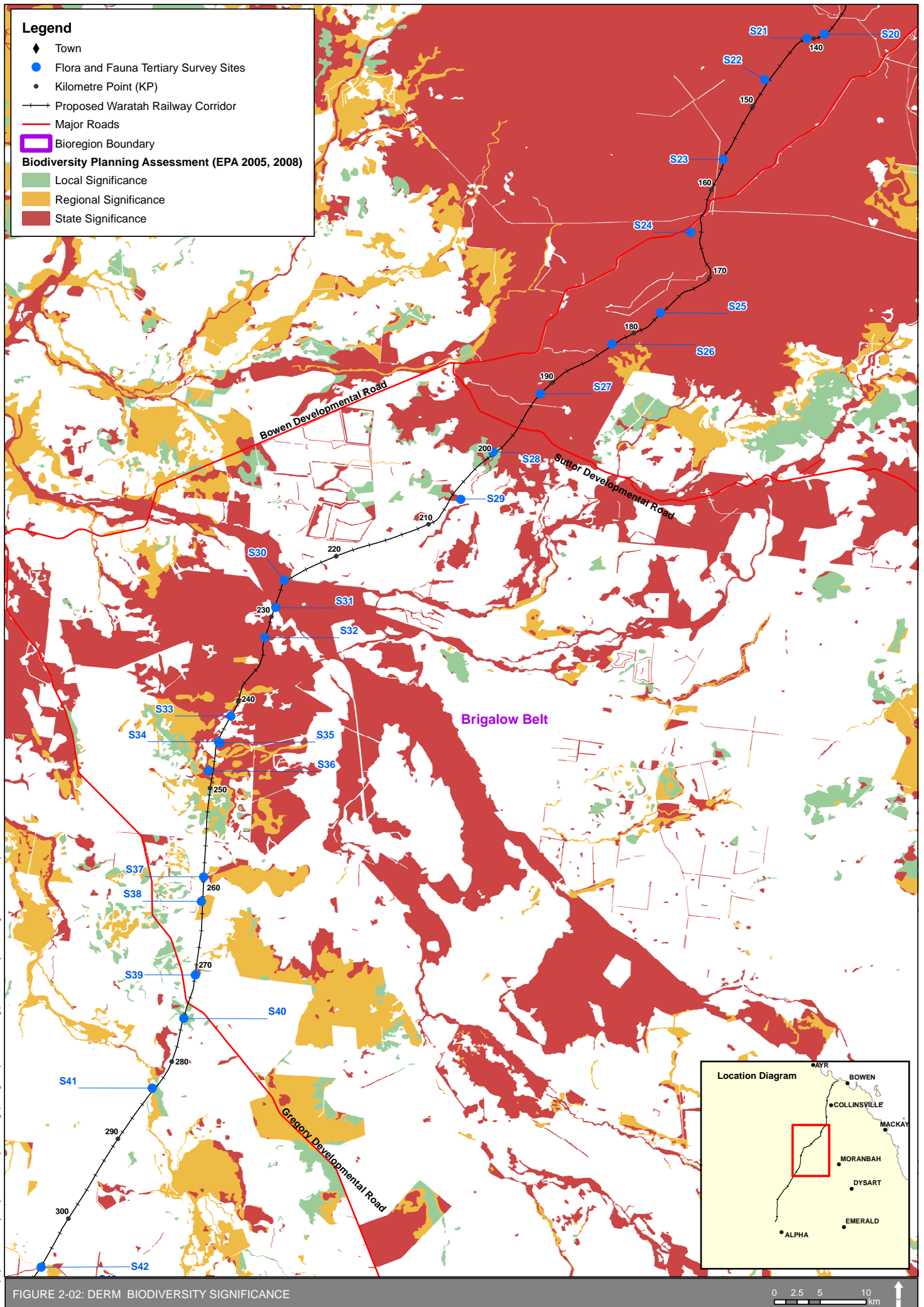


FIGURE 2-02: DERM BIODIVERSITY SIGNIFICANCE

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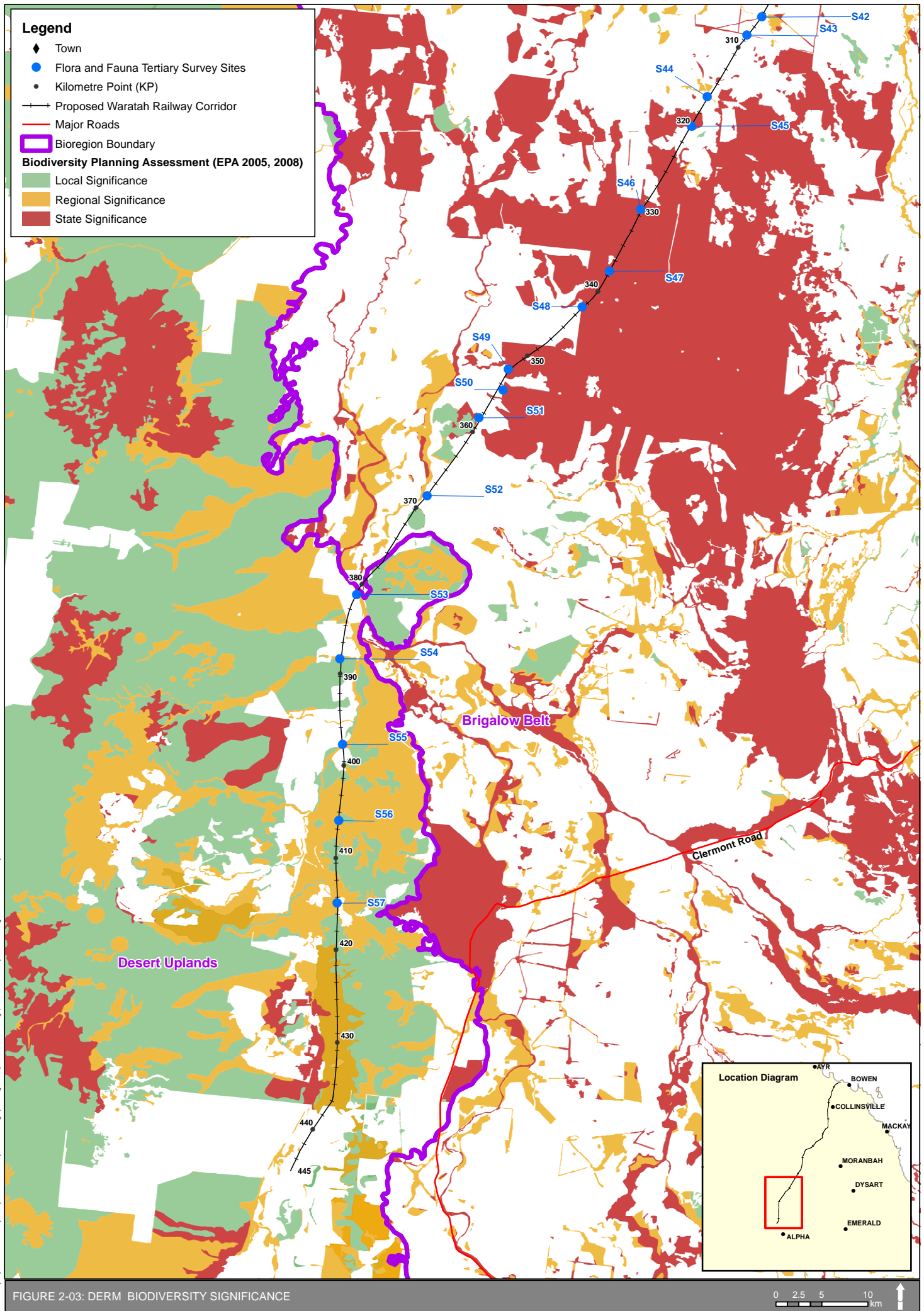


FIGURE 2-03: DERM BIODIVERSITY SIGNIFICANCE

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Plate 4 Sandy Creek north of Alpha: typical *Eucalyptus camaldulensis* (River Red Gum) lined watercourse transected by the proposed rail corridor

5.2 DERM's Environmentally Sensitive Areas

Terrestrial ESAs as provided by DERM's online ESA mapping are shown in **Figure 3**.

The only ESAs occurring within the proposed rail corridor are Category B ESAs, Regional Ecosystems listed as Endangered under DERM Biodiversity Status. There are no Category A and / or Category C ESAs occurring within or adjacent to the proposed rail corridor.

Category B ESAs are predominantly Brigalow (*Acacia harpophylla*) dominant and co-dominant communities, but also include:

- *Acacia argyrodendron* woodlands (KP 205 - 207);
- *Acacia cambagei* (Gidgee) woodlands (KP 260 - 360); and
- *Eremophila mitchellii* open woodland on alluvial plains (KP 10 - 25).

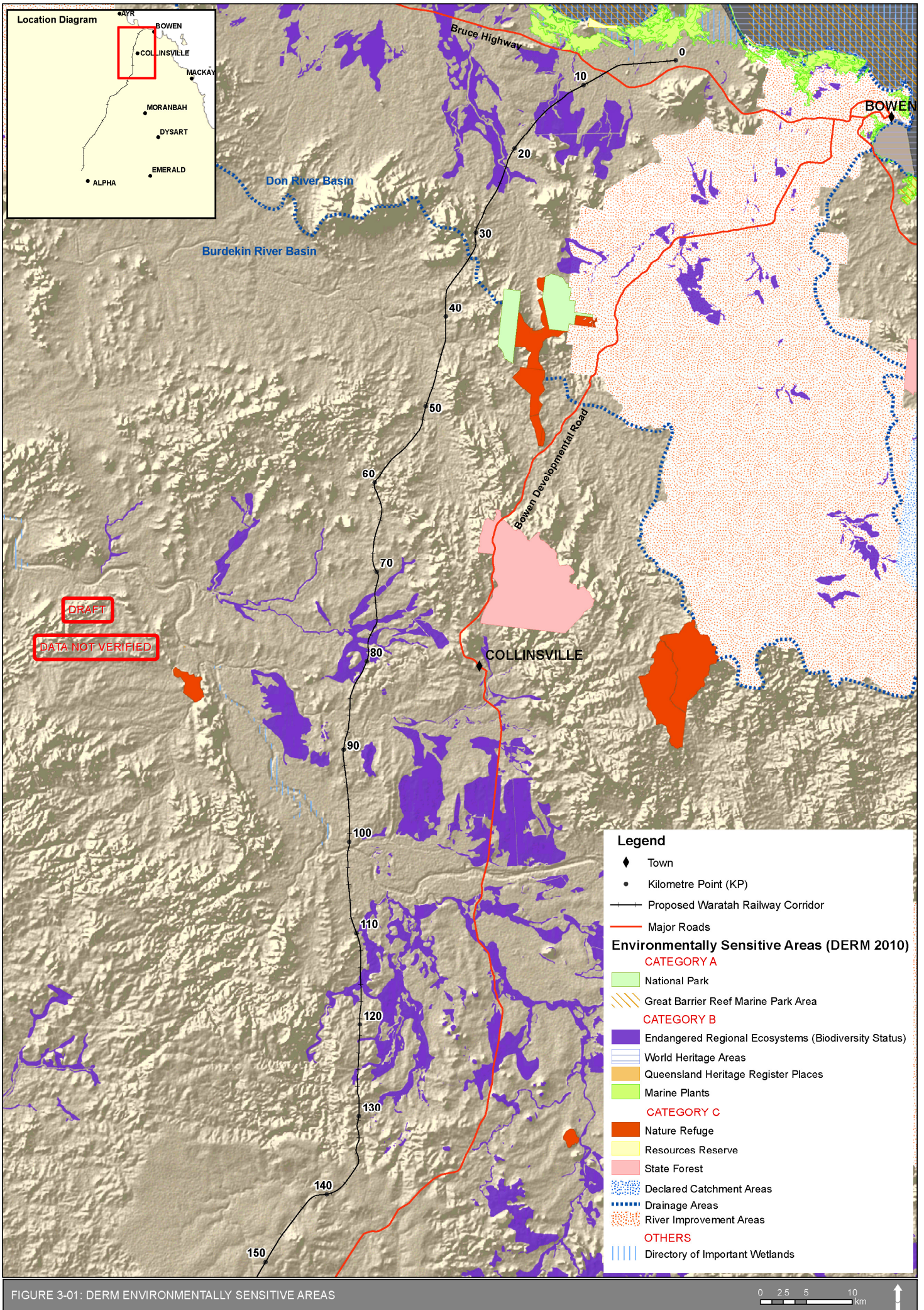
The Brigalow communities are discussed in **Section 5.3.1. Appendix 3** provides vegetation assessment proformas for each site and their locations are shown in **Figure 4**.

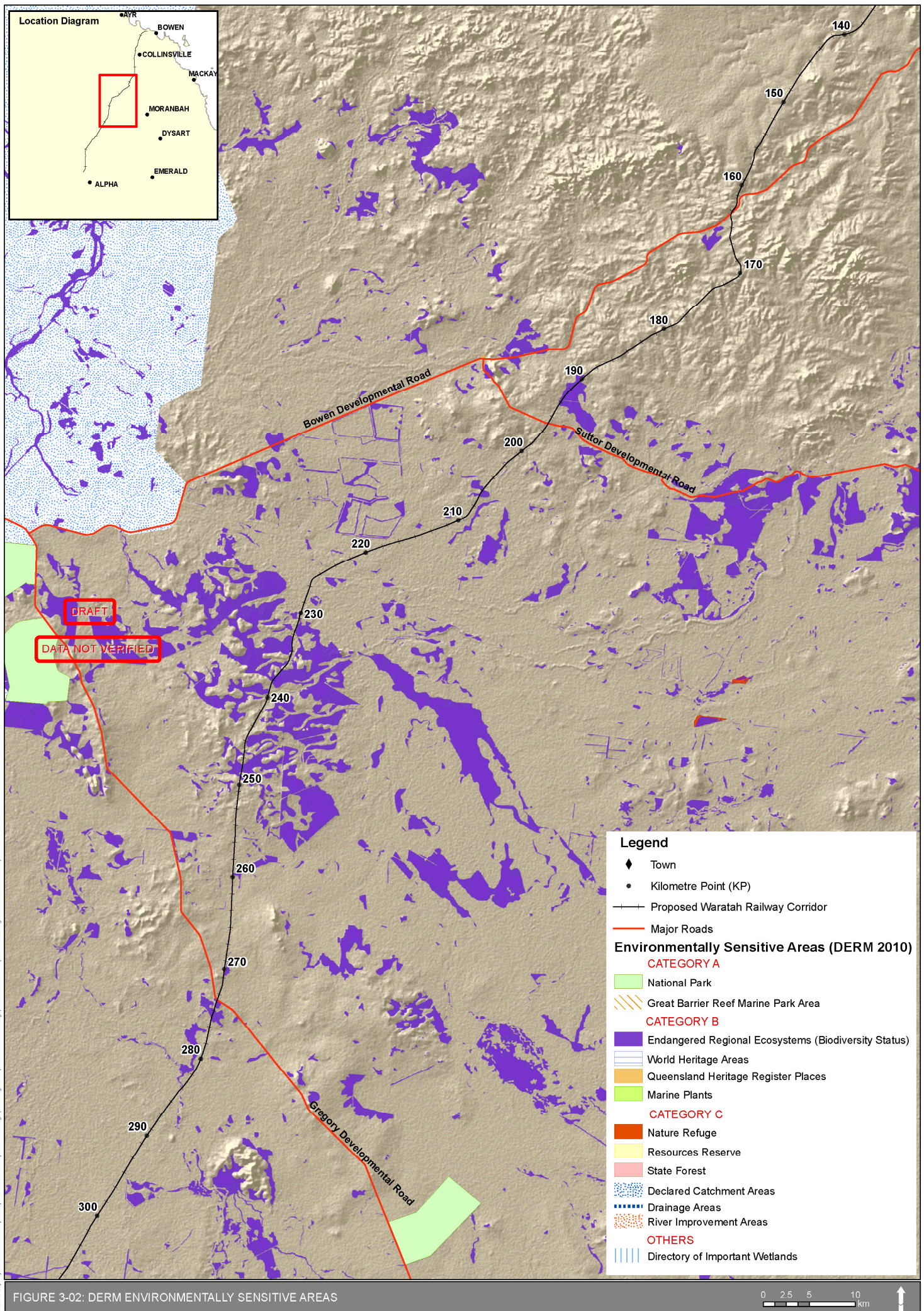
The *Acacia argyrodendron* woodland survey site (Site 29) was found to be degraded by grazing activities. Harissa Cactus (*Harrissia martini*) was identified as being present.

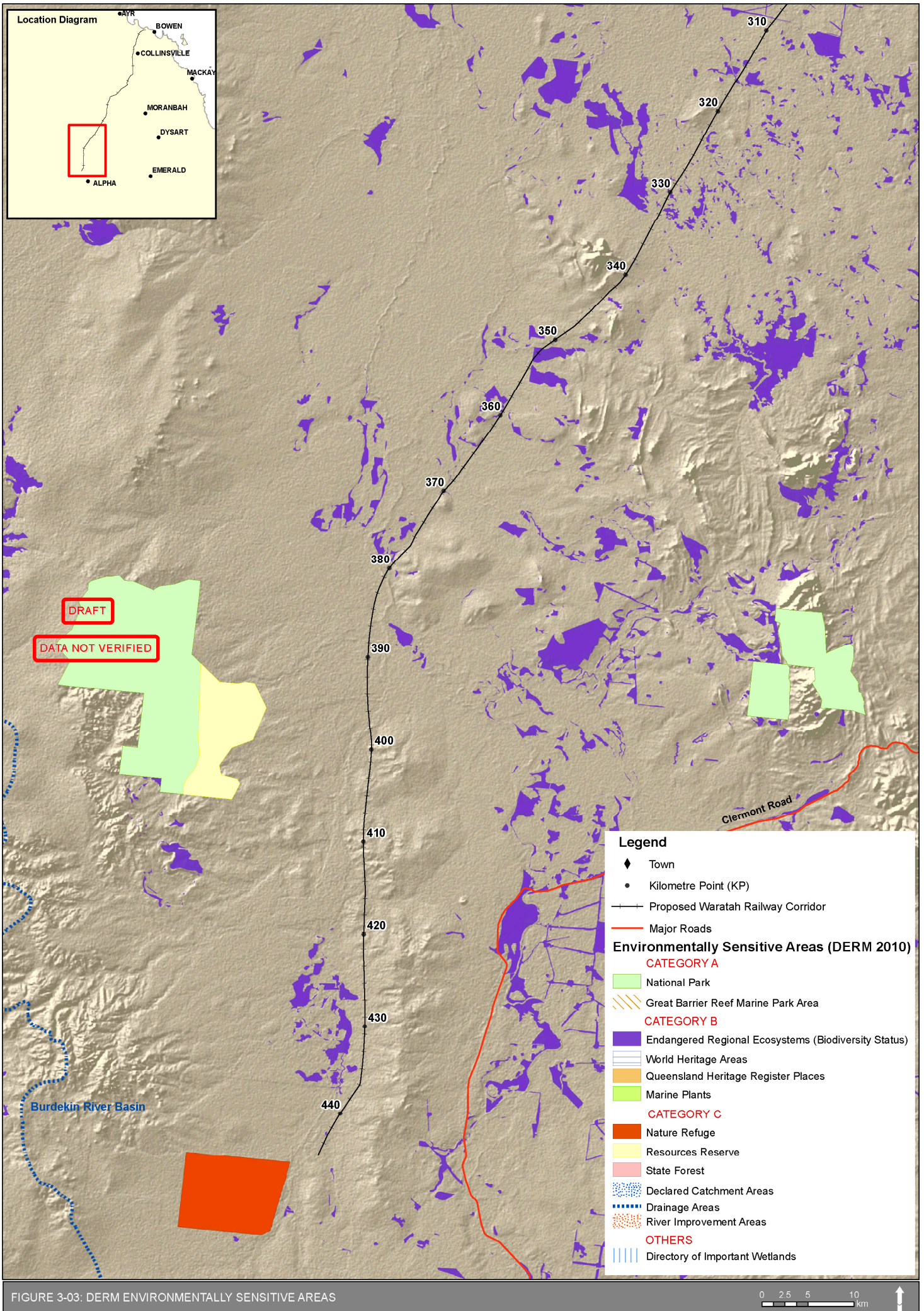
The Gidgee woodland survey sites (Sites 37, 39 and 51) were found to be in generally good condition; however, some areas have been degraded due to grazing and fire. Parthenium

Weed (*Parthenium hysterophorus*), Velvet Tree Pear (*Opuntia tomentosa*), Harissia Cactus and Buffel Grass were found to be present amongst these sites.

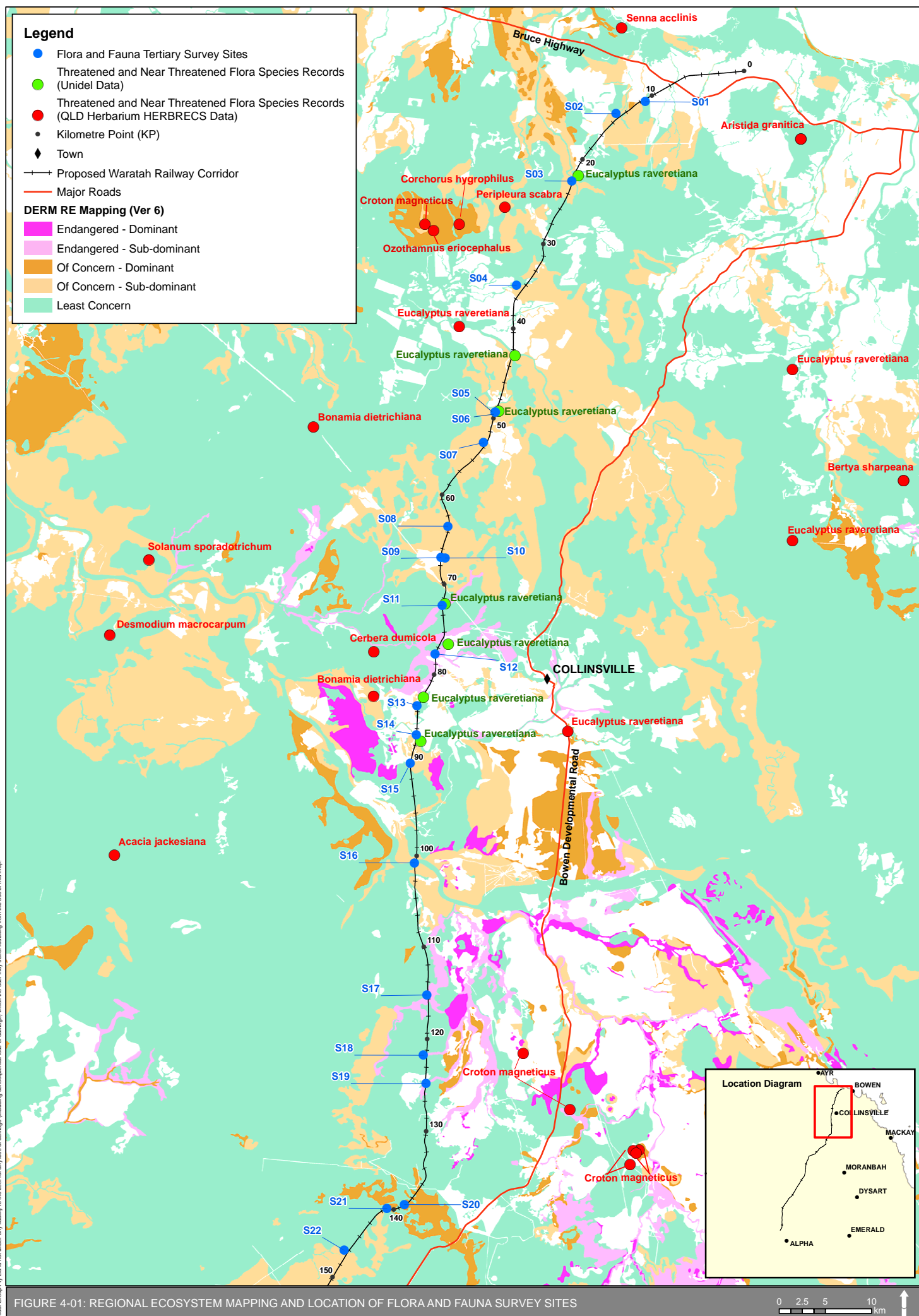
Eromophil mitchelli open woodland on alluvia plains is mapped as occurring within a mosaic between KP 7 - 25 (although this community was not present at any survey site, nor observed on the drive into Sites 1 and 2).

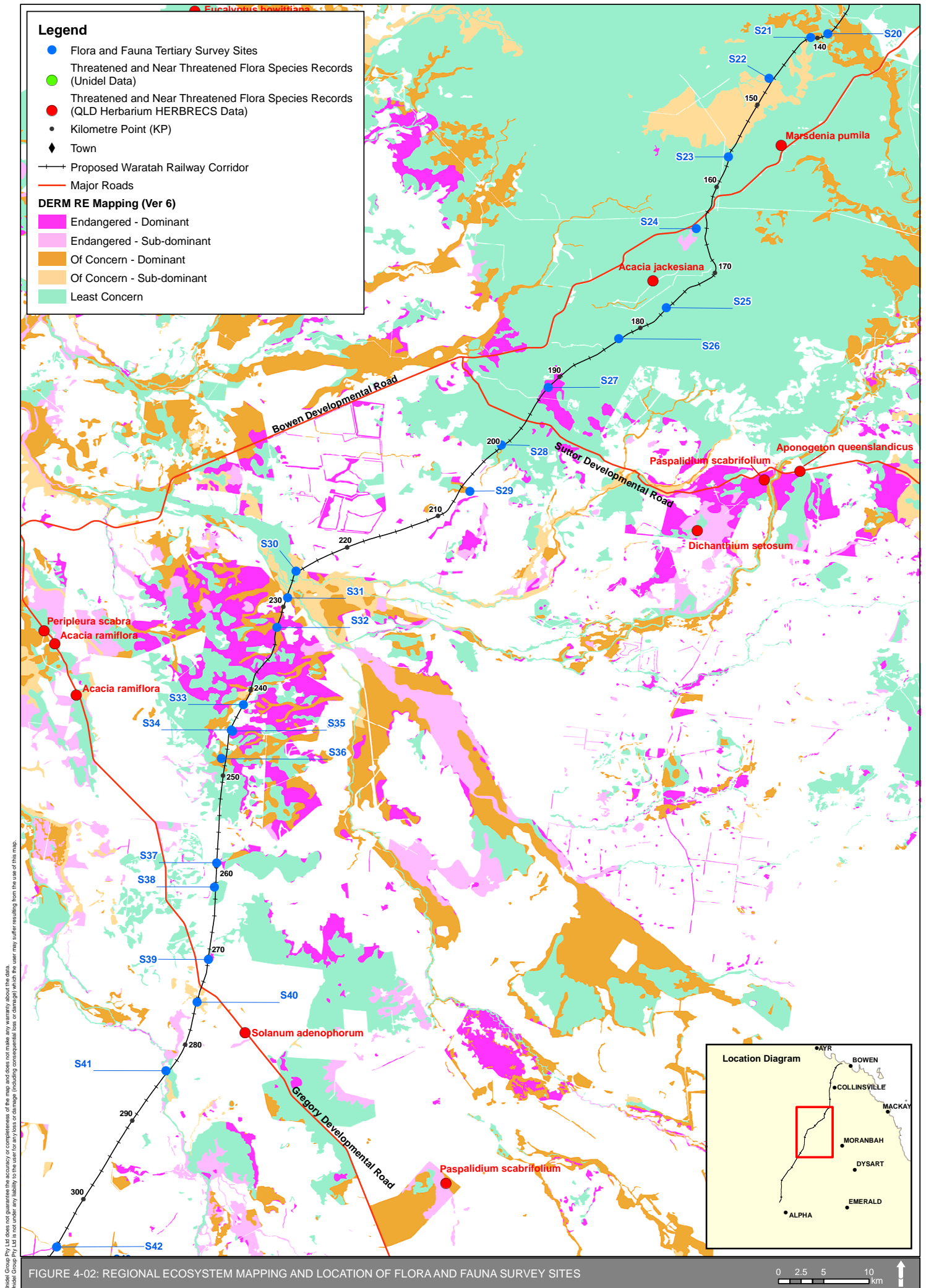


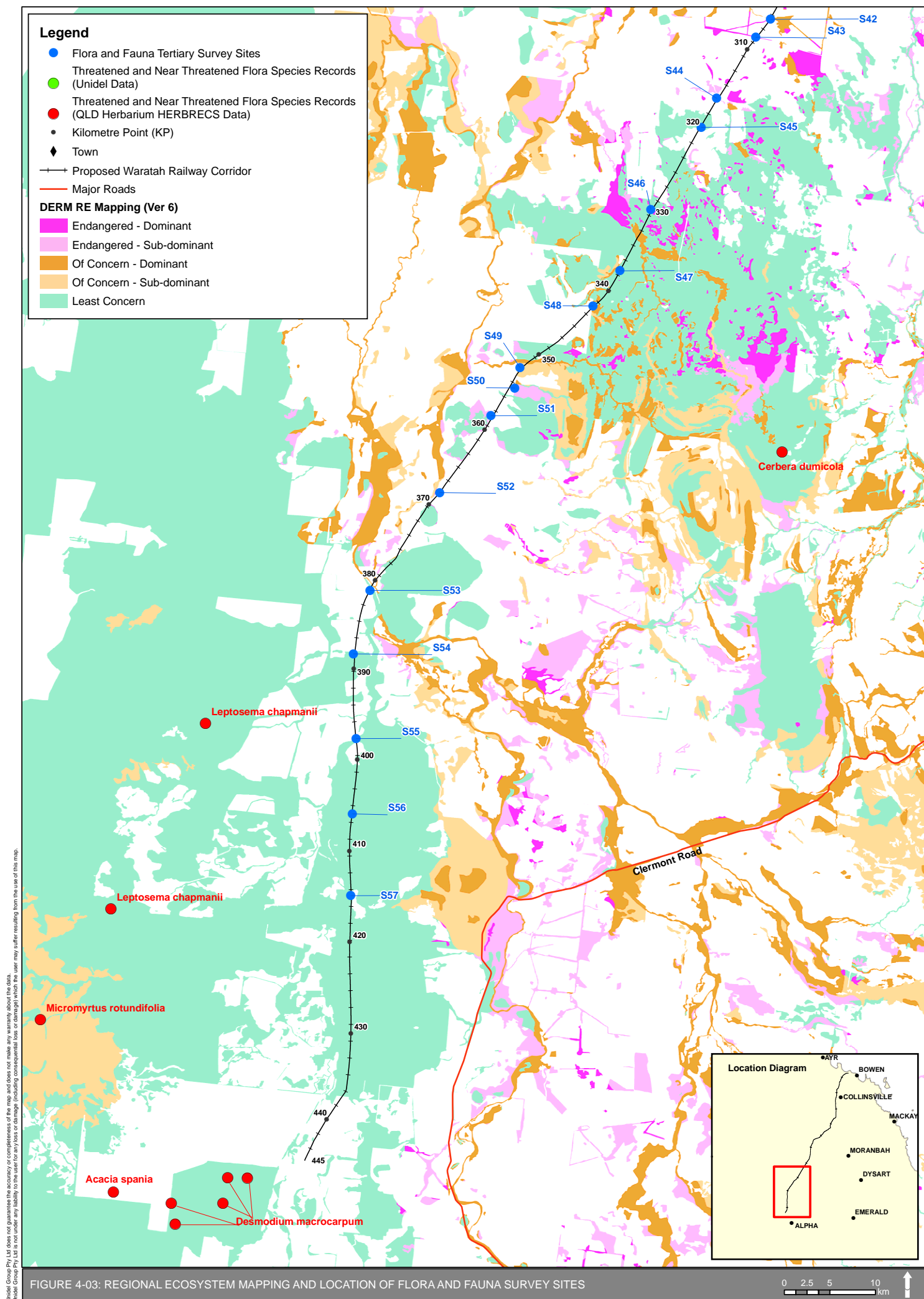




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5.3 Floral Environment

The proposed rail corridor commences in an area of open eucalypt woodland, subject to cattle grazing, on the northern side of the Bruce Highway. It then travels to the west through a gap in the Great Dividing Range and crosses a number of creeks in undulating rocky country comprising of eucalypt woodlands with a sparse, grassy understorey. Creeklines in the area are lined with gallery forest and dominated by *Melaleuca* spp. Most creeks are heavily infested with weeds, including dense stands of Rubber Vine (*Cryptostegia grandiflora*) (**Plate 5**), Mexican Poppy (*Argemone ochroleuca*) and Noogoora Burr (*Xanthium occidentale*), and are also subject to heavy grazing.



Plate 5 Rubber Vine (*Cryptostegia ciliaris*) in watercourse at KP 49.5

From Sites 10 to 13 (**Figure 4**), the corridor runs through undulating hills that support open Eucalypt woodlands with degraded and severely grazed understorey dominated by Buffel Grass. Patches of native grass (including *Dicanthium* sp. dominated grasslands) were observed. Creeklines in this area were smaller and fringed by open eucalypt woodlands or, in some more sheltered areas, Semi-evergreen vine thicket remnants in very poor condition.

From the Collinsville area (Site 13) to the south, the corridor moves into gently undulating plains supporting Eucalypt woodlands and scattered patches of Brigalow with grassy understorey. Most areas were heavily grazed and in poor condition.

As the corridor proceeds south from this area (from Site 16), it moves into slightly steeper terrain and the overall quality of vegetation improves (Sites 17 to 24).

South of the Bowen Developmental Road (nearest to Site 24) the corridor traverses an area of Sandstone range with bare, exposed rock and skeletal soils (Site 25). This area had been extensively burnt by a very severe fire; however, sufficient pockets of protected vegetation remain. In some areas, these rocky hills support Lancewood thickets (Sites 26 and 34) with Spinifex understorey. Site 28 is in an extensive area of remnant vegetation that is significant in terms of its size and quality with woodlands supporting grassy and shrubby understorey.

South of the Suttor Development Road (from Site 29), the corridor enters an extensive region of gently undulating plains, intersected by large, braided river systems. This includes the Suttor River, Mistake Creek and Belyando River. The vegetation throughout this region is comprised of open Eucalypt woodlands with interspersed patches of Brigalow. Larger trees and dense

vegetation dominates in the areas subject to seasonal flooding. Overall condition of the vegetation varied from good to degraded, depending on the intensity of grazing pressure and extent of Buffel Grass establishment. This pattern continues south to the proposed mine site.

5.3.1 Ecological Communities / Regional Ecosystems

The EPBC Act Protected Matters Search Tool identified five TECs potentially occurring within the broader study area. These are:

- Brigalow (*Acacia harpophylla* dominant and co-dominant);
- Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin;
- Weeping Myall Woodlands;
- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (SEVT); and
- The Community of native species dependent on natural discharge of groundwater from the Great Artesian Basin.

The field survey identified that one of these, Brigalow (*Acacia harpophylla* dominant and co-dominant), occurs as small intermittent patches throughout the length of the proposed rail corridor. These communities were generally observed to be in good condition.

Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin are mapped as occurring:

- As a pure stand at KP 273 (Site 38), however, the field survey found that this community had been removed by cultivation and no native grasslands occurred in the vicinity of this location;
- As 20% of a mosaic RE at KP 192 (Site 27), however, the field survey found the Native Grassland does not occur along the proposed rail corridor at this location; and
- With patchy distribution around Collinsville (between KP 60 – 110) and the field survey confirmed that some Native Grasslands areas do occur within this portion of the proposed rail corridor.

The desktop study indicated that Weeping Myall Woodlands could potentially occur in the southern portions of the proposed rail corridor although there is very limited suitable habitat (i.e. RE 11.3.2). No evidence of Weeping Myall Woodland was found during the field survey.

The desktop study indicated that the proposed rail corridor avoids any areas mapped as SEVT remnant vegetation; however the field survey observed a limited number of small areas of greatly degraded SEVT in sheltered pockets between KP 0 – 140.

The desktop study and field survey also concluded that the proposed rail corridor avoids any areas mapped as 'Communities of native species dependent on natural discharge of groundwater from the Great Artesian Basin'.

Current RE mapping identifies 61 REs as occurring within the study footprint, including 45 Least Concern, 13 Of Concern and 3 Endangered (**Figure 4**).

Table 1 shows each ecological community / RE mapped being transected by the proposed rail corridor and any tertiary survey sites which were conducted within each ecological community / RE or within areas mapped as containing each ecological community / RE.

Table 2 shows the KPs where each TEC, ERE and OCRE is mapped as occurring or known to occur along the proposed rail corridor.

Table 1. TECs and REs Mapped as Being Transected by the Proposed Rail Corridor

Ecological Communities / REs		Status					
RE Number	Description	EPBC	VM Act	Biodiversity	Tertiary Survey Site Number	Mapped by DERM but RE absent at site	Mapped as part of mosaic by DERM but RE absent at site
10.3.4	<i>Acacia cambagei</i> low open woodland to low woodland on alluvial plains.	-	LC	OC			
10.3.3	<i>Acacia harpophylla</i> and / or <i>Eucalyptus cambageana</i> low open woodland to open woodland on alluvial plains.	-	LC	NOC			
10.3.12	<i>Corymbia dallachiana</i> and <i>C. plena</i> or <i>C. terminalis</i> open woodland on sandy alluvial terraces (eastern).	-	LC	NOC			54
10.3.13	<i>Melaleuca fluviatilis</i> and / or <i>Eucalyptus camaldulensis</i> woodland along watercourses.	-	LC	OC			53, 55, 57
10.3.14	<i>Eucalyptus camaldulensis</i> and / or <i>E. coolabah</i> open woodland along channels and on floodplains.	-	LC	OC	53, 55, 57		
10.3.27	<i>Eucalyptus populnea</i> open woodland on alluvial plains.	-	LC	OC	54		
10.3.28	<i>Eucalyptus melanophloia</i> or <i>E. crebra</i> open woodland on sandy alluvial fans.	-	LC	NOC			54
10.5.1	<i>Eucalyptus similis</i> and / or <i>Corymbia brachycarpa</i> and / or <i>Corymbia setosa</i> low open woodland to open woodland on sand plains.	-	LC	NOC			
10.5.2	<i>Corymbia plena</i> with or without <i>C. dallachiana</i> or <i>C. terminalis</i> open woodland on sand plains.	-	LC	NOC			
10.5.5	<i>Eucalyptus melanophloia</i> open woodland on sand plains.	-	LC	NOC	56		
10.5.12	<i>Eucalyptus populnea</i> open woodland on sand plains.	-	LC	NOC			56
10.7.3	<i>Acacia shirleyi</i> woodland or <i>A. catenulata</i> low woodland at margins of plateaus.	-	LC	NOC			
10.7.5	<i>Eucalyptus thozetiana</i> open woodland on scarps and on pediments below scarps.	-	LC	OC			
10.7.7	<i>Melaleuca</i> spp. and / or <i>Acacia leptostachya</i> shrubland on ferricrete (eastern).	-	LC	NOC			
10.10.4	<i>Eucalyptus exilipes</i> and / or <i>Corymbia leichhardtii</i> open	-	LC	NOC			

Ecological Communities / REs		Status					
RE Number	Description	EPBC	VM Act	Biodiversity	Tertiary Survey Site Number	Mapped by DERM but RE absent at site	Mapped as part of mosaic by DERM but RE absent at site
	woodland on sandstone ranges.						
11.3.1	<i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains.	E	E	E	12, 31, 42, 52		11, 17, 18, 19, 44, 50
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains.	-	OC	OC			20, 51
11.3.3	<i>Eucalyptus coolabah</i> woodland on alluvial plains.	-	OC	OC	44	31	42
11.3.4	<i>Eucalyptus tereticornis</i> and / or <i>Eucalyptus</i> spp. tall woodland on alluvial plains.	-	OC	OC			4, 6, 7, 8, 9, 10, 17, 18, 19
11.3.5	<i>Acacia cambagei</i> woodland on alluvial plains.	-	LC	OC			42, 43
11.3.7	<i>Corymbia</i> spp. woodland on alluvial plains.	-	LC	OC			
11.3.9	<i>Eucalyptus platyphylla</i> , <i>Corymbia</i> spp. Woodland on alluvial plains.	-	LC	NOC			
11.3.10	<i>Eucalyptus brownii</i> woodland on alluvial plains.	-	LC	NOC			11,, 12
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines.	-	LC	OC	2, 3, 5, 8, 9, 10, 11, 14, 16, 19, 21, 41		12, 17, 18
11.3.30	<i>Eucalyptus crebra</i> , <i>Corymbia dallachiana</i> woodland on alluvial plains.	-	LC	NOC			1
11.3.32	<i>Allocasuarina luehmannii</i> open woodland on alluvial plains.	-	LC	NOC	1		
11.3.33	<i>Eremophila mitchellii</i> open woodland on alluvial plains.	-	OC	E			1
11.3.35	<i>Eucalyptus platyphylla</i> , <i>Corymbia clarksoniana</i> woodland on alluvial plains.	-	LC	NOC	4, 17		
11.3.37	<i>Eucalyptus coolabah</i> fringing woodland on alluvial plains.	-	LC	NOC	30		
11.4.4	<i>Dichanthium</i> spp., <i>Astrelia</i> spp. Grassland on Cainozoic clay plains.	E	LC	OC		38	
11.4.5	<i>Acacia argyrodendron</i> woodland on Cainozoic clay plains.	-	OC	E	29		

Ecological Communities / REs		Status					
RE Number	Description	EPBC	VM Act	Biodiversity	Tertiary Survey Site Number	Mapped by DERM but RE absent at site	Mapped as part of mosaic by DERM but RE absent at site
11.4.6	<i>Acacia cambagei</i> woodland on Cainozoic clay plains.	-	OC	E	37, 39, 51		40, 50
11.4.8	<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains.	E	E	E	27, 36, 43, 46, 50	39	37, 51
11.4.9	<i>Acacia harpophylla</i> shrubby open forest to woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains.	E	E	E			35
11.4.11	<i>Dichanthium sericeum</i> , <i>Astrebla</i> spp. and patchy <i>Acacia harpophylla</i> , <i>Eucalyptus coolabah</i> on Cainozoic clay plains.	E	OC	OC			27
11.5.2	<i>Eucalyptus crebra</i> , <i>Corymbia</i> spp., with <i>E. moluccana</i> on lower slopes of Cainozoic sand plains/remnant surfaces.	-	LC	NOC			
11.5.3	<i>Eucalyptus populnea</i> + / - <i>E. melanophloia</i> + / - <i>Corymbia clarksoniana</i> on Cainozoic sand plains/remnant surfaces.	-	LC	NOC	28, 40, 47	29	20, 29,36, 37, 50
11.5.5	<i>Eucalyptus melanophloia</i> , <i>Callitris glaucophylla</i> woodland on Cainozoic sand plains/remnant surfaces. Deep red sands.	-	LC	NOC			
11.5.9	<i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains / remnant surfaces.	-	LC	NOC	20, 23		22
11.5.10	<i>Melaleuca tamariscina</i> shrubland on Cainozoic sand plains / remnant surfaces.	-	OC	OC	22		
11.5.12	<i>Corymbia clarksoniana</i> woodland and other <i>Corymbia</i> spp. and <i>Eucalyptus</i> spp. on Cainozoic sand plains/remnant surfaces.	-	LC	NOC			40
11.7.2	<i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone.	-	LC	NOC	34		33
11.7.3	<i>Eucalyptus persistens</i> , <i>Triodia mitchellii</i> open woodland on stripped margins of Cainozoic lateritic duricrust.	-	LC	NOC	33, 35		37
11.9.3	<i>Dichanthium</i> spp., <i>Astrebla</i> spp. grassland on fine-grained sedimentary rocks.	E	LC	NOC			
11.9.9	<i>Eucalyptus crebra</i> woodland on fine-grained sedimentary rocks.	-	LC	NOC			
11.9.10	<i>Eucalyptus populnea</i> , <i>Acacia harpophylla</i> open forest on fine-grained sedimentary rocks.	-	OC	E	36		
11.10.3	<i>Acacia catenulate</i> or <i>A. shirleyi</i> open forest on coarse-grained sedimentary rocks, crests and scarps.	-	LC	NOC			

Ecological Communities / REs		Status					
RE Number	Description	EPBC	VM Act	Biodiversity	Tertiary Survey Site Number	Mapped by DERM but RE absent at site	Mapped as part of mosaic by DERM but RE absent at site
11.10.7	<i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks.	-	LC	NOC			
11.10.12	<i>Eucalyptus populnea</i> on medium to coarse-grained sedimentary rocks.	-	LC	NOC	18		
11.11.1	<i>Eucalyptus crebra</i> + / - <i>Acacia rhodoxylon</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding.	-	LC	NOC	13		15
11.11.8	<i>Eucalyptus shirleyi</i> woodland on deformed and metamorphosed sediments and interbedded volcanics.	-	LC	NOC			15
11.11.9	<i>Eucalyptus populnea</i> or <i>E. brownii</i> woodland on deformed and metamorphosed sediments and interbedded volcanics.	-	LC	NOC	7		13
11.11.10	<i>Eucalyptus melanophloia</i> woodland on deformed and metamorphosed sediments and interbedded volcanics.	-	OC	OC			
11.11.13	<i>Acacia harpophylla</i> or <i>A. argyrodendron</i> , <i>Terminalia oblongata</i> low open forest on deformed and metamorphosed sediments and interbedded volcanics.	-	OC	OC	15	48	33
11.11.15	<i>Eucalyptus crebra</i> woodland on deformed and metamorphosed sediments and interbedded volcanics.	-	LC	NOC	45		
11.11.19	<i>Eucalyptus thozetiana</i> , <i>Acacia harpophylla</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding.	-	OC	OC	48		15
11.12.1	<i>Eucalyptus crebra</i> woodland on igneous rocks.	-	LC	NOC	6, 26		4, 7, 8, 9, 10, 24, 25
11.12.2	<i>Eucalyptus melanophloia</i> woodland on igneous rocks.	-	LC	NOC	25		26
11.12.7	<i>Eucalyptus crebra</i> woodland with patches of Semi-evergreen vine thicket on igneous rocks (boulder-strewn hillsides).	-	LC	NOC		57.5 - 61.7	
11.12.9	<i>Eucalyptus platyphylla</i> woodland on igneous rocks.	-	LC	NOC			4
11.12.10	<i>Corymbia clarksonia</i> woodland on igneous rocks.	-	OC	OC			

E = Endangered; OC = Of Concern; LC = Least Concern under the VM Act; NOC = No Concern at Present under Biodiversity status classification

Table 2. KPs for TECs, EREs and OCREs

RE Number	Description	EPBC	VM Act	Bio-diversity	KPs where RE is mapped by DERM	KPs where RE is mapped as part of mosaic by DERM	KP of Unidel Tertiary Survey Site KP where RE recorded
11.3.1	<i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains.	E	E	E		72.2 - 72.4, 75.2 - 75.4, 75.6 - 76.4, 77.7 - 78.2, 78.6 - 79, 79.4 - 79.8, 80.8 - 81, 114.4 - 116, 121.6 - 122, 124.8 - 125, 125.8 - 126, 283.6 - 283.7, 283.8 - 283.9, 316.1 - 316.3, 352.4 - 352.5	78, 228, 306, 368
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains.	-	OC	OC		136.2 - 136.3, 136.4 - 137.2, 137.6 - 137.8, 138.2 - 139.2, 139.8 - 140, 140.3 - 140.4, 332.6 - 333.8, 351.1 - 351.5, 359.5 - 359.6	
11.3.3	<i>Eucalyptus coolabah</i> woodland on alluvial plains.	-	OC	OC	228.7 - 229, 230.4 - 232, 232.2 - 234.2, 235 - 235.2	3.7 - 3.8, 227.4 - 227.6, 228 - 228.2, 228.4 - 228.5, 228.6 - 228.7, 283.6 - 283.7, 283.8 - 283.9, 306 - 306.2, 316.1 - 316.3, 351.1 - 351.5, 379.8 - 379.9, 380.6 - 380.7	316
11.3.4	<i>Eucalyptus tereticornis</i> and / or <i>Eucalyptus</i> spp. tall woodland on alluvial plains.	-	OC	OC	199.6 - 199.8, 239.7 - 239.9, 240.3 - 240.4, 241.5 - 241.8, 242.1 - 242.2	31.9 - 32.5, 32.9 - 34, 34.8 - 36.6, 42.8 - 44.8, 48.8 - 50.8, 51 - 51.4, 51.6 - 52.2, 52.4 - 57.6, 61.6 - 66.4, 67.8 - 70, 70.2 - 70.4, 70.6 - 70.8, 84.4 - 84.6, 95 - 95.8, 97 - 97.2, 99.9 - 100.6, 100.9 - 102, 102.4 - 103.69, 114.4 - 116, 121.6 - 122, 124.8 - 125, 125.8 - 126, 225.4 - 225.8	
11.3.33	<i>Eremophila mitchellii</i> open woodland on alluvial plains.	-	OC	E		7.8 - 7.9, 11.4 - 13.4, 14 - 14.4, 14.6 - 14.8, 16.1 - 16.4, 22.1 - 22.4, 22.6 - 24.6	
11.4.4	<i>Dichanthium</i> spp., <i>Astrelia</i> spp. Grassland on Cainozoic clay plains.	E	LC	OC	70 - 71, 73.4 - 73.6, 262 - 264.2		
11.4.5	<i>Acacia argyrodendron</i> woodland on Cainozoic clay plains.	-	OC	E		205.8 - 206.6	205.5
11.4.6	<i>Acacia cambagei</i> woodland on Cainozoic clay plains.	-	OC	E		273.6 - 274, 274.5 - 275.6, 351.5 - 352.4, 352.6 - 353.3, 359.5 - 359.6	260, 270, 358.5

11.4.8	<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains.	E	E	E	244.5 - 244.6	190 - 193.8, 229.8 - 230.4, 232 - 232.2, 234.2 - 234.4, 234.6 - 234.8, 235.6 - 235.7, 236.6 - 237, 237.4 - 238.2, 308.3 - 308.4, 314 - 314.2, 330.1 - 330.3, 359.5 - 359.6	192, 308.5, 330, 355
11.4.9	<i>Acacia harpophylla</i> shrubby open forest to woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains.	E	E	E		234.2 - 234.4, 234.6 - 234.8	
11.4.11	<i>Dichanthium sericeum</i> , <i>Astrebla</i> spp. and patchy <i>Acacia harpophylla</i> , <i>Eucalyptus coolabah</i> on Cainozoic clay plains.	E	OC	OC		190 - 193.8	
11.5.10	<i>Melaleuca tamariscina</i> shrubland on Cainozoic sand plains/remnant surfaces.	-	OC	OC		141.2 - 141.8, 143.8 - 144.1, 146.8 - 154.8	147
11.9.3	<i>Dichanthium</i> spp., <i>Astrebla</i> spp. grassland on fine-grained sedimentary rocks.	E	LC	NOC	97.2 - 100		
11.9.10	<i>Eucalyptus populnea</i> , <i>Acacia harpophylla</i> open forest on fine-grained sedimentary rocks.	-	OC	E		247.7 - 248.6, 249 - 249.5	248
11.11.10	<i>Eucalyptus meanophloia</i> woodland on deformed and metamorphosed sediments and interbedded volcanics.	-	OC	OC	339.9 - 340.1		
11.11.13	<i>Acacia harpophylla</i> or <i>A. argyrodendron</i> , <i>Terminalia oblongata</i> low open forest on deformed and metamorphosed sediments and interbedded volcanics.	-	OC	OC	342 - 342.5	82.4 - 83, 87.4 - 88.4, 86.6 - 89.2, 89.4 - 89.6, 89.8 - 90.8, 240.1 - 240.4	90
11.11.19	<i>Eucalyptus thozetiana</i> , <i>Acacia harpophylla</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding.	-	OC	OC			13
11.12.10	<i>Corymbia clarksonia</i> woodland on igneous rocks.	-	OC	OC		45.2 - 47, 47.2 - 47.6	

The field survey found the DERM RE mapping to be generally accurate and 27 REs were observed during the ground-truthing surveys including:

- 17 LCRES;
- 7 OCRES; and
- 2 ERE (Table 1 and Table 2).

The communities were generally found to be in good to excellent condition within the large contiguous stands of vegetation between KP 10 - 202, KP 225 - 255, KP 323 - 343 and KP 400 - 437. In other areas the communities tended to be impacted to a greater degree by grazing and / or altered fire regimes associated with Buffel Grass.

5.3.2 High Value Regrowth Vegetation

The proposed rail corridor transects numerous small patches of HVR REs as mapped by DERM (2009, 2010). These are predominantly LCRES but also include regrowth of three TECs / ERES and eight OCRES. The HVR REs transected by the proposed rail corridor are listed in Table 3.

Table 3. High Value Regrowth REs Transected by the Proposed Rail Corridor

Pre-clearing RE	Pre-clearing VM Act Status	EPBC Act Status	Location (KP)	Notes
11.10.12	LC			
11.11.1	LC			
11.11.13	OC			
11.11.8	LC			
11.11.9	LC			
11.12.1	LC		29.6-29.7, 32.4-32.5, 51.4-51.6, 52.4-52.6	
11.12.9	LC		32.4-32.5	
11.3.1	E	TEC		Brigalow dominant community
11.3.10	LC		29.6-29.7	
11.3.2	OC			
11.3.25	LC		3.6-3.7	
11.3.29a	LC		3.2-3.3	
11.3.30	LC		3.3-3.4, 16.3-16.4, 29.6-29.7	
11.3.3	OC			
11.3.32	LC		3.3-3.4, 16.3-16.4, 29.6-29.7	
11.3.33	OC		3.3-3.4, 16.3-16.4	
11.3.35	LC		3.2-3.3	
11.3.37	LC			
11.3.4	OC		32.4-32.5, 51.4-51.6, 52.4-52.6	
11.3.5	LC			
11.4.5	OC			
11.4.6	OC			
11.4.8	E	TEC		RE is brigalow sub-dominant community
11.4.9	E	TEC		Brigalow dominant community
11.5.12	LC			
11.5.3	LC			
11.5.9b	LC			

Pre-clearing RE	Pre-clearing VM Act Status	EPBC Act Status	Location (KP)	Notes
11.5.9c	LC			
11.7.2	LC			
11.9.10	OC			

5.3.3 Threatened and Near Threatened Flora Species

The review of Queensland Herbarium HERBRECS, Wildnet and EPBC Act Protected Matters databases identified 34 Threatened or Near Threatened plant species that are known to occur or have ranges that overlap with the proposed rail corridor (**Table 4**). These include:

- 31 species listed under the NC Act, including 3 Endangered, 10 Vulnerable and 18 Near Threatened species; and
- 9 species listed under the EPBC Act including 1 Endangered and 8 Vulnerable.

Table 4. Threatened and Near Threatened Flora Species Recorded as Occurring Within or Having Ranges that Overlap the Proposed Rail Corridor

Species	Status		Preferred Habitat	Source	Preferred Habitat Present
	NC Act	EPBC Act			
<i>Acacia jackesiana</i>	NT	-	Rocky hillsides in open Eucalypt and Acacia woodland. Extends from north of Mackay to north of Townsville, mostly inland.	2,3	Yes
<i>Acacia ramiflora</i>	-	V	Woodland on sandstone hills.	3	Yes
<i>Acacia spania</i>	NT	-	Shallow sandstone-derived soils in open Eucalypt or Acacia shrublands and woodlands.	2,3	Yes
<i>Aristida granitica</i>	E	E	Known only from the type locality in the foothills of Mt Pring, 10 km west of Bowen, Queensland, where it is common.	2,3	No
<i>Bertya pedicellata</i>	NT	-	Commonly found in open and closed forest on rocky hills with shallow skeletal or sandy soils. It is recorded at altitudes of 320 to 840 m. Associated with <i>Corymbia trachyphloia</i> (brown bloodwood), <i>Dodonaea filifolia</i> (shrub), <i>Acacia catenulata</i> , <i>A. curvinervia</i> and <i>A. shirleyi</i> (Lancewood).	3	Yes
<i>Bertya sharpeana</i>	NT	-	Tall shrub on rocky terrain north and south of Mackay.	3	Yes (KP 0 - 100)
<i>Bonamia dietrichiana</i>	NT	-	Dry rainforest and SEVT; less commonly in Eucalypt woodland; mostly coastal from Townsville south to just north of Rockhampton.	2,3	Yes (KP 0 - 140)
<i>Cerbera dumicola</i>	NT	-	Open woodland and SEVT often associated with 'jump-ups' and ridges.	2,3	Yes
<i>Corchorus hygrophilus</i>	V	-	Small shrub in SEVT and dry rainforest from Rockhampton to Townsville.	2,3	Yes (KP 0 - 140)

<i>Corymbia clandestina</i>	V	V	Restricted to a small area near Blair Athol, growing in eucalypt woodland.	2,3	No
<i>Croton magneticus</i>	V	V	Vine thickets on skeletal granite, limestone or sandstone soils, including rocky seashores.	2,3	Yes (KP 0 - 140)
<i>Desmodium macrocarpum</i>	NT	-	Open woodland and open forest communities on redearths, rarely on sandy clay soils, to 884 m. Also occurs in semideciduous vine thicket.	2,3	Yes
<i>Dichanthium queenslandicum</i> (King Blue-grass)	V	-	Restricted to Emerald and rarely in the Darling Downs in Queensland. Found on black clay soils in native grassland communities.	1,3	Yes (KP 70 - 110)
<i>Dichanthium setosum</i>	NT	-	Restricted to eastern Queensland. Grassy woodland and open forest.	2,3	Yes
<i>Digitaria porrecta</i> (Finger Panic Grass)	NT	-	Occurs in coastal regions of south Queensland and in northern New South Wales. Found in tropical and subtropical rainforests and sub-humid woodlands.	1	Yes (KP 0 - 100)
Black Ironbox (<i>Eucalyptus raveretiana</i>)	V	V	Along watercourses and on riverflats. Open forest or woodland communities in association with <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>Corymbia tessellaris</i> (Moreton Bay Ash), <i>E. camaldulensis</i> (River Red Gum), <i>Melaleuca</i> spp. and <i>Casuarina cunninghamiana</i> (River Oak).	2,3,4	Yes (KP 0 - 100)
<i>Graptophyllum excelsum</i>	NT	-	Occurs in Semi-evergreen vine thickets, although near Chillagoe it is also recorded growing in grassy woodland in association with <i>Eucalyptus cullenii</i> and <i>Corymbia erythrophloia</i> . Usually found in soil pockets among rocks and in rock crevices on quite steep, rough, rocky, eroded hillsides.	3	Yes (KP 0 - 140)
<i>Livistona drudei</i>	V	-	In coastal rainforest and <i>Melaleuca</i> forest.	3	Yes (KP 0 - 20)
<i>Livistona lanuginosa</i>	V	V	Restricted to a small area of the Burdekin River Basin along sandy river and creek channels.	3	Yes (KP 0 - 20)
<i>Macropteranthes leiocaulis</i>	NT	-	Maryborough to south of Townsville, in semi-evergreen vine thickets.	3	Yes (KP 0 - 140)
<i>Marsdenia pumila</i>	V	-	Grass tussocks in woodland with <i>Eucalyptus leichhardtii</i> , <i>E. trachyphloia</i> , <i>Acacia shirleyi</i> and <i>Lysicarpus</i> .	2,3	Yes
<i>Omphalea celata</i>	V	V	Occurs in fragmented Semi evergreen vine thicket or araucarian microphyll vine forest. Recorded along watercourses in steep sided gorges and gullies on weathered metamorphic or granitic soils.	3	Yes (KP 0 - 140)

<i>Ozothamnus eriocephalus</i>	V	V	Known from a range of habitat types, including the margins of disturbed notophyll vine forest, margins of gallery forest, microphyll vine forest, tall open <i>Eucalyptus andrewsii</i> - <i>E. resinifera</i> forest with an understorey of <i>Allocasuarina littoralis</i> , in open eucalypt forest and on rocky ridges within <i>Eucalyptus</i> spp. - <i>Acacia</i> spp.	2	Yes
<i>Paspalidium scabrifolium</i>	NT	-	Restricted to coastal regions of north and central Queensland. Found in brigalow country in Eucalypt and <i>Acacia harpophylla</i> woodland.	2,3	Yes
<i>Peripleura scabra</i>	NT	-	Eucalypt woodland on rocky hills and slopes.	2,3	Yes
<i>Peripleura sericea</i>	NT	-	From Stannary Hills to about Collinsville in eucalypt woodland.	3	Yes
<i>Polianthion minutiflorum</i>	V	-	From Mackay to about Nanango growing in open woodland.	3	Yes
<i>Rhamphicarpa australiensis</i>	NT	-	Occurs at 200 to 570 m altitude. It grows in <i>Melaleuca-Casuarina</i> open woodland and open sclerophyll woodland. It has been found on wet ground and in seepage areas near pools and swamps.	3	Yes
<i>Sarcotoechia heterophylla</i>	NT	-	Usually occurs at an altitude of 200 to 900 m. It has been recorded in simple or mixed notophyll vine forests on ridges. It often grows on light loams derived from granite. The associated species include <i>Schizomeria ovata</i> (White Birch), <i>Acmena resa</i> (Red Eungella Satinash) and <i>Syzygium wesa</i> (White Eungella Satinash).	3	No
<i>Senna acclinis</i>	NT	-	Appears to prefer rainforest margins and adjacent open forests. Occurs at altitudes of 100 to 660 m on soils derived from a mixture of basalt and metamorphic rocks. In rainforest, associated with <i>Pleiogynium timorensis</i> (Burdekin Plum or Tulip Plum) and <i>Elattostachys</i> sp. In open forests, associated with <i>Eucalyptus grandis</i> (Flooded Gum), <i>Syncarpia glomulifera</i> and <i>Alphitonia excelsa</i> (Red Ash or Soap Tree).	3	Yes (KP 0 - 140)
<i>Solanum adenophorum</i>	E	-	Brigalow scrub.	2	Yes
<i>Solanum sporadotrichum</i>	NT	-	Mainly coastal from Townsville to Mackay in Semi-evergreen vine thickets, open eucalypt woodland and littoral rainforest margins.	3	Yes (KP0 - 200)
<i>Tephrosia leveillei</i>	V	V	Habitat poorly known. Only 3 records, on from open woodland beside creek.	3	Yes
<i>Trioncinia retroflexa</i>	E	-	Recorded from Blair Athol and Springsure areas in grassland and in sparse eucalypt woodland.	3	No

Status: 1: Commonwealth (EPBC) listed: E = Endangered; V = Vulnerable.

²: State (NC Act) listed: **E** = Endangered; **V** = Vulnerable; **NT** = Near Threatened.

Source: **1** = EPBC Protected Matters search; **2** = QEPA WildNet record; **3** = Herbreccs



Plate 6 Riparian channel with Black Ironbox (*Eucalyptus raveretiana*) at KP 49.5

Potential habitat is present for 30 Threatened and Near Threatened flora species. Of these, only, Black Ironbox was recorded during the field survey.

Black Ironbox is known to occur between Rockhampton and Ayr in Queensland. The extent of occurrences is about 90,000 km² (QLD Herbarium 2008). There are 23 recorded sites or subpopulations in two main areas of occurrence: Nebo to Ayr and Apis Creek to Rockhampton (Halford 1997; QLD Herbarium 2008). The total population is unknown but many thousands are known to occur within each of several major watercourses in both of these areas.

Black Ironbox was observed at seven locations (**Figure 4**). In all instances the plants were observed within the beds or banks of watercourses. Several age classes are represented at these locations and specimens generally range from 0.5 – 8 m in height in the channel and up to 25 m along the banks.

Black Ironbox is widespread in larger watercourses between KP 0 – 100. In this section of the proposed rail corridor this species is likely to be present in additional watercourses to those recorded during the helicopter survey.

Black Ironbox was found to follow the watercourses as the dominant or co-dominant species and at many of the locations and may be unavoidable without significant detour.

There is potential for one or more of the other 29 Threatened and Near Threatened flora species also to occur within the proposed rail corridor.

The Brigalow Belt (North) Planning Assessment (EPA 2008) and the ANRA (2002) do not identify regionally significant flora species.

5.3.4 Least Concern Flora Species

A total of 187 Least Concern flora species were identified during the field survey. A complete list of flora species identified during the desktop and field assessments is provided in **Appendix 4**.

5.3.5 Significant Weed Species

This study identified 16 significant weed species within the project footprint including 8 declared species (**Table 5**).

Table 5. Significant Weed Species Recorded Within the Proposed Rail Corridor

Scientific name	Common Name	Classification		Site Number
		WONS	LP Act Class	
<i>Acacia nilotica</i> subsp. indica	Prickly Acacia	X	Class 2	10
<i>Cenchrus ciliaris</i>	Buffel Grass			12, 15, 18, 24, 28, 36, 37, 39 - 44, 48 - 49, 51 - 52
<i>Cryptostegia grandiflora</i>	Rubber Vine	X	Class 2	3, 5, 7, 9 - 10, 14
<i>Harrisia martinii</i>	Harissa Cactus		Class 2	7, 10, 12, 29, 32 - 33, 37, 39, 42 - 43
<i>Lantana camara</i>	Common Lantana	X	Class 3	13
<i>Leonotis nepetifolia</i>	Lion's Tail			8, 11
<i>Parthenium hysterophorus</i>	Parthenium Weed	X	Class 2	14, 16 - 17, 19, 29 - 32, 37 - 39, 44
<i>Opuntia tomentosa</i>	Velvet Tree Pear		Class 2	24, 31, 37, 40, 42 - 43
<i>Mimosa pigra</i>	Mimosa	X	Class 1	41, 55, 57
<i>Parkinsonia aculeate</i>	Parksonia	X	Class 2	57

Additional information on the declared species is provided below.

Parthenium Weed is possibly the most significant weed identified within the rail corridor. It was observed at KPs 86, 101, 116, 125, 205 / 206, 226, 228, 232 / 233, 260, 263, 270 and 316 but is likely to occur in other parts of the rail corridor. Parthenium Weed commonly displaces native and pasture grasses in areas of heavy clay soils which are intensively grazed and / or cropped. Parthenium Weed is also known to cause human health problems.

Prickly Acacia is a significant weed which can form dense thickets. One individual was recorded at KP 72.5 (Site 10) but it is known to occur in dense stands in the local vicinity.

Rubber Vine is a widespread pest in the area which often forms dense thickets particularly along drainage lines closer to the coast. Rubber Vine reduces fauna and flora habitat values as well as grazing productivity when dense. Rubber Vine was observed at KPs 22, 50, 54, 67, 72 / 73, 75 / 76 and 86 but is likely to occur in other parts of the proposed rail corridor.

Harissa Cactus is frequently present along the entire length of the rail corridor, usually in low numbers as scattered individuals or small clumps. This species was observed at KPs 54, 67, 78, 205 / 206, 232 / 233, 241 / 242, 260, 270, 306, 208 and 309.

Common Lantana was observed at KP 84 but is likely to occur in other parts of the proposed rail corridor.

Tree Pear was observed at KPs 165, 228, 260, 275, 306, 208 and 309 but is likely to occur in other parts of the proposed rail corridor.

Parkinsonia was observed at KP 415 but is likely to occur in other parts of the rail corridor.

Buffel Grass is widespread throughout much of the proposed rail corridor as the majority of the land has been previously cleared to accommodate agricultural uses, particularly cattle grazing. This species is an introduced and highly valued pasture grass in many areas; however, it has the potential to out-compete native groundcover species and increase biomass

5.4 Fauna Environment

5.4.1 Fauna Habitat

The corridor commences in an area of open Eucalypt woodland, subject to cattle grazing, on the northern side of the Bruce Highway. It then travels to the west through a gap in the Great Dividing Range and crosses a number of creeks in undulating rocky country with eucalypt woodlands and sparse, grassy understorey. Creeklines in the area are lined with gallery forest and dominated by melaleuca (**Plate 7**), with many hollow trees. Both the eucalypts and melaleucas provide seasonal nectar supplies for birds and some mammals. Most creeks are heavily infested with weeds, including dense stands of Rubber Vine, Mexican Poppy and Noogoora Burr, and are also subject to heavy grazing.



Plate 7 Watercourse fringed by Melaleuca woodlands at KP 101

From Sites 10 to 13, the corridor runs through undulating hills that support open eucalypt woodlands with degraded and severely grazed understorey dominated by Buffel Grass, although patches of native grass were observed. Creeklines in this area were smaller and fringed by open eucalypt woodlands, sometimes with semi-evergreen vine thicket plant species present in the understorey in some more sheltered areas.

From the Collinsville area (Site 13) to the south, the corridor moves into gently undulating plains supporting eucalypt woodlands and scattered patches of Brigalow with grassy understorey. Most areas were heavily grazed and overall habitat assessment for fauna was judged to be poor with watercourses providing better habitats with a greater diversity of microenvironments (leaf litter, understorey vegetation, hollows, bark refuges) (**Plate 8**). As the corridor proceeds south from this area (from Site 16), it moves into slightly steeper terrain and the overall quality of habitats improves (Sites 17 to 24).



Plate 8 Habitat diversity is generally higher along watercourses

South of the Bowen Developmental Road (Site 24 nearby) the corridor traverses an area of sandstone range with bare, exposed rock and skeletal soils (Site 25) (**Plate 9**). This area has been extensively burnt recently by a very severe fire; however, sufficient pockets of protected vegetation remained (**Plate 10**). This may be a significant habitat for reptiles and possibly Northern Quoll. In some areas, these rocky hills support Lancewood thickets (Sites 26, 34) (**Plate 3**) with spinifex understorey. Site 28 is in an extensive area or remnant vegetation that is significant in terms of its size and quality with woodlands supporting grassy and shrubby understorey. Fauna habitat values in this area were assessed as high.



Plate 9 Rocky habitats on sandstone range at KP 122



Plate 10 Sandstone range around KP 177 showing evidence of recent widespread hot fire

South of the Suttor Development Road (from Site 29), the corridor enters an extensive region of gently undulating plains, intersected by large, braided river systems (**Plate 11** and **Plate 12**). This includes the Suttor River, Mistake Creek and Belyando River. This area is subject to extensive seasonal inundation and is undoubtedly important habitat for water birds, including migratory species. It may also be significant habitat for the Black-throated Finch. The habitat throughout this region is comprised of open eucalypt woodlands with interspersed patches of Brigalow. Larger trees and dense vegetation predominate in the areas subject to seasonal flooding. Overall habitat quality in this area varied from good to exceedingly poor, depending on the intensity of grazing pressure and extent of Buffel Grass establishment. This pattern continues south to the proposed mine site.



Plate 11 Ephemeral watercourse typical of those transversed by the rail corridor



Plate 12 Watercourse junction close to proposed rail corridor at KP 385

5.4.2 Threatened, Near Threatened and Listed Migratory Fauna Species

Database searches identified 40 terrestrial Threatened and Near Threatened fauna species listed either under the EPBC or NC Act as potentially occurring in the area. These include:

- 9 Endangered, 16 Vulnerable under the EPBC Act; and
- 9 Endangered, 17 Vulnerable and 12 Near Threatened under the NC Act.

Additionally, the searches identified 20 other Migratory species under the EPBC Act.

A list of these species, together with their preferred habitat and an indication as to whether the species is known to occur or has the potential to occur within the proposed rail corridor is provided in **Table 6**.

Table 6. Threatened, Near Threatened and Listed Migratory Terrestrial Fauna Species Recorded as Occurring Within or Having Ranges that Overlap the Study Area

Common Name	Scientific Name	Status		Preferred Habitat	Likelihood of Occurrence Within Rail Corridor	Source
		NC Act	EPBC Act			
Amphibian						
Rough Frog	<i>Cyclorana verrucosa</i>	NT	-	Open grasslands and woodlands, usually near temporary pond, ditches, claypans and creeks.	Does Not Occur	3
Eungella Tinker Frog	<i>Taudactylus liemi</i>	NT	-	Montane forests in north-east Queensland. It is found amongst rocks and plants beside small mountain streams.	Does Not Occur	3
Eungella Day Frog	<i>Taudactylus eungellensis</i>	E	E	Along small creeks in rainforest as well as wet sclerophyll forest (Liem and Hosmer 1973). The immediate streamside habitat is dense rainforest with ferns, vines, palms and epiphytes in the understorey (Retallick <i>et al.</i> 1997).	Does Not Occur	1
Reptiles						
Common Death Adder	<i>Acanthophis antarcticus</i>	NT	-	Wet and dry eucalypt forests, woodlands and coastal heaths.	Likely	2,3
Loggerhead Turtle	<i>Caretta caretta</i>	E	E/Mi	Nest on open, sandy beaches (Spotila 2004). Tidal and sub-tidal habitat as feeding areas (Limpus 2008).	Does Not Occur	1
Green Turtle	<i>Chelonia mydas</i>	V	V/Mi	Pelagic often found in association with driftlines and rafts of Sargassum (Robins <i>et al.</i> 2002; Poiner and Harris 1996; Carr and Meylan 1980). Adults settle in shallow benthic foraging habitats such as tropical tidal and sub-tidal coral and rocky reef habitat or inshore seagrass beds.	Does Not Occur	1
Estuarine Crocodile	<i>Crocodylus porosus</i>	V	-	Tidal rivers, coastal floodplains and channels, billabongs and swamps.	Does Not Occur	1,3
Capricorn Ctenotus	<i>Ctenotus capricorni</i>	NT	-	Open scrub, woodland.	Highly unlikely	2
Striped-tailed Delma	<i>Delma labialis</i>	V	V	Low open forest with a grassy understorey (Shea 1987).	Likely	1,2,3
Ornamental Snake	<i>Denisonia maculata</i>	V	V	Brigalow (<i>Acacia harpophylla</i>) woodland growing on clay and sandy soils, riverside woodland, and open forest growing on natural levees (Shine 1983; Cogger <i>et al.</i> 1993).	Likely	1,2,3
Leatherback Turtle	<i>Dermochelys coriacea</i>	E	E/Mi	Highly pelagic species, venturing close to shore mainly during the nesting season (Sarti Martinez 2000).	Does Not Occur	1

Common Name	Scientific Name	Status		Preferred Habitat	Likelihood of Occurrence Within Rail Corridor	Source
		NC Act	EPBC Act			
Yakka Skink	<i>Egernia rugosa</i>	V	V	Poplar box, ironbark, brigalow, white cypress pine, mulga, bendee and lancewood woodlands, open forests. Substrates include rock, sand, clay and loamy red earth.	Likely	1,2,3
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	V	V/Mi	Pelagic often found in association with driftlines and rafts of <i>Sargassum</i> (Carr 1987; Limpus <i>et al.</i> 1994). Adults settle and forage in tropical tidal and sub-tidal coral and rocky reef habitat.	Does Not Occur	1
Lemon-barred Forest-skink	<i>Eulamprus amplus</i>	NT	-	Found in the rainforest habitats around Eungella.	Does Not Occur	3
Dunmall's Snake	<i>Furina dunmalli</i>	V	V	Brigalow forest and woodland with fallen timber and ground litter, growing on cracking clay soils and clay loam soils.	Does Not Occur	1
Olive Ridley Turtle	<i>Lepidochelys olivacea</i>	E	E/Mi	Marine species; nests on sandy beaches and islands / cays	Does Not Occur	1
Flatback Turtle	<i>Natator depressus</i>	V	V/Mi	Open seas but prefer inshore waters and bays where their feeding ground is the shallow, soft-bottomed seabed.	Does Not Occur	1
Brigalow Scaly-foot	<i>Paradelma orientalis</i>	V	V	Variety of open forest habitats on several soil types (Schultz and Eyre 1997; Tremul 2000).	Likely	1,2
Golden-tailed Gecko	<i>Strophurus taenicauda</i>	NT	-	Open woodland and open forest where it shelters under loose bark and hollow limbs.	Does Not Occur	2
Fitzroy River Turtle	<i>Rheodytes leukops</i>	V	V	Rivers with large deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles. High water clarity, often associated with Ribbonweed (<i>Vallisneria</i> sp.) beds (Cogger <i>et al.</i> 1993).	Does Not Occur	1
Birds						
Fork-tailed Swift	<i>Apus pacificus</i>	-	Mi	Almost exclusively aerial. Mostly occur over inland plains but sometimes above foothills or in coastal areas.	Likely	1
Great Egret	<i>Ardea alba</i>	-	Mi	Widespread species – common.	Likely	1
Cattle Egret	<i>Ardea ibis</i>	-	Mi	Widespread species – common.	Likely	1
Lesser Sand Plover	<i>Charadrius mongolus</i>	-	Mi	Coastal littoral and estuarine environments. Large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops.	Highly unlikely	1

Common Name	Scientific Name	Status		Preferred Habitat	Likelihood of Occurrence Within Rail Corridor	Source
		NC Act	EPBC Act			
Streaked Cisticola	<i>Cisticola juncidis</i>	NT	-	Coastal swamps and grassy plains. Margins of mangrove swamps.	Likely	4
Red Goshawk	<i>Erythrotriorchis radiatus</i>	E	V	Coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia (Marchant & Higgins 1993), including eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins.	Likely	1,2
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	NT	-	Permanent freshwater wetlands including margins of billabongs, swamps, shallow floodwaters, and adjacent grasslands and savannah woodlands.	Likely	2
Beach Stone-curlew	<i>Esacus magnirostris (neglectus)</i>	V	-	Estuarine, lagoon, mangrove, marine shore-tidal sandflat, mudflat, open beach, rock reef, tidal sandbar (Christidis <i>et al.</i> 2008).	Likely	2
Latham's Snipe	<i>Gallinago hardwickii</i>	-	Mi	Marshes and swamps in tall grass.	Likely	1
Squatter Pigeon (southern)	<i>Geophaps scripta scripta</i>	V	V	Patchy distribution in dry eucalypt forest, often near water. Locally extinct in former southerly parts of its range.	Likely	1,2
Sarus Crane	<i>Grus antigone</i>	-	Mi	Inhabit open wet and dry grasslands, agricultural fields, marshes and pools. Prefers dry savannah woodlands with ephemeral pools during the breeding season.	Likely	1
Sooty Oystercatcher	<i>Haematopus fuliginosus</i>	NT	-	Rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries.	Unlikely	2
White-bellied Sea-eagle	<i>Haliaeetus leucogaster</i>	-	Mi	In association with large, permanent water bodies. Not known from project area.	Unlikely	1
White-throated Needletail	<i>Hirundapus caudacutus</i>	-	Mi	Migrant, occasionally found in airspace over project area only.	Likely	1
Barn Swallow	<i>Hirundo rustica</i>	-	Mi	Summer seasonal migrant to parts of northern Australia. Breeds in Europe, Asia and North America.	Unlikely	1
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	-	Mi	Estuarine mudflats, saltmarshes and reefs as feeding and roosting habitat.	Unlikely	1
Black-tailed Godwit	<i>Limosa limosa</i>	-	Mi	Along the coast on sand spits, lagoons and mudflats.	Unlikely	1
Square-tailed Kite	<i>Lophoictinia isura</i>	NT	-	Variety of timbered habitats including dry woodlands and	Likely	2

Common Name	Scientific Name	Status		Preferred Habitat	Likelihood of Occurrence Within Rail Corridor	Source
		NC Act	EPBC Act			
				open forests. Shows a particular preference for timbered watercourses.		
Southern Giant-Petrel	<i>Macronectes giganteus</i>	E	E	Marine bird that occurs in Antarctic to subtropical waters.	Does Not Occur	1,4
Black-chinned Honeyeater	<i>Melithreptus gularis</i>	NT	-	Upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially <i>Eucalyptus sideroxylon</i> (Mugga Ironbark), <i>Eucalyptus albens</i> (White Box), <i>Eucalyptus microcarpa</i> (Grey Box), <i>Eucalyptus melliodora</i> (Yellow Box) and <i>Eucalyptus tereticornis</i> (Forest Red Gum).	Likely	2
Rainbow Bee-eater	<i>Merops ornatus</i>	-	Mi	Variety of habitats. May breed in sand banks of creeks and rivers. Seasonal visitor.	Likely	1
Spectacled Monarch	<i>Monarcha trivirgatus</i>	-	Mi	Thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	Likely	1
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	-	Mi	Tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests.	Likely	1
Star Finch (eastern)	<i>Neochmia ruficauda ruficauda</i>	E	E	Open grasslands and eucalypt woodlands. Along creeks and streams in reeds and tall grasses. Locally extinct in the former southern areas of its range.	Unlikely	1
Australian Cotton Pygmy-goose	<i>Nettapus coromandelianus albipennis</i>	-	Mi	Freshwater lakes, swamps and large water impoundments.	Does Not Occur	1,2
Little Curlew	<i>Numenius minutus</i>	-	Mi	Coastal and inland grasslands and black soil plains in northern Australia, near swamps and flooded areas.	Likely	1
Eastern Curlew	<i>Numenius madagascariensis</i>	NT	-	Intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons.	Likely	2
Black-throated Finch (southern)	<i>Poephila cincta cincta</i>	E	E	<i>Eucalypt</i> woodland and riverside vegetation, including paperbark and wattle shrubland.	Likely	1
Kermadec Petrel (western)	<i>Pterodroma neglecta neglecta</i>	-	V	Marine, pelagic of the subtropical and tropical water of the south Pacific Ocean.	Does Not Occur	1
Australian Painted Snipe	<i>Rostratula australis</i>	V	V/Mi	Shallow inland wetlands, either freshwater or brackish, and seasonally or ephemerally inundated pastures and grasslands.	Likely	1

Common Name	Scientific Name	Status		Preferred Habitat	Likelihood of Occurrence Within Rail Corridor	Source
		NC Act	EPBC Act			
Common Greenshank	<i>Tringa nebularia</i>	-	Mi	On the coast and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.	Likely	1
Marsh Sandpiper	<i>Tringa stagnatilis</i>	-	Mi	Fresh or brackish (slightly salty) wetlands such as rivers, water meadows, sewage farms, drains, lagoons and swamps.	Likely	1
Little Tern	<i>Sterna albfrons</i>	-	Mi	Exclusively coastal with sheltered environments preferred.	Does Not Occur	1,2
Mammals						
Northern Quoll	<i>Dasyurus hallucatus</i>	-	E	Open grassy woodland on rocky hills, breakaway country escarpments.	Likely	1,2,3
Dugong	<i>Dugong dugon</i>	V	Mi	Coastal waters, estuarine creeks and streams.	Does Not Occur	2
Northern Hairy-nosed Wombat	<i>Lasiorhinus krefftii</i>	E	E	Semi-arid cattle grazing country (Horsup 1999). Deep sandy soils are required for burrow construction.	Does Not Occur	1,2,3
Eastern Long-eared Bat	<i>Myotis timoriensis</i>	V	V	Mallee, <i>Allocasuarina leucomanni</i> (Bullock) and box eucalypt dominated communities. Roosts in tree hollows, crevices, and under loose bark.	Unlikely	1
Spectacled Flying-fox	<i>Pteropus conspicillatus</i>	-	V	Rainforest and sometimes mangroves containing Black Flying-foxes (Hall and Richards 2000; Richards 1990).	Does Not Occur	1
Coastal Shearwater	<i>Puffinus pacificus</i>	V	-	Sand dune scrub, mangroves, melaleuca swamps, coastal heathlands, open eucalypt forest, and grasslands.	Likely	2
False Water Rat	<i>Xeromys myoides</i>	V	V	Mangrove forests, freshwater swamps and floodplain saline grasslands (Woinarski <i>et al.</i> 2000).	Does Not Occur	1

Status: Commonwealth (EPBC) listed: **E** = Endangered; **V** = Vulnerable; **Mi** = Migratory Species

State (NC Act) listed: **E** = Endangered; **V** = Vulnerable; **NT** = Near Threatened

Source: 1 = EPBC Protected Matters Search; 2 = QEPWA WildNet record; 3 = Queensland Museum (QM) record.

No Threatened, Near Threatened or listed Migratory fauna species were recorded during the field survey. However, 29 species are likely to occur within the study area based on the presence of their suitable habitat.

5.4.3 Regionally Significant Fauna Species

Brigalow Belt North bioregion

There are 30 fauna species that are not listed as Threatened or Near Threatened species under the EPBC Act and / or NC Act, but that have been listed as non-threatened priority taxa for the Brigalow Belt North bioregion (EPA 2008; **Appendix 7**). Of these 30 species 15 may occur within the rail corridor (**Table 7**).

Table 7. Regionally Significant Fauna species of the Brigalow Belt North bioregion likely to occur within the proposed rail corridor

Common name	Species name
Birds	
Cotton Pygmy-goose	<i>Nettapus coromandelianus</i>
Wompoo Fruit-dove	<i>Ptilinopus magnificus</i>
Superb Fruit-dove	<i>Ptilinopus superbus</i>
Gould's Bronze-cuckoo	<i>Chrysococcyx russatus</i>
White-rumped Swiftlet	<i>Aerodramus spodiopygius</i>
Noisy Pitta	<i>Pitta versicolor</i>
Yellow-throated Scrubwren	<i>Sericornis citreogularis</i>
Fairy Gerygone	<i>Gerygone palpebrosa</i>
Yellow Honeyeater	<i>Lichenostomus flavus</i>
Brown-backed Honeyeater	<i>Ramsayornis modestus</i>
White-eared Monarch	<i>Monarcha leucotis</i>
Barred Cuckoo-shrike	<i>Coracina lineate</i>
Black-throated Finch	<i>Poephila cincta</i>
Olive-backed Sunbird	<i>Nectarinia jugularis</i>
Russet-tailed Thrush	<i>Zoothra heinei</i>

Desert Uplands bioregion

There are 46 fauna species that are not listed as Threatened or Near Threatened species under the EPBC Act and / or NC Act, but have been listed as non-threatened priority taxa for the Desert Uplands bioregion (EPA 2005; **Appendix 8**). Of these 46 species, 33 may occur within the rail corridor.

Table 8. Regionally Significant Fauna species of the Desert Uplands bioregion likely to occur within the proposed rail corridor

Common name	Species name
Frogs	
Great Brown Broodfrog	<i>Pseudophryne major</i>
Reptiles	
Skink	<i>Ctenotus rosarium</i>
Wood Gecko	<i>Diplodactylus vittatus</i>
Winnecke's Dragon	<i>Diporiphora winneckeii</i>
Gidgee Skink	<i>Egernia stokesii</i>
Desert Uplands' Skink	<i>Lerista</i> sp.
Blackheaded / Dwyer's Snake	<i>Suta spectabilis dwyeri</i>
Centralian Blue-tongued Lizard	<i>Tiliqua multifasciata</i>
Birds	
Brown Thornbill	<i>Acanthiza pusilla</i>
Australian Bustard	<i>Ardeotis australis</i>
Bush Stonecurlew	<i>Burhinus grallarius</i>
Brown Treecreeper	<i>Climacteris picumnus</i>
Black Falcon	<i>Falco subniger</i>
White-eared Honeyeater	<i>Lichenostomus leucotis</i>
Hooded Robin	<i>Melanodryas cucullata</i>
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>
Masked Owl	<i>Tyto novaehollandiae</i>
Mammals	
Rufous Bettong	<i>Aepyprymnus rufescens</i>
Spectacled Hare-wallaby	<i>Lagorchestes conspicillatus</i>
Lakeland Downs Mouse	<i>Leggadina lakedownensis</i>
Gould's Long-eared Bat	<i>Nyctophilus gouldi</i>
Greater Glider	<i>Petauroides volans</i>
Squirrel Glider	<i>Petaurus norfolcensis</i>
Koala	<i>Phascolarctos cinereus</i>
Common Planigale	<i>Planigale maculata</i>
Desert Mouse	<i>Pseudomys desertor</i>
Queensland Pebble-mound Mouse	<i>Pseudomys patrius</i>
Common Dunnart	<i>Sminthopsis murina</i>
Common Brushtail Possum	<i>Trichosurus vulpecula</i>
Inland Forest Bat	<i>Vespadelus baverstocki</i>
Inland Cave Bat	<i>Vespadelus finlaysoni</i>
Swamp Wallaby	<i>Wallabia bicolor</i>
Common Rockrat	<i>Zyzomys argurus</i>

5.4.4 Introduced Fauna Species

Two common introduced species were recorded from the study area (Feral Cat and Pig) and both species are declared Class 2 animals under the LP Act.

5.5 Essential Habitat Areas

There are no DERM mapped Essential Habitat Areas within 2 km of the proposed rail corridor.

5.6 Wetlands

There are no Nationally Important Wetlands or Wetlands of International Importance (Ramsar sites) within and / or in the vicinity of the study area.

The DERM Queensland Wetland Mapping identifies several freshwater palustrine and lacustrine wetlands within the study area. These wetlands are identified as mostly ephemeral watercourses as well as some large, braided river systems including the Suttor River, Mistake Creek and Belyando River.

A detailed assessment of the aquatic values associated with these watercourses is provided in a separate technical report to the EIS.

6 Potential Impacts during Construction

The construction and operation of the rail infrastructure has the potential to impact the terrestrial ecology of the area. The following section discusses these potential impacts and identifies the likelihood of occurrence (L) and the potential consequence of these impacts (C) using the risk matrix presented in **Section 5.3**.

6.1 Significance of Construction of the Rail Infrastructure in a State, Bioregional and Local Context

The potential impacts to terrestrial flora and fauna values associated with the construction of the rail infrastructure are detailed in the following sub-sections. As detailed below, there is potential to have Medium (7) impacts on:

- 2 TECs;
- 3 EREs;
- 12 OCREs; and
- 45 Least Concern REs.

Within the Desert Upland bioregional context, the rail clearance footprint is estimated to require the unavoidable removal of approximately 437 ha of Least Concern remnant vegetation, which represents approximately 0.02% of the remnant vegetation in the Bioregion (and less than 0.06% for each RE type proposed to be cleared). Locally this clearing represents less than 0.6% of that which occurs within 10 km (and less than 3% for each RE type proposed to be cleared). This clearing is unavoidable (L = 5) and will have a minor (C = 2) consequence within State, Bioregional and local contexts. As such, these impacts have been determined to be Medium (7).

Within the Brigalow Belt North bioregional context, the rail clearance footprint is estimated to require the unavoidable removal of approximately 2,251 ha of Least Concern remnant vegetation, which represents approximately 0.04% of the remnant vegetation in the Bioregion (and less than 0.4% of all except one of the RE types proposed to be cleared). This clearing is unavoidable (L = 5) and will have a minor (C = 2) consequence within State, Bioregional and local contexts. As such, these impacts have been determined to be Medium (7).

The clearing includes removal of approximately 2.35% of RE 11.11.15d which is classified as Least Concern under the VM Act and Not Concern at Present under its DERM Biodiversity Status (**Section 6.3**). This clearing is unavoidable (L = 5) and will have a minor (C = 2) consequence within State, Bioregional and local contexts. As such, this impact has been determined to be Medium (7).

There is also potential to have a High (8) impact on one Threatened flora species (Black Ironbox), although with appropriate mitigation measures this should be a Medium (6) impact, and Medium (6 - 7) impacts on any of 34 other Threatened and Near Threatened flora species (**Section 5.3.3**).

The proposed rail corridor has been selected to avoid impact upon any Category A ESA. The only ESAs within the proposed rail corridor are Category B ESAs consisting of seven REs listed as Endangered under DERM Biodiversity Status, upon which construction has the potential to cause Medium (7) impacts.

The construction has the potential to cause High (8) social and economic impacts through spreading declared weeds (including Parthenium Weed which exists along significant section of the proposed rail corridor).

The construction of the rail infrastructure also has the potential for:

- Medium (7) impacts upon Least Concern fauna as a group;
- Medium (7) impacts upon a number of Regionally Significant fauna species; and
- Medium (6) impacts upon a number of Threatened and Near Threatened fauna species.

There is also potential for the construction to result in High (8) impacts upon terrestrial flora and fauna values through alteration to hydrological characteristics of several freshwater palustrine and lacustrine wetlands (mostly ephemeral watercourses as well as some large, braided river systems including the Suttor River, Mistake Creek and Belyando River) although this may be reduced to a Medium (6) impact where rail infrastructure design minimises the risk of significant hydrological change.

6.2 Potential Impacts of Construction on Flora in General

While a significant length (176 km) of the proposed rail corridor transects cleared grazing land, the majority (269 km) is within mapped remnant vegetation.

In all, approximately 2,688 ha of remnant vegetation is proposed to be cleared. This represents less than 1% (approximately 0.53%) of the entire vegetation extent within a 10 km buffer and less than 1% (approximately 0.3%) of that which occurs at the bioregional level (**Table 9**).

Potential direct and indirect impacts to flora associated with the proposed clearing include:

- Direct spatial reduction in remnant vegetation due to clearing (detailed below);
- Increased edge effects (through transecting large vegetation areas as well as reducing edge to area ratios) including the potential to increase the abundance of Buffel Grass and other weeds, feral animals and fire;
- Potential for dust to reduce the health of vegetation in the vicinity of the clearance footprint;
- Potential for temporary facilities, materials and equipment to damage areas outside the construction footprint;
- Potential to alter the hydrological characteristics for areas upstream and downstream of the rail corridor; and
- Potential for accidental and inappropriate release of pollutants.

6.3 Potential Impacts of Construction on Ecological Communities/REs

In relation to direct clearing impacts, **Table 9** shows the estimated clearance and the local and bioregional extent of each RE transected.

Table 9. Approximate Clearing Areas within the Project Footprint

Regional Ecosystem	EPBC Act Status	VM Act Status	DERM Biodiversity Status	Area (ha)	Area within 10 km buffer	Clearing 10 km buffer %	Extent within Bioregion	Clearing within Bioregion %
Bioregion: Desert Uplands								
10.10.4a	-	LC	NOC	1.44	50	2.88	39,283	<0.01
10.3.12a	-	LC	NOC	2.66	2,158	0.12	32,854	<0.01

Regional Ecosystem	EPBC Act Status	VM Act Status	DERM Biodiversity Status	Area (ha)	Area within 10 km buffer	Clearing 10 km buffer %	Extent within Bioregion	Clearing within Bioregion %
10.3.13a	-	LC	OC	1.26	539	0.23	31,235	<0.01
10.3.14a	-	LC	OC	12.13	1,606	0.76	72,445	0.02
10.3.27a	-	LC	OC	36.61	8,682	0.42	71,031	0.05
10.3.28a	-	LC	NOC	26.58	6,808	0.39	273,761	0.01
10.3.3	-	LC	NOC	2.09	1,225	0.17	31,641	<0.01
10.3.4b	-	LC	OC	3.34	2,434	0.14	16,811	0.02
10.5.1	-	LC	NOC	80.31	15,618	0.51	403,039	0.02
10.5.2a	-	LC	NOC	12.73	786	1.62	123,842	0.01
10.5.5a	-	LC	NOC	205.38	31,704	0.65	937,745	0.02
10.7.3	-	LC	NOC	33.75	4,815	0.70	77,409	0.04
10.7.5	-	LC	OC	6.34	1,509	0.42	26,492	0.02
10.7.7	-	LC	NOC	5.22	625	0.83	31,894	0.02
11.5.5	-	LC	NOC	7.26	419	1.73	2,310	0.31
Total in Desert Uplands				437	78,978	0.55	2,171,791	0.02
Bioregion: Brigalow Belt North								
11.10.12	-	LC	NOC	162.57	4,846	3.35	47,710	0.34
11.10.3	-	LC	NOC	22.79	999	2.28	333,419	<0.01
11.10.7	-	LC	NOC	18.18	6,187	0.29	164,772	0.01
11.11.1	-	LC	NOC	21.50	5,427	0.40	161,384	0.01
11.11.10	-	OC	OC	1.26	974	0.13	85,082	<0.01
11.11.13	-	OC	OC	7.84	1,730	0.45	49,830	0.02
11.11.15d	-	LC	NOC	11.04	308	3.59	470	2.35
11.11.19	-	LC	OC	25.56	2,358	1.08	14,849	0.17
11.11.8	-	LC	NOC	1.51	63	2.41	14,989	0.01
11.11.9	-	LC	NOC	34.84	4,748	0.73	53,394	0.07
11.12.1	-	LC	NOC	556.13	96,934	0.57	807,586	0.07
11.12.10	-	OC	OC	2.08	184	1.13	9,185	0.02
11.12.2	-	LC	NOC	81.61	13,795	0.59	186,194	0.04
11.12.7	-	LC	NOC	24.20	11,311	0.21	86,571	0.03
11.12.9	-	LC	NOC	12.17	6,944	0.18	94,484	0.01
11.3.1	E	E	E	16.69	5,511	0.30	80,700	0.02
11.3.10	-	LC	NOC	63.12	8,288	0.76	168,786	0.04
11.3.2	-	OC	OC	25.73	7,282	0.35	518,290	<0.01
11.3.25	-	LC	OC	58.02	11,317	0.51	493,504	0.01
11.3.3	-	OC	OC	51.15	11,813	0.43	261,967	0.02
11.3.30	-	LC	NOC	39.06	9,612	0.41	66,059	0.06
11.3.32	-	LC	NOC	57.75	10,091	0.57	17,929	0.32
11.3.33	-	OC	E	2.71	471	0.58	1,862	0.15
11.3.35	-	LC	NOC	11.24	5,172	0.22	94,856	0.01
11.3.37	-	LC	NOC	8.78	1,442	0.61	30,452	0.03
11.3.4	-	OC	OC	39.18	8,918	0.44	184,545	0.02
11.3.5	-	LC	OC	21.90	7,339	0.30	55,352	0.04

Regional Ecosystem	EPBC Act Status	VM Act Status	DERM Biodiversity Status	Area (ha)	Area within 10 km buffer	Clearing 10 km buffer %	Extent within Bioregion	Clearing within Bioregion %
11.3.7	-	LC	OC	3.92	3,024	0.13	61,889	<0.01
11.3.9	-	LC	NOC	7.63	2,994	0.25	63,628	0.01
11.4.11	E	OC	OC	7.43	804	0.92	23,777	0.03
11.4.4	E	LC	OC	24.18	5,223	0.46	24,558	0.10
11.4.5	-	OC	E	6.20	723	0.86	13,246	0.05
11.4.6	-	OC	E	4.21	3,593	0.12	34,692	0.01
11.4.8	E	E	E	54.72	9,649	0.57	71,532	0.08
11.4.9	E	E	E	4.36	10,736	0.04	84,920	<0.01
11.5.10	-	OC	OC	4.57	1,787	0.26	9,896	0.05
11.5.12	-	LC	NOC	24.78	5,728	0.43	48,920	0.05
11.5.2	-	LC	NOC	27.22	5,289	0.51	174,287	0.02
11.5.3	-	LC	NOC	363.86	71,386	0.51	388,192	0.09
11.5.9	-	LC	NOC	189.90	21,071	0.90	200,109	0.09
11.7.2	-	LC	NOC	103.49	29,792	0.35	368,211	0.03
11.7.3	-	LC	NOC	12.32	3,546	0.35	91,553	0.01
11.9.10	-	OC	E	6.27	4,953	0.13	81,101	<0.01
11.9.3	E	LC	NOC	16.33	4,276	0.38	103,874	0.02
11.9.9	-	LC	NOC	10.89	3,717	0.29	102,862	0.01
Total in Brigalow Belt North				2,251	432,355	0.52	6,032,947	0.04
TOTAL				2,688	511,333	0.53	8,204,738	0.03

Table 10 shows the estimated clearing extent and local and bioregional extents based on conservation status.

Table 10. Estimated Clearing Extents by Conservation Status

Status	Area (ha)	Area within 10 km buffer	% Clearing 10 km buffer	Extent within Bioregion	% Clearing within Bioregion
Bioregion: Desert Uplands					
Least Concern	437	78,978	0.55	2,171,791	0.02
Bioregion: Brigalow Belt North					
EPBC listed*	129	36,200	0.36	389,360	0.033
Endangered	76	25,896	0.29	237,152	0.032
Of Concern	159	43,233	0.37	1,273,473	0.013
Least Concern	2,016	363,226	0.56	4,522,322	0.045
TOTAL	2,688	511,332	0.53	8,204,738	0.03

* EPBC listed Communities are overlapping (and not additional to) VM Act REs.

The proposed rail corridor also transects approximately 50 ha of High Value Regrowth (HVR) as mapped by DERM (2009, 2010). The approximate area of each RE with HVR present on the proposed rail corridor is shown in **Table 11**. **Table 11** also shows those areas of HVR which are mapped as Category X (Cat X), meaning the VM Act may not prevent clearing of those areas of HVR (although other legislation including the EPBC Act may apply).

Table 11. High Value Regrowth Areas Transected by the Proposed Rail Corridor

RE	VM Status	BVG1M	TEC	HVR	HVR Cat X*	Notes
				Area Ha	Area (ha)	
11.10.12	LC	17a		0.17	0.00	
11.11.1	LC	13c		0.18	0.07	
11.11.13	OC	25a		0.30	0.01	
11.11.8	LC	13c		0.01	0.01	
11.11.9	LC	17a		0.21	0.14	
11.12.1	LC	13c		3.25	0.30	
11.12.9	LC	9b		0.07	0.07	
11.3.1	E	25a	TEC	0.26	0.00	Brigalow dominant community
11.3.10	LC	17a		0.05	0.05	
11.3.2	OC	17a		1.07	0.67	
11.3.25	LC	16a		3.46	3.15	
11.3.30	LC	18b		0.19	0.19	
11.3.3	OC	16c		2.17	2.17	
11.3.32	LC	18a		0.50	0.50	
11.3.33	OC	26a		0.04	0.04	
11.3.35	LC	9e		0.19	0.19	
11.3.37	LC	16a		0.31	0.31	
11.3.4	OC	16c		1.56	0.02	
11.3.5	LC	26a		2.19	0.11	
11.4.5	OC	26a		1.23	0.00	
11.4.6	OC	26a		6.01	5.85	
11.4.8	E	25a	TEC	2.26	0.61	Brigalow sub-dominant community
11.4.9	E	25a	TEC	2.87	1.02	Brigalow dominant community
11.5.12	LC	9e		3.02	3.02	
11.5.3	LC	17a		8.95	0.11	
11.5.9b	LC	18b		0.51	0.00	
11.5.9c	LC	18b		1.57	0.00	
11.7.2	LC	24a		3.64	3.13	
11.9.10	OC	25a		2.35	0.00	
Total (ha)				48.58	21.71	

* Cat X area is a subset of the total HVR not additional

In total approximately 5.4 ha of the TEC Brigalow (*Acacia harpophylla* dominant and co-dominant) High Value Regrowth is mapped as occurring along the proposed rail corridor. These are made up of numerous small patches.

6.3.1 Potential Impacts of Construction on EPBC Act Threatened Ecological Communities

Two EPBC listed TECs are transected by the proposed rail corridor, namely

- Brigalow (*Acacia harpophylla* dominant and co-dominant); and

- Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin.

Table 12 shows the estimated clearing extent (on the basis that all Brigalow HVR is TEC) and local and bioregional extents for these TECs.

Table 12. Estimated Clearing Extents for TECs

TECs	Area (ha)	Area within 10 km buffer	% Clearing 10 km buffer	Extent within Bioregion	% Clearing within Bioregion
Brigalow Communities	81	25,896	0.31	237,152	0.03
Natural Grassland Communities	48	10,304	0.47	152,208	0.03
TOTAL	129	36,200	0.36	389,360	0.03

This clearing is unavoidable (L = 5) and will have a minor (C = 2) consequence for these TECs even within their local and bioregional contexts. As such, it represents a Medium (7) impact. Mitigation measures to minimise these impacts are provided in **Section 8**.

6.3.2 Potential Impacts of Construction on Endangered REs

Three EREs, equating to approximately 76 ha of remnant vegetation (and 5.4 ha of HVR), are required to be cleared or will be impacted by the proposed clearance footprint (i.e. REs 11.3.1, 11.4.8 and 11.4.9). These are all Brigalow REs (and are the same as the Brigalow TEC REs). This represents 0.31% of the RE extent within a 10 km buffer and 0.03% of the RE extent within the bioregion. For each individual ERE the impact is less than 0.6% of the RE extent within a 10 km buffer and less than 0.07% of the RE extent within the bioregion. This clearing is unavoidable (L = 5) and will have a minor (C = 2) consequence for these EREs within the local and bioregional contexts. As such, it represents a Medium (7) impact. Nonetheless, mitigation measures to minimise impacts on EREs are provided in **Section 8**.

6.3.3 Potential Impacts of Construction on Of Concern REs

Twelve Of Concern REs, equating to approximately 159 ha, are required to be cleared or will be impacted by the rail corridor clearance footprint. This represents 0.37% of OCREs within a 10 km buffer and 0.01% of that which occurs within the bioregion. For each individual OCRE the impact is less than 1% of the RE extent within a 10 km buffer and less than 0.06% of the RE extent within the bioregion.

This clearing is unavoidable (L = 5) and will have a minor (C = 2) consequence for these REs within a local and bioregional context. As such, it represents a Medium (7) impact on these REs. Nonetheless, mitigation measures to minimise impacts on OCREs are provided in **Section 8**.

6.3.4 Potential Impacts of Construction on Least Concern REs

A total of 48 Least Concern REs, equating to approximately 2,453 ha, are required to be cleared or will be impacted by the rail corridor clearance footprint. This represents 0.55% of their extent within a 10 km buffer and 0.04% of their extent within both bioregions.

Note that for each of these LCRE the impact is less than 3.4% of the RE extent within a 10 km buffer and less than 0.4% of the RE extent within the bioregion. One exception is RE 11.11.15d for which the impact is approximately 2.35% of the RE extent within the bioregion (11 ha out of 407 ha).

The clearing of LCREs is unavoidable (L = 5) and will have a minor (C = 2) consequence for these REs within a local and bioregional context. As such, it represents a Medium (7) impact on these REs. Mitigation measures to minimise these impacts are provided in **Section 8**.

6.4 Potential Impacts on Threatened and Near Threatened Flora Species

As detailed in **Table 13**, the proposed rail corridor contains potential habitat for 31 EVR flora species.

Detailed survey is required to confirm the presence or absence and potential presence of each of these flora species along the proposed rail corridor prior to alignment finalisation. It is anticipated that Threatened and Near Threatened flora species recorded during detailed corridor survey will generally be able to be avoided by alignment refinement. There may, however, be some individuals and populations which are unavoidable. Generally this would relate to species with restricted habitat niches from which the rail corridor may not be able to deviate. For example, the Vulnerable Black Ironbox occurs as a dominant and co-dominant canopy species along a number of watercourses between KP 0 – 100. These watercourses will need to be crossed by the rail corridor and it is likely that some individual trees and seedlings will need to be displaced to facilitate construction.

In circumstances where Threatened and Near Threatened species are unavoidable, Significant Species Management Plans should be developed and approval sought from both DSEWPC (for EPBC Act listed species) and DERM (for NC Act EVRs) prior to alignment finalisation.

Potential direct and indirect impacts associated with construction of the rail corridor on Threatened and Near Threatened flora species include:

- Direct loss of individuals through clearing activities;
- Reduction in the long term viability of the local populations by removing individual plants, population reduction and increased spatial isolation of plant populations;
- Direct loss of potential habitat; and
- Potential affects on health and viability of plants outside the clearance footprint through
 - Increased edge effects and associated potential to increasing the abundance of weed species and fire intensity;
 - Potential for dust to reduce the health of plants and associated vegetation retained outside the construction footprint; and
 - Potential for temporary facilities, materials and equipment to damage plants and associated vegetation outside the construction footprint.

Table 13 identifies the potential impacts on each potential threatened and near threatened flora species before and after mitigation measures.

Table 13. Potential Impacts and Significance of Impacts on Threatened and Near Threatened Flora Species Likely to Occur Within the Proposed Rail Corridor

Species	Status		Preferred habitat	Occurrence of preferred habitat within project footprint	Potential to be Impacted prior to mitigation measures	Significance of potential impacts	Mitigation measures	Significance of impacts after mitigation
	NC Act	EPBC Act						
<i>Acacia jackesiana</i>	NT	-	Rocky hillsides in open eucalypt and acacia woodland. Extends from north of Mackay to north of Townsville, mostly inland.	Yes throughout	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (8)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Acacia ramiflora</i>	-	V	Woodland on sandstone hills	Yes throughout	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (8)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Acacia spania</i>	NT	-	Shallow sandstone-derived soils in open eucalypt or acacia shrub-lands and wood-lands.	Yes throughout	Potential to remove important populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Bertya pedicellata</i>	NT	-	Commonly found in open and closed forest on rocky hills with shallow skeletal or sandy soils. It is recorded at altitudes of 320 to 840 m. Associated with <i>Corymbia trachyphloia</i> , <i>Dodonaea filifolia</i> , <i>Acacia catenulata</i> , <i>A. curvinervia</i> and <i>A. shirleyi</i>	Yes (KP 0 - 100)	Potential to remove individuals or populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)

Species	Status		Preferred habitat	Occurrence of preferred habitat within project footprint	Potential to be Impacted prior to mitigation measures	Significance of potential impacts	Mitigation measures	Significance of impacts after mitigation
	NC Act	EPBC Act						
<i>Bertya sharpeana</i>	NT	-	Mall shrub on rocky terrain north and south of Mackay.	Yes throughout	Potential to remove individuals or populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Bonamia dietrichiana</i>	NT	-	Dry rainforest and SEVT; less commonly in eucalypt woodland; mostly coastal from Townsville south to just north of Rockhampton.	Yes (KP 0 - 140)	Potential to remove individuals or populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Cerbera dumicola</i>	NT	-	Open woodland and SEVT often associated with 'jump-ups' and ridges.	Yes throughout	Potential to remove important populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 8 of this report.	L = 2 C = 2 Low (2)
<i>Corchorus hygrophilus</i>	V	-	Small shrub in SEVT and dry rainforest from Rockhampton to Townsville.	Yes (KP 0 - 140)	Potential to remove important populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Croton magneticus</i>	V	V	Vine thickets on skeletal granite, limestone or sandstone soils, including rocky seashores.	Yes (KP 0 - 140)	Potential to remove individuals or populations Unlikely to result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 2 C = 4 Medium (6)	See Section 7 of this report.	L = 2 C = 2 Low (4)

Species	Status		Preferred habitat	Occurrence of preferred habitat within project footprint	Potential to be Impacted prior to mitigation measures	Significance of potential impacts	Mitigation measures	Significance of impacts after mitigation
	NC Act	EPBC Act						
<i>Desmodium macrocarpum</i>	NT	-	Open woodland and open forest communities on red earths, rarely on sandy clay soils, to 884 m. Also occurs in SEVT.	Yes throughout	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 7 of this report.	L = 2 C = 2 Low (4)
King Blue-grass (<i>Dichanthium queenslandicum</i>)	V	-	Restricted to Emerald and rarely in the Darling Downs in Queensland. Found on black clay soils in native grassland communities.	Yes (KP 70 - 110)	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 7 of this report.	L = 2 C = 2 Low (4)
<i>Dichanthium setosum</i>	NT	-	Occurs in coastal regions of south Queensland and in northern New South Wales. Found in tropical and subtropical rainforests and sub-humid woodlands.	Yes throughout	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 7 of this report.	L = 2 C = 2 Low (4)
Finger Panic Grass (<i>Digitaria porrecta</i>)	NT	-	Occurs in coastal regions of south Queensland and in northern New South Wales. Found in tropical and subtropical rainforests and sub-humid woodlands.	Yes (KP 0 - 100)	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 7 of this report.	L = 2 C = 2 Low (4)

Species	Status		Preferred habitat	Occurrence of preferred habitat within project footprint	Potential to be Impacted prior to mitigation measures	Significance of potential impacts	Mitigation measures	Significance of impacts after mitigation
	NC Act	EPBC Act						
Black Ironbox (<i>Eucalyptus raveretiana</i>)	V	V	Along watercourses and on riverflats. Open forest or woodland communities in association with <i>Eucalyptus tereticornis</i> , <i>Corymbia tessellaris</i> , <i>E. camaldulensis</i> , <i>Melaleuca</i> spp. and <i>Casuarina cunninghamiana</i> .	Yes (KP 0 - 100)	Almost certain to require removal of individuals but extensive areas of similar habitat and hundreds of adjoining individuals retained.	L = 5 C = 3 High (8)	See Section 8 of this report.	L = 5 C = 2 Medium (7)
<i>Graptophyllum excelsum</i>	NT	-	Occurs in semi-evergreen vine thickets, although near Chillagoe, also recorded growing in grassy woodland in association with <i>Eucalyptus cullenii</i> and <i>Corymbia erythrophloia</i> . Usually found in soil pockets among rocks and in rock crevices on quite steep, rough, rocky, eroded hillsides.	Yes (KP 0 - 140)	Potential to remove individuals or populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Livistona drudei</i>	V	-	In coastal rainforest and melaleuca forests.	Yes (KP 0 - 20)	Potential to remove individuals or populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Livistona lanuginosa</i>	V	V	Restricted to a small area of the Burdekin River Basin along sandy river and creek channels.	Yes (KP 0 - 20)	Potential to remove individuals or populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)

Species	Status		Preferred habitat	Occurrence of preferred habitat within project footprint	Potential to be Impacted prior to mitigation measures	Significance of potential impacts	Mitigation measures	Significance of impacts after mitigation
	NC Act	EPBC Act						
<i>Macropteranthes leiocalis</i>	NT	-	Maryborough to south of Townsville, in SEVT.	Yes (KP 0 - 140)	Potential to remove individuals or populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Marsdenia pumila</i>	V	-	Grass tussocks in woodland with <i>Eucalyptus leichardii</i> , <i>E. trachyphloia</i> , <i>Acacia shirleyi</i> and <i>Lysicarpus</i> .	Yes throughout	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Omphalea celata</i>	V	V	Occurs in fragmented SEVT or araucarian microphyll vine forest. Recorded along watercourses in steep sided gorges and gullies on weathered metamorphic or granitic soils.	Yes (KP 0 - 140)	Potential to remove individuals or populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Ozothamnus eriocephalus</i>	V	V	Known from a range of habitat types, including the margins of disturbed notophyll vine forest, margins of gallery forest, microphyll vine forest, tall open <i>Eucalyptus andrewsii</i> - <i>E. resinifera</i> forest with an understorey of <i>Allocasuarina littoralis</i> , in open eucalypt forest and on rocky ridges within <i>Eucalyptus</i> spp. - <i>Acacia</i> spp. scrub.	Yes throughout	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 8 of this report.	L = 2 C = 2 Low (4)

Species	Status		Preferred habitat	Occurrence of preferred habitat within project footprint	Potential to be Impacted prior to mitigation measures	Significance of potential impacts	Mitigation measures	Significance of impacts after mitigation
	NC Act	EPBC Act						
<i>Paspalidium scabrifolium</i>	NT	-	Restricted to coastal regions of north and central Queensland. Found in brigalow country in eucalypt and Brigalow woodlands.	Yes throughout	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Peripleura scabra</i>	NT	-	Eucalypt woodland on rocky hills and slopes.	Yes throughout	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Peripleura sericea</i>	NT	-	From Stannary Hills to about Collinsville in eucalypt woodland.	Yes throughout	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Polianthion minutiflorum</i>	V	-	From Mackay to about Nanango growing in open woodland.	Yes throughout	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 8 of this report.	L = 2 C = 2 Low (4)

Species	Status		Preferred habitat	Occurrence of preferred habitat within project footprint	Potential to be Impacted prior to mitigation measures	Significance of potential impacts	Mitigation measures	Significance of impacts after mitigation
	NC Act	EPBC Act						
<i>Rhamphicarpa australiensis</i>	NT	-	Occurs at 200 to 570 m altitude. It grows in <i>Melaleuca</i> - <i>Casuarina</i> open woodland and open sclerophyll woodland. It has been found on wet ground and in seepage areas near pools and swamps.	Yes throughout	Potential to remove important populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Senna acclinis</i>	NT	-	Rainforest margins and adjacent open forests at altitudes of 100 to 660 m on soils derived from a mixture of basalt and metamorphic rocks. In rainforest, associated with <i>Pleogynium timorense</i> and <i>Elatostachys</i> sp. In open forests, associated with <i>Eucalyptus grandis</i> , <i>Syncarpia glomulifera</i> and <i>Alphitonia excelsa</i> .	Yes (KP 0 - 140)	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Solanum adenophorum</i>	E	-	Brigalow scrub.	Yes throughout	Potential to remove individuals or populations May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 8 of this report.	L = 2 C = 2 Low (4)

Species	Status		Preferred habitat	Occurrence of preferred habitat within project footprint	Potential to be Impacted prior to mitigation measures	Significance of potential impacts	Mitigation measures	Significance of impacts after mitigation
	NC Act	EPBC Act						
<i>Solanum sporadotrichum</i>	NT	-	Mainly coastal from Townsville to Mackay in SEVT open eucalypt woodland and littoral rainforest margins,	Yes (KP 0 - 200)	Potential to remove important populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Tephrosia levelleii</i>	V	V	Habitat poorly known. Only 3 records, on from open woodland beside creek.	Yes throughout	Potential to remove important populations Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)

The analysis provided in **Table 13** identifies that in the absence of appropriate mitigation measures there are Medium (6-8) impacts on these species. Mitigation measures to help minimise the impacts upon Threatened and Near Threatened Species including Black Ironbox are provided in **Section 8**.

Assuming the implementation of the mitigation measures identified in **Section 8**, the impacts on these species is determined to be Low (4) for all species with the exception of Black Ironbox where the impact is determined to be Medium (7).

6.5 Potential Impacts of Construction on Environmentally Sensitive Areas

The proposed rail corridor has been selected to avoid impact upon any Category A Environmentally Sensitive Area.

The only ESAs, as mapped by DERM (2010), occurring within the proposed rail corridor are Category B ESAs - Regional Ecosystems listed as Endangered under DERM Biodiversity Status.

Seven REs classified as Endangered under the DERM Biodiversity Status classification will be transected by the proposed rail corridor (**Table 9**).

A total of approximately 95 ha of these REs will be cleared. The proportion of these REs that this clearing would represent is 0.27% and 0.02% of that which occurs within a 10 km buffer and the bioregion respectively. For each individual RE the impact is less than 0.9% of the RE extent within a 10 km buffer and less than 0.16% of the RE extent within the bioregion (**Table 9**).

Other potential impacts on these ESAs associated with the construction of the rail infrastructure include:

- Increased edge effects;
- Potential for dust to reduce the health of retained vegetation in the vicinity of the clearance footprint; and
- Potential for temporary facilities, materials and equipment to damage areas outside the construction footprint.

The main impacts of direct clearing and edge effects are largely unavoidable (L = 5) and will have a minor (C = 2) consequence for these ESAs. As such, it represents a Medium (7) impact. Nonetheless, mitigation measures to minimise impacts on these ESAs are provided in **Section 8**.

6.6 Potential Impacts Associated with Significant Weeds

The construction of the rail infrastructure has the potential to spread existing significant, environmental and other weeds and introduce new weed species to the area.

Introduction and spread of significant weeds can render land less productive and in some cases have serious health impacts on livestock and people. Parthenium Weed is of particular interest to landholders and the community due to its potential impacts on agricultural productivity and human health. The proposed rail corridor transects extensive areas of Parthenium Weed and there is potential for construction activities to spread Parthenium Weed into currently clean areas through earthworks, movement of vehicles, machinery, equipment, materials and fill.

There is also potential for construction of the rail infrastructure to spread other significant weeds (including the seven detected during the fieldwork) into currently clean areas. The rail construction activities also have the potential to spread weeds into the adjoining woodlands

and riparian areas where they do not currently occur. There is potential for the density and prevalence of Buffel Grass to be increased through edge effects and increased traffic. This species is an introduced and highly valued pasture grass in many areas; however, it has the potential to out-compete native groundcover species and increase biomass. An increase in biomass may bias fire regimes towards much more intense and frequent fire events which could degrade fire sensitive communities, particularly Brigalow forests and woodlands. The grass itself also provides very little nutritive or forage value for wildlife and therefore areas dominated by the Buffel Grass can become less biodiverse.

Even with the implementation of mitigation measures, potential impacts associated with the introduction and spread of weeds remain possible (L = 3) and, at least in the case of Parthenium Weed, could have major (C = 4) social and economic consequences. As such, these potential impacts have been determined to be Medium (7). Recommendations aimed at controlling the introduction and spread of weed species are provided in **Section 8**.

6.7 Potential Impacts of Construction on Fauna in General

Potential direct and indirect impacts on fauna are likely to include the following:

- Loss of habitat such as mature vegetation, hollow-bearing trees and fallen logs, and therefore loss of nesting, refuge and foraging resources;
- Mortality;
- Habitat fragmentation and loss of connectivity (disturbance to fauna movement corridors);
- Barrier effects; and
- Edge effects.

The significance of these impacts on Threatened, Near Threatened, Migratory and Regionally Significant fauna species is considered in **Sections 6.8 to 6.9**. The potential impacts on Least Concern fauna species as a group are largely unavoidable (L = 5) and will be of minor (C = 2) significance to these species. As such the impacts on Least Concern fauna as a group are Medium (7).

Loss of habitat

Clearing of remnant vegetation inevitably results in habitat loss for wildlife fauna species.

An important potential impact on fauna is the loss of hollow-bearing trees. A large number of Australian vertebrate fauna species are dependent on tree hollows for shelter and nesting, including (amongst others) parrots, owls, possums, gliders and bats (Gibbons *et al.* 2002). Within the study area large habitat trees were observed, in particular, along creekline (e.g. Sites 2, 21, 30, 41, 53, 55, 57).

Additionally, fallen logs and dead timber on the ground and understorey vegetation provide shelter (either underneath timber or within hollow logs) and food resources for a broad range of small ground-dwelling fauna. These include, but are not exclusive to, native rodents, dasyurids, bandicoots, lizards, snakes, frogs, and some birds. Fallen logs and dead timber mostly occur in the riverine habitat (**Appendix 6**).

Mortality

Fauna injury or death has the greatest potential to occur during the start-up phase of construction when vegetation and habitats are being cleared. While some mobile species, such as birds, may be able to move away from the path of clearing, other species that are

less mobile, or those that are nocturnal, restricted to tree hollows and / or burrowing species, could find it difficult to escape direct impacts.

Habitat Fragmentation and Loss of Connectivity

Fauna values in the majority of the study area are minimal and do not provide strong connectivity due to the land under pressure from heavy agricultural and grazing activities. However, bridges and underpasses which have been constructed for cattle for watercourse areas allow some degree of fauna movement.

Some extensive areas of remnant vegetation will be transacted by the proposed rail corridor, namely at Sites 38 to 40. As a result, fragmentation at these sites will be unavoidable.

The most significant habitats for fauna are the riparian corridors particularly within the gallery forests within the northern section of the proposed alignment and the associated areas of intact and healthy remnant vegetation. The proposed biodiversity offsets however will compensate for the areas of lost habitat and connectivity.

Barrier Effects

Barrier effects occur where particular species are either unable or are unwilling to move between suitable areas of fragmented habitat. This could result in either a complete halt to movement or a reduced level of movement between fragments. Species most vulnerable to barrier effects are smaller ground-dwelling species and species with low mobility. Species least vulnerable to barrier effects tend to be those that are highly mobile (e.g. birds and bats), although even these species can vary in their response to barriers.

It is unlikely that the impacts will be significant given that the majority of the proposed rail corridor has been previously cleared to accommodate agricultural uses with a high occurrence of Buffel Grass.

Edge effects

Edge effects refer to disturbance associated with an edge or boundary between retained vegetated habitats and cleared areas such as infrastructure. While the existing vegetated habitats are already affected by edge effects resulting from previous clearing, grazing and roads, new edges would be created during the construction phase of the Project. Edge effects may potentially reduce soil moisture and impact on retained boundary vegetation through increased wind, dust, noise and light. Such changes have the potential to alter species composition and abundance in the vicinity of the rail corridor, increase predation and competition, and particularly increase weed invasion.

It is unlikely that the impacts as a result of the proposed rail corridor will be significant; however, the introduction of pest flora species and the increased likelihood of fire occurrences could potentially result in edge effects. It should be noted however that various locations of the proposed alignment have already been subject to fire occurrences and are degraded as a result.

6.8 Potential Impacts on Threatened, Near Threatened and Listed Migratory Fauna Species

No Threatened or Near Threatened species were observed during the field survey. Twenty-seven species (including listed Migratory species) were, however, identified as potentially occurring within the vicinity of the proposed rail corridor based on the occurrence of their preferred habitat (**Table 6**). The degree of impact on these species is shown in **Table 14**.

For the purposes of this study, these species are considered to be present in the area and are thus treated accordingly and included in the development of the mitigation measures presented in **Section 8**.

Table 14. Potential Impacts and Significance of Impacts on Threatened, Near Threatened and Listed Migratory Fauna Species Likely to Occur Within the Proposed Rail Corridor

Species	Status		Potential to be impacted	Significance of potential Impacts	Mitigation Measures	Significance of impacts after mitigation
	NC Act	EPBC Act				
Reptiles						
Common Death Adder <i>Acanthophis antarcticus</i>	NT	-	Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats.	L (4) C (2) Medium (6)	See Section 8 of this report.	L (4) C (2) Medium (6)
Striped-tailed Delma <i>Delma labialis</i>	V	V	Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats.	L (4) C (2) Medium (6)	See Section 8 of this report.	L (4) C (2) Medium (6)
Ornamental Snake <i>Denisonia maculata</i>	V	V	Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats.	L (4) C (2) Medium (6)	See Section 8 of this report.	L (4) C (2) Medium (6)
Yakka Skink <i>Egernia rugosa</i>	V	V	Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats.	L (4) C (2) Medium (6)	See Section 8 of this report.	L (4) C (2) Medium (6)
Brigalow Scaly-foot <i>Paradelma orientalis</i>	V	V	Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats.	L (4) C (2) Medium (6)	See Section 8 of this report.	L (4) C (2) Medium (6)
Birds						
Fork-tailed Swift <i>Apus pacificus</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Great Egret <i>Ardea alba</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Cattle Egret <i>Ardea ibis</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Red Goshawk <i>Erythrorhynchus radiatus</i>	E	V	Unlikely to be impacted as no extensive stands of suitable habitat occur along the line.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Black-necked Stork <i>Ephippiorhynchus asiaticus</i>	NT	-	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)

Species	Status		Potential to be impacted	Significance of potential Impacts	Mitigation Measures	Significance of impacts after mitigation
	NC Act	EPBC Act				
Beach Stone-curlew <i>Esacus magnirostris</i> (neglectus)	V	-	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Latham's Snipe <i>Gallinago hardwickii</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Squatter Pigeon (southern) <i>Geophaps scripta scripta</i>	V	V	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Sarus Crane <i>Grus antigone</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
White-throated Needletail <i>Hirundapus caudacutus</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Square-tailed Kite <i>Lophoictinia isura</i>	NT	-	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Black-chinned Honeyeater <i>Melithreptus gularis</i>	NT	-	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Rainbow Bee-eater <i>Merops ornatus</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Spectacled Monarch <i>Monarcha trivirgatus</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Satin Flycatcher <i>Myiagra cyanoleuca</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Little Curlew <i>Numenius minutus</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Eastern Curlew <i>Numenius madagascariensis</i>	NT	-	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)

Species	Status		Potential to be impacted	Significance of potential Impacts	Mitigation Measures	Significance of impacts after mitigation
	NC Act	EPBC Act				
Black-throated Finch (southern) <i>Poephila cincta cincta</i>	E	E	Possible occurrence. Moderate consequence if breeding, minor consequence if not breeding. Highly mobile species able to use adjacent habitats.	L = 3 C = 3 Medium (6)	See Section 8 of this report.	L = 3 C = 2 Medium (5)
Australian Painted Snipe <i>Rostratula australis</i>	V	V	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Common Greenshank <i>Tringa nebularia</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Marsh Sandpiper <i>Tringa stagnatilis</i>	-	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Mammals						
Northern Quoll <i>Dasyurus hallucatus</i>	-	E	Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats.	L (4) C (2) Medium (6)	See Section 8 of this report.	L (4) C (2) Medium (6)
Coastal Sheath-tail-Bat <i>Taphozous australis</i>	V	-	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)

6.9 Potential Impacts of Construction on Regionally Significant Fauna Species

Regionally Significant fauna, including the 48 species which have been identified as potentially occurring within the proposed rail corridor, have the potential to be affected by the direct loss of habitat and other potential indirect impacts described in **Section 6.7**. The direct habitat loss and some edge effect impacts are unavoidable ($L = 5$). The consequences of these impacts will be minor ($C = 2$) for most of these species which are generally either mobile (e.g. Bush Stone-curlew, Grey-crowned Babbler, Brown Treecreeper), able to utilise adjoining habitats (e.g. Great Brown Broodfrog, Australian Bustard, Rufus Bettong, Hooded Robin) and / or relatively tolerant of disturbance (Common Brushtail Possum, Swamp Wallaby and Spectacled Hare-wallaby). As such the impacts on these species have been determined to be Medium (7).

Mitigation measures, including the potential offset rehabilitation linkages described in **Section 8**, will reduce the likelihood and / or degree of impacts on regionally significant fauna species.

6.10 Potential Impacts Associated with Pest Fauna Species

Two species of introduced animals were recorded in the study area (i.e. Cat and Feral Pig). These pest species are listed under Class 2 of the LP Act, which are pests that are established in Queensland and have, or could have, a substantial adverse economic, environmental or social impact. Management of these pests requires coordination and they are subject to programs led by local government, community or landowners. Under the LP Act, landowners must take reasonable steps to keep land free of Class 2 pests.

It is possible ($L = 3$) that the construction of the rail infrastructure will favour pest fauna species and the consequence on adjoining remnant vegetation areas could potentially be moderate ($C = 3$). As such the potential impacts associated with enhancing the environment for pest fauna species is Medium (6).

6.11 Potential Impacts to Wetlands

The construction of the proposed rail corridor has the potential to alter hydrological regimes upstream and downstream of the corridor particularly where it crosses several freshwater palustrine and lacustrine wetlands (mostly ephemeral watercourses as well as some large, braided river systems including the Suttor River, Mistake Creek and Belyando River) (**Plate 11** and **Plate 12**).

Such alterations have potential affect both terrestrial and aquatic ecosystems and species. The potential impacts on the aquatic values associated with wetlands are detailed in a separate technical report for the EIS. Some degree of impact on terrestrial species is likely ($L=4$) and without adequate mitigation the consequence of such impacts could be major ($C=4$). This equates to a High (8) impact on terrestrial flora and fauna. Mitigation measures such as designing rail infrastructure so that it does not significantly alter hydrological characteristics of watercourses and floodplains, could reduce the likelihood of such impacts to possible ($L=3$) and the consequences of any impacts to moderate (3), equating to a Medium (6) impact on terrestrial communities and species.

6.12 Summary of Impacts Assessment during Construction

Table 15 summarises the impacts of construction activities on the terrestrial ecology of the area. It also provides an assessment of the risks before and after mitigation measures.

Table 15. Risk Ratings for Construction Phase Impacts Before and After Mitigations

Activity	Impact	Risk Assessment (L, C) Score	Mitigation Measures	Residual Risk After Mitigation Measures Implemented
Clearing of vegetation	Loss of habitat and resources Approx. 2,688 ha of native vegetation will be cleared.	L (5) C (2) Medium (6)	<ul style="list-style-type: none"> Infrastructure should be located away from remnant vegetation areas whenever possible. Ensure only rail infrastructure footprint is cleared. Provision of offsets. 	L (5) C (2) Medium (6)
	Loss of Threatened, Near Threatened and listed Migratory species At least some individuals of Black Ironbox and preferred habitat for some Threatened, Near Threatened and listed Migratory species will be removed.	L (5) C (3) High (8)	<ul style="list-style-type: none"> Detailed surveys prior to alignment finalisation. Develop Significant Species Management Plan. Offset commitments relating to affected species. 	L (5) C (2) Medium (7)
	Loss of Environmentally Sensitive Area Approx. 95 ha of EREs will be cleared.	L (5) C (2) Medium (7)	<ul style="list-style-type: none"> Provision of offsets. 	L (5) C (2) Medium (7)
	Direct mortality of wildlife Low mobility, nocturnal, tree hollows-dependant and / or burrowing species have the potential to be injured or killed during clearing activities.	L (3) C (3) Medium (6)	<ul style="list-style-type: none"> Employ a fauna handler to check all vegetation prior to clearing. Develop Significant Species Management Plan. Enforce speed limits. Educate personnel about environmental responsibilities. 	L (3) C (2) Medium (5)

Activity	Impact	Risk Assessment (L, C) Score	Mitigation Measures	Residual Risk After Mitigation Measures Implemented
Potential introduced and / or spread of pests and weeds	Restricted fauna movement Clearing of vegetation will result in increased barrier effect, edge effect and loss of connectivity, in particular for species with low mobility.	L (3) C (2) Medium (5)	<ul style="list-style-type: none"> Provision of suitable underpasses at watercourse crossings. Provision of offsets. 	L (3) C (2) Medium (5)
	Potential introduced and / or spread of pests and weeds Weeds and feral pests are typically associated with increased human activity. The rail construction activities could potentially spread declared and environmental weeds and favour pest species.	L (3) C (5) High (8)	<ul style="list-style-type: none"> Develop a Weed and Pest Management Plan. Vehicle and machinery wash downs. Control movement of machinery and trucks. 	L (3) C (4) Medium (7)
	Potential alterations to the hydrological characteristics for adjoining and downstream areas The rail infrastructure has the potential to alter hydrological regimes upstream and downstream of the corridor particularly where it crosses several freshwater palustrine and lacustrine wetlands (mostly ephemeral watercourses as well as some large, braided river systems including the Suttor River, Mistake Creek and Belyando River).	Possible (3) Major (4) Medium (7)	<ul style="list-style-type: none"> Monitor adjoining wetland areas for water quality and hydrology impacts. 	Possible (3) Moderate (3) Medium (6)

7 Potential Impacts during Rail Operations

The ongoing operation of the rail infrastructure to transport coal from the mine to the port has the potential to impact terrestrial flora and fauna values. The potential impacts are described in the following sub-sections. In many cases the potential impacts associated with the operation of the rail infrastructure will be the same as those identified for its construction. To avoid repetition, such impacts are provided in a brief format where they have been discussed in more detail in **Section 6**.

7.1 Significance of Rail Operations in a State, Bioregional and Local Context

The ongoing operation of the rail infrastructure has the potential to cause indirect impacts Medium (7) impacts on:

- 2 TECs;
- 3 EREs;
- 12 OCREs; and
- 48 Least Concern REs.

There is also potential for the rail operations to have a Medium (6) impacts on one Threatened flora species (Black Ironbox), and any of 34 other Threatened and Near Threatened flora species.

Operation of the rail also has the potential to cause Medium (7) impacts to Category B ESAs, consisting of seven REs listed as Endangered under DERM Biodiversity Status.

The operation of the rail infrastructure also has the potential for:

- Medium (7) impacts upon Least Concern fauna as a group;
- Medium (7) impacts upon a number of Regionally Significant fauna species; and
- Medium (6) impacts upon a number of Threatened and Near Threatened fauna species.

7.2 Potential Impacts of Rail Operations on Flora in General

Potential impacts to flora associated with the ongoing operation of the rail include:

- Edge effects, including the potential to increase:
 - The abundance of Buffel Grass (through altering fire regime);
 - The abundance of other weeds (through altering fire regime and increased risk of weed spread by maintenance crews, etc.); and
 - Altered fire regime through increased fire risk (e.g. welding crews) and the rail corridor acting as a fire break;
- Potential for accidental and inappropriate release of pollutants at rail stockyard which could contaminate soil and water, reducing the health of riparian and other flora and fauna.

7.3 Potential Impacts of Rail Operations on Ecological Communities / REs

Potential impacts of operation on Ecological Communities / REs are related to those identified in **Section 7.2** (particularly potential alteration of weed densities and fire frequency). These impacts are possible (L = 3) and their consequence could potentially be minor (C = 2) for all Ecological Communities / REs. As such, the impacts upon the Ecological Communities / REs from operation of the rail are Medium (5).

Mitigation measures to help minimise these impacts are provided in **Section 8**.

7.4 Potential Impacts of Rail Operations on Threatened and Near Threatened Flora Species

Potential impacts associated with operation of the rail on Threatened and Near Threatened flora species (including Black Ironbox) include potential impacts on the health and viability of plants outside the clearance footprint through the:

- Potential to increase the abundance of Buffel Grass and other weeds and fire; and
- Potential for accidental and inappropriate release of pollutants at rail stockyard which could contaminate soil and water and subsequently affect Threatened or Near Threatened species.

These impacts are unlikely (L = 2), assuming widely accepted standards of environmental practice. Their consequences could potentially be major (C = 4) so the impacts associated with these indirect impacts have been determined to be Medium (6). Mitigation measures to help minimise these impacts are provided in **Section 8**.

7.5 Potential Impacts of Operations on Environmentally Sensitive Areas

During operation, there is a potential that ESAs (consisting of seven REs classified as Endangered under the DERM Biodiversity Status Classification) will be affected by operational activities. Potential impacts may include those identified in **Section 7.2** as well as the potential for noise and light (at night) to reduce the value of transected habitat areas for some fauna species.

These impacts are possible (L = 3) and their consequence could potentially be minor (C = 2) for these REs. As such, the impact upon these REs from the operation of the rail is Medium (5).

Mitigation measures to help minimise these impacts are provided in **Section 8**.

7.6 Potential Impacts of Rail Operations Associated with Significant and Other Weeds

The operation of the rail has the potential to spread existing significant, environmental and other weeds and introduce new weed species to the area through earthworks, train movements, movement of maintenance vehicles, machinery, equipment, materials and fill.

These impacts are possible (L = 3) and their social and economic consequences could potentially be severe (C = 3) so these impacts have been determined to be High (8). Recommendations aimed at controlling the introduction and spread of weed species are provided in **Section 8**.

7.7 Potential Impacts of Rail Operations on Fauna in General

Potential impacts on fauna associated with rail operations are likely to include those presented in **Table 16**.

Table 16 Potential Impacts of Rail Operations on Fauna

Potential impacts	Significance of potential impacts add column for mitigation measures	Mitigation Measures	Significance of impacts after mitigation
Potential reduction in habitat values and general health and viability through edge effects such as potential increase in noise and light pollution.	L = 5 C = 2 Medium (7)	General mitigation measures provided in Section 8.2.2 .	L = 5 C = 2 Medium (7)
Mortality through potential collisions with trains and maintenance vehicles.	L = 4 C = 2 Medium (6)	General mitigation measures provided in Section 8.2.2 .	L = 4 C = 2 Medium (6)
Altered fire frequency and intensity.	L = 4 C = 3 Medium (7)	General mitigation measures provided in Section 8.2.2 .	L = 3 C = 3 Medium (6)
Barrier effects (associated with the rail corridor).	L = 5 C = 4 High (9)	General mitigation measures provided in Section 8.2.2 .	L = 4 C = 3 Medium (7)

Mitigation measures to help minimise these impacts are provided in **Section 8**.

7.8 Potential Impacts of Rail Operations on Threatened, Near Threatened and Listed Migratory Fauna Species

The operation of the rail has the potential (L = 3) to be of moderate (C = 3) consequence for a number of Threatened or Near Threatened fauna species through the following potential impacts:

- Potential reduction in habitat values and general health and viability through edge effects such as potential increase in noise and light pollution;
- Mortality through potential collisions with trains and maintenance vehicles;
- Altered fire frequency and intensity; and

- Barrier effects (associated with the rail corridor).

The potential impact on these species has been identified as Medium (6). Mitigation measures to further reduce the potential for any such impacts are presented in **Section 8**.

7.9 Potential Impacts of Rail Operations on Regionally Significant Fauna Species

The operation of the rail has the potential to be of moderate consequence for a number of Regionally Significant fauna species through the following potential impacts:

- Potential reduction in habitat values and general health and viability through edge effects such as potential increase in noise and light pollution;
- Mortality through potential collisions with trains and maintenance vehicles;
- Altered fire frequency and intensity; and
- Barrier effects (associated with the rail corridor).

The operation of the rail has the potential (L = 3) to be of moderate (C = 3) consequence for a number of these species and the potential impact on these species are therefore identified as Medium (6). Mitigation measures to further reduce the potential for any such impacts are presented in **Section 8**.

7.10 Potential Impacts of Rail Operations Associated with Pest Fauna Species

The main impacts will occur during construction activities. It is unlikely that the operation of the rail will cause any additional impact.

7.11 Summary of Impacts Assessment during Operation

Table 17 summarises the impacts of operation activities on the terrestrial ecology of the area. It also provides an assessment of the risks before and after mitigation measures.

Table 17. Risk Ratings for Operation Phase Impacts Before and After Mitigations

Activity	Risk Assessment (L, C) Score	Mitigation Measures	Residual Risk After Mitigation Measures Implemented
Increase in light and noise The rail activities will cause a localised increase in noise and light. This has the potential to disrupt local wildlife behaviour.	L (4) C (3) Medium (7)	<ul style="list-style-type: none"> Implement Significant Species Management Plans. 	L (4) C (3) Medium (7)
Accidental or inappropriate release of pollutants Potential for accidental and inappropriate release of pollutants which could contaminate local soils and waterways. This has the potential to impact on the local wildlife.	L (2) C (3) Medium (5)	<ul style="list-style-type: none"> Install Gross Pollutant Traps, detention tanks and filters to capture oil / hydrocarbons, fines and heavy metals at rail depots. Regular machinery and vehicle maintenance. 	L (2) C (2) Low (4)
Animal death and / or injury due to collision with trains and maintenance vehicles	L (3) C (3) Medium (6)	<ul style="list-style-type: none"> Enforce safe speed limits. Educate personnel about environmental responsibilities. 	L (3) C (2) Medium (5)
Weeds and feral pests typically associated with increased human activity The rail activities could spread declared and environmental weeds in the adjoining woodlands and riparian areas and could also favour pest species.	L (3) C (5) High (8)	<ul style="list-style-type: none"> Develop a Weed and Pest Management Plan. Maintenance vehicle washdowns. Control movement of machinery equipment and fill. 	L (3) C (4) Medium (7)

8 Mitigation and Management

8.1 Mitigation and Rehabilitation Recommendations for Flora

Objectives

- No unnecessary removal of remnant vegetation;
- Limit the clearing of threatened species or large mature trees wherever possible;
- Rehabilitation of areas required only for construction; and
- Ensure compliance with licenses and approvals.

8.1.1 Construction

The following measures should be implemented during the construction phase to mitigate impacts on flora within and adjacent to the project area:

- Detailed flora surveys to be conducted of all remnant vegetation areas within the corridor prior to finalisation of the alignment;
- Minimise the clearance of remnant vegetation to that necessary for construction;
- Ensure all necessary permits and approvals are in place prior to removal of native vegetation;
- All vegetation clearing boundaries should be clearly identified in the field to avoid inadvertent clearing of native vegetation;
- Clearly mark designated revegetation / rehabilitation zones and other no go areas (including large sign cant trees) prior to any vegetation clearing. High visibility tape, barricade webbing or similar will be used to avoid inadvertent clearing of native vegetation;
- Clearing along the proposed rail corridor should be limited to the amount necessary to undertake earthworks and should aim to minimise the construction corridor width where possible;
- When working in and around remnant vegetation, a suitably qualified person should inspect the area for threatened species;
- Any additional clearing of native vegetation outside the approved area of disturbance will not be carried out without the necessary approvals;
- Felled vegetation should be mulched and reused on site. Hollow logs and large debris may be salvaged for the use of habitat enhancement within areas designated for rehabilitation;
- A detailed Weed Management Plan that addresses the construction, rehabilitation and operation phases of the project should be prepared prior to construction. This Plan should include hygiene protocols to minimise the likelihood of introduction and spread of environmental, agricultural and declared weeds, including:
 - The implementation of sediment control mechanisms to reduce the potential for the spread of weed species into sensitive areas;
 - Vehicle wash down procedures to avoid the potential for weed spread;
 - Monitoring and weed inspections (monitoring across disturbed areas on a

monthly basis is recommended during construction);

- Detailed Sediment and Erosion Management Plans should be developed prior to construction to minimise sediment runoff. The plan should include a requirement to rehabilitate disturbed areas as soon as possible after disturbance;
- Dust monitoring should be undertaken and dust reduction measures should be implemented where necessary. These measures could include:
 - The regular maintenance and wetting down of tracks to minimize dust generation; and
 - The implementation and enforcement of a site speed limit to minimise dust generation;
- Cleared areas to be rehabilitated as soon as practicable;
- Exclude the parking of heavy vehicles, stockpiling and the storage of plant and equipment from the drip zone of trees to avoid damage to the root system and lower branches;
- Where practical use existing and designated access tracks, avoiding unnecessary clearing of large large mature remnant trees where possible;
- An offset strategy which compensates for all unavoidable clearing should be developed and implemented (refer to **Section 8.3**);
- Fire fuel loads should be monitored and vehicle activities should be restricted to roads, access tracks and hardened surfaces to reduce the possibility of wildfire. Vehicles should be fitted with spark arrestors and fire fighting equipment should be available at construction sites;
- A Fire Management Plan should be developed and implemented;
- All construction personnel should be educated of environmental responsibilities during inductions;
- A detailed Rehabilitation Pan should be developed that includes a detailed rehabilitation monitoring and evaluation plan including monitoring schedule (e.g. quarterly monitoring of areas under rehabilitation). Suitable completion criteria and indicators to measure the progress of rehabilitation may include 70% of cover of native and introduced species within each stratum as occurring on adjoining reference sites of the same land type. At least two reference sites within the same sub-catchment should be established within each RE being rehabilitated to provide benchmarking of rehabilitation progress and completion;
- Significant Community / Species Management Plans should be developed for Brigalow and Natural Grassland Communities, Black Ironbox and any other significant flora species which may potentially be impacted by the proposed development (including those identified in **Table 13**). These plans should include:
 - Proposed management measures including those identified for construction and operation of the rail infrastructure;
 - A monitoring and evaluation program for the community / species; and
 - Offset commitments relating to the community / species.

8.1.2 Operation

The following measures should be implemented to mitigate impacts on flora within and adjacent to the project area:

- The Weed Management Plan should be implemented and the regular monitoring of the prevalence of weed species in disturbed and adjacent areas should be undertaken;
- Areas necessary for construction, but not required for the operational phase should progressively be rehabilitated. Rehabilitation should include the re-establishment of original REs where possible;
- The rehabilitation program should incorporate a wide variety of species endemic to the area and typical of the RE being rehabilitated;
- Where practical, maintenance workers are to remain on designated tracks at all times to minimise the disturbance of surrounding vegetation; and
- Control and / or removal of any weeds that have been introduced or exacerbated as a result of the works.

8.2 Mitigation and Rehabilitation Recommendations for Fauna

Objectives:

- No unnecessary clearing of threatened species habitat;
- To comply with all licences and approvals ensuring protection of fauna habitat and rehabilitation of disturbed areas; and
- No death or serious injury to native fauna during construction activities.

8.2.1 Construction

The following mitigation measures should be implemented during the construction phase to mitigate adverse impacts on the fauna assemblages associated with or adjacent to the rail corridor:

- Detailed fauna and fauna habitat surveys to be conducted of all remnant vegetation areas within the corridor prior to finalisation of the alignment;
- Remove vegetation in a staggered sequence to allow fauna species to relocate off site;
- Minimise clearing of large trees in riparian areas to protect potential nesting trees of raptors;
- Staff including contractors to be informed that all native wildlife is protected and shall not be intentionally harmed as a result of works or workers actions;
- Any injured fauna to be taken to the nearest vet or reported to the DERM;
- Recognised fauna spotter / catcher (DERM certified) to inspect the corridor immediately prior to clearing vegetation;
- Contact details for qualified animal carers and vets within the areas to be outlined and provided to relevant staff;
- Development and implementation of protocols for any displaced fauna to be relocated

to more suitable similar habitat within the surrounding area;

- Observation of tree hollows for sign of activity;
- Site works, such as trenches and excavations, will be designed to ensure fauna are not trapped or likely to be impacted by construction activities (e.g. install trench ramps at 15 degree slope every 30 m or place branches or suitable material for fauna to climb and escape from trenches);
- Inspect culverts and other structures prior to works within the area to determine whether there are any trapped or injured fauna species present and action as appropriate (eg contact spotter / catcher to relocate animal);
- Where temporary fencing is required consideration will be given to fauna movement, current land uses and construction staff safety requirements;
- Watercourse crossings should consider fauna movement across the rail corridor;
- Implementation of waste management measures to minimise increased numbers of introduced animal and opportunistic native fauna in the project area;
- Where possible rehabilitation of disturbed areas associated with construction works with suitable endemic vegetation to enhance their potential for fauna movement;
- Appropriate strategies should be developed and implemented to minimise the risk of road kill including (reduced speed zones, minimise vehicle movement during times of high fauna activity, for example dawn, dusk and at night);
- Significant Species Management Plans should be developed for any significant fauna species which may potentially be impacted by the proposed development (including those identified as having potential Medium impacts in **Table 14**). These plans should include:
 - Proposed management measures including those identified for construction and operation of the rail infrastructure;
 - A monitoring and evaluation program for the community / species; and
 - Offset commitments relating to the community / species.

8.2.2 Operation

The following mitigation measures will be implemented during the operational phase to minimise any adverse impacts on fauna associated with or adjacent to the rail corridor:

- Maintenance works are to be carried out within designated areas to minimise impact on surrounding undisturbed areas;
- Vehicular traffic should be restricted to constructed access tracks;
- Implementation of fauna and pest management procedures. This will include procedures to manage the removal of native fauna where required, including contact details for local animal carers and vets; and
- Where maintenance of fencing is required, consideration should be given to fauna movement, current land uses and safety / security requirements.

8.3 Environmental Offsets

Whilst the proposed rail corridor has been selected to avoid significant areas of remnant vegetation the nature of the topography, existing land uses and extensive vegetation areas

mean that clearing of approximately 2,688 ha of remnant vegetation will be unavoidable. As such, it is a requirement that offsets be established to compensate for ecological impacts associated with this unavoidable clearing (including for direct loss of vegetation, fragmentation of fauna habitat and movement corridors, disturbance of EVR flora).

Both the Commonwealth and Queensland Governments' offsets legislation and policy, including Part 9 of the EPBC Act and the Queensland Government's Environmental Offsets Policy (QGEOP) (EPA 2008) require that unavoidable impacts to flora and fauna be compensated for through the provision of offsets. To the greatest practicable extent the offset activities should address these legislation and policies and as such, should incorporate the following principles:

- Offsets should only be utilised in situations where impacts on environmental values are unavoidable;
- The offset must directly relate to the environmental value that will be impacted, often referred to as the "like for like" principle;
- The offset may be either direct or indirect actions. A direct action usually requires the on-ground maintenance and / or improvement of the protected matter. An indirect action, however, includes a wide range of actions that improve the knowledge and understanding of a protected matter in order to facilitate its conservation;
- The implementation of the offset must be timed to minimise the time lag between the impact and the delivery of the offset;
- Where possible the offset will be located in the vicinity of the impact;
- The offset must be legally secured; and
- Mechanisms will be put in place to ensure that the offset is enforceable, monitored and audited.

According to the QGEOP it is not necessary that an offset is in place before project approval is granted so long as an offset agreement is entered into before the matter to be offset is impacted. An offset agreement is a formal document between the regulator and proponent that sets out the arrangements for creating the offset. Once finalised these agreements form part of the development approval and are legally enforceable. An offset agreement needs to consider such matters as:

- A description of the matter to be offset;
- A description of the proposed offset;
- The mechanism to legally secure the offset;
- Timeframes to achieving offset objectives;
- The offset management plan;
- Reporting and monitoring plan; and
- When and how responsibility for the offset is extinguished (EPA 2008).

According to the QGEOP, an environmental offset is taken to be legally secured if protected by some form of legally binding mechanism. These can include:

- Designation as a protected area under the NC Act;
- Designation as an area of high nature conservation value under the VM Act; and

- The purchase of land or the establishment of a covenant under the *Land Title Act 1994* (EPA 2008).

It is preferable that offsets are protected for the long term by purchasing land or establishing covenants on title (e.g. VM Act covenants). As such, selection of offset sites will also depend on a number of non-environmental factors including:

- Land tenure – tenure needs to enable purchase or covenants on title;
- Landholder preferences – it will be necessary to find willing landholders to sell or covenant land; and
- Land use – (e.g. possible synergies and constraints relating to mining tenements and other land uses).

It is recommended that a China First Project Offset Strategy set out a process to identify landholders within offset priority areas. In the first instance, sites should be identified on the basis of their conservation values and similarity to those areas to be impacted (“like for like”).

It is recommended that where offset areas are established, management and monitoring plans be developed in order to guide the strategic development of these areas, identifying key values, threats and the environmental management strategies required to achieve the appropriate conservation outcomes.

The environmental management of these areas would generally encompass:

- Fire management planning and activities (e.g. firebreak grading, fire mapping, fire response planning);
- Livestock exclusion (e.g. fencing);
- Weed control;
- Feral animal control activities (e.g. fox and rabbit baiting); and
- Flora and fauna monitoring in order to assess implemented management strategies.

The Queensland and Commonwealth offset policies currently allow Category X regrowth to be used to provide offsets for unavoidable clearing of remnant vegetation. Analysis has been conducted of Category X regrowth areas within 50 km either side of the proposed rail corridor to ascertain the extent of suitable offset areas in the vicinity (**Table 18**).

Table 18. Areas of Category X Regrowth within 50 km of Proposed Rail Corridor

RE	EPBC Act Status	VM Act Status	Clearing (100m corridor) Area (ha)	Cat X regrowth* (100km corridor) Area (ha)	Estimated clearing extent as a percentage of Cat X regrowth (%)
10.3.3a		LC	1.34	773	0.17
10.3.3b		LC	0.76	2353	0.03
10.3.4b		LC	3.34	1686	0.20
10.3.12a		LC	2.66	1250	0.21
10.3.13a		LC	1.26	170	0.74
10.3.14a		LC	12.13	719	1.69
10.3.27a		LC	36.61	13605	0.27
10.3.28a		LC	26.58	9282	0.29
10.5.1b		LC	21.81	1165	1.87
10.5.1c		LC	3.23	169	1.91
10.5.2a		LC	12.73	489	2.60

RE	EPBC Act Status	VM Act Status	Clearing (100m corridor) Area (ha)	Cat X regrowth* (100km corridor) Area (ha)	Estimated clearing extent as a percentage of Cat X regrowth (%)
10.5.5a		LC	205.38	31351	0.66
10.5.12		LC	55.27	8637	0.64
10.7.3a		LC	30.56	503	6.08
10.7.3b		LC	3.19	339	0.94
10.7.5		LC	6.34	887	0.71
10.7.7a		LC	0.02	40	0.05
10.7.7b		LC	5.2	19	26.92
10.10.4a		LC	1.44	386	0.37
11.3.1	E	E	16.69	13847	0.12
11.3.2		OC	25.73	18929	0.14
11.3.3		OC	51.15	23547	0.22
11.3.4		OC	39.18	2136	1.83
11.3.5		LC	21.9	19902	0.11
11.3.7		LC	3.92	3264	0.12
11.3.9		LC	7.63	1277	0.60
11.3.10		LC	63.12	12330	0.51
11.3.25		LC	37.41	3834	0.98
11.3.25b		LC	20.61	258	7.99
11.3.30		LC	39.06	2123	1.84
11.3.32		LC	57.75	1279	4.51
11.3.33		OC	2.71	207	1.31
11.3.35		LC	11.24	1752	0.64
11.3.37		LC	8.78	1563	0.56
11.4.4	E	LC	24.18	894	2.70
11.4.5		OC	6.2	6154	0.10
11.4.6		OC	4.21	34667	0.01
11.4.8	E	E	54.72	29376	0.19
11.4.9	E	E	4.36	35078	0.01
11.4.11	E	E	7.43	5427	0.14
11.5.2		LC	27.22	1781	1.53
11.5.3		LC	363.86	60191	0.60
11.5.5		LC	7.26	1920	0.38
11.5.9b		LC	54.38	702	7.74
11.5.9c		LC	135.53	2110	6.42
11.5.10		OC	4.57	119	3.85
11.5.12		LC	24.78	1498	1.65
11.7.2		LC	103.49	5913	1.75
11.7.3		LC	12.32	1248	0.99
11.9.3	E	LC	16.33	776	2.10
11.9.9		LC	10.89	4252	0.26
11.9.10		OC	6.27	2760	0.23
11.10.3		LC	22.79	217	10.51
11.10.7		LC	18.18	670	2.71
11.10.12		LC	162.57	392	41.50
11.11.1		LC	21.5	988	2.18
11.11.8		LC	1.51	185	0.81
11.11.9		LC	34.84	5205	0.67
11.11.10		OC	1.26	5843	0.02
11.11.13		OC	7.84	7667	0.10

RE	EPBC Act Status	VM Act Status	Clearing (100m corridor) Area (ha)	Cat X regrowth* (100km corridor) Area (ha)	Estimated clearing extent as a percentage of Cat X regrowth (%)
11.11.15d		LC	11.04	125	8.87
11.11.19		LC	25.56	817	3.13
11.12.1		LC	556.13	13409	4.15
11.12.2		LC	81.61	1724	4.73
11.12.7		LC	24.2	611	3.96
11.12.9		LC	12.17	1632	0.75
11.12.10		OC	2.08	28	7.47
Total Clearing			2,688	414,450	0.65

* Based on DERM RE mapping (Ver 6) as at November 2009 (the dataset does not include any PMAV related map changes after October 2009).

The analysis found that, with the exception of three Least Concern REs, the estimated extent of clearing within all REs is less than 10% of the extent of these REs represented within Category X regrowth within 50 km of the proposed rail corridor. The three exceptions are RE 11.10.3 (10.5%), RE 11.10.12 (41.5%) and RE 11.11.7b (27%). However, as the Queensland and Commonwealth offset policies do not require offsetting for all clearing within Least Concern REs, offsets areas for these REs are unlikely to represent a significant constraint.

The Queensland offset policy requires offsets to be provided for all unavoidable clearing of EREs and OCREs (as well as some areas of Least Concern REs in particular circumstances). For most of the affected EREs and OCREs the clearing represents less than 1-2% of the Category X vegetation areas within 50 km of the proposed rail corridor. The proposed clearing within two of the OCREs; namely RE 11.5.10 and RE 11.12.10, represents a more significant proportion, at 3.9% and 7.5% respectively (**Table 18**). Depending on the interest of landholders who own the Category X, there is potential that Waratah Coal may have to look further afield to secure offsets for these communities (if required) when compared to the other communities, where more Category X regrowth areas exist in the vicinity. An alternative may be to offset other REs with similar values in closer proximity to the rail corridor.

The Commonwealth Government's offset policy requires offsets to be provided for all unavoidable clearing within TECs. The existence of Category X regrowth within 50 km of the proposed rail corridor for the Brigalow TEC is outlined in **Table 19**. Due to the absence of canopy trees, the Natural Grassland TEC is not able to be identified as Category X vegetation. In this case, the extent of these Natural Grassland REs within 10 km of the rail corridor has been used to indicate the extent of suitable local offset areas.

Table 19. Local Extent of Category X Regrowth Brigalow and Remnant Natural Grasslands

TEC	REs	Estimated clearing extent (ha)	Comments
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	11.3.1	16.69 remnant + 0.26 HVR	Clearing occurs in several areas with RE 11.3.1 being present (as a subdominant RE) at: <ul style="list-style-type: none"> ○ KP 114 to KP 126 (200 ha of regrowth within 50 km); ○ KP 72 to KP 79 (over 500 ha of regrowth within 50 km); ○ KP 283 to KP 284 (500 ha of regrowth within 50 km); and ○ KP 316 to KP 317 (500 ha of regrowth within 50 km).
	11.4.8	54.72 remnant + 2.26 HVR	Clearing is predominately located between KP 229 – 239. There is approximately 4,000 ha of regrowth within a 50 km radius of the clearing area.
	11.4.9	4.36 remnant + 2.87 HVR	Clearing is predominately located between KP 229 and KP 239, 3,000 ha of regrowth within 50 km of the clearing area.
Total Brigalow		81	A total of approximately 78,301 ha of Category X regrowth occurs within 50 km of the proposed rail corridor
Natural Grassland of the Queensland Central Highlands and the northern Fitzroy Basin	11.4.4	24.18	Approximately 5,223 ha within 10 km.
	11.4.11	7.43	Approximately 804 ha within 10 km.
	11.9.3	16.33	Approximately 4,276 ha within 10 km.
Total Natural Grassland		48	A total of approximately 10,303 ha of remnant Natural Grasslands occur within 10 km of the proposed rail corridor
TOTAL TECs		129	

The findings presented in **Table 19** indicate that significant areas of suitable offset vegetation occur in the vicinity of the proposed rail corridor.

Between KP 0 – 100, the proposed rail corridor also transects several watercourses which are fringed by the Queensland and Commonwealth Vulnerable Black Ironbox. Due to its prevalence in these watercourses, it is likely that individual trees and seedlings will need to be removed to facilitate construction of the rail infrastructure. Several watercourses dominated by Black Ironbox occur in the local vicinity which would represent suitable offset sites.

9 Conclusion

9.1 Assessment Outcomes

With the implementation of appropriate mitigations measures, including undertaking detailed on-ground flora and fauna surveys through all remnant vegetation areas prior to alignment finalisation and the provision of compensatory offsets for unavoidable impacts, the proposed rail infrastructure has the potential to have Medium impacts upon:

- 3 Brigalow REs listed as Endangered under the EPBC Act and VM Act;
- 3 Natural Grassland REs listed as Endangered under the EPBC Act;
- 12 Of Concern REs;
- 45 Least Concern REs;
- Wetland habitats;
- Black Ironbox;
- 5 reptiles and 1 bird listed under the EPBC Act and / or VM Act;
- 48 regionally significant fauna species; and
- Social and economic values through spreading declared weeds.

The assessment found that the proposed rail corridor is generally well located in relation to minimising impacts on terrestrial flora and fauna values. It is likely that additional avoidance and minimisation will be achievable based on detailed on-ground surveys.

9.2 Recommended Commitments

9.2.1 Construction

- Detailed flora and fauna surveys to be conducted of all remnant vegetation areas prior to finalisation of the alignment;
- Minimise the clearance of remnant vegetation to that necessary for construction;
- Ensure all necessary permits and approvals are in place prior to removal of native vegetation;
- All vegetation clearing boundaries should be clearly identified in the field;
- Clearly mark designated revegetation / rehabilitation zones and other no go areas (including large significant trees) prior to any vegetation clearing. High visibility tape, barricade webbing or similar should be used;
- Clearing along the proposed rail corridor should be limited to the amount necessary to undertake earthworks and should aim to minimise the construction corridor width where possible;
- When working in and around remnant vegetation, a suitably qualified person should inspect the area for threatened species;
- Any additional clearing of native vegetation outside the approved area of disturbance will not be carried out without the necessary ecological surveys and approvals;
- Felled vegetation should be mulched and reused on site. Hollow logs and large debris may be salvaged for the use of habitat enhancement within areas designated for

rehabilitation;

- Weed hygiene practices should be adopted to minimise the introduction or spread of declared, agricultural and environmental weeds within the area;
- A detailed Weed Management Plan that addresses the construction, rehabilitation and operation phases of the project should be prepared prior to construction. This Plan should include hygiene protocols to minimise the likelihood of introduction and spread of environmental, agricultural and declared weeds, including:
 - The implementation of sediment control mechanisms to reduce the potential for the spread of weed species into sensitive areas;
 - Vehicle wash down procedures; and
 - Monitoring and weed inspections (monitoring across disturbed areas on a monthly basis is recommended during construction);
- Detailed Soil and Erosion Management Plans should be developed prior to construction to minimise sediment runoff. The plan should include a requirement to rehabilitate disturbed areas as soon as possible after disturbance;
- Dust monitoring should be undertaken and dust reduction measures should be implemented where necessary. These measures could include:
 - The regular maintenance and wetting down of tracks to minimize dust generation; and
 - The implementation and enforcement of a site speed limit to minimise dust generation;
- Cleared areas to be progressively rehabilitated;
- Exclude the parking of heavy vehicles, stockpiling and the storage of plant and equipment from the drip zone of trees where possible;
- Where practical use existing and designated maintenance access tracks, and avoid the need to clear large mature remnant trees where possible;
- An offset strategy which compensates for all unavoidable clearing is to be developed and implemented (refer to **Section 8.3**);
- Fire fuel loads should be monitored and vehicle activities should be restricted to roads, access tracks and hardened surfaces to reduce the possibility of wildfire. Vehicles should be fitted with spark arrestors and fire fighting equipment should be available at construction sites;
- A Fire Management Plan should be developed and implemented;
- All construction personnel should be educated of environmental responsibilities during inductions;
- A detailed Rehabilitation Plan should be developed that includes a detailed rehabilitation monitoring and evaluation plan including monitoring schedule (e.g. quarterly monitoring of areas under rehabilitation). Suitable completion criteria and indicators to measure the progress of rehabilitation may include 70% of cover of native and introduced species within each stratum as occurring on adjoining reference sites of the same land type. At least two reference sites within the same sub-catchment should be established within each RE being rehabilitated to provide benchmarking of rehabilitation progress and completion;

- Significant Community / Species Management Plans should be developed for Brigalow and Natural Grassland Communities, Black Ironbox and any other significant flora species which may potentially be impacted by the proposed development (including those identified in **Table 13**). These plans should include:
 - Proposed management measures including those identified for construction and operation of the rail infrastructure;
 - A monitoring and evaluation program for the community / species; and
 - Offset commitments relating to the community / species;
- Detailed fauna and fauna habitat surveys to be conducted of all remnant vegetation within the corridor areas prior to finalisation of the alignment;
- Remove vegetation in a staggered sequence to allow fauna species to relocate off site;
- Minimise clearing of large trees in riparian areas to protect potential nesting trees of raptors;
- Any injured fauna to be taken to the nearest vet or reported to the DERM;
- Recognised fauna spotter / catcher (DERM certified) to inspect the corridor immediately prior to clearing vegetation;
- Contact details for qualified animal carers and vets within the areas to be outlined and provided to relevant staff;
- Development and implementation of protocols for any displaced fauna to be relocated to more suitable similar habitat within the surrounding area;
- Removal of trees with hollows must be conducted with the use of a cherry picker, qualified arborist and spotter/catcher in order to safely remove fauna species if present;
- Inspect culverts and other structures prior to works within the area to determine whether there are any trapped or injured fauna species present and action as appropriate (e.g. contact spotter / catcher to relocate animal);
- Where temporary fencing is required consideration will be given to fauna movement, current land uses and construction staff safety requirements;
- Watercourse crossings should consider fauna movement across the rail corridor;
- Where practical minimise night work to reduce impacts to nocturnal as well as diurnal species;
- Implement waste management measures to minimise increased numbers of introduced animal and opportunistic native fauna in the project area;
- Where possible rehabilitate disturbed areas associated with construction works with suitable endemic vegetation to enhance their potential for fauna movement;
- Appropriate strategies should be developed and implemented to minimise the risk of road kill including (reduced speed zones, minimise vehicle movement during times of high fauna activity, for example dawn, dusk and at night);
- Construction to be undertaken outside of the Black-throated Finch breeding season (February – April) where possible. Where not possible surveys to be conducted for breeding birds immediately prior to any vegetation clearing; and

- Significant Species Management Plans should be developed for any significant fauna species which may potentially be impacted by the proposed development (including those identified as having potential Medium impacts in **Table 14**. These plans should include:
 - Proposed management measures including those identified for construction and operation of the rail infrastructure;
 - A monitoring and evaluation program for the community / species; and
 - Offset commitments relating to the community / species.

9.2.2 Operation

- The Weed Management Plan should be implemented and the regular monitoring of the prevalence of weed species in disturbed and adjacent areas should be undertaken;
- Areas necessary for construction, but not required for the operational phase should be rehabilitated. Rehabilitation should include the re-establishment of original REs;
- The rehabilitation program should incorporate a wide variety of species endemic to the area and typical of the RE being rehabilitated;
- Where practical, maintenance workers are to remain on designated tracks at all times to minimise the disturbance of surrounding vegetation;
- Control and / or removal of any weeds that have been introduced or exacerbated as a result of the works;
- No unnecessary clearing of threatened species habitat;
- To comply with all licences and approvals ensuring protection of fauna habitat and rehabilitation of disturbed areas;
- No death or serious injury to native fauna during construction activities;
- All native fauna is protected and shall not be intentionally impacted as a result of the works or worker actions;
- Maintenance works are to be carried out within designated areas to minimise impact on surrounding undisturbed areas;
- Vehicular traffic should be restricted to constructed access tracks;
- Implement fauna and pest management procedures. This will include procedures to manage the removal of native fauna where required, including contact details for local animal carers and vets;
- Fauna underpasses (at watercourse crossings) require regular monitoring and maintenance to ensure the effectiveness and to allow remedial actions if required; and
- Where maintenance of fencing is required, consideration should be given to fauna movement, current land uses and safety/security requirements.

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Appendices

Appendix 1 – Assessment of EPBC Matters of National Environmental Significance occurring in the study area (Rail) Against Significant Impact Criteria

Introduction

Matters of National Environmental Significance (MNES) are protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EPBC Act relates to projects that involve or impact upon MNES and addresses Australia's commitments to international environmental law and treaties.

The following discussion provides an assessment of the likely significance of the proposed rail infrastructure potential environmental effects on MNES. This assessment is based upon the significant impact criteria identified in the EPBC Act Policy Statement 1.1 – "Significant Impact Guidelines, Matters of National Environmental Significance".

Description of the Proposed Action

Waratah Coal is proposing to develop a new coal terminal on land incorporating the Port of Abbot Point and the Abbot Point State Development Area (APSDA), a new mine near Alpha in central Queensland and a new heavy haul standard gauge rail system linking the mine and coal terminal. The Project is called the China First Project.

The mine development includes the underground and open cut mines, coal preparation plants and the supporting coal handling infrastructure through to the train loading facility. The rail component commences at the balloon loop at the mine and ends at the balloon loop adjoining the coal terminal at the APSDA, and includes the rail line. The coal terminal commences at the train unloading facility and includes infrastructure through to the ship loaders. The coal terminal includes onshore and offshore components at the APSDA and waters of the Port of Abbot Point respectively.

Description of the Affected Environment

The proposed rail corridor is located within the Brigalow Belt North bioregion (from KP 0 to KP 376) and Desert Uplands bioregion (from KP 376 to KP 445).

At the broad scale, the proposed rail corridor transects cleared pasture lands, eucalypt and acacia woodlands, narrow strips of riparian vegetation and small pockets of high value regrowth.

The dominant land use for the vast majority of the area transected by the proposed rail corridor is cattle grazing. A significant portion is cleared of standing timber for cattle pastures. These areas are dominated by *Pennisetum ciliare* (Buffel Grass), an introduced invasive pasture species which is well established in most areas throughout the proposed rail corridor.

The proposed alignment commences in an area of open eucalypt woodland, subject to cattle grazing, on the northern side of the Bruce Highway. It then travels to the west through a gap in the Great Dividing Range and crosses a number of creeks in undulating rocky country comprising of eucalypt woodlands with a sparse, grassy understorey. Creeklines in the area are lined with gallery forest and dominated by *Melaleuca* spp. Most creeks are heavily infested with weeds, including dense stands of Rubber Vine (*Cryptostegia grandiflora*), Mexican Poppy (*Argemone ochroleuca*) and Noogoora Burr (*Xanthium occidentale*), and are also subject to heavy grazing.

From the approximate location of KP 65 to 85, the corridor runs through undulating hills that support open eucalypt woodlands with degraded and severely grazed understorey dominated by Buffel Grass. Patches of native grass (including *Dicanthium* sp. dominated grasslands) were observed. Creeklines in this area were smaller and fringed by open eucalypt woodlands or, in some more sheltered areas, semi-evergreen vine thicket remnants in very poor condition.

South of the Collinsville area (KP 13), the corridor moves into gently undulating plains supporting eucalypt woodlands and scattered patches of Brigalow with grassy understorey. Most areas were heavily grazed and in poor condition.

As the corridor proceeds further south, it moves into slightly steeper terrain and the overall quality of vegetation improves (approximately from KP 115 to KP 165).

South of the Bowen Developmental Road the corridor traverses an area of sandstone range with bare, exposed rock and skeletal soils. This area had been extensively burnt by a very severe fire; however, sufficient pockets of protected vegetation remain. In some areas, these rocky hills support Lancewood thickets with *Spinifex* understorey. Around the approximate location of KP 200 is an extensive area of remnant vegetation that is significant in terms of its size and quality with woodlands supporting grassy and shrubby understorey.

South of the Suttor Development Road (from approximately KP 205), the corridor enters an extensive region of gently undulating plains, intersected by large, braided river systems. This includes the Suttor River, Mistake Creek and Belyando River. The vegetation throughout this region is comprised of open eucalypt woodlands with interspersed patches of Brigalow. Larger trees and dense vegetation dominates in the areas subject to seasonal flooding. Overall condition of the vegetation varied from good to degraded, depending on the intensity of grazing pressure and extent of Buffel Grass establishment. This pattern continues south to the proposed mine site.

Threatened Ecological Communities

Two EPBC Threatened Ecological Communities (TECs) were confirmed to be present along the proposed rail corridor, namely:

- Brigalow (*Acacia harpophylla* dominant and co-dominant); and
- Natural Grassland of the Queensland Central Highlands and the northern Fitzroy Basin.

The field survey identified that one of these, Brigalow (*Acacia harpophylla* dominant and co-dominant), occurs as small intermittent patches throughout the length of the proposed rail corridor. These communities were generally observed to be in good condition.

Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin are mapped as occurring:

- As a pure stand at KP 273, however, the field survey found that the community had been removed by cultivation and no native grasslands occurred in the vicinity of this location;
- As 20% of a mosaic RE at KP 192, however, the field survey found the Native Grassland does not occur along the proposed rail corridor at this location; and
- With patchy distribution around Collinsville (between KP 60 – KP 110) and the field survey confirmed that some Native Grasslands areas do occur within this portion of the proposed rail corridor.

Flora Species

Review of Queensland Herbarium HERBRECS, Wildnet and EPBC Act Protected Matters databases, for the proposed rail corridor identified nine EPBC Act listed plant species that are known to occur or have ranges that overlap with the proposed rail corridor (**Table 1**). These include one Endangered and eight Vulnerable flora species.

Table 1. EPBC Act Listed Flora Species Recorded as Occurring Within or Having Ranges that Overlap the Rail Corridor

Species	Status	Preferred Habitat	Source	Preferred Habitat Present
<i>Acacia ramiflora</i>	V	Woodland on sandstone hills.	3	Yes
<i>Aristida granitica</i>	E	Known only from the type locality in the foothills of Mt Pring, 10 km west of Bowen, Queensland, where it is common.	2,3	No
<i>Corymbia clandestina</i>	V	Restricted to a small area near Blair Athol, growing in eucalypt woodland.	2,3	No
<i>Croton magnificus</i>	V	Vine thickets on skeletal granite, limestone or sandstone soils, including rocky seashores.	2,3	Yes (KP 0 - 140)
<i>Eucalyptus raveretiana</i> (Black Ironbox)	V	Along watercourses and on riverflats. Open forest or woodland communities in association with <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>Corymbia tessellaris</i> (Moreton Bay Ash), <i>E. camaldulensis</i> (River Red Gum), <i>Melaleuca</i> spp. and <i>Casuarina cunninghamiana</i> (River Oak).	2,3,4	Yes (KP 0 - 100)
<i>Livistona lanuginosa</i>	V	Restricted to a small area of the Burdekin River Basin along sandy river and creek channels.	3	Yes (KP 0 - 20)
<i>Omphalea celata</i>	V	Occurs in fragmented semi evergreen vine thicket or araucarian microphyll vine forest. Recorded along watercourses in steep sided gorges and gullies on weathered metamorphic or granitic soils.	3	Yes (KP 0 - 140)
<i>Ozothamnus eriocephalus</i>	V	Known from a range of habitat types, including the margins of disturbed notophyll vine forest, margins of gallery forest, microphyll vine forest, tall open	2	Yes

			<i>Eucalyptus andrewsii</i> - <i>E. resinifera</i> forest with an understorey of <i>Allocasuarina littoralis</i> , in open eucalypt forest and on rocky ridges within <i>Eucalyptus</i> spp. - <i>Acacia</i> spp.		
<i>Tephrosia levelleii</i>	V		Habitat poorly known. Only three records, one from open woodland beside creek.	3	Yes

Status: **E** = Endangered; **V** = Vulnerable

Source: **1** = EPBC Protected Matters search; **2** = QEPA WildNet record; **3** = HerbreCs;

Black Ironbox was observed at seven locations, in all instances the plants were observed within the beds or banks of watercourses. Several age classes are represented at these locations and specimens generally range from 0.5m - 8m in height in the channel and up to 25m along the banks.

Black Ironbox is widespread in larger watercourses between KP 0 - 100. In this section of the proposed rail corridor this species is likely to be present in additional watercourses to those recorded during the helicopter survey.

Black Ironbox was found to follow the watercourses as the dominant or co-dominant species and at many of the locations may be unavoidable without significant detour.

Aristida granitica is known only from its type location in the foothills of Mt Pring approximately 12km from the northern end of the rail corridor and is unlikely to be in the rail corridor.

Likewise, *Corymbia clandestina* is known only from a small area near Blair Athol and is unlikely to be in the rail corridor.

Fauna Species

The database searches identified 43 fauna species listed under the EPBC Act as potentially occurring in the area (**Table 2**).

Twenty-one of these species were identified as potentially occurring within the vicinity of the proposed rail corridor based on the occurrence of their preferred habitat. These include 2 Endangered, 7 Vulnerable and an additional 12 Migratory species.

No Threatened or Near Threatened species or listed Migratory fauna species were observed during the field survey. However, for the purposes of this assessment, the precautionary principle has been applied and these species have been assumed to be present in the area.

Table 2. Threatened, Near Threatened and Listed Migratory Terrestrial Fauna Species Recorded as Occurring Within or Having Ranges that Overlap the Study Area

Common Name	Scientific Name	EPBC Act Status	Preferred Habitat	Likelihood of Occurrence Within Rail Corridor	Source
Amphibian					
Eungella Day Frog	<i>Taudactylus eungellensis</i>	E	Along small creeks in rainforest as well as wet sclerophyll forest (Liem and Hosmer 1973). The immediate streamside habitat is dense rainforest with ferns, vines, palms and epiphytes in the understorey (Retallick <i>et al.</i> 1997).	Does Not Occur	1
Reptiles					
Loggerhead Turtle	<i>Caretta caretta</i>	E/Mi	Nest on open, sandy beaches (Spotila 2004). Tidal and sub-tidal habitat as feeding areas (Limpus 2008).	Does Not Occur	1
Green Turtle	<i>Chelonia mydas</i>	V/Mi	Pelagic often found in association with driftlines and rafts of <i>Sargassum</i> (Robins <i>et al.</i> 2002; Poiner & Harris 1996; Carr & Meylan 1980). Adults settle in shallow benthic foraging habitats such as tropical tidal and sub-tidal coral and rocky reef habitat or inshore seagrass beds.	Does Not Occur	1
Striped-tailed Delma	<i>Delma labialis</i>	V	Low open forest with a grassy understorey (Shea 1987).	Likely	1,2,3
Ornamental Snake	<i>Denisonia maculata</i>	V	Brigalow (<i>Acacia harpophylla</i>) woodland growing on clay and sandy soils, riverside woodland, and open forest growing on natural levees (Shine 1983; Cogger <i>et al.</i> 1993).	Likely	1,2,3
Leatherback Turtle	<i>Dermochelys coriacea</i>	E/Mi	Highly pelagic species, venturing close to shore mainly during the nesting season (Sarti Martinez 2000).	Does Not Occur	1
Yakka Skink	<i>Egernia rugosa</i>	V	Poplar box, ironbark, brigalow, white cypress pine, mulga, bendee and lancewood woodlands, open forests. Substrates include rock, sand, clay and loamy red earth.	Likely	1,2,3

Common Name	Scientific Name	EPBC Act Status	Preferred Habitat	Likelihood of Occurrence Within Rail Corridor	Source
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	V/Mi	Pelagic often found in association with driftlines and rafts of <i>Sargassum</i> (Carr 1987; Limpus <i>et al.</i> 1994). Adults settle and forage in tropical tidal and sub-tidal coral and rocky reef habitat.	Does Not Occur	1
Dunmall's Snake	<i>Furina dunmalli</i>	V	Brigalow forest and woodland with fallen timber and ground litter, growing on cracking clay soils and clay loam soils.	Does Not Occur	1
Olive Ridley Turtle	<i>Lepidochelys olivacea</i>	E/Mi	Marine species; nests on sandy beaches and islands/cays	Does Not Occur	1
Flatback Turtle	<i>Natator depressus</i>	V/Mi	Open seas but prefer inshore waters and bays where their feeding ground is the shallow, soft-bottomed seabed.	Does Not Occur	1
Brigalow Scaly-foot	<i>Paradelma orientalis</i>	V	Variety of open forest habitats on several soil types (Schultz and Eyre 1997; Tremul 2000).	Likely	1,2
Fitzroy River Turtle	<i>Rheodytes leukops</i>	V	Rivers with large deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles. High water clarity, often associated with Ribbonweed (<i>Valisneria</i> sp.) beds (Cogger <i>et al.</i> 1993).	Does Not Occur	1
Birds					
Fork-tailed Swift	<i>Apus pacificus</i>	Mi	Almost exclusively aerial. Mostly occur over inland plains but sometimes above foothills or in coastal areas.	Likely	1
Great Egret	<i>Ardea alba</i>	Mi	Widespread species – common.	Likely	1
Cattle Egret	<i>Ardea ibis</i>	Mi	Widespread species – common.	Likely	1
Lesser Sand Plover	<i>Charadrius mongolus</i>	Mi	Coastal littoral and estuarine environments. Large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops.	Highly unlikely	1

Common Name	Scientific Name	EPBC Act Status	Preferred Habitat	Likelihood of Occurrence Within Rail Corridor	Source
Red Goshawk	<i>Erythrorhynchus radiatus</i>	V	Coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia (Marchant and Higgins 1993), including eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins.	Likely	1,2
Latham's Snipe	<i>Gallinago hardwickii</i>	Mi	Marshes and swamps in tall grass.	Likely	1
Squatter Pigeon (southern)	<i>Geophaps scripta scripta</i>	V	Patchy distribution in dry eucalypt forest, often near water. Locally extinct in former southerly parts of its range.	Likely	1,2
Sarus Crane	<i>Grus antigone</i>	Mi	Inhabit open wet and dry grasslands, agricultural fields, marshes and pools. Prefers dry savannah woodlands with ephemeral pools during the breeding season.	Likely	1
White-bellied Sea-eagle	<i>Haliaeetus leucogaster</i>	Mi	In association with large, permanent water bodies. Not known from project area.	Unlikely	1
White-throated Needletail	<i>Hirundapus caudacutus</i>	Mi	Migrant, occasionally found in airspace over project area only.	Likely	1
Barn Swallow	<i>Hirundo rustica</i>	Mi	Summer seasonal migrant to parts of northern Australia. Breeds in Europe, Asia and North America.	Unlikely	1
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	Mi	Estuarine mudflats, saltmarshes and reefs as feeding and roosting habitat.	Unlikely	1
Black-tailed Godwit	<i>Limosa limosa</i>	Mi	Along the coast on sand spits, lagoons and mudflats.	Unlikely	1
Southern Giant-petrel	<i>Macronectes giganteus</i>	E	Marine bird that occurs in Antarctic to subtropical waters.	Does Not Occur	1,4
Rainbow Bee-eater	<i>Merops ornatus</i>	Mi	Variety of habitats. May breed in sand banks of creeks and rivers. Seasonal visitor.	Likely	1
Spectacled Monarch	<i>Monarcha trivirgatus</i>	Mi	Thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	Likely	1

Common Name	Scientific Name	EPBC Act Status	Preferred Habitat	Likelihood of Occurrence Within Rail Corridor	Source
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	Mi	Tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests.	Likely	1
Star Finch (eastern)	<i>Neochmia ruficauda ruficauda</i>	E	Open grasslands and eucalypt woodlands. Along creeks and streams in reeds and tall grasses. Locally extinct in the former southern areas of its range.	Unlikely	1
Australian Cotton Pygmy-goose	<i>Nettapus coromandelianus albigennis</i>	Mi	Freshwater lakes, swamps and large water impoundments.	Does Not Occur	1,2
Little Curlew	<i>Numenius minutus</i>	Mi	Coastal and inland grasslands and black soil plains in northern Australia, near swamps and flooded areas.	Likely	1
Black-throated Finch (southern)	<i>Poephila cincta cincta</i>	E	<i>Eucalypt</i> woodland and riverside vegetation, including paperbark and wattle shrubland.	Likely	1
Kermadec Petrel (western)	<i>Pterodroma neglecta neglecta</i>	V	Marine, pelagic of the subtropical and tropical water of the south Pacific Ocean.	Does Not Occur	1
Australian Painted Snipe	<i>Rostratula australis</i>	V/Mi	Shallow inland wetlands, either freshwater or brackish, and seasonally or ephemerally inundated pastures and grasslands.	Likely	1
Common Greenshank	<i>Tringa nebularia</i>	Mi	On the coast and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.	Likely	1
Marsh Sandpiper	<i>Tringa stagnatilis</i>	Mi	Fresh or brackish (slightly salty) wetlands such as rivers, water meadows, sewage farms, drains, lagoons and swamps.	Likely	1
Little Tern	<i>Sterna albigrons</i>	Mi	Exclusively coastal with sheltered environments preferred.	Does Not Occur	1,2
Mammals					
Northern Quoll	<i>Dasyurus hallucatus</i>	E	Open grassy woodland on rocky hills, breakaway country escarpments.	Likely	1,2,3

Common Name	Scientific Name	EPBC Act Status	Preferred Habitat	Likelihood of Occurrence Within Rail Corridor	Source
Dugong	<i>Dugong dugon</i>	Mi	Coastal waters, estuarine creeks and streams.	Does Not Occur	2
Northern Hairy-nosed Wombat	<i>Lasiorhinus krefftii</i>	E	Semi-arid cattle grazing country (Horsup 1999). Deep sandy soils are required for burrow construction.	Does Not Occur	1,2,3
Eastern Long-eared Bat	<i>Nyctophilus timoriensis</i>	V	Mallee, bulloke <i>Allocasuarina leuhmannii</i> and box eucalypt dominated communities. Roosts in tree hollows, crevices, and under loose bark.	Unlikely	1
Spectacled Flying-fox	<i>Pteropus conspicillatus</i>	V	Rainforest and sometimes mangroves containing Black Flying-foxes (Hall and Richards 2000; Richards 1990).	Does Not Occur	1
False Water Rat	<i>Xeromys myoides</i>	V	Mangrove forests, freshwater swamps and floodplain saline grasslands (Woinarski <i>et al.</i> 2000).	Does Not Occur	1

Status: Commonwealth (EPBC) listed: **E** = Endangered; **V** = Vulnerable; **Mi** = Migratory Species

Source: 1 = EPBC Protected Matters Search; 2 = QEPA WildNet record; 3 = Queensland Museum (QM) record

Relevant Controlling Provisions

MNES relating to terrestrial ecology are discussed in relation to the proposed rail infrastructure corridor based on the results of the EPBC Protected Matters database searches, desktop review of databases and literature and the subsequent fieldwork.

These results indicate that the following terrestrial ecology MNES may potentially be impacted by the construction and / or operation of the proposed rail infrastructure.

Threatened Ecological Communities

- Two EPBC listed ecological communities:
 - Brigalow (*Acacia harpophylla* dominant and co-dominant); and
 - Natural Grassland of the Queensland Central Highlands and the northern Fitzroy Basin.

Threatened species

- Seven EPBC listed flora species:
 - *Acacia ramiflora* – may occur;
 - *Croton magneticus* – may occur;
 - *Eucalyptus raveretiana* (Black Ironbox) – does occur;
 - *Livistona lanuginosa* – may occur;
 - *Omphalea celata* – may occur;
 - *Ozothamnus eriocephalus* – may occur; and
 - *Tephrosia leveillei* – may occur.
- Nine EPBC listed fauna species:
 - *Delma labialis* (Striped-tailed Delma) – may occur;
 - *Denisonia maculata* (Ornamental Snake) – may occur;
 - *Egernia rugosa* (Yakka Skink) – may occur;
 - *Paradelma orientalis* (Brigalow Scaly-foot) – may occur;
 - *Erythrorhynchus radiatus* (Red Goshawk) – may occur;
 - *Geophaps scripta scripta* (Squatter Pigeon) – may occur;
 - *Poephila cincta cincta* (Black-throated Finch) – may occur;
 - *Rostratula australis* (Australian Painted Snipe) – may occur; and
 - *Dasyurus hallucatus* (Northern Quoll) – may occur.

Migratory species

- 12 Migratory bird species:
 - *Apus pacificus* (Fork-tailed Swift) – may occur;
 - *Ardea alba* (Great Egret) - may occur;
 - *Ardea ibis* (Cattle Egret) - may occur;
 - *Gallinago hardwickii* (Latham's Snipe) - may occur;
 - *Grus antigone* (Sarus Crane) - may occur;
 - *Hirundapus caudacutus* (White-throated Needletail) - may occur;
 - *Merops ornatus* (Rainbow Bee-eater) - may occur;
 - *Monarcha trivirgatus* (Spectacled Monarch) - may occur;
 - *Numenius minutus* (Little Curlew) - may occur;
 - *Rostratula australis* (Australian Painted Snipe) - may occur;
 - *Tringa nebularia* (Common Greenshank) - may occur; and
 - *Tringa stagnatilis* (Marsh Sandpiper) - may occur.

For all EPBC listed flora species, the proposed rail infrastructure is either unlikely to result in removal of suitable habitat or where it is likely to (i.e for Black Ironbox) or may result in removal of suitable habitat, extensive areas of similar habitat would be retained within the immediate vicinity. This finding is incorporated into the impacts assessment against the MNES Significant Impact Guidelines 1.1 (2009).

The impact assessment found that the proposal:

- Has the potential to have a significant impact upon six Vulnerable flora species; and
- Is unlikely to have a significant impact upon Black Ironbox.

In relation to fauna species the impact assessment found that the proposal:

- Has the potential to have a significant impact upon Black-throated Finch (southern); and
- Is unlikely to have a significant impact upon:
 - 4 Vulnerable reptile species;
 - 3 Vulnerable bird species; and
 - 12 additional Migratory bird species.

Assessment of Impact on Matters of National Environmental Significance

Tables 3, 4 and 5 identify the potential impacts of the Project on EBC Listed TECs and flora and fauna species likely to occur within the proposed rail corridor. **Tables 6, 7 and 8** provide an assessment of the likely significance of the Project's potential environmental effects on MNES. This assessment is based upon the significant impact criteria identified in the EPBC Act Policy Statement 1.1 – “*Significant Impact Guidelines, Matters of National Environmental Significance*”.

The EPBC Significant Impact Guidelines provide criteria to consider when undertaking a self-assessment to ascertain whether an action is likely to have a significant impact upon MNES. Firstly, a proponent considers whether there are matters of MNES located within the Project area. Secondly, consideration would be given to the proposed action at a broad scale including the potential for indirect impacts. Consideration is given to whether the action is likely to result in a significant impact to the MNES and whether there are adequate mitigation measures in place to avoid or reduce the impacts.

Table 3 shows the estimated clearing extent (on the basis that all Brigalow High Value Regrowth is TEC) and local and bioregional extents for these TECs.

Table 3. Estimated Clearing Extents for TECs

TECs	Area (ha)	Area within 10 km buffer	% Clearing 10 km buffer	Extent within Bioregion	% Clearing within Bioregion
Brigalow Communities	81	25,896	0.31	237,152	0.03
Natural Grassland Communities	48	10,304	0.47	152,208	0.03
TOTAL	129	36,200	0.36	389,360	0.03

Table 4. Potential Impacts on EPBC Listed Flora Species Likely to Occur Within the Proposed Rail Corridor

Species	EPBC Status	Preferred habitat	Occurrence of preferred habitat within project footprint	Potential to be Impacted prior to mitigation measures	Significance of potential impacts	Mitigation measures	Significance of impacts after mitigation
<i>Acacia ramiflora</i>	V	Woodland on sandstone hills.	Yes	Potential to remove individuals or populations. May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (8)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Croton magneticus</i>	V	Vine thickets on skeletal granite, limestone or sandstone soils, including rocky seashores.	Yes (KP 0 - 140)	Potential to remove individuals or populations. Unlikely to result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 2 C = 4 Medium (6)	See Section 7 of this report.	L = 2 C = 2 Low (4)
<i>Eucalyptus raveretiana</i> (Black Ironbox)	V	Along watercourses and on riverflats. Open forest or woodland communities in association with <i>Eucalyptus tereticornis</i> , <i>Corymbia tessellaris</i> , <i>E. camaldulensis</i> , <i>Melaleuca</i> spp. and <i>Casuarina cunninghamiana</i> .	Yes (KP 0 - 100)	Almost certain to require removal of individuals but extensive areas of similar habitat and hundreds of adjoining individuals retained.	L = 5 C = 3 High (8)	See Section 8 of this report.	L = 5 C = 2 Medium (7)
<i>Livistona lanuginosa</i>	V	Restricted to a small area of the Burdekin River Basin along sandy river and creek channels.	Yes (KP 0 - 20)	Potential to remove individuals or populations. Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)

Species	EPBC Status	Preferred habitat	Occurrence of preferred habitat within project footprint	Potential to be impacted prior to mitigation measures	Significance of potential impacts	Mitigation measures	Significance of impacts after mitigation
<i>Omphalea celata</i>	V	Occurs in fragmented SEVT or araucarian microphyll vine forest. Recorded along watercourses in steep sided gorges and gullies on weathered metamorphic or granitic soils.	Yes (KP 0 - 140)	Potential to remove individuals or populations. Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Ozothamnus eriocephalus</i>	V	Known from a range of habitat types, including the margins of disturbed notophyll vine forest, margins of gallery forest, tall microphyll vine forest, open <i>Eucalyptus andrewsii</i> - <i>E. resinifera</i> forest with an understorey of <i>Allocasuarina littoralis</i> , in open eucalypt forest and on rocky ridges within <i>Eucalyptus</i> spp. - <i>Acacia</i> spp. scrub.	Yes	Potential to remove individuals or populations. May result in removal of suitable habitat but extensive areas of similar habitat retained.	L = 3 C = 4 Medium (7)	See Section 8 of this report.	L = 2 C = 2 Low (4)
<i>Tephrosia leveillei</i>	V	Habitat poorly known. Only three records, from an open woodland beside a creek.	Yes	Potential to remove important populations. Unlikely to result in removal of suitable habitat.	L = 2 C = 4 Medium (6)	See Section 8 of this report.	L = 2 C = 2 Low (4)

Table 5. Potential Impacts on Threatened, Near Threatened and Listed Migratory Fauna Species Likely to Occur Within the Proposed Rail Corridor

Species	EPBC Act Status	Potential to be impacted	Significance of potential Impacts	Mitigation Measures	Significance of impacts after mitigation
Reptiles					
Striped-tailed Delma <i>Delma labialis</i>	V	Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats.	L (4) C (2) Medium (6)	<ul style="list-style-type: none"> Employ a fauna handler to check all vegetation prior to clearing; Develop Significant Species Management Plan Infrastructure should be located away from remnant vegetation areas whenever possible; and Ensure only rail infrastructure footprint is cleared. 	L (4) C (2) Medium (6)
Ornamental Snake <i>Denisonia maculata</i>	V	Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats.	L (4) C (2) Medium (6)	<ul style="list-style-type: none"> Employ a fauna handler to check all vegetation prior to clearing; Develop Significant Species Management Plan; Infrastructure should be located away from remnant vegetation areas whenever possible; and Ensure only rail infrastructure footprint is cleared. 	L (4) C (2) Medium (6)
Yakka Skink <i>Egernia rugosa</i>	V	Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats.	L (4) C (2) Medium (6)	<ul style="list-style-type: none"> Employ a fauna handler to check all vegetation prior to clearing; Develop Significant Species Management Plan; Infrastructure should be located away from remnant vegetation areas whenever possible; and Ensure only rail infrastructure footprint is cleared. 	L (4) C (2) Medium (6)

Species	EPBC Act Status	Potential to be impacted	Significance of potential Impacts	Mitigation Measures	Significance of impacts after mitigation
Brigalow Scaly-foot <i>Paradelma orientalis</i>	V	Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats.	L (4) C (2) Medium (6)	<ul style="list-style-type: none"> Employ a fauna handler to check all vegetation prior to clearing; Develop Significant Species Management Plan; Infrastructure should be located away from remnant vegetation areas whenever possible; and Ensure only rail infrastructure footprint is cleared. 	L (4) C (2) Medium (6)
Birds					
Fork-tailed Swift <i>Apus pacificus</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Great Egret <i>Ardea alba</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Cattle Egret <i>Ardea ibis</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Red Goshawk <i>Erythrotriorchis radiatus</i>	V	Unlikely to be impacted as no extensive stands of suitable habitat occur along the line.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Latham's Snipe <i>Gallinago hardwickii</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Squatter Pigeon (southern) <i>Geophaps scripta scripta</i>	V	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)
Sarus Crane <i>Grus antigone</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No Mitigation required.	L (1) C (1) Low (2)

Species	EPBC Act Status	Potential to be impacted	Significance of potential Impacts	Mitigation Measures	Significance of impacts after mitigation
White-throated Needletail <i>Hirundapus caudacutus</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Rainbow Bee-eater <i>Merops ornatus</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Spectacled Monarch <i>Monarcha trivirgatus</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Satin Flycatcher <i>Myiagra cyanoleuca</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Little Curlew <i>Numenius minutus</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Black-throated Finch (southern) <i>Poephila cincta cincta</i>	E	Possible occurrence. Moderate consequence if breeding, minor consequence if not breeding. Highly mobile species able to use adjacent habitats.	L = 3 C = 3 Medium (6)	<ul style="list-style-type: none"> Employ a fauna handler to check all vegetation prior to clearing; Develop Significant Species Management Plan; Avoid construction during the breeding season (February – April) if possible and where not possible survey prior to any vegetation clearing for breeding birds; Infrastructure should be located away from remnant vegetation areas whenever possible; and Ensure only rail infrastructure footprint is cleared. 	L = 3 C = 2 Medium (5)
Australian Painted Snipe <i>Rostratula australis</i>	V/Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)

Species	EPBC Act Status	Potential to be impacted	Significance of potential Impacts	Mitigation Measures	Significance of impacts after mitigation
Common Greenshank <i>Tringa nebularia</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Marsh Sandpiper <i>Tringa stagnatilis</i>	Mi	No or negligible impacts predicted.	L (1) C (1) Low (2)	No mitigation required.	L (1) C (1) Low (2)
Mammals					
Northern Quoll <i>Dasyurus hallucatus</i>	E	Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats.	L (4) C (2) Medium (6)	<ul style="list-style-type: none"> Employ a fauna handler to check all vegetation prior to clearing; Develop Significant Species Management Plan; Infrastructure should be located away from remnant vegetation areas whenever possible; and Ensure only rail infrastructure footprint is cleared. 	L (4) C (2) Medium (6)

Table 6. Assessment of Significance of Impacts on TECs

Species name / EPBC Status	Likelihood of Significant Impact	Assessment Against MNES Significance Criteria
Threatened Ecological Communities known to occur in the study area: Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant) – Endangered	Likely	<ul style="list-style-type: none"> The proposed rail corridor transects approximately 81 ha of mapped remnant vegetation and High Value Regrowth that corresponds to the Brigalow TEC; The required clearing will: <ul style="list-style-type: none"> Result in a reduction in the extent of the ecological community; Fragment and increased fragmentation of the ecological community; and The required clearing could potentially: <ul style="list-style-type: none"> Modify abiotic factors necessary of the TEC survival, including substantial alteration to surface water drainage patterns; Cause a substantial change in the species composition of an occurrence of the TEC, including causing a decline or loss of functionally important species; Cause a substantial reduction in the quality or integrity of an occurrence of the TEC through assisting invasive species, that are harmful to the listed TEC, to become established; and Interfere with the recovery of the TEC.
Threatened Ecological Communities known to occur in the study area: Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin - Endangered	Likely	<ul style="list-style-type: none"> The proposed rail corridor transects approximately 48 ha of mapped remnant vegetation that corresponds to the Natural Grassland TEC; The required clearing will: <ul style="list-style-type: none"> Result in a reduction in the extent of the ecological community; Fragment and increased fragmentation of the ecological community; The required clearing could potentially: <ul style="list-style-type: none"> Modify abiotic factors necessary of the TEC survival, including substantial alteration to surface water drainage patterns; Cause a substantial change in the species composition of an occurrence of the TEC, including causing a decline or loss of functionally important species; Cause a substantial reduction in the quality or integrity of an occurrence of the TEC through assisting invasive species, that are harmful to the listed TEC, to become established; and Interfere with the recovery of the TEC.

Table 7. Assessment of Impacts on MNES Flora Species

Species name / EPBC Status	Likelihood of Significant Impact	Assessment Against MNES Significance Criteria
<p>Vulnerable Species known to occur in the study area:</p> <p><i>Eucalyptus raveretiana</i> (Black Ironbox) – Vulnerable</p>	Not likely	<ul style="list-style-type: none"> Black Ironbox is widespread in larger watercourses between KP 0-100; The Black Ironbox population of the rail corridor does not constitute an “important population”; <ul style="list-style-type: none"> The rail corridor does not provide a key breeding / dispersal resource (the species has a widespread distribution in the region and breeds across its range); The relatively small terrestrial development footprint does not support a population that is necessary to maintain genetic diversity in the species; and The rail corridor does not affect the limit of the species range. Given the populations and availability of habitat within the surrounding region, the Project will not have a significant detrimental impact on populations of this species; The minimal loss of habitat and any mortality or other adverse impacts on individual plants will not result in: <ul style="list-style-type: none"> The long-term decrease in the size of an important population; A reduction in the area of occupancy of an important population; Fragmentation of an existing important population into two or more populations; Disruption of the breeding cycle of an important population; or Modification, destruction, removal or isolation or a decrease in the availability or quality of habitat to the extent that the species is likely to decline; and The Project is unlikely to introduce disease that may cause the species to decline.
<p>Vulnerable Species potentially occurring in the study area:</p> <p><i>Acacia ramiflora</i> – Vulnerable</p> <p><i>Croton magneticus</i> – Vulnerable</p> <p><i>Livistona lanuginosa</i> - Vulnerable</p>	Possible	<ul style="list-style-type: none"> There is potential that an important population for these EPBC listed flora species occurs within the proposed rail corridor. This cannot be confirmed until a detailed on ground flora survey of all remnant vegetation areas has been conducted. Therefore, the precautionary principal is adopted for the following findings; A population of threatened species potentially occurring within the rail corridor may constitute an “important population” and <ul style="list-style-type: none"> The study area may provide a key breeding / dispersal resource for some of these species; The terrestrial development footprint may support a population that is necessary to maintain genetic diversity in the threatened species; and The study area is known to occur near the limit of these threatened species ranges;

<p><i>Omphalea celata</i> – Vulnerable</p> <p><i>Ozothamnus eriocephalus</i> – Vulnerable</p> <p><i>Tephrosia levelleii</i> – Vulnerable</p>	<ul style="list-style-type: none">• Given the availability of habitat within the surrounding region, the Project is unlikely to have a significant detrimental impact on populations of threatened species, but this cannot be confirmed until a detailed survey has been conducted;• The loss of habit and any mortality or other adverse impacts on individual plants or animals could potentially result in:<ul style="list-style-type: none">- The long-term decrease in the size of an important population;- A reduction in the area of occupancy of an important population;- Fragmentation of an existing important population into two or more populations;- Disruption of the breeding cycle of an important population; or- Modification, destruction, removal or isolation or a decrease in the availability or quality of habitat to the extent that the species is likely to decline;• The Project may result in an increase of invasive species that are harmful to these species becoming established in their habitat. However, none of the potentially present species are notably sensitive to invasive species and the implementation of a weed and vegetation management plan and pest animal management plan is reduces the risk of a significant impact from invasive species; and• The Project is unlikely to introduce disease that may cause an Endangered or Vulnerable species to decline.
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Table 8. Assessment of Significance of Impacts on MNES Fauna

Species name / EPBC Status	Likelihood of Significant Impact	Assessment Against MNES Significance Criteria
<p>Endangered Species potentially occurring in the study area:</p> <p>Black-throated Finch (southern)</p> <p><i>Poephila cincta cincta</i> – Endangered</p>	<p>Possible (Moderate consequence if breeding, minor consequence if not breeding. Highly mobile species able to use adjacent habitats)</p>	<p>There is a real possibility that a population of this species utilises the proposed rail corridor, due to the availability of similar habitat in adjacent areas, and that without appropriate mitigation measures the proposal could:</p> <ul style="list-style-type: none"> - Disrupt the breeding cycle of a population; or - Interfere with the recovery of the species. <p>It is unlikely that the proposed rail infrastructure would:</p> <ul style="list-style-type: none"> - Lead to the long-term decrease in the size of the population; - Reduce the area of occupancy of the species; - Fragment an existing population into two or more populations; - Adversely affect habitat critical to the survival of a species; - Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; - Result in invasive species that are harmful to the species becoming established in their habitat; or - Introduce disease that may cause the species to decline.
<p>Endangered Species potentially occurring in the study area:</p> <p>Northern Quoll</p> <p><i>Dasyurus hallucatus</i> – Endangered</p>	<p>Unlikely (Likely to result in removal of suitable habitat but minor consequence as species able to use adjacent habitats)</p>	<p>Although there is a possibility that a population of this species utilises the proposed rail corridor, due to the availability of similar habitat in adjacent areas, it is unlikely that the construction or operation of the rail infrastructure would:</p> <ul style="list-style-type: none"> - Lead to the long-term decrease in the size of the population; - Reduce the area of occupancy of the species; - Fragment an existing population into two or more populations; - Disrupt the breeding cycle of a population; - Adversely affect habitat critical to the survival of a species; - Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; - Result in invasive species that are harmful to the species becoming established in their

Species name / EPBC Status	Likelihood of Significant Impact	Assessment Against MNES Significance Criteria
		<p>habitat;</p> <ul style="list-style-type: none"> - Introduce disease that may cause the species to decline; or - Interfere with any recovery of the species.
<p>Vulnerable Species potentially occurring in the study area:</p> <p>Striped-tailed Delma <i>Delma labialis</i> – Vulnerable</p> <p>Ornamental Snake <i>Denisonia maculata</i> – Vulnerable</p> <p>Yakka Skink <i>Egernia rugosa</i> – Vulnerable</p> <p>Brigalow Scaly-foot <i>Paradelma orientalis</i> – Vulnerable</p>	<p>Unlikely (Likely to result in removal of habitat but minor consequence as species able to use adjacent habitats)</p>	<p>Given the availability of habitat within the surrounding region, the Project is unlikely to result to:</p> <ul style="list-style-type: none"> - Lead to the long-term decrease in the size of an important population; - Reduce the area of occupancy of an important population; - Fragment an existing important population into two or more populations; - Adversely affect habitat critical to the survival of these species; - Disrupt the breeding cycle of an important population; - Modify, destroy, remove or isolate or decrease in the availability or quality of habitat to the extent that the species is likely to decline; - Result in invasive species that are harmful to the species becoming established in their habitat; - Introduce disease that may cause the species to decline; or - interfere with the recovery of the species.
<p>Vulnerable Species potentially occurring in the study area:</p> <p>Red Goshawk <i>Erythrorhynchus radiatus</i> – Vulnerable</p>	<p>Unlikely (Unlikely to be impacted as no extensive stands of suitable habitat occur along the line)</p>	<p>Given the availability of habitat within the surrounding region, the Project is unlikely to result to:</p> <ul style="list-style-type: none"> - Lead to the long-term decrease in the size of an important population; - Reduce the area of occupancy of an important population; - Fragment an existing important population into two or more populations; - Adversely affect habitat critical to the survival of these species; - Disrupt the breeding cycle of an important population; - Modify, destroy, remove or isolate or decrease in the availability or quality of habitat to the extent that the species is likely to decline; - Result in invasive species that are harmful to the species becoming established in their habitat; - Introduce disease that may cause the species to decline; or - Interfere with the recovery of the species.

Species name / EPBC Status	Likelihood of Significant Impact	Assessment Against MNES Significance Criteria
<p>Vulnerable Species potentially occurring in the study area:</p> <p>Squatter Pigeon</p> <p><i>Geophaps scripta</i> – Vulnerable</p> <p>Australian Painted Snipe</p> <p><i>Rostratula australis</i> – Vulnerable</p>	<p>Unlikely</p> <p>(No or negligible impacts predicted)</p>	<p>Given the availability of habitat within the surrounding region, the Project is unlikely to result to:</p> <ul style="list-style-type: none"> - Lead to the long-term decrease in the size of an important population; - Reduce the area of occupancy of an important population; - Fragment an existing important population into two or more populations; - Adversely affect habitat critical to the survival of these species; - Disrupt the breeding cycle of an important population; - Modify, destroy, remove or isolate or decrease in the availability or quality of habitat to the extent that the species is likely to decline; - Result in invasive species that are harmful to the species becoming established in their habitat; - Introduce disease that may cause the species to decline; or - Interfere with the recovery of the species.
<p>Migratory Species potentially occurring in the study area:</p> <p>Fork-tailed Swift</p> <p><i>Apus pacificus</i> - Migratory</p> <p>Great Egret</p> <p><i>Ardea alba</i> - Migratory</p> <p>Cattle Egret</p> <p><i>Ardea ibis</i>- Migratory</p> <p>Latham's Snipe</p> <p><i>Gallinago hardwickii</i> - Migratory</p> <p>Sarus Crane</p> <p><i>Grus antigone</i> - Migratory</p>	<p>Unlikely</p> <p>(No or negligible impacts predicted)</p>	<p>Given the availability of habitat within the surrounding region, the Project is unlikely to result to:</p> <ul style="list-style-type: none"> - Lead to the long-term decrease in the size of an important population; - Reduce the area of occupancy of an important population; - Fragment an existing important population into two or more populations; - Adversely affect habitat critical to the survival of these species; - Disrupt the breeding cycle of an important population; - Modify, destroy, remove or isolate or decrease in the availability or quality of habitat to the extent that the species is likely to decline; - Result in invasive species that are harmful to the species becoming established in their habitat; - Introduce disease that may cause the species to decline; or - Interfere with the recovery of the species.

Species name / EPBC Status	Likelihood of Significant Impact	Assessment Against MNES Significance Criteria
White-throated Needletail <i>Hirundapus caudacutus</i> - Migratory		
Rainbow Bee-eater <i>Merops ornatus</i> - Migratory		
Spectacled Monarch <i>Monarcha trivirgatus</i> - Migratory		
Satin Flycatcher <i>Myiagra cyanoleuca</i>		
Little Curlew <i>Numenius minutus</i> - Migratory		
Australian Painted Snipe <i>Rostratula australis</i> – Vulnerable and Migratory		
Common Greenshank <i>Tringa nebularia</i> - Migratory		
Marsh Sandpiper <i>Tringa stagnatilis</i> – Migratory		

Mitigation Measures

The construction and operation of the proposed development has the potential to have a number of direct and indirect impacts on the threatened flora and fauna species and Migratory species occurring within or overlapping the proposed rail infrastructure corridor. These impacts include:

- Direct spatial reduction in remnant vegetation due to clearing;
- Increased edge effects (through transecting large vegetation areas as well as reducing edge to area ratios) including the potential to increase the abundance of Buffel Grass and other weeds, feral animals and fire;
- Potential for dust to reduce the health of vegetation in the vicinity of the clearance footprint;
- Potential for temporary facilities, materials and equipment to damage areas outside the construction footprint;
- Potential to alter the hydrological characteristics for areas upstream and downstream of the rail corridor; and
- Potential for accidental and inappropriate release of pollutants which could contaminate soil and water, reducing the health of riparian and water dependant vegetation.

The proposed mitigation measures to minimise the potential impacts of the Project include:

- Develop a vegetation offset strategy in consultation with DERM and DSEWPC;
- Develop a Fire Management Plan in accordance with the relevant local planning policies, the relevant State planning policy and in consultation with the Rural Fire Service;
- Develop and a Weed and Pest Management Plan in consultation with Biosecurity Queensland and the various regional council's;
- Conduct a detailed flora and fauna survey of all remnant vegetation areas within the corridor prior to finalising the alignment with the purpose of identifying the presence of significant flora and fauna species as listed under Commonwealth and State legislation. Where significant species are identified, all practicable measures will be implemented to avoid or limit impacts;
- Develop a Species Management Plan in accordance with Commonwealth and State requirements for vegetation offsets, DERM's *Back on Track Species Prioritisation Framework* and other relevant management and / recovery plans to reduce the impacts on significant fauna species. Where habitat for significant fauna species is identified, all practicable measures will be implemented to limit the impact;
- Develop a Significant Community / Species Management Plans in accordance with Commonwealth and State legislation for vegetation offsets and any relevant State management and recovery plans;
- Develop and implement a Sediment and Erosion Management Plan in accordance with the relevant local planning policies and the relevant State planning policy;
- All vegetation clearing boundaries will be clearly identified in the field to avoid inadvertent clearing of native vegetation;

- Clearly mark designated revegetation / rehabilitation zones and other no go areas (including large sign cant trees) prior to any vegetation clearing. High visibility tape, barricade webbing or similar will be used to avoid inadvertent clearing of native vegetation;
- When working in and around remnant vegetation, a suitably qualified person will inspect the area for threatened species;
- Any additional clearing of native vegetation outside the approved area of disturbance will not be carried out without the necessary approvals;
- Felled vegetation should be mulched and reused on site. Hollow logs and large debris will be salvaged for the use of habitat enhancement within areas designated for rehabilitation;
- Dust monitoring should be undertaken and dust reduction measures should be implemented where necessary. These measures could include:
 - The regular maintenance and wetting down of tracks to minimise dust generation; and
 - The implementation and enforcement of a site speed limit to minimise dust generation;
- Cleared areas will be rehabilitated as soon as practicable;
- Where practical use existing and designated access tracks, avoiding unnecessary clearing of large mature remnant trees where possible;
- Detailed fauna and fauna habitat surveys will be conducted of all remnant vegetation areas within the corridor prior to finalisation of the alignment;
- Removal of vegetation in a staggered sequence to allow fauna species to relocate off site;
- Minimised clearing of large trees in riparian areas to protect potential nesting trees of raptors;
- Any injured fauna will be taken to the nearest vet or reported to the relevant Authority;
- Recognised fauna spotter / catcher (DERM certified) to inspect the corridor immediately prior to clearing vegetation;
- Contact details for qualified animal carers and vets within the areas will be outlined and provided to relevant staff;
- Development and implementation of protocols for any displaced fauna to be relocated to more suitable similar habitat within the surrounding area;
- Implementation of waste management measures to minimise increased numbers of introduced animal and opportunistic native fauna in the Project area;
- Where possible rehabilitation of disturbed areas associated with construction works with suitable endemic vegetation to enhance their potential for fauna movement; and
- Appropriate strategies will be developed and implemented to minimise the risk of road kill including (reduced speed zones, minimise vehicle movement during times of high fauna activity, for example dawn, dusk and at night).

Conclusion

The impact assessments against the MNES Significant Impact Guidelines 1.1 (2009) found that the proposal:

- Is likely to have a significant impact upon:
 - Brigalow (*Acacia harpophylla* dominant and co-dominant); and
 - Natural Grassland of the Queensland Central Highlands and the northern Fitzroy Basin;
- Has the potential to have a significant impact upon:
 - Six Vulnerable flora species; and
 - Black-throated Finch (southern);
- Is unlikely to have a significant impact upon:
 - Black Ironbox;
 - 4 Vulnerable reptile species;
 - 3 Vulnerable bird species; or
 - Any Migratory bird species.

However, with the implementation of appropriate mitigations measures, including undertaking detailed on-ground flora and fauna surveys through all remnant vegetation areas prior to alignment finalisation and the provision of compensatory offsets for unavoidable impacts, the potential for significant impact is minimised.

References

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Commonwealth Conservation Advice on *Croton magneticus* (Threatened Species Scientific Committee, 2008) [Conservation Advice]. In: Department of Sustainability, Environment, Water, Population and Communities (2011). *Croton magneticus* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>. Accessed Mon, 7 Feb

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Commonwealth Conservation Advice on *Delma labialis* (Striped-tailed Delma) (Threatened Species Scientific Committee, 2008) [Conservation Advice]. In: Department of Sustainability, Environment, Water, Population and Communities (2011). *Delma labialis* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>. Accessed Mon, 7 Feb 2011.

Commonwealth Conservation Advice on *Paradelma orientalis* (Brigalow Scaly-foot) (Threatened Species Scientific Committee (TSSC), 2008) [Conservation Advice]. In: Department of Sustainability, Environment, Water, Population and Communities (2011). *Paradelma orientalis* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>. Accessed Mon, 7 Feb.

Commonwealth Conservation Advice on *Geophaps scripta scripta* (Squatter Pigeon (southern)) (Threatened Species Scientific Committee, 2008) [Conservation Advice]. In: Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) (2011). *Geophaps scripta scripta* in Species Profile and Threats Database,

Commonwealth Listing Advice for *Rostratula australis* (Australian Painted Snipe) (Threatened Species Scientific Committee, 2003n) [Listing Advice]. In: Department of Sustainability, Environment, Water, Population and Communities (2011). *Rostratula australis* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>. Accessed Mon, 7 Feb.

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Hill B.M. and Ward S.J. (2010). National Recovery Plan for the Northern Quoll *Dasyurus hallucatus*. Department of Natural Resources, Environment, The Arts and Sport, Darwin.

Environmental Protection Authority (EPA), 2007, 'Striped-tailed Delma', Queensland National Parks and Wildlife Service, viewed 31 March 08, <http://www.epa.qld.gov.au/nature_conservation/wildlife/az_of_animals/stripedtailed_delma/

Queensland Parks and Wildlife Service QPWS and Forest Management (2001). *Denisonia maculata* (Ornamental Snake).

Queensland Parks and Wildlife Service QPWS and Forest Management (2001). *Egernia rugosa* (Yakka Skink).

NSW National Parks & Wildlife Service (2002). *Approved Recovery Plan for the Red Goshawk (Erythrorhynchus radiatus)*, NSW National Parks & Wildlife Service, Hurstville.



Appendix 2. Curriculum Vitae



Steve Fox

General Manager, Environment

Profile

Steve has more than 13 years experience in environmental approvals (including under Part 3A of the *Environmental Planning & Assessment Act, 1997*), impact assessment studies, native vegetation identification and mapping, ecological monitoring and land management and rehabilitation. He has managed numerous environmental impact assessments for linear infrastructure projects including gas, water and slurry pipelines, main roads and powerlines, as well as several major urban and regional development projects, including coal seam gas field developments. Steve has managed multidisciplinary teams undertaking approvals studies and liaised directly with Federal, State and local government agencies as part of obtaining environmental approvals for large and medium sized infrastructure projects. He is thoroughly conversant with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* as well as the principal NSW and Queensland environmental legislation and approvals requirements.

Qualifications

Post Graduate Certificate	Urban and Regional Planning 2003
Bachelor of Applied Science - Natural Systems and Wildlife Management	University of Queensland 1995

Awards

1st Class Hons. and University Medal	University of Queensland 1995
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Affiliations

Ecological Society of Australia
 Environmental Institute of Australia and New Zealand
 Australian Pipeline Industry Association
 Queensland Petroleum and Exploration Association

Career summary

2008 - current	Unidel Group – Associate Director; Environmental Assessment, Approval Management and Compliance
2003 - 2008	HLA-Envirosciences – Manager Environmental Services Group
2001 - 2003	KBR – Environmental Scientist/Botanist
1996 - 2001	Lockyer Catchment Association – Technical Officer
1995	University of Queensland – Lecturer in Botany

Recent Papers & Publications

Fox, S. and Mathieson, W. 2008. "Carbon Credits and Environmental Offsets what does it mean to the Pipeline Industry". Co-author and co-presenter on this paper presented at the Australian Pipeline Industry Association Conference, Perth, October 2008.

T. Read, S. Fox and L. Keliher. 2005. "Ecosystem Re-establishment on Waste Rock Dumps at Mount Morgan Mine Comparison of 1m and 2m Cover Trials after Two Years". Co-author and sole presenter of joint paper presented to the Australian Centre for Minerals Extension and Research (ACMER) "Challenges to the Establishment of Sustainable Ecosystems on Mined Lands across Diverse Biogeographic Zones" Workshop, Townsville, July 2005.

Fox, S. and Baldock, R. 2003. "Monitoring Road Reserves for Sustainability". Principal author and sole presenter of joint paper presented to the 21st ARRB Transport Research and 11th Road Engineering Association of Asia and Australasia (REAAA) Conference, Cairns.

Areas Of Expertise

- Environmental approvals
- Liaison with government agencies



Steve Fox

General Manager, Environment

- Environmental Impact Assessments and Management Plans
- Managing environmental assessment teams
- Vegetation and Biodiversity Offsets
- Flora surveys and vegetation mapping
- Ecology and ecological monitoring
- Land management

Relevant Experience

Infrastructure corridor and field projects	<ul style="list-style-type: none"> • Queensland Curtis LNG Project (QGC)- EIS study coordinator and joint author for gas field and pipeline components . Principle author of vegetation and biodiversity offset strategy. • Proposed Wallumbilla to Bulla Park Gas Pipeline (APA) - Advice and management of environmental approvals for a pipeline under NSW (Part 3A), Queensland and Commonwealth jurisdictions. • Richmond Valley Power Station and Casino Gas Project (Metgasco) - Management and authorship of ecological studies and provision of ecological input into Part 3A and <i>EPBC Act</i> approvals applications and approvals strategy. • Hunter Gas Pipeline (Qld Section) – Managed technical studies for flora, fauna, soils, surface water and groundwater. Studies meet agency approvals requirements without necessity for any additional work • EIS studies, including controlled actions under the EPBC Act for several gas and water pipelines, a geosequestration pipeline, a slurry pipeline, an infrastructure corridor and a number of power road and rail corridors. Clients include Epic Energy, APC, Hunter Gas, ZeroGen, Energex, Stanwell, Santos, Ergon, Origin Energy, Enertrade, Gladstone Pacific Nickel, NSW RTA, various other Government Departments and Shire Councils
Mining experience	<ul style="list-style-type: none"> • Galilee-Coal Project (Waratah Coal) • Olympic Dam Expansion (BHP Billiton) - Flora survey of Great Artesian Basin mound-spring communities as part of EIS • Mount Morgan Mine Rehabilitation Program (Qld Dep't of Natural Resources and Mines) – Managed revegetation trials • Progressive mine rehabilitation policy review (Qld EPA) – Principal researcher and associate author
Land development	<ul style="list-style-type: none"> • Various appeals eg for subdivision proposals and against an EPA decisions; as well as responses to Brisbane City Council and other consenting agency requests in preparation for potential legal appeals • Ecological assessment and monitoring for proposed canal and residential developments for QM Properties and Lakeview Developers • Vegetation management and rehabilitation plan for the Department of State Development's Synergy Industrial Park
Land management and rehabilitation	<ul style="list-style-type: none"> • Threatened Species Management Plan for Braemar Peaking Plant near Dalby, (Energex then Origin Energy) • Vegetation management and weed control works eg in two locations for the Department of Defence, for Reef Cove Resort proposal, QM Properties' Pacific Harbour Golf Course and Enertrade's North Queensland gas pipeline project • Lockyer Creek rehabilitation project (Lockyer Creek) • Coastal resource and management practices survey (Caloundra City Council)
Defence	<ul style="list-style-type: none"> • Management of on-ground implementation of broadscale weed control works at Enoggera, Greenbank, Wide Bay and Shoalwater military training areas



Steve Fox

General Manager, Environment

Biodiversity Offset

- Management of revegetation program at Enoggera training area.
- Development of an offsets strategy for the Queensland Curtis LNG Project
- Management of offset selection and landholder engagement for the Queensland Curtis LNG Project
- Assessment of the APA Wallumbilla – Newstead Pipeline' s offset requirements
- Management of offset selection and landholder engagement for the Wiggins Island Coal Terminal Project



Geoff Sharp

Principal Environmental Scientist

Profile

Geoff has 15 years experience in landholder liaison, soil and vegetation survey, environmental impact assessment and site rehabilitation. Geoff blends government and private sector experience in development approvals, particularly clearing permits and vegetation offsets. He has recently advised on purchase of regrowth in South East Queensland and facilitated its partial use in a \$1.7 million dollar habitat offset deal while protecting the landowners' property rights to the sites future timber resources. Offsetting is a driving personal interest which provides many opportunities for ethical profits.

Qualifications

Postgraduate Diploma in Project Management (in progress)	Australian Institute of Management
Graduate Diploma of Engineering Technology	University of Southern Queensland
Bachelor of Natural Resources	University of New England

Papers & Publications

Sharp, G, Stone, H and Jannusch N 2009 Management of the vulnerable plant species, *Sclerolaena walkeri* in a remote electricity corridor, Currawinya National Park, *Ecological Management and Restoration*, Volume 10 Number 2 2009

Sharp and McGarry 2003 *Soil Workability and Compaction Risk of 29 New South Wales and Queensland Cropping Soils* In: Proceedings of the International Soil and Tillage Research Organisation Conference, Brisbane, 2003.

McGarry and Sharp 2003 *A Comparison of Soil Physical Properties and Soil Morphology under Adjoining Fields of Conventional and Reduced Till with Controlled Traffic* In: Proceedings of the International Soil and Tillage Research Organisation Conference, Brisbane, 2003.

D. McGarry and G Sharp, 2001. *A rapid, farmer-useable method for assessing soil structure condition to support conservation agriculture*, 1st World Congress on Conservation Agriculture, Madrid, 1-5 October 2001

D McGarry, G Sharp and S Bray, 2000. *Soil Compaction Risk Assessment*. A farmer self-diagnosis kit, Queensland Department of Natural Resources, Brisbane.

G Sharp and D McGarry, 1999. *Assessing Soil Structure: A simple field guide*, Queensland Department of Natural Resources.

D McGarry, G Sharp & S Bray, 1999. *The current status of soil structure degradation in Queensland Cropping Soils*, Department of Natural Resource, Queensland.

D McGarry & G Sharp, 1997. *GIS at farm and local scales with particular reference to precision agricultural*. In proceedings of a workshop 28-29 August 1997. T.J. East and S.M. Dempsey (Eds). Department of Agriculture & Fisheries and Forestry, Australia Canberra Bureau of Rural Science.

G Sharp, 1996. *Land Resources* in Noble (Ed) Understanding and Managing Soils in the Moreton Region, Queensland Department of Primary Industries, Training Series



Geoff Sharp

Principal Environmental Scientist

Career Summary

2010 – Current	Unidel Group Pty Ltd – Offsets Manager
2004 – 2010	Ergon Energy – Environmental Advisor Southern
2002 – 2004	Department of Natural Resources and Mines – Planning and Environment Officer
2000 – 2002	Sinclair Knight Merz – Toowoomba Office Manager, Project Manager, Environmental Scientist
1997 - 2000	Queensland Department of Natural Resources – Land Resources Extension Officer
1996 – 1997	Bureau of Sugar Experiment Stations – Extension Officer
1995 – 1996	Queensland Department of Natural Resources – Land Resources Officer

Areas Of Expertise

- Permitting and offsetting process for clearing remnant vegetation
- Negotiating with landholders and regulators to achieve mutual agreement
- Development of Vegetation Management Plans for offset areas
- Assessment of vegetation for remnant status and modification of relevant maps with DERM

Relevant Experience

Vegetation and Biodiversity Offsets	<ul style="list-style-type: none"> • Ergon Energy - Advising on purchase of 10,000 ha of timber production properties based on potential for use in offsetting of vegetation clearing impacts. Negotiation of price per hectare based on land value and each Regional Ecosystem's rarity and ecological attributes. Lodging of Property Maps of Assessable vegetation, lodging of remnant map modification requests on third parties land, gathering evidence to change regulatory remnant and regrowth maps, routine determination of regional ecosystems and remnant status in the field for new construction projects. • Ergon Energy - Negotiating Vegetation Management Plans with DERM for offset areas sold and purchased by Ergon Energy
	<ul style="list-style-type: none"> • Ergon Energy - Advice on securing offsets from third parties for impacts of new construction • Ergon Energy - Prepared project purchase of \$1.2 million dollars worth of pre-emptive offsets in 2007. • Ergon Energy - Creation of regional ecosystems and threatened species offsets on public reserves for offsetting project impacts as part of permit or development conditions • Dept Natural Resources and Mines - Assessment of land degradation hazard parameters for 100 000s ha of tree clearing permits under the Vegetation Management Act 1999. Development of reasonable conditions.
	<ul style="list-style-type: none"> • Ergon Energy - Environmental advice for maintenance, operational works and new construction projects including clearing permits and offsets under the <i>Vegetation management Act</i> and the <i>Nature Conservation Act</i>, licensing of environmentally relevant activities, vegetation clearing, site rehabilitation, cultural heritage and other legislative requirements.
	<ul style="list-style-type: none"> • Ergon Energy - Negotiation of environmental management plans with regulatory agencies, particularly DERM Supervising contractors for onsite remediation of environmental impacts such as contamination, erosion and excessive clearance. Establishing and managing offset areas for project impacts and for external sale.
Environmental Management Plans	



Geoff Sharp

Principal Environmental Scientist

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| Environmental Impact Statements | <ul style="list-style-type: none"> • Dept Natural Resources and Mines - Developed and implemented project to remove remnant vegetation map modification backlog associated with tree clearing permits. This involved collation of field and remote sensed data and facilitation of remnant map modifications within the Environmental Protection Agency. This project was completed under time pressure and involved liaison between internal staff in Charleville, Roma, Toowoomba and Brisbane and the EPA. • SKM - Soil and vegetation survey including soil rehabilitation plan for the 3200 ha Clermont coal project. • SKM - Preparation of the Subtropical Dairy Region Natural Resource Management Strategic Plan. |
| Review of Environmental Factors | <ul style="list-style-type: none"> • Dept Natural Resources and Mines - Development assessment and Environmental Impact Statements • SKM - Preparation of Environmental Impact Statement for Bundaberg industrial development at the Fairymead sugar mill, water storages on the Burnett River, expansion of smelter facilities and power plant construction. • Roads and Traffic Authority - Responding to EIS submissions on major construction projects, measuring noise pollution and roadside revegetation |
| Environmental assessments | <ul style="list-style-type: none"> • SKM - Preparation of Reviews of Environmental Factors for highway construction though out Southern Queensland. • SKM - Catchment scale land suitability mapping for the Greater Taree Shire • SKM - Analysis of bush fire hazard for Mackay Shire based on Queensland SKM - Guidelines. The Shire was classified into High, Medium and Low risk and appropriate development control procedures recommended. • SKM - Assessment of soil condition and crop performance under controlled traffic farming systems in Northern NSW and Qld for the Grains Research and Development Corporation. Farmer workshops were utilised to exchange information. • SKM - Evaluation of acid sulfate soils for civil construction projects • SKM - Erosion and sediment control plans for industrial, powerline and road construction. Assessment of rehabilitation plans for mines and civil earthworks. • SKM - Land disposal of sewerage treatment plant effluent for Bunya Mountains, Stanthorpe Shire, Allora townships, Townsville, Darney Island (Torres Strait), Hopevale (Cape York), Bundaberg, Bowen, Mareeba and tourist developments. Irrigation of industrial waste water at Tarong power station, Townsville. • Department of Natural Resources - Produced technical and extension material and ran farmer workshops on soil • Department of Natural Resources - Soil compaction research and extension for common and problematic cropping soils of South Queensland • Bureau of Sugar Experiment Stations - Agronomic and environmental adviser to 250 cane growers spread over 80 km of coastal low lands south of Mackay. Worked with community groups such as Landcare, Waterwatch, Local Councils to coordinate land management and drainage issues. Trained and establish water monitoring network and Catchment Care group for the Coastal Creek south of Sarina. • Bureau of Sugar Experiment Stations Surveying dam sites, contour banks, drainage and irrigation systems, waterways and tailwater recycling systems. Air photos, contour maps and Geographic Information System were used to produce farm plans. Acid sulfate soil management. |



Bruce Thomson

Principal Ecologist

Profile

Bruce Thomson has 30 years of experience in a broad range of environmental assessment, management, concept planning, project proposal and development and conservation disciplines. He is a senior ecologist and biodiversity planner and has worked as a professional botanist, wildlife researcher and conservation manager. Bruce has managed scientific and technical staff (project management) and associated budgets and work programs. He has strong communication skills, having negotiated conservation outcomes in difficult situations with potentially hostile stakeholders; published and presented numerous industry papers, workshops and seminars; and participated in media news and documentary interviews.

Bruce's government and university background has provided experience in fauna consultancy work for the mining industry and he was appointed scientific advisor to the Queensland Government's Flying Fox Consultative Committee. Bruce has conducted field surveys throughout the Northern Territory and has conducted wildlife surveys in southeast Queensland for the Queensland Parks and Wildlife Service.

Qualifications

PhD "Social ecology of the Chocolate Wattled Bat, <i>Chalinolobus morio</i> , in southeast Queensland	University of Queensland
Masters of Business Administration (Marketing, Public Sector & Strategic Management) – includes formal qualifications in HRM	University of New England
Bachelor of Applied Science (Natural Resource Management)	University of Canberra

Recent Papers & Publications

Thomson, B.G. (2004) Conservation Management of Cave-dwelling Bats in *Protected Area Management (Principles and Practices)*. Oxford University Press

Thomson, B.G., Reardon, T. and Pavey, C. (2004). *Recovery plan for cave-dwelling bats - Rhinolophus philippinensis, Hipposideros semoni and Taphozous troughtoni* 2000 -2005. Report to Department of the Environment and Heritage, Canberra. Queensland Parks and Wildlife Service, Brisbane

Thomson, B.G. (2006) *Australia's Most Deadly and Dangerous Beasts*, Lothian Publishers, Melbourne

Shulz, M and Thomson, B (2007) National Recovery Plan for the Bare-rumped Sheath-tail Bat, *Saccolaimus saccolaimus*. Report to Department of the Environment and Water Resources, Canberra. Queensland Parks and Wildlife Service, Brisbane

Career Summary

2008 – Current	Unidel Group Pty Ltd – Principal Ecologist
2003 – 2008	Queensland Parks and Wildlife Service - Senior Conservation Officer (Central Office Secondment) - Bat conservation and policy development
1993 – 2002	Queensland Parks and Wildlife Service - Senior Conservation Officer (Management Planning)
1983 – 1993	Wildlife Research Section, Conservation Commission of the Northern Territory, Alice Springs - Officer in Charge, Northern Territory Southern Regional Herbarium
1981 – 1983	Northern Territory Herbarium, NT Department of Primary Production, Alice Springs - Scientific Research Officer, P2
1979 – 1981	Wildlife Research Section, Territory Parks and Wildlife Commission, Alice Springs - Technical Assistant T2

Areas Of Expertise

- Collection / identification of botanical specimens, nocturnal insects and small mammal bone
- Bat survey using mist nets, bat traps, water trip lines, echo-location call analysis, transect



Bruce Thomson

Principal Ecologist

material	methodologies and anecdotal observations
<ul style="list-style-type: none"> • Elliott and large cage trapping and pit fall trapping of small mammals, reptiles and arthropods • Extensive involvement with Aboriginal Traditional Owners in fauna survey work in the NT 	<ul style="list-style-type: none"> • Anecdotal observations of wildlife and active searching techniques • Recording of wildlife with automated camera systems (built by Bruce Thomson)
Relevant Experience	
Flora	<ul style="list-style-type: none"> • Botanical surveys, species inventories and biodiversity assessments for projects such as the Yulara development at Ayers Rock • Acquisition planning for national parks such as Kings Canyon NP, Gregory NP on the Victoria River and parts of the Tanami Desert including type specimens for newly recognised species • Monitored and conducted ecological studies on two rare and endangered plant species and described two new species from the northern parts of WA • Curated the NT Herbarium
Fauna	<ul style="list-style-type: none"> • Conducted fauna trapping surveys for: <ul style="list-style-type: none"> ◦ Queensland Curtis LNG Project (QGC) ◦ Galilee-Coal Project (Waratah Coal) • Conducted fauna habitat assessments for: <ul style="list-style-type: none"> ◦ Newstead to Bulla Park Pipeline (APA Group) ◦ Ruby Braemar Pipeline (ERM Power) ◦ Wambo to Goondiwindi Pipeline (ERM Power) ◦ Wallumbilla to Wambo Pipeline (ERM Power) • Involved in the initial capture and captive breeding of the Bilby and Rufous Hare Wallaby (Alice Springs, NT) • Academic supervision of Masters research project on bat roosting ecology • Researched bat behaviour when negotiating steel grills (on mine entrances) • Conducted flying fox taste and smell deterrent chemical trials for fruit crop protection • Research into the social ecology of the Chocolate Wattled Bat (PhD) • Genetic research at Queensland Biosciences Precinct University of Qld, St Lucia
Conservation Management	<ul style="list-style-type: none"> • Researched and developed concept plans / project proposals for sustainable development of tourism on Queensland Park's estates • Co-authored original concept plan for multi-million dollar, Alice Springs Desert Park • Developed and assisted implement conservation planning strategies in SE Qld • Protected roosting habitat for rare and threatened bat species • Designed and provided advice on the construction of several experimental 'artificial caves' in mining areas • Developed a Species Recovery Plan for three species of Qld endangered bats • Negotiated and implemented ongoing, cooperative research programs
Other Scientific Services – advisory and public relations	<ul style="list-style-type: none"> • Scientific advisor / founding member - Qld Gvt's Flying Fox Consultative Committee • Advised Melbourne Botanic Gardens, Sydney Botanic Gardens, Mt Isa and numerous local authorities in greater Brisbane • Provided range of botanical services to the NT Government
Communication	<ul style="list-style-type: none"> • Negotiated conservation outcomes in difficult situations with potentially hostile stakeholders, as in the case of fruit growers and flying foxes and grazing lessees in State Forests



Bruce Thomson

Principal Ecologist

Administrative and Financial

- Worked closely with Aboriginal groups to conduct surveys
- Presented scientific and conservation papers at international scientific conventions
- Wrote survey reports, ministerial briefing notes and popular publications and provided high level advice to senior government staff and conducted workshops
- Participated in radio and TV interviews for news reports, documentaries and children's programs to promote conservation
- Recruited, managed, supported and trained effective teams and participated in strategic planning and enterprise bargaining processes
- Administered budgets up to \$150,000
- Applied for and administered numerous grants ranging from \$5,000 to \$35,000
- Coordinated regional industrial placement program for University students
- Applied for and implemented EPA license conditions for administrative purposes
- Coordinated and supervised management plans for national parks.



Appendix 3. Tertiary Site Vegetation Proformas

VEGETATION SURVEY

Vegetation Community Site number 01



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.32
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No concern at present
DNRW Mapped as:	11.3.32 / 11.3.30 / 11.3.33
Width of RE:	

Site Description	
Location:	KP11
Site Description:	Alluvial woodland adjacent cleared
Orientation of Transect:	E/W
Photo Numbers:	554-553
Datum:	AGD84
Latitude / Longitude:	19.99030 / 147.93866

Vegetation Community Description													
Woodland of <i>Allocasuarina leuhmanii</i> with emergent <i>Corymbia</i> sp.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² / ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Allocasuarina leuhmanii</i>		D		8									
<i>Melaleuca viridiflora</i>		A		10									
<i>Grevillea striata</i>		A		8									
<i>Corymbia tessellaris</i>			14				2						
<i>Petalostigma pubescens</i>													
<i>Melaleuca viridiflora</i>							2						
<i>Allocasuarina leuhmanii</i>		D					3						
<i>Stylosanthes scabra</i>													
<i>Heteropogan contortus</i>								0.6					
<i>Aristida</i> sp.								0.4					
<i>Digitaria</i> sp.								0.4					
% Rock	0	% Bare ground	20			% Leaf litter		80		% Cryptogram		0	
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species. # = weed. ## = declared plant													

Abundance measures													
Basal Area (0.5m x 1cm gap)					Species	Stem Count (500m ²)						Cover (%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	8				<i>A. luehmannii</i>		10			400		40	45
1					<i>C. tessellaris</i>		1					4	
					<i>Grevillea striata</i>		0			2		1	
					<i>Melaleuca viridiflora</i>		1			3			

Community Health and Condition	
Overall Health:	Good. Some canopy senescing
Potential EVR Flora Species Habitat:	No
EVR Flora Species Recorded:	No
Weed Species:	Seca stylo
Weed Cover (%):	0
Disturbance:	Grazing
Disturbance Cover (%):	5

Topography and Landform	
Landform Situation:	Alluvial Plain
Altitude:	22 m
Relief:	Very Low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N / A
Soils:	Duplex (poorly drained) - surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Clay loam surface
Geology:	Alluvium - surface observation (reliability low)
Rock / Sediment Type:	Weathered alluvium

Survey Details	
Recorder/s:	Geoff Sharp
Field Site Number:	1
Date/Time:	24/7/2010 11:48am

Additional Comments	

VEGETATION SURVEY

Vegetation Community Site number 02



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.25b
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.3.25
Width of RE:	20 m

Site Description	
Location:	KP14
Site Description:	S02
Orientation of Transect:	North-South
Photo Numbers:	546-547
Datum:	AGD84
Latitude / Longitude:	20.00193 / 147.91020 (RE boundary with 11.3.35)

Vegetation Community Description												
Open forest of <i>Melaleuca fluviatilis</i> with <i>Melaleuca leucadendra</i> and <i>Casuarina cunninghamiana</i> fringing drainage lines.												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² / ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Melaleuca leucadendra</i>	S		15							2		
<i>Melaleuca fluviatilis</i>	D		15.2							10		
<i>Pleiogynum timorense</i>	A		10							2		
<i>Nauclea orientalis</i>	A					5				1		
<i>Casuarina cunninghamiana</i>	A		17							2		
<i>Carissa ovata</i>							1					
<i>Heteropogon contorta</i>								1				
<i>Trichodesma</i> sp.												
<i>Tephrosia</i> sp.												
<i>Exocarpus</i> sp.												
<i>Alphitonia excelsa</i>												
<i>Discorea</i> sp.												
<i>Cryptostegia grandiflora</i>	##											
<i>Dioscorea</i> sp.												
<i>Pandanus</i> sp.						4						
% Rock Sand	0	% Bare ground		60		% Leaf litter		40		% Cryptogram		
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	15				<i>Melaleuca fluviatilis</i>		18					45	55
					<i>Melaleuca leucadendra</i>			2				5	
					<i>Casuarina cunninghamiana</i>			2				5	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	None
Weed Species:	Noogoora burr, Snake weed, Rubber vine
Weed Cover (%):	15%
Disturbance:	Grazing (very limited)
Disturbance Cover (%):	0

Topography and Landform	
Landform Situation:	Alluvial channel
Altitude:	2-300 m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	n/a
Soils:	Alluvial loam - surface observation (reliability low)
Soil Colour:	Grey brown
Soil Texture:	Loam
Geology:	Alluvium – surface observation (reliability low)
Rock / Sediment Type:	Alluvium

Survey Details	
Recorder/s:	Geoff Sharp
Field Site Number:	2
Date/Time:	24/7/10 at 2:50pm

Additional Comments	
<ul style="list-style-type: none"> Edge RE 20.00191/147.90999 Quaternary sites x 3 in 11.3.32, 11.3.32, 11.3.35 Adjacent 	

VEGETATION SURVEY

Vegetation Community

Site number 03



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.25b
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of concern
DNRW Mapped as:	11.3.25b
Width of RE:	50 m

Site Description	
Location:	KP 22.5
Site Description:	Riparian channel
Orientation of Transect:	NE-SW Across Channel
Photo Numbers:	-
Datum:	AGD 84
Latitude / Longitude:	20.06628 / 147.86823

Vegetation Community Description												
Open forest of <i>Melaleuca leucadendra</i> to 20 m fringing river channel with emergent <i>Eucalyptus raveretiana</i> .												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² / ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Melaleuca leucadendra</i>	D		20									
<i>Eucalyptus raveretiana</i>	S, EVR	25				4		0.5				
<i>Casuarina Cunninghamiana</i>	S		20									
<i>Melaleuca fluviatilis</i>	A			10								
<i>Lophostemon grandiflora</i>	A			10								
<i>Nauclea orientalis</i>					8							
<i>Pipterus</i> sp.							2					
<i>Macaranga tanarius</i>						4						
<i>Syzygium</i> sp.						3						
<i>Ficus racemosa</i>						5						
<i>Ficus opposita</i>							2					
<i>Cryptostegia grandiflora</i>							2					
% Rock	0	% Bare ground		20		% Leaf litter		20		% Cryptogram		0
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures

Basal Area (0.5m x1cm gap)					Species	Stem Count (500m ²)						Cover (%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	16				<i>M. leucandendra</i>		15					40	55
2					<i>E. raveretiana</i>					4		5	
	7				<i>C. cunninghamiana</i>		4					10	

Community Health and Condition	
Overall Health:	Very Good
Potential EVR Flora Species Habitat:	<i>E. raveretiana</i>
EVR Flora Species Recorded:	Yes – multiple age classes
Weed Species:	Rubber vine
Weed Cover (%):	10%
Disturbance:	Weeds, Fencing, grazing
Disturbance Cover (%):	10%

Topography and Landform	
Landform Situation:	Stream Channel and lower bank
Altitude:	50-100 m
Relief:	Very low
Slope:	1%
Slope Class:	Very gently inclined
Erosional Landform Pattern:	-
Soils:	-
Soil Colour:	Yellow brown
Soil Texture:	Coarse sand
Geology:	Quaternary alluvium
Rock / Sediment Type:	-

Survey Details	
Recorder/s:	Sharp
Field Site Number:	3
Date/Time:	26/7/10

Additional Comments	
<p>Inspection by foot reveals <i>Eucalyptus raveretiana</i> has continuous dense stands 400 m downstream and 200 m upstream. Current crossing point has relatively low density of <i>Eucalyptus raveretiana</i>. 40 m clearing width would require a Nature Conservation Act (Qld) permit and at least assessment against the Environment Protection Diversity Conservation Act (Cwlth) significance Guidelines for 2 mature (25m) and approximately 40 juvenile (20 cm to 4 m height).</p>	

VEGETATION SURVEY

Vegetation Community Site number 04



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.35
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.12.1 / 11.12.9 / 11.3.4
Width of RE:	100 m

Site Description	
Location:	KP 35
Site Description:	Narrow alluvial plain
Orientation of Transect:	N-S
Datum:	ADG84
Latitude / Longitude:	-20.16788 / 147.81422

Vegetation Community Description													
Woodland of <i>Corymbia tessellaris</i> , <i>Corymbia clarksoniana</i> and <i>Eucalyptus platyphylla</i> on alluvial plain.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² / ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Corymbia tessellaris</i>		D		18							2		
<i>Acacia salicina</i>							8						
<i>Planchonia careya</i>							5						
<i>Corymbia clarksoniana</i>		S		15							2		
<i>Eucalyptus platyphylla</i>		S		15									
<i>Heteropogon contortus</i>									1				
% Rock	0	% Bare ground	0		% Leaf litter		40		% Cryptogram		0		
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area (0.5m x 1cm gap)					Species	Stem Count (500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	2				<i>Corymbia tessellaris</i>		10					25	35
	2				<i>Corymbia clarksoniana</i>		10					10	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	None
Weed Species:	No significant weeds
Weed Cover (%):	0
Disturbance:	Grazing
Disturbance Cover (%):	80

Topography and Landform	
Landform Situation:	Alluvial Plain
Relief:	Low
Slope:	3%
Slope Class:	Very gently inclined
Erosional Landform Pattern:	Alluvial plain
Soils:	Alluvial duplex
Soil Colour:	Grey
Soil Texture:	Clay loam surface
Geology:	Quaternary Alluvium

Survey Details	
Recorder/s:	Sharp
Field Site Number:	4
Date/Time:	26/7/10

Additional Comments	
RE 11.12.9 Boundary <i>Eucalyptus platyphylla</i> on granite (20.16777 / 147.81491)	

VEGETATION SURVEY

Vegetation Community Site number S05



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.25a
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.3.25
Width of RE:	50m

Site Description	
Location:	In channel, O'Sullivan's Property, KP 49.5
Site Description:	Alluvial system verification
Orientation of Transect:	In channel, North-south
Datum:	AGD 84
Latitude / Longitude:	-20.29148/147.79325

Vegetation Community Description												
Open forest of <i>Eucalyptus raveretiana</i> and <i>Casuarina cunninghamiana</i> with <i>Melaleuca fluviatilis</i> in riparian gallery and channel.												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus raveretiana</i>	D, V		20	15								
<i>Casuarina cunninghamiana</i>	A		20									
<i>Melaleuca fluviatilis</i>	A			15								
<i>Melaleuca viminalis</i>						4						
<i>Pleiogynum timorense</i>	A					5						
<i>Cryptostegia floribunda</i>	##				10	4	1					
% Rock	0	% Bare ground		50		% Leaf litter		20		% Cryptogram		0
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant, V = vulnerable												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	10	3			<i>Eucalyptus raveretiana</i>		10	4					
	3				<i>Casuarina cunninghamiana</i>			4					
		1			<i>Melaleuca fluviatilis</i>								

Community Health and Condition	
Overall Health:	Medium
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	<i>Eucalyptus raveretiana</i>
Weed Species:	Rubber vine
Weed Cover (%):	20% increasing
Disturbance:	Grazing, weeds, flooding
Disturbance Cover (%):	20%

Topography and Landform	
Landform Situation:	Riparian channel
Relief:	Low
Slope:	3%
Slope Class:	Very gently inclined
Erosional Landform Pattern:	Reworked alluvial sand
Soil Colour:	Yellow brown
Soil Texture:	Coarse sand
Geology:	Quaternary alluvium

Survey Details	
Recorder/s:	Sharp
Field Site Number:	5
Date/Time:	26/7/10

VEGETATION SURVEY

Vegetation Community Site number S06



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.12.1
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.12.1 / 11.3.4
Width of RE:	Non-linear

Site Description	
Location:	O'Sullivan's Property, KP 49.5
Site Description:	Adjoins S08A upslope
Orientation of Transect:	North-South
Datum:	AGD 84
Latitude / Longitude:	-20.29317/147.79266

Vegetation Community Description													
<i>Eucalyptus crebra</i> with <i>Corymbia erythrophloia</i> woodland on granite.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² / ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus crebra</i>		D		15							3		
<i>Corymbia erythrophloia</i>		C			12							2	
<i>Corymbia dallachiana</i>		A		16									
<i>Corymbia tessellaris</i>		A		16									
<i>Leonotus nepetifolia</i>		#							1				
% Rock		% Bare ground					% Leaf litter				% Cryptogram		
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area (0.5m x 1cm gap)					Species	Stem Count (500 m ²)						Cover (%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
					<i>Eucalyptus crebra</i>		7					25	30
					<i>Corymbia erythrophloia</i>			3				5	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	None
Weed Species:	Lamiaceae
Weed Cover (%):	10%
Disturbance:	Grazing, fence, powerline
Disturbance Cover (%):	10%

Topography and Landform	
Landform Situation:	Lower slope and level
Altitude:	167 m
Relief:	Moderate
Slope:	5%
Slope Class:	Gently inclined
Erosional Landform Pattern:	-
Soils:	Duplex on granite
Soil Colour:	Yellow brown
Soil Texture:	Loam
Geology:	Granite

Survey Details	
Recorder/s:	Sharp
Field Site Number:	6
Date/Time:	26/7/10

VEGETATION SURVEY

Vegetation Community Site number S07



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.11.9
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.12.1 / 11.3.4
Width of RE:	-20.32116 / 147.78208

Site Description	
Location:	O Sullivan's
Site Description:	Lower slope above minor drainage line
Orientation of Transect:	North-South
Datum:	ADG84
Latitude / Longitude:	S20 19.270 E147 46.925

Vegetation Community Description												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² / ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus brownii</i>	D		13			4						
<i>Atalaya hemiglauca</i>							2					
<i>Eremophila mitchellii</i>						3						
<i>Grewia</i>							0.5					
<i>Aristida</i> sp.								0.6				
<i>Chloris</i> sp.								0.6				
% Rock	1	% Bare ground		5		% Leaf litter		10		% Cryptogram		0
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PF C	CC
	15				<i>Eucalyptus brownii</i>		8			10	3	40	40
										8			

Community Health and Condition

Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	None
Weed Species:	Harissa cactus, Rubber vine, Lions tail
Weed Cover (%):	In channel 80%, elsewhere 5%
Disturbance:	Sheet and gully erosion
Disturbance Cover (%):	5%

Topography and Landform	
Landform Situation:	Lower slope
Altitude:	177m
Relief:	Moderate
Slope:	5%
Slope Class:	Gently inclined
Erosional Landform Pattern:	-
Soils:	Duplex
Soil Colour:	Yellow brown sodic B horizon
Soil Texture:	Clay loam (surface)
Geology:	Volcanics / metamorphics

Survey Details	
Recorder/s:	Sharp
Field Site Number:	7
Date / Time:	9am 26/7/10

Additional Comments	
<ul style="list-style-type: none"> Drainage line < 10m wide, <i>Eucalyptus platyphylla</i>, <i>Lysiphyllum hooker</i>, <i>Lophostemon grandiflora</i>, Rubber vine, <i>Leonotis nepetifolia</i> 11.3.35 	

VEGETATION SURVEY

Vegetation Community Site number S08



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.25b
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.12.1 / 11.3.4
Width of RE:	30 m, 11.12.1 adjoins

Site Description	
Location:	KP 63
Site Description:	Alluvial
Orientation of Transect:	In channel
Datum:	AGD 84
Latitude / Longitude:	-20.40416 / 147.74622

Vegetation Community Description													
Open forest of <i>Melaleuca fluviatilis</i> fringing watercourses.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Melaleuca fluviatilis</i>		D		15							4		
<i>Melaleuca bracteata</i>		S			10							3	
<i>Lophostemon grandiflora</i>		S			10		6					3	
<i>Pleiogynium timorense</i>		A			10								
% Rock	0	% Bare ground		10		% Leaf litter		20		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures														
Basal Area (0.5m x 1cm gap)					Species	Stem Count (500m ²)						Cover (%)		
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC	
	4				<i>Eucalyptus fluviatilis</i>		10					30		50
		3			<i>Lophostemon grandiflora</i>			20		20		10		
		3			<i>Melaleuca bracteata</i>			40				10		

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	None
Weed Species:	Cobbler's Pegs, Lions Ear (<i>Leonotis nepetifolia</i>)
Weed Cover (%):	10%
Disturbance:	Grazing
Disturbance Cover (%):	10%

Topography and Landform	
Landform Situation:	Drainage line
Altitude:	168
Relief:	Moderate
Slope:	3%
Slope Class:	Very gently inclined
Erosional Landform Pattern:	Narrow alluvial system in low rises
Soils:	Sandy alluvium
Soil Colour:	Yellow Brown
Soil Texture:	Coarse sand
Geology:	Quaternary alluvium
Rock / Sediment Type:	Quaternary alluvium

Survey Details	
Recorder/s:	Sharp
Field Site Number:	8
Date / Time:	26/7/10

VEGETATION SURVEY

Vegetation Community Site number S09



Regional Ecosystem Profile	
Regional Ecosystem Type:	12.3.25b
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.12.1 / 11.3.4
Width of RE:	15m

Site Description	
Location:	KP 67
Site Description:	Creek crossing
Orientation of Transect:	North South through channel
Datum:	AGD 84
Latitude / Longitude:	-20.43321 / 147.74057

Vegetation Community Description													
Woodland of <i>Melaleuca fluviatilis</i> and <i>Melaleuca fluviatilis</i> with emergent <i>Corymbia tessellaris</i> .													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² / ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Corymbia tessellaris</i>		A	15							2			
<i>Melaleuca bracteata</i>		D		10							1		
<i>Melaleuca fluviatilis</i>		S		10							1		
<i>Grevillea striata</i>					8								
<i>Pleiogynum timorense</i>		A			8								
<i>Cryptostegia floribunda</i>		##				5							
% Rock	0	% Bare ground		0		% Leaf litter		40		% Cryptogram		0	
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures												
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC
					<i>Corymbia tessellaris</i>	1						5
					<i>Melaleuca bracteata</i>		10					25
												30

Community Health and Condition	
Overall Health:	Moderate
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	None
Weed Species:	Rubber vine
Weed Cover (%):	<5%
Disturbance:	Grazing
Disturbance Cover (%):	70%

Topography and Landform	
Landform Situation:	Drainage line in granite slope
Altitude:	164m
Relief:	Low
Slope:	3%
Slope Class:	Very gently inclined
Soils:	Grey vertosols
Soil Colour:	Grey
Soil Texture:	Coarse sandy loam
Geology:	Quaternary alluvium
Rock / Sediment Type:	Quaternary alluvium

Survey Details	
Recorder/s:	Sharp
Field Site Number:	9
Date / Time:	26/7/10

VEGETATION SURVEY

Vegetation Community Site number S10



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.25b
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.12.1 / 11.3.4
Width of RE:	20 m

Site Description	
Location:	KP 67
Site Description:	Drainage line adjacent water point
Orientation of Transect:	In channel SW / NE
Photo Numbers:	2
Datum:	AGD 84
Latitude / Longitude:	-20.43522 / 147.74365

Vegetation Community Description													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² / ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Melaleuca fluviatilis		D		17							9		
Melaleuca bracteata		S			12							9	
Corymbia tessellaris		A		15								1	
Acacia nilotica subsp. indica		##											
Typha sp.						1							
Cryptostegia floribunda		##				3							
% Rock	5	% Bare ground		15		% Leaf litter		30		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	9				<i>Melaleuca fluviatilis</i>		12					20	45
		9			<i>Melaleuca bracteata</i>			20				20	
		1			<i>Corymbia tessellaris</i>			2				2	

Community Health and Condition	
Overall Health:	Moderate
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	None
Weed Species:	Rubber vine, Harissia cactus
Weed Cover (%):	5%
Disturbance:	Grazing
Disturbance Cover (%):	80%

Topography and Landform	
Landform Situation:	Lower slope / drainage line
Altitude:	171 m
Relief:	Low
Slope:	2%
Slope Class:	Very gently incline
Soils:	Grey cracking clay
Soil Colour:	Grey
Soil Texture:	Medium clay
Geology:	Quaternary alluvium

Survey Details	
Recorder/s:	Sharp
Field Site Number:	10
Date/Time:	26/7/10

Additional Comments	
<ul style="list-style-type: none"> Harissia cactus in vicinity 	

VEGETATION SURVEY

Vegetation Community Site number S11



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.25a
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.3.25 / 11.3.10 / 11.3.1
Width of RE:	30m - gallery community only

Site Description	
Location:	KP 73, Watts Property
Site Description:	Gallery forest
Orientation of Transect:	E-West, in channel parallel to bank.
Datum:	AGD 84
Latitude / Longitude:	-20.48130 / 147.74075

Vegetation Community Description													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus raveretiana</i>		D, EVR		22							5		
<i>Melaleuca fluviatilis</i>		S		20							4		
<i>Lophostemon grandiflorus</i>		A			15							4	
<i>Pleigogynium timorense</i>		A			10							2	
<i>Corymbia tessellaris</i>				18									
<i>Breynia oblongifolia</i>								1					
<i>Acacia salicina</i>						4							
<i>Cryptostegia grandiflora</i>		##						1					
<i>Hovea</i> sp.						2							
<i>Lysiphyllum hookeri</i>					8			1					
<i>Melinis repens</i>		#							0.5				
<i>Aristida</i> sp.									0.5				
<i>Bothriocloa</i> sp.									0.5				
<i>Acacia holosericea</i>													
<i>Lagunaria patersonii</i>													
<i>Sida</i> sp.									0.5				
% Rock	0	% Bare ground	50			% Leaf litter		50		% Cryptogram		0	
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area (0.5m x1cm gap)					Species	Stem Count (500m ²)						Cover (%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
					<i>Eucalyptus raveretiana</i>		3					20	50
					<i>Melaleuca fluviatilis</i>		2					15	
					<i>Lophostemon grandiflorus</i>			5				10	
					<i>Pleiogynum timorense</i>			7				5	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	<i>Eucalyptus raveretiana</i>
Weed Species:	Rubber vine, Lions ear (<i>Leonotis nepetifolia</i>)
Weed Cover (%):	<5%
Disturbance:	Grazing
Disturbance Cover (%):	<5%

Topography and Landform	
Landform Situation:	Drainage line in lower slope
Altitude:	137m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Soils:	Sodosol
Soil Colour:	Yellow brown
Soil Texture:	Coarse sand
Geology:	Volcanic outcrops

Survey Details	
Recorder/s:	Geoff Sharp
Field Site Number:	11
Date / Time:	26/7/10

Additional Comments	
<ul style="list-style-type: none"> Rock outcrops in Channel have no <i>Eucalyptus raveretiana</i>. Rock bar area downstream is the ecologically preferred point crossing (AGD 84 20.48194 / 147.74028) 	

VEGETATION SURVEY

Vegetation Community Site number S12



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.1
EPBC Status:	Endangered Ecological Community – Brigalow
VMA Status:	Of Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.3.10 / 11.3.1 / 11.3.25
Width of RE:	100m

Site Description	
Location:	KP 78
Site Description:	Brigalow
Orientation of Transect:	North-South
Datum:	AGD 84
Latitude / Longitude:	-20.52712 / -147.73483

Vegetation Community Description													
Acacia harpophylla woodland on alluvium													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² / ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Acacia harpophylla		D		11							4		
Owenia acidula		A			8							1	
Pennisetum ciliare		#							0.5				
Harrissia martinii		##							0.4				
% Rock	0	% Bare ground	40			% Leaf litter		30		% Cryptogram	0		
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area (0.5m x1cm gap)					Species	Stem Count (500m²)						Cover (%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
					Acacia harpophylla		30						35
					Owenia acidula			5					

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	None
Weed Species:	Buffel grass, Harrisia cactus
Weed Cover (%):	15%
Disturbance:	Grazing
Disturbance Cover (%):	30%

Topography and Landform	
Landform Situation:	Alluvium
Altitude:	134
Relief:	Low
Slope:	Simple
Slope Class:	Very gently inclined
Erosional Landform Pattern:	Plain
Soils:	Grey clay
Soil Colour:	Grey
Soil Texture:	Clay
Geology:	Alluvium

Survey Details	
Recorder/s:	Sharp
Field Site Number:	12
Date / Time:	25/7/10 11:30am

VEGETATION SURVEY

Vegetation Community Site number S13



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.11.1
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.11.1 / 11.11.9
Width of RE:	1km

Site Description	
Location:	KP 84
Site Description:	Acacia ridge
Orientation of Transect:	E.W.
Datum:	AGD84
Latitude / Longitude:	-20.57905 / 147.71614

Vegetation Community Description													
Acacia rhodoxylon open forest on metamorphics													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² / ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Acacia rhodoxylon		D			10							10	
Eucalyptus crebra		S		14							1		
Eucalyptus exerta		A		12							1		
Erythroxylon australe						5							
Lantana camara		##				3							
Alphitonia excelsa													
Eragrostis sp.													
Aristida sp.													
Brachychiton australis													
% Rock	10	% Bare ground	5		% Leaf litter		50		% Cryptogram		0		
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	2	10			<i>Acacia rhodoxylon</i>			35					40
					<i>Erythroxylon australe</i>		3						
				3	Unknown								

Community Health and Condition	
Overall Health:	Heavily disturbed
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	None
Weed Species:	Common Lantana
Weed Cover (%):	25%
Disturbance:	Ringbarking decades ago, post removal
Disturbance Cover (%):	80%

Topography and Landform	
Landform Situation:	Upper slope
Altitude:	160
Relief:	Low
Slope:	4% simple
Slope Class:	gently inclined
Erosional Landform Pattern:	Ridge
Soils:	Red brown dermosols
Soil Colour:	Brown
Soil Texture:	clay loam
Geology:	Sedimentary / metamorphic

Survey Details	
Recorder/s:	Sharp
Field Site Number:	13
Date/Time:	25/7/2010

Additional Comments	
3 m multi-stemmed shrub, tessellated bark. Red Berry (<i>Erythroxylon</i> confirmed)	

VEGETATION SURVEY

Vegetation Community Site number S14



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.25
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.3.25
Width of RE:	200m

Site Description	
Location:	KP 87
Site Description:	River Crossing
Orientation of Transect:	NS
Datum:	AGD84
Latitude / Longitude:	-20.60581 / 147.7165

Vegetation Community Description												
Woodland of <i>Eucalyptus raveretiana</i> fringing river												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² / ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus raveretiana</i>	D		22	10						4	7	
<i>Casuarina cunninghamiana</i>	A				8						3	
<i>Eucalyptus camaldulensis</i>	A		20									
<i>Melaleuca fluviatilis</i>					6							
<i>Melaleuca viminalis</i>						3						
<i>Parthenium hysterophorus</i>	##							0.5				
<i>Xanthium occidentale</i>	#							0.8				
<i>Ricinus communis</i>	#							1				
<i>Cryptostegia floribunda</i>	##					3						
% Rock	0	% Bare ground		5		% Leaf litter		Grass 95		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures

Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
					<i>Eucalyptus raveretiana</i>		1	10				25	31
					<i>Casuarina cunninghamiana</i>				2			5	
					<i>Melaleuca fluviatilis</i>				1			1	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	Confirmed <i>Eucalyptus raveretiana</i>
Weed Species:	Parthenium weed, Rubber vine, Castor oil plant, Noogoora burr, Buffel grass
Weed Cover (%):	40%
Disturbance:	Grazing
Disturbance Cover (%):	100%

Topography and Landform	
Landform Situation:	In channel
Altitude:	129m
Relief:	Low
Slope:	1-3
Slope Class:	Very gently inclined
Erosional Landform Pattern:	River channel
Soils:	Alluvial loam
Soil Colour:	Yellow brown
Soil Texture:	Sand
Geology:	Alluvium

Survey Details	
Recorder/s:	Sharp
Field Site Number:	14
Date/Time:	26/7/2010

Additional Comments	
Multiple age classes of <i>Eucalyptus raveretiana</i> . Regenerating in channel 0.5 m to 8 m. Banks have <i>Eucalyptus raveretiana</i> to 25 m. <i>Eucalyptus raveretiana</i> widespread and possibly unavoidable between this site and homestead (20.62318 / 147.72415 AGD84)	

VEGETATION SURVEY

Vegetation Community Site number S15



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.11.13
EPBC Status:	N/A
VMA Status:	Of Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.11.19 / 11.11.1 / 11.11.8 / 11.11.13
Width of RE:	>100m

Site Description	
Location:	KP 90
Site Description:	153 m
Orientation of Transect:	EW
Datum:	AGD84
Latitude / Longitude:	-20.63519 / 147.70961

Vegetation Community Description													
Brigalow Woodland													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Acacia harpophylla		D		12							8		
Lysiphyllum sp.		A					6					1	
Eucalyptus populnea		A	16								1		
Eucalyptus sp.				10							1		
Pennisetum ciliare													
Eragrostis sp.													
% Rock	0	% Bare ground		10		% Leaf litter		50		% Cryptogram		0	
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area (0.5 m x 1cm gap)					Species	Stem Count (500m ²)						Cover (%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
1					<i>Eucalyptus populnea</i>								40
	8				<i>Acacia harpophylla</i>		18	7					
		1			<i>Lysiphyllum</i> sp.					7			

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	No
EVR Flora Species Recorded:	None
Weed Species:	Buffel Grass
Weed Cover (%):	10%
Disturbance:	Grazing
Disturbance Cover (%):	50%

Topography and Landform	
Landform Situation:	Undulating rises
Altitude:	153
Relief:	Very low
Slope:	3%
Slope Class:	Very gently inclined
Erosional Landform Pattern:	-
Soils:	No gilga
Soil Colour:	Brown
Soil Texture:	Clay
Geology:	No outcrop
Rock / Sediment Type:	Alluvial clay

Survey Details	
Recorder/s:	Sharp
Field Site Number:	15
Date/Time:	25/7/10

Additional Comments	
Brigalow regrowth not EPBC significant adjoining landing site 1m high	

VEGETATION SURVEY

Vegetation Community Site number S16



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.25b
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.3.25b
Width of RE:	100m

Site Description	
Location:	KP 101
Site Description:	Gallery forest, river
Orientation of Transect:	East-West
Datum:	AGD84
Latitude / Longitude:	-20.73231 / 147.71367

Vegetation Community Description													
Open forest of <i>Melaleuca fluviatilis</i> fringing major drainage line.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² / ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Melaleuca fluviatilis</i>		D		18							50		
<i>Ficus racemosa</i>		A			12						1		
<i>Ficus opposita</i>		A					5						
<i>Nauclea orientalis</i>		A					3						
<i>Argemone ochroleuca</i>		#							1				
<i>Parthenium hysterophorus</i>		##							1.5				
<i>Xanthium occidentale</i>		#							0.5				
<i>Datura stramonium</i>		#							0.5				
% Rock	0	% Bare ground	20			% Leaf litter		20		% Cryptogram		0	
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures

Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	50				<i>Melaleuca fluviatilis</i>		33						
	1				<i>Ficus racemosa</i>		4						
					<i>Ficus opposita</i>		10						

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	None
Weed Species:	Mexican poppy, Noogora burr, Parthenium weed
Weed Cover (%):	50%
Disturbance:	Flooding, grazing
Disturbance Cover (%):	10%

Topography and Landform	
Landform Situation:	Alluvial Plane
Altitude:	121 m
Relief:	Low
Slope:	1%
Slope Class:	Very gently inclined
Erosional Landform Pattern:	Alluvial channel
Soils:	Sand
Soil Colour:	Grey
Soil Texture:	Fine sand
Geology:	Quaternary alluvium

Survey Details	
Recorder/s:	Sharp
Field Site Number:	16
Date / Time:	25/7/10

VEGETATION SURVEY

Vegetation Community Site number S17



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.35
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at present
DNRW Mapped as:	11.3.4 / 11.3.1 / 11.3.25
Width of RE:	200 m

Site Description	
Location:	KP 115
Site Description:	-
Orientation of Transect:	East-West
Datum:	AGD84
Latitude / Longitude:	20.86105 / 147.7592

Vegetation Community Description												
Grassy woodland of mixed Eucalyptus/Corymbia on alluvium												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Corymbia clarksonia</i>	S		16							6	1	
<i>Eucalyptus dallachyana</i>	C		16								1	
<i>Eucalyptus platyphylla</i>	C			12								
<i>Pleiogynium timorense</i>	A			10							1	
<i>Eucalyptus brownii</i>	A			12								
<i>Bursana</i> sp.						4						
<i>Diospyros</i> sp.						4						
<i>Alphitonia excelsa</i>							3					
<i>Owenia acidula</i>												
<i>Carissa ovata</i>							1					
<i>Pennisetum ciliare</i>								0.5				
<i>Aristida</i> sp.								0.5				
<i>Echinocloa</i> sp.								0.5				
<i>Digitaria</i> sp.												
<i>Parthenium hysterophorus</i>	##							0.5				
% Rock	-	% Bare ground		-		% Leaf litter		-		% Cryptogram		-
Status: D = dominant, C = Co-dominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area (0.5 m x1cm gap)					Species	Stem Count (500 m ²)						Cover (%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
-	6	1	-	-	<i>Corymbia clarksonia</i>		4						30
					<i>Eucalyptus dallachyana</i>		2						
					<i>Eucalyptus platyphylla</i>		2						

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	None
Weed Species:	Parthenium weed
Weed Cover (%):	<5%
Disturbance:	Grazing, improved pasture
Disturbance Cover (%):	50%

Topography and Landform	
Landform Situation:	Alluvial Plain
Altitude:	161
Relief:	Low
Slope:	1%
Slope Class:	Very gently inclined
Erosional Landform Pattern:	Alluvial deposits
Soils:	Duplex
Soil Colour:	Brown
Soil Texture:	Clay loam
Geology:	Alluvium
Rock / Sediment Type:	Alluvium

Survey Details	
Recorder/s:	Sharp
Field Site Number:	17
Date/Time:	25/7/10

Additional Comments

VEGETATION SURVEY

Vegetation Community Site number S18



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.10.12
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.3.4/11.3.1/11.3.25
Width of RE:	>200m

Site Description	
Location:	KP 122
Site Description:	Simple slope
Orientation of Transect:	E-W
Datum:	AGD 84
Latitude / Longitude:	-20.91989 / 147.72241

Vegetation Community Description												
Popular box woodland on lower slope of medium grained sediments. Geology outcropping in gully.												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus populnea</i>	D		12							4		
<i>Eucalyptus crebra</i>	A			8								
<i>Eremophila mitchellii</i>						3						
<i>Atalaya hemiglauca</i>							2					
<i>Lysiphyllum</i> sp.							2					
<i>Petalostigma pubescens</i>							2					
<i>Carissa ovata</i>							1					
<i>Flindersia maculata</i>							2					
<i>Aristida</i> sp.								1				
<i>Acacia bidwillii</i>							1					
% Rock	0	% Bare ground		40		% Leaf litter		60		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures														
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)		
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC	
	4				<i>Eucalyptus populnea</i>		10						30	
					<i>Eucalyptus crebra</i>			3						

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	None
EVR Flora Species Recorded:	None
Weed Species:	Buffel grass
Weed Cover (%):	<5%
Disturbance:	Grazing, thinning, erosion
Disturbance Cover (%):	30%

Topography and Landform	
Landform Situation:	Lower slope
Altitude:	215m
Relief:	Low
Slope:	4.6%
Slope Class:	Gently inclined
Erosional Landform Pattern:	Active sheet and gully erosion
Soils:	Grey duplex
Soil Colour:	Grey
Soil Texture:	Clay loam over medium clay
Geology:	Sedimentary
Rock / Sediment Type:	Medium grained sediment

Survey Details	
Recorder/s:	Geoff Sharp
Field Site Number:	18
Date/Time:	25/7/2010 8:30

Additional Comments	
<ul style="list-style-type: none"> Possible Scar tree: 20.92005 / 147.72273 	

VEGETATION SURVEY

Vegetation Community

Site number S19



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.25
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.3.4/11.3.1/11.3.25
Width of RE:	200m

Site Description	
Location:	KP 125
Site Description:	Fringing community adjoining non-remnant
Orientation of Transect:	N-S
Photo Numbers:	-
Datum:	AGD 84
Latitude / Longitude:	-20.945908 / 147.726426

Vegetation Community Description												
Eucalyptus tereticornis woodland fringing major drainage line.												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Eucalyptus tereticornis	D		25									
Corymbia dallachiana	A			20								
Corymbia tessellaris				15								
Pleiogynum timorense				10								
Bursaria tenuifolia						5						
Acacia salicina				10								
Hovea sp.							2					
Eucalyptus crebra	S			12								
Sida sp.								0.5				
Parthenium hysterophorus	##							0.5				
Grewia sp.								0.5				
Glochidion sp.							2					
Aristida sp.								1				
Carissa ovata							1					
Santalum lanceolatum							2					
Melaleuca fluviatilis				12								
Melaleuca bracteata							2					
Dicanthium sericum								1				
Petalostigma pubescens							2					
% Rock	-	% Bare ground		-		% Leaf litter		-		% Cryptogram		-
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures

Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	10	4		4	<i>Eucalyptus tereticornis</i>		8					40	50
					<i>Eucalyptus dallachiana</i>			3				8	
					<i>Acacia salicina</i>			3				2	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Eucalyptus raveretiana</i>
EVR Flora Species Recorded:	None
Weed Species:	Parthenium weed
Weed Cover (%):	30%
Disturbance:	Grazing
Disturbance Cover (%):	10%

Topography and Landform	
Landform Situation:	Narrow alluvium, adjoins clearway
Altitude:	-
Relief:	Moderate
Slope:	Low 1-3%
Slope Class:	-
Erosional Landform Pattern:	Depositional
Soils:	Alluvial sandy loam
Soil Colour:	Grey
Soil Texture:	Sandy loam surface
Geology:	Alluvial
Rock / Sediment Type:	-

Survey Details	
Recorder/s:	Geoff Sharp
Field Site Number:	S19
Date/Time:	25/7/10 7:00am

Additional Comments	
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VEGETATION SURVEY

Vegetation Community Site number S20



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.5.9
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.3.2/11.5.3
Width of RE:	Non linear

Site Description	
Location:	KP139, 25km NW of Newlands Mine
Site Description:	-
Orientation of Transect:	45°
Photo Numbers:	107 & 108
Datum:	AGD 84
Latitude / Longitude:	-21.06539 / 147.70367

Vegetation Community Description													
<i>Eucalyptus crebra</i> and other <i>Eucalypt</i> spp. and <i>Corymbia</i> spp. Woodland													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)						Abundance (m ² /ha)				
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Lysicarpus angustifolius</i>		D		20	10			7	2			8	1
<i>Corymbia intermedia</i>		D		25	10							3	1
<i>Eucalyptus melanophloia</i>		A		20	10							1	
<i>Eucalyptus crebra</i> (tent.)				18	10							1	
<i>Petalostigma banksii</i>								7	2				
<i>Acacia</i> sp.									2				
<i>Heteropogon contortus</i>										0.3			
<i>Eragrostis</i> sp.										0.5			
<i>Entolasia</i> sp.										0.3			
<i>Aristida</i> spp.										0.3			
<i>Melinis repens</i>		#								0.4			
<i>Lamandra</i> sp.										0.3			
<i>Petalostigma pubescens</i>								7					
<i>Alphitonia excelsa</i>								4					
<i>Cheilanthes sieberi</i>										0.3			
% Rock	0	% Bare ground		3		% Leaf litter		30		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	8	1			<i>Lysicarpus angustifolius</i>		6	2				20	60
	3	1			<i>Corymbia intermedia</i>		2	1				15	
	1				<i>Eucalyptus melanophloia</i>		1					15	
	1				<i>Eucalyptus crebra</i> (tent.)		2					10	

Community Health and Condition	
Overall Health:	Very good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Red natal grass
Weed Cover (%):	<0.1%
Disturbance:	Grazing
Disturbance Cover (%):	<1%

Topography and Landform	
Landform Situation:	Plain
Altitude:	2-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	White/Light grey
Soil Texture:	Sandy loam
Geology:	Surface observation (Reliability low)
Rock / Sediment Type:	Unconsolidated coarse-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	20
Date/Time:	23/07/10 15:15

Additional Comments	
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VEGETATION SURVEY

Vegetation Community Site number S21



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.25
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.3.25
Width of RE:	75m

Site Description	
Location:	KP 140.5, 26km NW of Newlands Mine
Site Description:	Watercourse
Orientation of Transect:	270°
Photo Numbers:	102 & 103
Datum:	AGD84
Latitude / Longitude:	-21.06912 / 147.68675

Vegetation Community Description													
<i>Eucalyptus tereticornis</i> fringing woodland													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus tereticornis</i>		D		20									
<i>Melaleuca leucadendra</i>		S		20									
<i>Corymbia intermedia</i> (tent.)		A		20									
<i>Alphitonia excelsa</i>							4						
<i>Acacia simsii</i>							3						
<i>Lomandra longifolia</i>									1				
<i>Imperata cylindrica</i>									1				
<i>Oryza australiensis</i>									1.3				
<i>Juncus usitatus</i>									1				
<i>Themeda triandra</i>									1				
<i>Poaceae</i> (indeterminates)									0.5				
<i>Acacia</i> sp.							2						
% Rock	0	% Bare ground	40		% Leaf litter		20		% Cryptogram		0		
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	8				<i>Eucalyptus tereticornis</i>		20					50	75
	6				<i>Melaleuca leucadendra</i>		32					20	
	2				<i>Corymbia intermedia (tent.)</i>		2					5	

Community Health and Condition	
Overall Health:	Very good
Potential EVR Flora Species Habitat:	<i>Aponogeton queenslandicus</i>
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Grazing
Disturbance Cover (%):	2

Topography and Landform	
Landform Situation:	Watercourse
Altitude:	2-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	White
Soil Texture:	Sand
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated Coarse-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	21
Date/Time:	23/07/10 14:15

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S22



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.5.10
EPBC Status:	N/A
VMA Status:	Of Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.5.9/11.5.10
Width of RE:	Non linear

Site Description	
Location:	KP147, 28km W of Newlands Mine
Site Description:	-
Orientation of Transect:	270°
Photo Numbers:	100 & 101
Datum:	AGD84
Latitude / Longitude:	-21.10999 / 147.64525

Vegetation Community Description												
<i>Melaleuca tamariscina</i> shrubland												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Melaleuca tamariscina</i>	D		3									
<i>Erythroxylum australe</i>			3									
<i>Canthium</i> sp.			3									
<i>Canthium oleaefolium</i>			2									
<i>Petalostigma banksii</i>			3									
<i>Kailarsenia ochreatea</i>			2									
<i>Aristida</i> spp.								1				
<i>Cymbopogon bombycinus</i>								1				
<i>Heteropogon contortus</i>								0.5				
<i>Themeda triandra</i>								0.5				
% Rock	5	% Bare ground		10	% Leaf litter		40	% Cryptogram		0		

Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant

Abundance measures

Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
					<i>Melaleuca tamariscina</i>		500					60	60

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Acacia jackesiana</i>
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Grazing
Disturbance Cover (%):	5

Topography and Landform	
Landform Situation:	Plain
Altitude:	2-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated coarse-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	22
Date/Time:	23/07/10 13:15

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S23



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.5.9
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.5.9
Width of RE:	Non linear

Site Description	
Location:	KP 156.5, 32km W of Newlands Mine
Site Description:	-
Orientation of Transect:	90°
Photo Numbers:	98 & 99
Datum:	AGD 84
Latitude / Longitude:	-21.18815 / 147.60480

Vegetation Community Description												
Eucalyptus Crebra woodland												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus crebra</i>			20			7						
<i>Corymbia clarksoniana</i> (tentative)			20									
<i>Acacia</i> sp.						7	1.5					
<i>Corymbia dallachgana</i>			20				2					
<i>Erythroxylum australe</i>						15						
<i>Alphitonia excelsa</i>						4						
<i>Grevillea sessilis</i>						4						
<i>Dodonaea triangularis</i>							1.5					
<i>Heteropogon contortus</i>							1					
<i>Cymbopogon bombycinus</i>								0.5				
<i>Themeda triandra</i>								0.5				
<i>Aristida calycina</i>								0.5				
Cyperaceae (indeterminate)								0.5				
<i>Canthium</i> sp.							2					
<i>Petalostigma banksii</i>												
% Rock	15	% Bare ground		15		% Leaf litter		40		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	9				<i>Eucalyptus crebra</i>		5			3		10	20
	2				<i>Corymbia clarksoniana (tent.)</i>		1			3		5	
	2				<i>Acacia</i> sp. (<i>black ?</i>)		3			20		5	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	<i>Acacia jackesiana</i>
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Hot fires
Disturbance Cover (%):	20

Topography and Landform	
Landform Situation:	Lower slope
Altitude:	2.400m
Relief:	Undulating
Slope:	Simple slope
Slope Class:	Inclined (3-6%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Loam
Geology:	Surface observation (reliability Low)
Rock / Sediment Type:	Rocks close to surface

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	23
Date/Time:	23/07/10 12:30pm

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S24



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.12.21
EPBC Status:	Endangered Ecological Community – Brigalow
VMA Status:	Endangered
EPA Status:	Endangered
DNRW Mapped as:	11.12.1/11.12.21
Width of RE:	Non linear

Site Description	
Location:	1km east of KP165, 36km of Newlands Mine
Site Description:	-
Orientation of Transect:	90°
Photo Numbers:	88 & 89
Datum:	AGD84
Latitude / Longitude:	-21.25955 / 147.57289

Vegetation Community Description													
Acacia harpophylla woodland on colloviales derived from igneous rocks.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m²/ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Acacia harpophylla													
Terminalia oblongata													
Eremophila mitchellii													
Atalaya hemiglauca													
Capparis lasiantha													
Carissa ovata													
Stylosanthes scabra													
Paspalidium caespitosum													
Dichantium sp.													
Pennisetum ciliare		#											
Sporobolus sp.													
Opuntia sp.		##											
% Rock	0	% Bare ground		45		% Leaf litter		35		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	16	2			Acacia harpophylla		27	8				50	50
	1				Atalaya hemiglauca		2					2	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Tree Pear, Buffel Grass
Weed Cover (%):	<1
Disturbance:	Grazing
Disturbance Cover (%):	2

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Clay loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Extensive rock areas

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	24
Date/Time:	23/07/10 11.30

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S25



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.12.2
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No concern at present
DNRW Mapped as:	11.12.1/11.12.2
Width of RE:	Non linear

Site Description	
Location:	KP 176.5, 42km SW of Newlands mine
Site Description:	-
Orientation of Transect:	180°
Photo Numbers:	86 & 87
Datum:	AGD 84
Latitude / Longitude:	-21.33810 / 147.54303

Vegetation Community Description													
Eucalyptus melanophloia woodland (severely degraded by hot fire) on igneous rocks													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Corymbia similis		D		8			1.5				2		
Eucalyptus melanophloia		S		8			1.5						
Acacia catenulata (tentative)				8			1.5				1		
Tephrosia brachyodon var. longifolia							1						
Heteropogon contortus									1.3				
Cymbopogon									1				
Aristida calycina									1				
Aristida sp.									1.2				
Keraudrenia hookeriana									1.5				
Tephrosia purpurea var. sericea									1.5				
% Rock	80	% Bare ground	5			% Leaf litter	7			% Cryptogram	0		
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x0.5cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	2				<i>Corymbia similis</i>		3			6			
					<i>Eucalpytus melanophloia</i>					7			
	1				<i>Acacia catenulata (tent.)</i>								

Community Health and Condition	
Overall Health:	Very degraded
Potential EVR Flora Species Habitat:	<i>Acacia jackesiana</i>
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Hot fire
Disturbance Cover (%):	90

Topography and Landform	
Landform Situation:	Upper slope
Altitude:	250-400m
Relief:	Undulating
Slope:	Simple
Slope Class:	3-6%
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Extensive rock areas

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	25
Date/Time:	23/7/10 10:20

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S26



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.12.1
EPBC Status:	N/A
VMA Status:	Least concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.12.1 / 11.12.2
Width of RE:	Non linear

Site Description	
Location:	KP183, 48km SW of Newlands Mine
Site Description:	Sullivan's property, Mt Coolon
Orientation of Transect:	180°
Photo Numbers:	80 & 81
Datum:	AGD84
Latitude / Longitude:	-21.36905 / 147.49580

Vegetation Community Description												
Eucalyptus crebra woodland on igneous rocks												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus crebra</i>	D		14									
<i>Petalostigma banksii</i>						3						
<i>Acacia rhodoxylon</i>						3						
<i>Eucalyptus melanophloia</i>	S			8								
<i>Panicum</i> sp.								0.5				
<i>Cymbopogon bombycinus</i>								0.5				
<i>Aristida</i> sp.								0.5				
<i>Themeda triandra</i>								0.5				
% Rock	0	% Bare ground		0		% Leaf litter		70		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures														
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)		
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC	
	8				<i>Eucalyptus crebra</i>		30					20		25
	1				<i>Eucalyptus melanophloia</i>		2					5		

Community Health and Condition	
Overall Health:	Very good
Potential EVR Flora Species Habitat:	<i>Acacia jackesiana</i>
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Grazing
Disturbance Cover (%):	2

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Clay
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediment

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	26
Date/Time:	22/07/10 16:15

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S27



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.4.8
EPBC Status:	Endangered Ecological Community - Brigalow
VMA Status:	Endangered
EPA Status:	Endangered
DNRW Mapped as:	11.4.8/11.4.11
Width of RE:	Non linear

Site Description	
Location:	KP192, 57km SW of Newlands Mine
Site Description:	-
Orientation of Transect:	180°
Photo Numbers:	78 & 79
Datum:	AGD84
Latitude / Longitude:	-21.41763 / 147.42563

Vegetation Community Description												
Eucalyptus cambageana woodland with Acacia harpophylla on clay plains												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus cambageana</i>	D		20							8		
<i>Acacia harpophylla</i>				11	8							2
<i>Terminalia oblongata</i>						5						
<i>Flindersia dissosperma</i>						5						
<i>Ventilago viminalis</i>							1					
<i>Carissa ovata</i>							1					
<i>Atalaya hemiglauc</i>							1					
<i>Oxychloris scariosa</i>								0.3				
<i>Ennaeapogon</i> sp.								0.3				
<i>Enteropogon acicularis</i>								0.3				
<i>Aristida</i> sp.								0.3				
% Rock	0	% Bare ground		2	% Leaf litter		60	% Cryptogram		0		

Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	7				<i>Eucalyptus cambageana</i>		8					10	18
			2		<i>Acacia harpophylla</i>			10	4			8	

Community Health and Condition

Overall Health:	Very good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Grazing
Disturbance Cover (%):	5

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	27
Date/Time:	22/07/2010 15:00

Additional Comments
<ul style="list-style-type: none"> No native grasslands observed in vicinity (nor apparent from air)

VEGETATION SURVEY

Vegetation Community Site number S28



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.5.3
EPBC Status:	N/A
VMA Status:	Least concern
EPA Status:	No concern at present
DNRW Mapped as:	11.5.3
Width of RE:	Non-linear

Site Description	
Location:	KP200, 64km SW of Newlands Mine
Site Description:	-
Orientation of Transect:	90°
Photo Numbers:	76 & 77
Datum:	AGD84
Latitude / Longitude:	-21.47467 & 147.37904

Vegetation Community Description													
Eucalyptus brownii woodland.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus brownii</i>				18									
<i>Acacia excelsa</i>					10								
<i>Ventilago viminalis</i>					10								
<i>Eremophila mitchellii</i>							6						
<i>Petalostigma pubescens</i>								3					
<i>Grevillea longistyla</i>								3					
<i>Melaleuca pallescens</i>							4						
<i>Atalaya hemiglauca</i>								2					
<i>Cassia brewsteri</i>							4						
<i>Capparis canescens</i>							6						
<i>Pennisetum Ciliare</i>		#						0.5					
<i>Aristida calycina</i>								0.5					
% Rock	0	% Bare ground	20			% Leaf litter		20		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	4				<i>Eucalyptus brownii</i>		5					15	15

Community Health and Condition	
Overall Health:	Average
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Buffel Grass
Weed Cover (%):	20
Disturbance:	Grazing, frequent burning
Disturbance Cover (%):	20

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	28
Date/Time:	22/07/2010 13.30

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S29



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.4.5
EPBC Status:	N/A
VMA Status:	Of Concern
EPA Status:	Endangered
DNRW Mapped as:	11.4.5/11.5.3
Width of RE:	150m

Site Description	
Location:	205/206, 70km SW of Newlands Mine
Site Description:	Richard Powell's Property
Orientation of Transect:	270°
Photo Numbers:	74 & 75
Datum:	AGD84
Latitude / Longitude:	-21.52073 / 147.34772

Vegetation Community Description													
Acacia argyrodendron woodland (mature regrowth) on clay plain													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m²/ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Acacia cambagei		C		10	7						3	6	
Acacia argyrodendron		C		15	7						2	3	
Acacia harpophylla		S		12	7						1	1	
Terminalia oblongata							6						
Erenioguka mitchellii							5						
Carissa ovata								1					
Enchylaena tomentosa									0.3				
Eriocereus martinii		##							0.3				
Enteropogon acicularis									0.3				
Pennisetum ciliare		#							0.3				
% Rock	0	% Bare ground		15		% Leaf litter		30		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
		3			<i>Acacia cambagei</i>		2	20					

	3	3			Black wood 'P14'		6	2				
					<i>Acacia harpophylla</i>		4	6				

Community Health and Condition	
Overall Health:	Degraded
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Harissa cactus, Parthenium weed (on property), Buffel grass
Weed Cover (%):	<1%
Disturbance:	Grazing
Disturbance Cover (%):	20%

Topography and Landform	
Landform Situation:	Watercourse
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Clay loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-trained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	29
Date/Time:	22/07/10

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S30



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.37
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.3.37
Width of RE:	100m

Site Description	
Location:	KP226, 90km SW of Newlands Mine
Site Description:	Diamond Creek – Suttor River
Orientation of Transect:	180°
Photo Numbers:	82 & 83
Datum:	AGD 84
Latitude / Longitude:	-21.60022 / 147.17471

Vegetation Community Description												
Eucalyptus coolabah woodland fringing watercourse with scattered Brigalow subdominant												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status *	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus coolabah</i>	D		20			4						
<i>Acacia harpophylla</i>	S		18			4	1					
<i>Lysiphyllum carronii</i>				10			1					
<i>Eucalyptus camaldulensis</i>				6								
<i>Terminalia oblongata</i>							1					
<i>Melaleuca linariifolia</i>				6								
<i>Muehlenbeckia cunninghamii</i>							2					
<i>Xanthium accidentalis</i>	#						2					
<i>Cardiospermum</i> sp.								0.3				
<i>Paspalidium caespitosum</i>								0.3				
<i>Paspalidium</i> sp.								0.5				
<i>Parthenium hysterophorus</i>	##							0.2				
<i>Cyperus</i> sp.								0.3				
% Rock	0	% Bare ground		20	% Leaf litter		40	% Cryptogram		0		

Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	4	7			<i>Eucalyptus coolabah</i>							30	35

	2				<i>Acacia harpophylla</i>						5	
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Community Health and Condition	
Overall Health:	Very good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Parthenium weed (dense), Noogoora burr (dense)
Weed Cover (%):	20
Disturbance:	Grazing
Disturbance Cover (%):	5

Topography and Landform	
Landform Situation:	Watercourse
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Clay loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	30
Date/Time:	23/07/10 07.50

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S31



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.1
EPBC Status:	Endangered Ecological Community – Brigalow
VMA Status:	Endangered
EPA Status:	Endangered
DNRW Mapped as:	11.3.3
Width of RE:	>200m

Site Description	
Location:	KP228, 90km SW of Newlands Mne
Site Description:	Near Diamond Creek
Orientation of Transect:	270°
Photo Numbers:	84 & 85
Datum:	AGD 84
Latitude / Longitude:	-21.62708 / 147.16635

Vegetation Community Description												
Acacia harpophylla woodland on alluvials												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Acacia harpophylla	D		14			1.5						
Terminalia oblongata	S		10			1.5						
Eucalyptus coolabah	A		14									
Atalaya hemiglauca	A		10			1						
Sesbania sp.						1						
Eremophila maculate						1						
Cyperus sp.						0.5						
Opuntia sp.	##					0.5						
Parthenium hysterophorus	##					0.5						
Sporobolus disjunctus						0.7						
Dichanthium sericeum						0.5						
Cymbidium canaliculatum			+									
% Rock	0	% Bare ground		5		% Leaf litter		75		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	11				Acacia harpophylla		21					30	50
	1				Terminalia oblongata		2					10	
	2				Eucalyptus coolabah		1					10	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Parthenium Weed, Tree pear
Weed Cover (%):	5
Disturbance:	Grazing
Disturbance Cover (%):	5

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Black
Soil Texture:	Cracking clay
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediment

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	31
Date/Time:	23/07/10 8:50

Additional Comments	
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VEGETATION SURVEY

Vegetation Community Site number S32



Regional Ecosystem Profile	
Regional Ecosystem Type:	Non remnant
EPBC Status:	N/A
VMA Status:	N/A
EPA Status:	N/A
DNRW Mapped as:	11.3.3
Width of RE:	Non linear

Site Description	
Location:	KP 232.5
Site Description:	-
Orientation of Transect:	180°
Photo Numbers:	72 & 73
Datum:	AGD 84
Latitude / Longitude:	-21.65655 / 147.15565

Vegetation Community Description													
Rung Bark? Dieback of canopy trees – non remnant. Erosive hazard area.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus populena</i>				15							1		
Dead Trees		D	20	15						6			
<i>Eucalyptus cambageana</i>				10							1		
<i>Acacia harpophylla</i>				10									
<i>Ericereus martinii</i>		##							0.3				
<i>Parthenium hysterophorus</i>		##							0.3				
<i>Pennisetum ciliare</i>		#							0.3				
% Rock	0	% Bare ground	70		% Leaf litter		10		% Cryptogram		0		
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
6	1				Dead Trees	4	2					0	3
	1				<i>Eucalyptus populena</i>		2					3	

Community Health and Condition	
Overall Health:	Very degraded
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Parthenium weed, Harissia cactus, Buffel grass
Weed Cover (%):	<1%
Disturbance:	Dieback
Disturbance Cover (%):	95%

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	Surface head cutting prevalent
Soils:	Surface observation (reliability low)
Soil Colour:	Red
Soil Texture:	Clay loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	32
Date/Time:	22/07/10

Additional Comments	
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VEGETATION SURVEY

Vegetation Community Site number S33



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.7.3 (non-typical as minor colluvial influence)
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.7.2 / 11.11.13
Width of RE:	150m

Site Description	
Location:	KP 241.5, 102km SW of Newlands Mine
Site Description:	-
Orientation of Transect:	0°
Photo Numbers:	70 & 71
Datum:	AGD 84
Latitude / Longitude:	-21.73332 / 147.12234

Vegetation Community Description													
<i>Eucalpytus persistens</i> , <i>Triodia mitchellii</i> open woodland on stripped margins of Cainozoic lateritic duricrust.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)						Abundance (m ² /ha)				
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus persistens</i>		D		15							16		
<i>Terminalia oblongata</i>		A		10							1		
<i>Acacia excelsa</i>		A		10									
<i>Acacia harpophylla</i>		A		10									
<i>Lysiphyllum carronii</i>		A		8							1		
<i>Cassia brewsteri</i>		A					3						
<i>Acacia catenulata</i>		A		10									
<i>Heteropogon contortus</i>									1				
<i>Themeda triandra</i>									1				
<i>Aristida calycina</i>									1				
<i>Dichanthium</i> sp.									0.5				
% Rock	5	% Bare ground		50		% Leaf litter		10		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	16				<i>Eucalyptus persiciens</i>		56					15	30
					<i>Acacia catenulata</i>		2					5	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Harissa cactus
Weed Cover (%):	<0.1
Disturbance:	Grazing
Disturbance Cover (%):	3

Topography and Landform	
Landform Situation:	Watercourse
Altitude:	200-300m
Relief:	Low undulations
Slope:	Simple
Slope Class:	Gentle incline (2-5%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Red
Soil Texture:	Sandy loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated coarse-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	33
Date/Time:	22/07/10

Additional Comments	
<ul style="list-style-type: none"> RE 11.11.13 in patches through creekline but all <0.03 ha Creekline is 11.7.3/11.7.2/11.11.13 at approx 60/20/20 	

VEGETATION SURVEY

Vegetation Community Site number S34



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.7.2
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.7.2
Width of RE:	Non linear

Site Description	
Location:	KP 245, 216km north of Alpha
Site Description:	-
Orientation of Transect:	180°
Photo Numbers:	59 & 60
Datum:	AGD 84
Latitude / Longitude:	-21.75854 / 147.11040

Vegetation Community Description													
Acacia shirleyi forest on edge of lateritic duricrust.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)						Abundance (m ² /ha)				
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Acacia shirleyi		D		10									
Paspalidium rarum		D							0.5				
Aristida caput-medusae									0.5				
Eucalyptus persistens 'P13'		A		10									
% Rock	0	% Bare ground		0		% Leaf litter		15		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	28				<i>Acacia shirleyi</i>		200					65	70
					<i>Eucalyptus exserta</i>		8					5	

Community Health and Condition

Overall Health:	Excellent
Potential EVR Flora Species Habitat:	<i>Cerbera drumicola</i> , <i>Acacia ramiflora</i>
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Nil
Disturbance Cover (%):	0

Topography and Landform	
Landform Situation:	Slope
Altitude:	200-300m
Relief:	Rise
Slope:	Gentle
Slope Class:	Gentle incline (2-5%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Laterized duricrust

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	34
Date/Time:	21/07/10 15:15

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S35



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.7.3
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.4.9 / 11.7.3
Width of RE:	Non-linear

Site Description	
Location:	KP 245, 216km North of Alpha
Site Description:	-
Orientation of Transect:	180°
Photo Numbers:	62 & 63
Datum:	AGD84
Latitude / Longitude:	-21.75956 / 147.11162

Vegetation Community Description
<i>Eucalyptus persistens</i> , <i>Triodia mitchellii</i> open woodland on stripped margins of Cainozoic lateritic duricrust.
Dominant Species (50 m x 10 m area)

Vegetation Community Description												
Botanical Species		Status*	Average Height (m)						Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2
<i>Eucalyptus persistsens</i>		D		11								
<i>Dodonea</i> sp.						1						
<i>Triodea mitchellii</i>								0.5				
<i>Aristida calycina</i>								0.5				
<i>Myoporum acuminatum</i>						1						
% Rock	30	% Bare ground	0		% Leaf litter		20		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	7				<i>Eucalyptus persiciens</i>		46					25	25

Community Health and Condition	
Overall Health:	Excellent
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Nil
Disturbance Cover (%):	0

Topography and Landform	
Landform Situation:	Slope
Altitude:	200-300m
Relief:	Low undulations
Slope:	Simple
Slope Class:	Gentle incline (2-5%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Reddish Grey
Soil Texture:	Loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Lateritic duricrust

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	35
Date/Time:	21/7/10

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S36



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.4.8
EPBC Status:	Endangered Ecological Community – Brigalow
VMA Status:	Endangered
EPA Status:	Endangered
DNRW Mapped as:	11.9.10/11.5.3 (11.4.8 adjoining)
Width of RE:	Non linear

Site Description	
Location:	200m W of KP248, 213km N or Alpha
Site Description:	-
Orientation of Transect:	180°
Photo Numbers:	57 & 58
Datum:	AGD 84
Latitude / Longitude:	-21.78717 / 147.10046

Vegetation Community Description												
<i>Eucalyptus cambageana</i> woodland with scattered brigalow over <i>Eremophila mitchellii</i>												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus cambageana</i>	D		19							4		
<i>Acacia harpophylla</i>	S			7							2	
<i>Eremophila mitchellii</i>	D					5						
<i>Myoporum montanum</i>							1.5					
<i>Carissa ovata</i>							1					
<i>Enchyleana tomentosa</i>								0.5				
<i>Paspalidium caespitosum</i>								0.5				
<i>Enteropogon aciculatum</i>								0.5				
<i>Pennistum ciliare</i>	#							0.5				
% Rock	0	% Bare ground		30		% Leaf litter		20		% Cryptogram		20
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures														
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)		
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC	
	4				<i>Eucalyptus cambageana</i>		5					17		25
		2			<i>Acacia harpophylla</i>			4				8		

Community Health and Condition	
Overall Health:	Very good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	None declared, minor Buffel grass
Weed Cover (%):	5
Disturbance:	Grazing
Disturbance Cover (%):	5

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Reddish grey
Soil Texture:	Clay loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated Fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	36
Date/Time:	21/07/10 14:30

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S37



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.4.6
EPBC Status:	N/A
VMA Status:	Of Concern
EPA Status:	Endangered
DNRW Mapped as:	11.4.8/11.5.3/11.7.3
Width of RE:	250m

Site Description	
Location:	KP260, 116km SW of Newlands Mine
Site Description:	-
Orientation of Transect:	270°
Photo Numbers:	68 & 69
Datum:	AGD 84
Latitude / Longitude:	-21.89063 / 147.09573

Vegetation Community Description												
Acacia cambagei open forest												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Acacia cambagei	D		10	5								
Carissa ovata						1						
Atalaya hemiglauca						1						
Opuntia sp.	##					1						
Parthenium hysterophorus	##					0.5						
Eriocereus martinii	##					0.2						
Jasminum didymum						0.2						
Capparis lasiantha						0.2						
Alectryon heterophyllus						0.5						
Pennisetum ciliare	D#					0.5						
% Rock	2	% Bare ground		40		% Leaf litter		20		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	22	2			<i>Acacia cambagei</i>		112	8				65	65

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Parthenium weed, Tree pear, Harissia cactus, Buffel grass
Weed Cover (%):	40
Disturbance:	Grazing, fire
Disturbance Cover (%):	40

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Brown
Soil Texture:	Loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated course-grained sediments and rocks

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	37
Date/Time:	22/07/10

Additional Comments	
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VEGETATION SURVEY

Vegetation Community Site number S38



Regional Ecosystem Profile	
Regional Ecosystem Type:	Non remnant (Buffel grass)
EPBC Status:	N/A
VMA Status:	N/A
EPA Status:	N/A
DNRW Mapped as:	11.4.4
Width of RE:	Non linear

Site Description	
Location:	KP 263, 118km SW of Newmans Mine
Site Description:	-
Orientation of Transect:	0°
Photo Numbers:	66 & 67
Datum:	AGD 84
Latitude / Longitude:	-21.91477 / 147.09343

Vegetation Community Description												
Non-remnant												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (Cover)			
		E	T1	T2	T3	S1	S2	G				%
<i>Pennisetum ciliare</i>	D							1				70
<i>Parthenium hysterophus</i>	S							0.5				3
<i>Brachyachne convergens</i>								0.2				<0.1
<i>Malvaceae</i> (indeterminate)								0.5				<0.1
<i>Vigna lanceolata</i>								0.2				<0.1
<i>Alternanthera nodiflora</i>								0.3				<0.1
% Rock	0	% Bare ground		20	% Leaf litter		10	% Cryptogram		0		

Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
					<i>Cenchrus ciliaris</i>							70	7

Community Health and Condition	
Overall Health:	Non-existent
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Parthenium weed
Weed Cover (%):	3
Disturbance:	Previously cultivated
Disturbance Cover (%):	100

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Black
Soil Texture:	Loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated Fine-grained sediment

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	38
Date/Time:	22/07/10

Additional Comments	
<ul style="list-style-type: none"> Mapped as native grasslands but non-present and appears to have been cultivated. 	

VEGETATION SURVEY

Vegetation Community Site number S39



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.4.6
EPBC Status:	N/A
VMA Status:	Of Concern
EPA Status:	Endangered
DNRW Mapped as:	11.4.8
Width of RE:	Non linear

Site Description	
Location:	KP 270, 124km SW of Newlands Mine
Site Description:	-
Orientation of Transect:	0°
Photo Numbers:	64 & 65
Datum:	AGD 84
Latitude / Longitude:	-21.98700 / 147.08745

Vegetation Community Description													
Acacia cambagei (Gidgee) open forest													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Acacia cambagei		D		8							12		
Lysicarpus carronii		A		6									
Carissa ovata							1						
Cassarris lasiantha									0.5				
Eriocereus martinii		##							0.5				
Enchylaena tomentosa									0.5				
Acacia harpophylla		A		8							1		
Pennisetum ciliare		#							0.5				
Jaminum didymum									0.5				
% Rock	0	% Bare ground		40		% Leaf litter		40		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	12				<i>Acacia cambagei</i>		52					50	52
	1				<i>Acacia harpophylla</i>		1					2	

Community Health and Condition	
Overall Health:	Average
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Harrisia Cactus, Buffel Grass, Parthenium weed
Weed Cover (%):	20
Disturbance:	Grazing, hot fire
Disturbance Cover (%):	20

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Red
Soil Texture:	Clay loam
Geology:	Surface observation
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	39
Date/Time:	22/07/10

Additional Comments	
<ul style="list-style-type: none"> Landholder reports Parthenium weed in heavier flay depressions in general vicinity. 	

VEGETATION SURVEY

Vegetation Community Site number S40



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.5.3
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.5.12/11.5.3/11.4.6
Width of RE:	Non linear

Site Description	
Location:	KP 275, 187km North of Alpha
Site Description:	-
Orientation of Transect:	180°
Photo Numbers:	55 & 56
Datum:	AGD 84
Latitude / Longitude:	-22.02953 / 147.07623

Vegetation Community Description													
<i>Corymbia clarksoniana</i> and <i>Eucalyptus melanophloia</i> woodland to 15m													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus clarksoniana</i> (tentative)		D		15									
<i>Eucalyptus melanophloia</i>		S		15									
<i>Erythrina vespertilio</i>					6								
<i>Acacia excelsa</i>					6								
<i>Terminalia oblongata</i>							3						
<i>Maytenus cunninghamiana</i>							3						
<i>Petalostigma pubescens</i>							3						
<i>Erthroxylum australe</i>							2						
<i>Bursaria</i> sp.							4						
<i>Stylosanthes scabra</i>		#						1					
<i>Opuntia</i> sp.		##						1					
<i>Themeda triandra</i>									0.5				
<i>Heteropogon contortus</i>									0.5				
<i>Pennisetum ciliare</i>		#							0.5				
<i>Aristida</i> sp.									0.5				
% Rock	0	% Bare ground		30		% Leaf litter		30		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	2				<i>Eucalyptus intermedia</i>		4					10	13
					<i>Eucalyptus melanophloia</i>							3	

Community Health and Condition	
Overall Health:	Average
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Tree pear, Buffel grass, Seca stylo
Weed Cover (%):	20
Disturbance:	Grazing
Disturbance Cover (%):	40

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Red
Soil Texture:	Loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grain sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	40
Date/Time:	21/07/10

Additional Comments	
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VEGETATION SURVEY

Vegetation Community Site number S41



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.25
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.3.25
Width of RE:	100m

Site Description	
Location:	KP 284, 178km North of Alpha
Site Description:	Mistake creek
Orientation of Transect:	180°
Photo Numbers:	53 & 54
Datum:	AGD 84
Latitude / Longitude:	-22.09784 / 147.04530

Vegetation Community Description												
Eucalyptus camaldulensis woodland fringing watercourse												
Dominant Species (50 m x 10 m area)												
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)		
			E	T1	T2	T3	S1	S2	G	E	T1	T2
Eucalyptus camaldulensis				20								
Eucalyptus coolabah				15								
Melaleuca linariifolia					6							
Lysiphylum carronii					6		2					
Terminalia oblongata							2					
Acacia salicina							2					
Grewia retusifolia						1						
Pennisetum ciliare									0.7			
Paspalidium sp.									0.7			
Xanthium strumarium		#							0.5			
Acacia farnesiana		#					1.5					
% Rock	0	% Bare ground		20		% Leaf litter		30		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	6				<i>Eucalyptus camaldulensis</i>		5					30	50
	4				<i>Eucalyptus coolabah</i>		3					20	

Community Health and Condition	
Overall Health:	Average
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Noogoora burr, Mimosa bush, Buffel grass
Weed Cover (%):	30
Disturbance:	Grazing
Disturbance Cover (%):	50

Topography and Landform	
Landform Situation:	Watercourse
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Clay loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	41
Date/Time:	21/07/10 12.50

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S42



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.1
EPBC Status:	Endangered Ecological Community – Brigalow
VMA Status:	Endangered
EPA Status:	Endangered
DNRW Mapped as:	11.3.3/11.3.5
Width of RE:	20-50m

Site Description	
Location:	KP 306, 157km North of Alpha
Site Description:	-
Orientation of Transect:	225°
Photo Numbers:	47 & 48
Datum:	AGD 84
Latitude / Longitude:	-22.27326 / 146.93661

Vegetation Community Description													
Very degraded <i>Acacia harpophylla</i> woodland													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)						Abundance (m ² /ha)				
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Acacia harpophylla</i>		D		17	8		3				1	2	
<i>Eucalyptus cambageana</i>		A	22										
<i>Eremophila mitchellii</i>							3						
<i>Terminalia oblongata</i>							2						
<i>Carissa ovata</i>								1					
<i>Pennisetum ciliare</i>		#							0.5				
<i>Chloris sp.</i>		#							0.5				
Dead Standing											4	2	
<i>Eriocereus martinii</i>		##							0.5				
% Rock	0	% Bare ground		5		% Leaf litter		60		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	1	2			<i>Acacia harpophylla</i>		5	5				10	10
	4	2			Dead standing		2	3					

Community Health and Condition	
Overall Health:	Very degraded
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Tree pear, Harissia cactus, Buffel grass
Weed Cover (%):	80%
Disturbance:	Grazing, hot fires
Disturbance Cover (%):	90%

Topography and Landform	
Landform Situation:	Plain
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Reddish grey
Soil Texture:	Clay loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Consolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	42
Date/Time:	21/7/10 08:50

Additional Comments	
<ul style="list-style-type: none"> Good degraded location for transecting remnant. Non-remnant from -22.27326/146.93661 to -22.2715/146.93807 but grading into remnant further East and West. 	

VEGETATION SURVEY

Vegetation Community Site number S43



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.4.8
EPBC Status:	Endangered Ecological Community – Brigalow
VMA Status:	Endangered
EPA Status:	Endangered
DNRW Mapped as:	11.4.8/11.3.5
Width of RE:	50m

Site Description	
Location:	KP308.5, 155km North of Alpha
Site Description:	Beresford Station Northern boundary
Orientation of Transect:	90°
Photo Numbers:	45 & 46
Datum:	AGD 84
Latitude / Longitude:	-22.29099 / 146.92194

Vegetation Community Description												
Acacia harpophylla (with Eucalyptus cambageana emergents) woodland in degraded condition.												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m²/ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Eucalyptus cambageana	S	20							1			
Acacia harpophylla	D		17	7						3	1	
Dead standing timber	S		17	7						2	1	
Flindersia dissosperma				7								
Terminalia oblongata						4						
Eremophila mitchellii						4						
Erythroxylum australe						2.5						
Carissa ovata							1					
Pennisetum ciliare	D							0.5				
Paspalidium caespitosum								0.5				
Hibiscus sp. (Emerald S.L.Everist 2124)												
Opuntia sp.	##						1					
Eriocereus martinii	##											
Geijera parvifolia						4						
Lysicarpus carronii						4						
% Rock	0	% Bare ground		5		% Leaf litter		40		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
1					<i>Eucalyptus cambageana</i>		1						
	3	1			<i>Acacia harpophylla</i>		2	1					
	2	1			Dead standing timber		2	4					

Community Health and Condition	
Overall Health:	Degraded
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Tree pear, Harissia cactus, Buffel grass
Weed Cover (%):	80%
Disturbance:	Grazing, hot fires.
Disturbance Cover (%):	80%

Topography and Landform	
Landform Situation:	Plain
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very Gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Red
Soil Texture:	Clay loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	43
Date/Time:	21/7/10 07:50

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S44



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.3
EPBC Status:	N/A
VMA Status:	Of Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.3.3/11.3.1
Width of RE:	200m

Site Description	
Location:	KP 316, 147km North of Alpha
Site Description:	Watercourse crossing
Orientation of Transect:	270°
Photo Numbers:	49 & 50
Datum:	AGD 84
Latitude / Longitude:	-22.35128 / 146.88335

Vegetation Community Description												
<i>Eucalyptus coolabah</i> woodland on alluvial watercourse with Brigalow (including RE 11.3.1 in adjoining patches).												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus coolabah</i>	D		20		6					13		
<i>Acacia harpophylla</i>	S		20	12	6					7		
<i>Terminalia oblongata</i>	S			12	6						2	
<i>Lysicarpus carronii</i>					6							
<i>Carissa ovata</i>						1						
<i>Parthenium hysterophorus</i>	##							0.3				
<i>Citrus glauca</i>						1.5						
<i>Grewia retusifolia</i>						1.5						
<i>Sporobolus</i> sp.								0.3				
<i>Jasminum didymum</i>								0.5				
<i>Pennisetum ciliare</i>	D							0.5				
<i>Paspalidium caespitosum</i>								0.5				
<i>Capparis lasiantha</i>								0.3				
% Rock	0	% Bare ground		35		% Leaf litter		20		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures														
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)		
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC	
	13				<i>Eucalyptus coolabah</i>		8	2	1					
	7				<i>Acacia harpophylla</i>		5	1	6					
		2			<i>Terminalia oblongata</i>				23					

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Parthenium weed, Buffel grass
Weed Cover (%):	30% (<1% Parthenium weed)
Disturbance:	Grazing
Disturbance Cover (%):	30%

Topography and Landform	
Landform Situation:	Watercourse
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Clay loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	44
Date/Time:	21/7/10 09:45

Additional Comments	
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VEGETATION SURVEY

Vegetation Community Site number S45



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.11.15
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at present
DNRW Mapped as:	11.11.15
Width of RE:	Non-linear

Site Description	
Location:	KP 319, 144km North of Alpha
Site Description:	Just east of end of east-west rocky ridge
Orientation of Transect:	90°
Photo Numbers:	51 & 52
Datum:	AGD 84
Latitude / Longitude:	-22.38001 / 146.86798

Vegetation Community Description													
Eucalyptus crebra, Corymbia clarksoniana, Eucalyptus melanophloia woodland with shrubby layer adjacent to distinct rocky outcrop/rise.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)						Abundance (m ² /ha)				
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Eucalyptus melanophloia		C		17							4		
Corymbia clarksoniana		C		15							4		
Corymbia dallachiana		A		15									
Eucalyptus crebra		S		15	9								
Petalostigma pubescens						5	3	1					
Erythroxylum australe							2						
Bursaria incarna						5							
Carissa ovata								1					
Grewia retusifolia								1					
Heteropogon contortus									0.5				
Aristida calycina									0.5				
Aristida sp.									0.5				
Cymbopogon bombycinus									0.5				
Themeda triandra									0.5				
Triodia pungens									0.4				
Melinus repens		#											
% Rock	20	% Bare ground		20		% Leaf litter		20		% Cryptogram		10	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	4				<i>Eucalyptus melanophloia</i>		3					8	25
	4				<i>Corymbia clarksoniana</i>		5					10	
					<i>Corymbia dallachiana</i>		1	3				2	
					<i>Eucalyptus crebra</i>							5	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	No declared, Red natal grass
Weed Cover (%):	10
Disturbance:	Grazing
Disturbance Cover (%):	5

Topography and Landform	
Landform Situation:	Plain
Altitude:	200-300m
Relief:	Low
Slope:	Gentle undulation
Slope Class:	Gently inclined (2-5%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Red
Soil Texture:	Sandy loam
Geology:	Surface observation
Rock / Sediment Type:	Exposed rocks and course-grained a-horizon

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	45
Date/Time:	21/7/10 10:51am

Additional Comments	
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VEGETATION SURVEY

Vegetation Community Site number S46



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.4.8
EPBC Status:	Endangered Ecological Community – Brigalow
VMA Status:	Endangered
EPA Status:	Endangered
DNRW Mapped as:	11.4.8
Width of RE:	Non linear

Site Description	
Location:	KP 330, 134km North of Alpha
Site Description:	-
Orientation of Transect:	145°
Photo Numbers:	43 & 44
Datum:	AGD 84
Latitude / Longitude:	-22.46101 146.81813

Vegetation Community Description												
<i>Eucalyptus cambageana</i> woodland with <i>Acacia harpophylla</i> .												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus cambageana</i>			15	10						4	2	
<i>Acacia harpophylla</i>			15	10		5				1	2	
<i>Terminalia oblongata</i>				10		5						
<i>Eremophila mitchellii</i>						4						
<i>Carissa ovata</i>							1					
<i>Themeda triandra</i>								1				
<i>Dichanthium</i> sp.								0.5				
<i>Sporobolus australiasicus</i>								0.3				
<i>Paspalidium caespitosum</i>								0.5				
Dead Standing Timber				10								
% Rock	0	% Bare ground		20		% Leaf litter		20		% Cryptogram		30
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	4	2			<i>Eucalyptus thosetiana</i>		2	5				15	25
	1	2			<i>Acacia harpophylla</i>		1	2				10	
	4	1			Dead Standing Timber		5	1					

Community Health and Condition

Overall Health:	Average
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Grazing, fire from pulled area
Disturbance Cover (%):	50

Topography and Landform	
Landform Situation:	Plain
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Reddish grey
Soil Texture:	Loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	46
Date/Time:	20/7/10 15.30

Additional Comments
<ul style="list-style-type: none"> Fire coming into remnant from adjoining pulled area.

VEGETATION SURVEY

Vegetation Community Site number S47



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.5.3a
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	11.5.3
Width of RE:	Non linear

Site Description	
Location:	KP 338, 127km North of Alpha
Site Description:	-
Orientation of Transect:	90°
Photo Numbers:	41 & 42
Datum:	AGD 84
Latitude / Longitude:	-22.52189 / 146.78763

Vegetation Community Description													
<i>Eucalyptus melanophloia</i> open woodland													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus melanophloia</i>		D		15	8						3	3	
<i>Corymbia intermedia</i>		A											
<i>Acacia coriacea</i>						5	1						
<i>Carissa ovata</i>							1						
<i>Aristida calycina</i>							0.5						
<i>Aristida latifolia</i>							1						
<i>Heteropogon contortus</i>							0.5						
<i>Themeda triandra</i>							0.5						
% Rock	0	% Bare ground		30		% Leaf litter		30		% Cryptogram		20	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	3	3			<i>Eucalyptus melanophloia</i>		3	7				20	20

Community Health and Condition

Overall Health:	Average
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Fire, grazing
Disturbance Cover (%):	40%

Topography and Landform	
Landform Situation:	Plain
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Sandy loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	47
Date/Time:	20/7/10 15.00

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S48



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.11.19
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	11.11.13
Width of RE:	Non linear

Site Description	
Location:	KP 341, 123km north of Alpha
Site Description:	-
Orientation of Transect:	180°
Photo Numbers:	39 & 40
Datum:	ADG84
Latitude / Longitude:	-22.55662 / 146.76105

Vegetation Community Description													
<i>Eucalyptus thozetiana</i> and <i>Acacia harpophylla</i> woodland on old sedimentary rocks.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)						Abundance (m ² /ha)				
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Acacia harpophylla</i>		D		15	9	6					1	2	1
<i>Eucalyptus thozetiana</i>		A		17	9						1		
<i>Eremophila mitchellii</i>							5						
<i>Flindersia dissosperma</i>							4						
<i>Carissa ovata</i>								1					
<i>Sporobolus australasicus</i>									0.3				
<i>Pennisetum ciliare</i>									0.5				
<i>Enneapogon</i> sp.									0.4				
<i>Lysicarpus carronii</i>					8								
% Rock	5	% Bare ground		15		% Leaf litter		40		% Cryptogram		10	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	1	2	1		<i>Acacia harpophylla</i>		1	6	6			30	35
	1				<i>Eucalyptus thozetiana</i>		1	2				5	

Community Health and Condition	
Overall Health:	Very good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	No declared weeds, Buffel grass
Weed Cover (%):	15
Disturbance:	Grazing
Disturbance Cover (%):	15

Topography and Landform	
Landform Situation:	Plain
Altitude:	250m-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Clay loam
Geology:	Surface observation
Rock / Sediment Type:	Unconsolidated fine- grained sediments with rocks

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	48
Date/Time:	20/7/10 14:10

Additional Comments
<ul style="list-style-type: none"> Move 250m West to avoid Brigalow

VEGETATION SURVEY

Vegetation Community Site number S49



Regional Ecosystem Profile	
Regional Ecosystem Type:	Regrowth (probably originally RE 11.5.3)
EPBC Status:	N/A
VMA Status:	N/A
EPA Status:	N/A
DNRW Mapped as:	11.5.3/11.4.6
Width of RE:	Non-linear

Site Description	
Location:	KP352, 115km North of Alpha
Site Description:	Burnt out / Regrowth paddock.
Orientation of Transect:	180°
Photo Numbers:	22 & 23
Datum:	AGD 84
Latitude / Longitude:	-22.61750 / 146.68875

Vegetation Community Description												
Regrowth <i>Eucalyptus populnea</i> with minor patches of Brigalow and <i>Bauhinia</i> regrowth scattered within. Brigalow more common in area shown as Brigalow to west of route.												
Dominant Species (50 m x 10 m area)												
Botanical Species		Status*	Average Height (m)						Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2
<i>Eucalyptus populnea</i>		C		8								
<i>Acacia harpophylla</i>		C		8								
<i>Lysicarpus carronii</i>		C		6								
<i>Flindersia dissosperma</i>		A		7								
<i>Eremophila mitchellii</i>						4						
<i>Terminalia oblongtata</i>		A		7								
<i>Carissa ovata</i>								1				
<i>Eucalyptus thozetiana</i>		#D							0.5			
<i>Sporobolus</i> sp.									0.3			
<i>Dicanthium</i> sp.									0.3			
<i>Aristida calycina</i> var. <i>praealta</i>									0.5			
<i>Aristida</i> spp.									0.5			
% Rock	0	% Bare ground		30		% Leaf litter		40		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x0.5cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	1				<i>Eucalyptus populnea</i>		4					5	15
	1				<i>Acacia harpophylla</i>		2					5	
					<i>Lysicarpus carronii</i>		2					5	

Community Health and Condition	
Overall Health:	Destroyed (no mature trees)
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Nil declared, Buffel grass dominant
Weed Cover (%):	30% Buffel grass
Disturbance:	Grazing
Disturbance Cover (%):	30%

Topography and Landform	
Landform Situation:	Plain
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Red
Soil Texture:	Sandy loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	49
Date/Time:	20/7/10 08.10

Additional Comments	
<ul style="list-style-type: none"> Aerial photo interpretation required to show if regrowth >15 years age. If so, approximately 30% of site may qualify as regrowth Brigalow although may be considered an associated species (rather than co-dominate) in other parts of this remnant. 	

VEGETATION SURVEY

Vegetation Community Site number S50



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.4.8
EPBC Status:	Endangered Ecological Community – Brigalow
VMA Status:	Endangered
EPA Status:	Endangered
DNRW Mapped as:	11.4.6/11.4.8/11.5.3/11.3.1
Width of RE:	Non-linear

Site Description	
Location:	700m East of KP 355, 115km North of Alpha
Site Description:	-
Orientation of Transect:	180°
Photo Numbers:	24 & 25
Datum:	AGD 84
Latitude / Longitude:	-22.63778 / 146.68367

Vegetation Community Description												
<i>Eucalyptus cambageana</i> , <i>Acacia harpohpylla</i> woodland in excellent condition.												
Dominant Species (50 m x 10 m area)												
Botanical Species		Status*	Average Height (m)						Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2
<i>Eucalyptus cambageana</i>		D	20							2		
<i>Acacia harpohpylla</i>		D		12	6						4	
<i>Eucalyptus populnea</i>		A		12								
<i>Acacia cambagei</i>		A		10	6							
<i>Eremophila mitchellii</i>							4					
<i>Myoporum montatum</i>								1				
<i>Carissa ovata</i>								1				
<i>Aristida calycina</i> var. <i>praealta</i>		D							1			
<i>Heteropogon contortus</i>									1			
<i>Enchaleana tomentosa</i>									0.3			
% Rock	0	% Bare ground		10		% Leaf litter		40		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures

Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
2					<i>Eucalyptus cambageana</i>		3					8	30
	4				<i>Acacia harpophylla</i>		3	3				20	

Community Health and Condition	
Overall Health:	Excellent
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Nil
Disturbance Cover (%):	0

Topography and Landform	
Landform Situation:	Plain
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Brown
Soil Texture:	Sandy loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated coarse –grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	50
Date/Time:	20/7/10 09:00

Additional Comments	
<ul style="list-style-type: none"> The route currently avoids this high quality high conservation value remnant. 	

VEGETATION SURVEY

Vegetation Community Site number S51



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.4.6
EPBC Status:	N/A
VMA Status:	Of Concern
EPA Status:	Endangered
DNRW Mapped as:	11.4.6/11.3.2/11.4.8
Width of RE:	Non linear

Site Description	
Location:	KP 358.5
Site Description:	-
Orientation of Transect:	0°
Photo Numbers:	27 & 28
Datum:	AGD 84
Latitude / Longitude:	-22.66513 / 146.65994

Vegetation Community Description												
Acacia cambagei woodland on clay plains												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Acacia cambagei	C		11							11		
Acacia harpohpylla	C		11							7		
Eremophila mitchellii						3	1					
Lysiphyllum carronii				5								
Carissa ovata							1					
Pennisetum ciliare	#							0.5				
Enteropogon acicularis								0.5				
Scleroleana sp.								0.2				
Enchylaena tomentosa								0.2				
% Rock	0	% Bare ground		30		% Leaf litter		30		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	11				<i>Acacia cambagei</i>		7					25	40
	7				<i>Acacia harpophylla</i>		5					15	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	No declared, Buffel grass
Weed Cover (%):	30%
Disturbance:	Grazing
Disturbance Cover (%):	30%

Topography and Landform	
Landform Situation:	Plain
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Reddish grey
Soil Texture:	Clay loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	51
Date/Time:	20/7/2010 09:50

Additional Comments
<ul style="list-style-type: none"> Route avoids adjoining regrowth transected by route <2m and 5 years old.

VEGETATION SURVEY

Vegetation Community Site number S52



Regional Ecosystem Profile	
Regional Ecosystem Type:	11.3.1
EPBC Status:	Endangered Ecological Community - Brigalow
VMA Status:	Endangered
EPA Status:	Endangered
DNRW Mapped as:	Non remnant
Width of RE:	50m

Site Description	
Location:	KP 368, 101km North of Alpha
Site Description:	Unmapped vegetated watercourse
Orientation of Transect:	90°
Photo Numbers:	29 & 30
Datum:	AGD84
Latitude / Longitude:	-22.74125 / 146.60928

Vegetation Community Description												
Acacia harpohpylla open forest with Eucalyptus orgadophila co-dominate along watercourse (uncleared)												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Eucalyptus orgadophila	C	18	17									
Acacia harpophylla	C		15	8								
Terminalia oblongata				8								
Lysiphyllum carronii				7		2						
Carissa ovata							1					
Pennisetum ciliare	#							1				
Dichanthium sp.								1				
Creekbank herbage (indeterminate)								0.3				
Sida spp.								0.2				
Acacia cambagei	A			7								
Xanthium occidentale	#							0.2				
% Rock	0	% Bare ground		40		% Leaf litter		20		% Cryptogram		5
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures

Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	7				<i>Eucalyptus orgadophila</i>		15					20	50
	3	3			<i>Acacia harpophylla</i>		5	30				15	
		3			<i>Terminalia oblongata</i>			22				15	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Noogoora burr, Buffel grass
Weed Cover (%):	30%
Disturbance:	Grazing
Disturbance Cover (%):	30%

Topography and Landform	
Landform Situation:	Watercourse
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Clay
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	52
Date/Time:	20/7/10 10:45

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S53



Regional Ecosystem Profile	
Regional Ecosystem Type:	10.3.14a
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	10.3.14a / 10.3.13a
Width of RE:	100m

Site Description	
Location:	KP 381, 90km North of Alpha
Site Description:	Sandy creek
Orientation of Transect:	0°
Photo Numbers:	34, 35 & 36 (33 of adjoining creek)
Datum:	AGD 84
Latitude / Longitude:	-22.83789 / 146.54057

Vegetation Community Description													
<i>Eucalyptus camaldulensis</i> and/or <i>Eucalyptus coolabah</i> open woodland along channels.													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus camaldulensis</i>		D		23	17								
<i>Eucalyptus coolabah</i>		S		23	17								
<i>Eucalyptus orgadophila</i>		A		20									
<i>Melaleuca linariifolia</i>						10							
<i>Ficus opposita</i>							6						
<i>Terminalia oblongata</i>					17		6						
<i>Lysiphyllum carronii</i>							4						
<i>Lomandra longifolia</i>									1				
<i>Oryza australiensis</i>									1				
<i>Vigna lanceolata</i>									0.5				
<i>Achyranthes obtectus</i>									1				
<i>Panicum larcomianum</i>									0.5				
<i>Xanthium occidentale</i>		#							0.5				
<i>Argemone ochroleuca</i>									0.5				
% Rock	0	% Bare ground		10		% Leaf litter		30		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	8	2			<i>Eucalyptus camaldulensis</i>		6	3				30	55
	2	1			<i>Eucalyptus coolabah</i>		2	3				25	

Community Health and Condition	
Overall Health:	Very good
Potential EVR Flora Species Habitat:	<i>Aponogeton queenslandicus</i>
EVR Flora Species Recorded:	Nil
Weed Species:	Noogoora burr
Weed Cover (%):	20
Disturbance:	Grazing
Disturbance Cover (%):	20

Topography and Landform	
Landform Situation:	Watercourse
Altitude:	250m – 500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Clay
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Undisclosed fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	53
Date/Time:	20/7/10 11:45

Additional Comments	
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VEGETATION SURVEY

Vegetation Community Site number 54



Regional Ecosystem Profile	
Regional Ecosystem Type:	10.3.27
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	10.3.28a/10.3.27a/10.3.12a
Width of RE:	Non-linear

Site Description	
Location:	KP 389, 83km North of Alpha
Site Description:	Timbered paddock
Orientation of Transect:	45°
Photo Numbers:	37 & 38
Datum:	AGD 84
Latitude / Longitude:	-22.90081 / 146.52403

Vegetation Community Description												
<i>Eucalyptus populnea</i> open woodland on alluvial plains.												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus populnea</i>	D		17	8								
<i>Eucalyptus melanophloia</i>	S		17	8								
<i>Corymbia</i> sp. (bloodwood)	A		17									
<i>Grevillea pteridifolia</i>												
<i>Archidendropsis basaltica</i>				6								
<i>Acacia coriacea</i>				6								
<i>Acacia decora</i>				8								
<i>Carissa ovata</i>						4						
<i>Grevillea parallela</i>						4						
<i>Grewia retusifolia</i>							1.3					
<i>Ennaeopogon</i> sp.							1					
<i>Arisitida latifolia</i>							1					
<i>Heteropogon contortus</i>								0.5				
<i>Panicum</i> sp.								1				
<i>Sida</i> sp.								0.5				
<i>Aristida calycina</i>								0.5				
<i>Maytenus cunninghamii</i>							1					
<i>Themeda triandra</i>								1				
<i>Triodia pungens</i>								0.5				
% Rock	0	% Bare ground		40		% Leaf litter		10		% Cryptogram		10
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	4	2			<i>Eucalyptus populnea</i>		2	7					
	1	1			<i>Eucalyptus melanophloia</i>			2					
	1				<i>Corymbia dallachyana</i>		1						

Community Health and Condition	
Overall Health:	Very good
Potential EVR Flora Species Habitat:	<i>Desmodium macrocarpum</i>
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Grazing
Disturbance Cover (%):	5%

Topography and Landform	
Landform Situation:	Steve Fox
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	Bad gully erosion on northern edge
Soils:	Surface observation (reliability low)
Soil Colour:	Reddish grey
Soil Texture:	Sandy loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated coarse-grained sediment

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	54
Date/Time:	20/7/10 13:10

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S55



Regional Ecosystem Profile	
Regional Ecosystem Type:	10.3.14a
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	10.3.14a/10.3.13a
Width of RE:	200m

Site Description	
Location:	KP 397.5, 74km North of Alpha
Site Description:	Sandy creek
Orientation of Transect:	180°
Photo Numbers:	20 & 21
Datum:	AGD 84
Latitude / Longitude:	-22.98449 / 146.52677

Vegetation Community Description													
<i>Eucalyptus camaldulensis</i> open woodland along watercourse													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)						Abundance (m ² /ha)				
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus camaldulensis</i>		D		20	15						7	2	
<i>Corymbia tessillaris</i>		S		18							2		
<i>Corymbia</i> sp. (bloodwood)		A		18									
<i>Alstonia constricta</i>							2						
<i>Acacia farnesiana</i>		#					1						
<i>Pennisetum ciliare</i>		#							1				
<i>Sida</i> sp.									1				
<i>Urochloa mosambicensis</i>		#							0.5				
<i>Heteropogon contortus</i>									1				
<i>Carrisa lanceolata</i>							2						
<i>Grewia retusifolia</i>									1				
<i>Stylosanthes scabra</i>													
<i>Panicum larcomianum</i>													
% Rock	0	% Bare ground		40		% Leaf litter		60		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures														
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)		
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC	
	7	2			<i>Eucalyptus camaldulensis</i>		9	25				50		60
	2				<i>Corymbia tessillaris</i>		2	2				10		

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	N/A
Weed Species:	Mimosa bush
Weed Cover (%):	3
Disturbance:	Grazing
Disturbance Cover (%):	15

Topography and Landform	
Landform Situation:	Alluvial watercourse
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Reddish grey
Soil Texture:	Sandy
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated course-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	55
Date/Time:	19/7/10 14:17

Additional Comments	
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VEGETATION SURVEY

Vegetation Community Site number S56



Regional Ecosystem Profile	
Regional Ecosystem Type:	10.5.5
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	No Concern at Present
DNRW Mapped as:	10.5.5/10.5.12
Width of RE:	Non-linear

Site Description	
Location:	KP 406, 66km north of Alpha
Site Description:	Treed paddock
Orientation of Transect:	300°
Photo Numbers:	18 & 19
Datum:	AGD 84
Latitude / Longitude:	-23.05902 / 146.52313

Vegetation Community Description												
<i>Eucalyptus melanophloia</i> open woodland on sand plains												
Dominant Species (50 m x 10 m area)												
Botanical Species	Status*	Average Height (m)							Abundance (m ² /ha)			
		E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
<i>Eucalyptus melanophloia</i>	D		15	8		3						
<i>Eucalyptus populnea</i>	S		16	8		3						
<i>Petalostigma pubescens</i>	A					3						
<i>Melaleuca tamariscina</i>	A					3						
<i>Heteropogon contortus</i>								1				
<i>Triodia pungens</i>								0.5				
<i>Bothriochloa</i> sp.								1				
<i>Aristida latifolia</i>								0.7				
<i>Chrysocephalum apiculatum</i>								0.3				
% Rock	0	% Bare ground		10		% Leaf litter		90		% Cryptogram		0
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant												

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	7				<i>Eucalyptus melanophloia</i>		4	6				20	30
	1				<i>Eucalyptus populnea</i>		2					10	

Community Health and Condition

Overall Health:	Very good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Nil
Weed Cover (%):	0
Disturbance:	Grazing
Disturbance Cover (%):	2

Topography and Landform	
Landform Situation:	Sand plain
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	N/A
Soils:	Surface observation (reliability low)
Soil Colour:	Light grey
Soil Texture:	Sandy loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	56
Date/Time:	19/7/10 13:39

Additional Comments
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VEGETATION SURVEY

Vegetation Community Site number S57



Regional Ecosystem Profile	
Regional Ecosystem Type:	10.3.14a
EPBC Status:	N/A
VMA Status:	Least Concern
EPA Status:	Of Concern
DNRW Mapped as:	10.3.14a / 10.3.13a
Width of RE:	100m

Site Description	
Location:	KP 415, 57km North of Alpha
Site Description:	Sandy creek
Orientation of Transect:	0°
Photo Numbers:	16 & 17
Datum:	AGD 84
Latitude / Longitude:	-23.13989 / 146.52144

Vegetation Community Description													
Eucalyptus camaldulensis open woodland along watercourse. Adjoined by Eucalyptus populnea open woodland (RE 10.3.7)													
Dominant Species (50 m x 10 m area)													
Botanical Species		Status*	Average Height (m)							Abundance (m ² /ha)			
			E	T1	T2	T3	S1	S2	G	E	T1	T2	T3
Eucalyptus camaldulensis		D		15	8		4						
Eucalyptus populnea		S		13									
Acacia excelsa		A			6								
Atalaya hemiglauca							2						
Carissa ovata							2						
Parkinsonia aculeata		##					2						
Acacia farnesiana		#											
Chloris divaricata								1					
Leptochloa digitata								1.5					
Paspalidium sp.								0.7					
Bothriochloa decipiens													
Panicum larcomianum													
% Rock	0	% Bare ground		30		% Leaf litter		70		% Cryptogram		0	
Status: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant													

Abundance measures													
Basal Area(0.5m x1cm gap)					Species	Stem Count(500m ²)						Cover(%)	
E	T1	T2	T3	S1		E	T1	T2	T3	S1	S2	PFC	CC
	5	4			<i>Eucalyptus camaldulensis</i>		8	36				35	65
		3			<i>Eucalyptus populnea</i>			33				30	

Community Health and Condition	
Overall Health:	Good
Potential EVR Flora Species Habitat:	-
EVR Flora Species Recorded:	Nil
Weed Species:	Parkinsonia, Mimosa bush
Weed Cover (%):	2
Disturbance:	Grazing, cattle pugs
Disturbance Cover (%):	15

Topography and Landform	
Landform Situation:	Alluvial watercourse
Altitude:	250-500m
Relief:	Very low
Slope:	Flat
Slope Class:	Very gently inclined (1-3%)
Erosional Landform Pattern:	n/a
Soils:	Surface observation (reliability low)
Soil Colour:	Grey
Soil Texture:	Clay loam
Geology:	Surface observation (reliability low)
Rock / Sediment Type:	Unconsolidated fine-grained sediments

Survey Details	
Recorder/s:	Steve Fox
Field Site Number:	57
Date/Time:	19/7/2010 12:30pm

Additional Comments	
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Appendix 4. Flora Species Identified during Field Survey

Table 28. Flora Species identified during Field Survey

Scientific Name	Status	
	NC Act	EBPC Act
<i>Acacia argyrodendron</i>	-	-
<i>Acacia cambagei</i>	-	-
<i>Acacia catenulata</i>	-	-
<i>Acacia coriacea</i>	-	-
<i>Acacia decora</i>	-	-
<i>Acacia excelsa</i>	-	-
<i>Acacia farnesiana</i>	-	-
<i>Acacia harpophylla</i>	-	-
<i>Acacia holosericea</i>	-	-
<i>Acacia nilotica</i> *	-	-
<i>Acacia rhodoxylon</i>	-	-
<i>Acacia salicifolia</i>	-	-
<i>Acacia salicina</i>	-	-
<i>Acacia shirleyi</i>	-	-
<i>Acacia simsii</i>	-	-
<i>Acacia</i> sp.	-	-
<i>Achyranthes obtectus</i>	-	-
<i>Alectryon heterophyllus</i>	-	-
<i>Allocasuarina luehmanii</i>	-	-
<i>Alphitonia excelsa</i>	-	-
<i>Alstonia constricta</i>	-	-
<i>Alternanthera nodiflora</i>	-	-
<i>Archidendropsis basaltica</i>	-	-
<i>Argemone ochroleuca</i> *	-	-
<i>Aristida latifolia</i>	-	-
<i>Aristida calycina</i>	-	-
<i>Aristida calycina</i> var. <i>calycina</i>	-	-
<i>Aristida calycina</i> var. <i>praealta</i>	-	-
<i>Aristida caput-medusae</i>	-	-
<i>Aristida latifolia</i>	-	-
<i>Aristida</i> sp.	-	-
<i>Atalaya hemiglauca</i>	-	-
<i>Bidens pilosa</i> *	-	-
<i>Bothriochloa decipiens</i>	-	-
<i>Bothriochloa</i> sp.	-	-
<i>Brachyachne convergens</i>	-	-
<i>Brachychiton australis</i>	-	-
<i>Breynia oblongifolia</i>	-	-
<i>Bursaria incarna</i>	-	-
<i>Bursaria</i> sp.	-	-
<i>Canthium oleaefolium</i>	-	-
<i>Canthium</i> sp.	-	-
<i>Capparis canescens</i>	-	-
<i>Capparis lasiantha</i>	-	-
<i>Cardiospermum</i> sp.	-	-
<i>Carissa ovata</i>	-	-
<i>Carrisa lanceolata</i>	-	-
<i>Cassia brewsteri</i>	-	-

<i>Casuarina cunninghamiana</i>	-	-
<i>Cheilanthes sieberi</i>	-	-
<i>Chloris divaricata</i>	-	-
<i>Chloris</i> sp.	-	-
<i>Chrysocephalum apiculatum</i>	-	-
<i>Citrus glauca</i>	-	-
<i>Corymbia clarksoniana</i>	-	-
<i>Corymbia dallachiana</i>	-	-
<i>Corymbia erythrophloia</i>	-	-
<i>Corymbia intermedia</i>	-	-
<i>Corymbia similis</i>	-	-
<i>Corymbia</i> sp. (bloodwood)	-	-
<i>Corymbia tessellaris</i>	-	-
<i>Cryptostegia grandiflora</i> *	-	-
<i>Cymbidium canaliculatum</i>	-	-
<i>Cymbopogon bombycinus</i>	-	-
<i>Cymbopogon</i> sp.	-	-
<i>Cyperus</i> sp.	-	-
<i>Datura stramonium</i> *	-	-
<i>Dichanthium sericeum</i>	-	-
<i>Dichanthium</i> sp.	-	-
<i>Digitaria</i> sp.	-	-
<i>Dioscorea</i> sp.	-	-
<i>Diospyros</i> sp.	-	-
<i>Dodonea triangularis</i>	-	-
<i>Dodonea</i> sp.	-	-
<i>Echinocloa</i> sp.	-	-
<i>Enchaleana tomentosa</i>	-	-
<i>Ennaeapogon</i> sp.	-	-
<i>Enteropogon acicularis</i>	-	-
<i>Entolasia</i> sp.	-	-
<i>Eragrostis</i> sp.	-	-
<i>Eremophila maculata</i>	-	-
<i>Eremophila mitchellii</i>	-	-
<i>Eriocereus martinii</i>	-	-
<i>Erythrina vespertilio</i>	-	-
<i>Erythroxylum australe</i>	-	-
<i>Eucalyptus melanophloia</i>	-	-
<i>Eucalyptus brownii</i>	-	-
<i>Eucalyptus camaldulensis</i>	-	-
<i>Eucalyptus cambageana</i>	-	-
<i>Eucalyptus clarksoniana</i>	-	-
<i>Eucalyptus coolabah</i>	-	-
<i>Eucalyptus crebra</i>	-	-
<i>Eucalyptus dallachyana</i>	-	-
<i>Eucalyptus exserta</i>	-	-
<i>Eucalyptus melanophloia</i>	-	-
<i>Eucalyptus orgadophila</i>	-	-
<i>Eucalyptus persistens</i>	-	-
<i>Eucalyptus platyphylla</i>	-	-
<i>Eucalyptus populena</i>	-	-
<i>Eucalyptus raveretiana</i>	V	V
<i>Eucalyptus tereticornis</i>	-	-
<i>Eucalyptus thozetiana</i>	-	-

<i>Ficus opposita</i>	-	-
<i>Ficus racemosa</i>	-	-
<i>Flindersia dissosperma</i>	-	-
<i>Geijera parvifolia</i>	-	-
<i>Grevillea longistyla</i>	-	-
<i>Grevillea parallela</i>	-	-
<i>Grevillea pteridifolia</i>	-	-
<i>Grevillea striata</i>	-	-
<i>Grewia retusifolia</i>	-	-
<i>Heteropogon contortus</i>	-	-
<i>Hovea</i> sp.	-	-
<i>Imperata cylindrica</i>	-	-
<i>Jasminum didymum</i>	-	-
<i>Juncus usitatis</i>	-	-
<i>Kailarsenia ochreatea</i>	-	-
<i>Keraudrenia hookeriana</i>	-	-
<i>Lagunaria patersonii</i>	-	-
<i>Lamandra</i> sp.	-	-
<i>Lantana camara</i> *	-	-
<i>Leonotus nepetifolia</i> *	-	-
<i>Leptochloa digitata</i>	-	-
<i>Lomandra longifolia</i>	-	-
<i>Lophostemon grandiflorus</i>	-	-
<i>Lysicarpus angustifolius</i>	-	-
<i>Lysiphyllum carronii</i>	-	-
<i>Lysiphyllum hookeri</i>	-	-
<i>Macaranga tanarius</i>	-	-
<i>Maytenus cunninghamii</i>	-	-
<i>Melaleuca bracteata</i>	-	-
<i>Melaleuca fluviatilis</i>	-	-
<i>Melaleuca leucadendra</i>	-	-
<i>Melaleuca linariifolia</i>	-	-
<i>Melaleuca pallescens</i>	-	-
<i>Melaleuca tamariscina</i>	-	-
<i>Melaleuca tamariscina</i>	-	-
<i>Melaleuca viminalis</i>	-	-
<i>Melaleuca viridiflora</i>	-	-
<i>Melinis repens</i> *	-	-
<i>Muehlenbeckia cunninghamii</i>	-	-
<i>Myoporum acuminatum</i>	-	-
<i>Myoporum montanum</i>	-	-
<i>Nauclea orientalis</i>	-	-
<i>Opuntia</i> sp.*	-	-
<i>Oryza australiensis</i>	-	-
<i>Owenia acidula</i>	-	-
<i>Oxychloris scariosa</i>	-	-
<i>Panicum larcomianum</i>	-	-
<i>Panicum</i> sp.	-	-
<i>Parkinsonia aculeate</i> *	-	-
<i>Parthenium hysterophorus</i> *	-	-
<i>Paspalidium caespitosum</i>	-	-
<i>Paspalidium rarum</i>	-	-
<i>Paspalidium</i> sp.	-	-
<i>Pennisetum ciliare</i> *	-	-

<i>Petalostigma banksii</i>	-	-
<i>Petalostigma pubescens</i>	-	-
<i>Pipterus</i> sp.	-	-
<i>Planchonia careya</i>	-	-
<i>Pleiogynum timorense</i>	-	-
<i>Psychotria</i> sp.	-	-
<i>Ricinus communis</i> *	-	-
<i>Scleroleana</i> sp.	-	-
<i>Sesbania</i> sp.	-	-
<i>Sida</i> sp.	-	-
<i>Sporobolus australasicus</i>	-	-
<i>Sporobolus disjunctus</i>	-	-
<i>Sporobolus</i> sp.	-	-
<i>Stachytarpheta</i> sp.*	-	-
<i>Stylosanthes scabra</i> *	-	-
<i>Stylosanthes scabra</i> *	-	-
<i>Syzygium</i> sp.	-	-
<i>Tephrosia brachyodon</i> var. <i>longifolia</i>	-	-
<i>Tephrosia purpurea</i> var. <i>sericea</i>		
<i>Tephrosia</i> sp.	-	-
<i>Terminalia oblongata</i>	-	-
<i>Themeda triandra</i>	-	-
<i>Trichodesma</i> sp.	-	-
<i>Triodia mitchellii</i>	-	-
<i>Triodia pungens</i>	-	-
<i>Typha</i> sp.	-	-
<i>Urochloa mosambicensis</i>	-	-
<i>Ventilago viminalis</i>	-	-
<i>Vigna lanceolata</i>	-	-
<i>Xanthium occidentale</i> *	-	-
<i>Xanthium pugens</i> *	-	-

* Non-native flora species.

Appendix 5. Complete Fauna Species List

Table 29. Complete Fauna Species List (including desktop searches and field survey)

Common Name	Species Name	EPBC Act Status	NC Act Status
Amphibians			
Cane Toad	<i>Bufo marinus</i>	-	-
Desert Froglet	<i>Crinia deserticola</i>	-	-
Green-stripe Frog	<i>Cyclorana alboguttata</i>	-	-
Superb Collared-frog	<i>Cyclorana brevipes</i>	-	-
Knife-footed Frog	<i>Cyclorana cultripes</i>	-	-
New Holland Frog	<i>Cyclorana novaehollandiae</i>	-	-
Rough Frog	<i>Cyclorana verrucosa</i>	-	NT
Long-thumbed Frog	<i>Limnodynastes fletcheri</i>	-	-
Ornate Burrowing Frog	<i>Limnodynastes ornatus</i>	-	-
Striped Marsh Frog	<i>Limnodynastes peronii</i>	-	-
Spotted Marshfrog	<i>Limnodynastes tasmaniensis</i>	-	-
Scarlet-sided Pobblebonk	<i>Limnodynastes terraereginae</i>	-	-
Northern Dwarf Tree-frog	<i>Litoria bicolor</i>	-	-
Green Treefrog	<i>Litoria caerulea</i>	-	-
Southern Orange-eyed Treefrog	<i>Litoria chloris</i>	-	-
Eastern Sedgefrog	<i>Litoria fallax</i>	-	-
Graceful Treefrog	<i>Litoria gracilentia</i>	-	-
Peters' Frog	<i>Litoria inermis</i>	-	-
Broad-palmed Rocketfrog	<i>Litoria latopalmata</i>	-	-
Stony-creek Frog	<i>Litoria lesueuri</i>	-	-
Striped Rocketfrog	<i>Litoria nasuta</i>	-	-
Roth's Treefrog	<i>Litoria rothii</i>	-	-
Naked Treefrog	<i>Litoria rubella</i>	-	-
	<i>Litoria wilcoxii</i>	-	-
Holy Cross Toad	<i>Notaden bennettii</i>	-	-
Bibron's Toadlet	<i>Pseudophryne bibronii</i>	-	-
Keferstein's Toadlet	<i>Pseudophryne coriacea</i>	-	-
Great Brown Broodfrog	<i>Pseudophryne major</i>	-	-
Eungella Day Frog	<i>Taudactylus eungellensis</i>	E	E
Eungella Tinker Frog	<i>Taudactylus liemi</i>	-	NT
Stonemason Toadlet	<i>Uperoleia lithomoda</i>	-	-
Littlejohn's Toadlet	<i>Uperoleia littlejohni</i>	-	-
Mimic Toadlet	<i>Uperoleia mimula</i>	-	-
Chubby Gungan	<i>Uperoleia rugosa</i>	-	-
Reptiles			
Common Death Adder	<i>Acanthophis antarcticus</i>	-	NT
Dubois' Sea Snake	<i>Aipysurus duboisii</i>	-	-
Ta Ta Lizard	<i>Amphibolurus gilberti</i>	-	-
Nobbi Dragon	<i>Amphibolurus nobbi</i>	-	-
	<i>Amphibolurus</i> sp.	-	-
Short-necked Worm-skink	<i>Anomalopus brevicollis</i>	-	-
Spotted Python	<i>Antaresia maculosa</i>	-	-
Black-headed Python	<i>Aspidites melanocephalus</i>	-	-
Australian Coral Snake	<i>Brachyuropsis australis</i>	-	-
Cone-eared Calyptotis	<i>Calyptotis lepidorostrum</i>	-	-
Loggerhead Turtle	<i>Caretta caretta</i>	E/Mi	E
Burnett's Skink	<i>Carlia foliorum</i>	-	-
Lined Rainbow-skink	<i>Carlia jarnoldae</i>	-	-

Common Name	Species Name	EPBC Act Status	NC Act Status
Shaded-litter Rainbow-skink	<i>Carlia munda</i>	-	-
Outcrop Rainbow-skink	<i>Carlia mundivensis</i>	-	-
Open-litter Rainbow-skink	<i>Carlia pectoralis</i>	-	-
Blue-throated Rainbow-skink	<i>Carlia rhomboidalis</i>	-	-
Robust Rainbow-Skink	<i>Carlia schmeltzii</i>	-	-
	<i>Carlia</i> sp.	-	-
Lively Skink	<i>Carlia vivax</i>	-	-
	<i>Carlia zuma</i>	-	-
Cann's Longneck Turtle	<i>Chelodina canni</i>	-	-
Eastern Long-necked Turtle	<i>Chelodina longicollis</i>	-	-
Green Turtle	<i>Chelonia mydas</i>	V/Mi	V
Saltwater Crocodile	<i>Crocodylus porosus</i>	-	V
Spiny-palmed Shinning-skink	<i>Cryptoblepharus carnabyi</i>	-	-
Callose-palmed Shinning-skink	<i>Cryptoblepharus plagiocephalus</i>	-	-
Wall Skink	<i>Cryptoblepharus virgatus</i>	-	-
Carpentaria Snake	<i>Cryptophis boschmai</i>	-	-
Black-striped Snake	<i>Cryptophis nigrostriatus</i>	-	-
Central Netted Dragon	<i>Ctenophorus nuchalis</i>	-	-
Capricorn Ctenotus	<i>Ctenotus capricorni</i>	-	NT
Stout Ctenotus	<i>Ctenotus hebetior</i>	-	-
Unspotted Yellow-sided Ctenotus	<i>Ctenotus ingrami</i>	-	-
Leopard Ctenotus	<i>Ctenotus pantherinus</i>	-	-
Eastern Striped Skink	<i>Ctenotus robustus</i>	-	-
	<i>Ctenotus</i> sp.	-	-
Eastern Barred Wedge-snout Ctenotus	<i>Ctenotus strauchii</i>	-	-
Copper-tailed Skink	<i>Ctenotus taeniolatus</i>	-	-
Striped-tailed Delma	<i>Delma labialis</i>	V	V
Excitable Delma	<i>Delma tinctoria</i>	-	-
Greater Black Whipsnake	<i>Demansia papuensis</i>	-	-
Collared Whipsnake	<i>Demansia torquata</i>	-	-
Lesser Black Whipsnake	<i>Demansia vestigiata</i>	-	-
Ornamental Snake	<i>Denisonia maculata</i>	V	V
Leatherback Turtle	<i>Dermochelys coriacea</i>	E/Mi	E
Fat-tailed Gecko	<i>Diplodactylus conspicillatus</i>	-	-
Box-patterned Gecko	<i>Diplodactylus steindachneri</i>	-	-
Stone Gecko	<i>Diplodactylus vittatus</i>	-	-
Tommy Round-head	<i>Diporiphora australis</i>	-	-
Major Skink	<i>Egernia frerei</i>	-	-
Yakka Skink	<i>Egernia rugosa</i>	V	V
Yellow-headed Snapping Turtle	<i>Elseya irwini</i>	-	-
Murray Short-necked Turtle	<i>Emydura macquarii</i>	-	-
Narrow-banded Sand-swimmer	<i>Eremiascincus fasciolatus</i>	-	-
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	V/Mi	V
Lemon-barred Forest-skink	<i>Eulamprus amplus</i>	-	NT
	<i>Eulamprus brachysoma</i>	-	-
Martin's Skink	<i>Eulamprus martini</i>	-	-
Red-naped Snake	<i>Furina diadema</i>	-	-
Dunmall's Snake	<i>Furina dunmalli</i>	V	V
Orange-naped Snake	<i>Furina ornata</i>	-	-
Chain-backed Dtella	<i>Gehyra catenata</i>	-	-
Dubious Dtella	<i>Gehyra dubia</i>	-	-

Common Name	Species Name	EPBC Act Status	NC Act Status
Fine-spotted Mulch-skink	<i>Glaphyromorphus punctulatus</i>	-	-
	<i>Glaphyromorphus</i> sp.	-	-
Bynoe's Gecko	<i>Heteronotia binoei</i>	-	-
Pale-headed Snake	<i>Hoplocephalus bitorquatus</i>	-	-
Spectacled Sea Snake	<i>Hydrophis kingii</i>	-	-
	<i>Lampropholis adonis</i>	-	-
Garden Skink	<i>Lampropholis delicata</i>	-	-
Olive Ridley Turtle	<i>Lepidochelys olivacea</i>	E/Mi	E
Mourning Gecko	<i>Lepidodactylus lugubris</i>	-	-
Eastern Mulch-slider	<i>Lerista fragilis</i>	-	-
Eastern Robust Slider	<i>Lerista punctatovittata</i>	-	-
	<i>Lerista zonulata</i>	-	-
Burton's Snake Lizard	<i>Lialis burtonis</i>	-	-
Common Dwarf Skink	<i>Menetia greyii</i>	-	-
Dwarf Litter-skink	<i>Menetia timlowi</i>	-	-
Carpet Python	<i>Morelia spilota</i>	-	-
South-eastern Morethia Skink	<i>Morethia boulengeri</i>	-	-
North-eastern Firetail Skink	<i>Morethia taeniopleura</i>	-	-
Flatback Turtle	<i>Natator depressus</i>	V/Mi	V
Prickly Knob-tailed Gecko	<i>Nephurus asper</i>	-	-
Northern Velvet Gecko	<i>Oedura castelnaui</i>	-	-
Ocellated Velvet Gecko	<i>Oedura ocellata</i>	-	-
Zigzag Velvet Gecko	<i>Oedura rhombifer</i>	-	-
Coastal Taipan	<i>Oxyuranus scutellatus</i>	-	-
Brigalow Scaly-foot	<i>Paradelma orientalis</i>	V	V
Dwyer's Snake	<i>Parasuta dwyeri</i>	-	-
Eastern Water Dragon	<i>Physignathus lesueurii</i>	-	-
Central Bearded Dragon	<i>Pogona vitticeps</i>	-	-
Northern Soil-crevice Skink	<i>Proablepharus tenuis</i>	-	-
Mulga Snake	<i>Pseudechis australis</i>	-	-
Eastern Brown Snake	<i>Pseudonaja textilis</i>	-	-
Eastern Hooded Scaly-foot	<i>Pygopus schraderi</i>	-	-
	<i>Ramphotyphlops</i> sp.	-	-
Claw-snouted Blind Snake	<i>Ramphotyphlops unguirostris</i>	-	-
North-eastern Blind Snake	<i>Ramphotyphlops polygrammicus</i>	-	-
Fitzroy River Turtle	<i>Rheodytes leukops</i>	V	V
Beaked Gecko	<i>Rhynchoedura ornata</i>	-	-
	<i>Saproscincus hannahae</i>	-	-
Golden-tailed Gecko	<i>Strophurus taenicauda</i>	-	NT
Eastern Spiny-tailed Gecko	<i>Strophurus williamsi</i>	-	-
Yellow-spotted Monitor	<i>Varanus panoptes</i>	-	-
Black-headed Monitor	<i>Varanus tristis</i>	-	-
Lace Monitor	<i>Varanus varius</i>	-	-
Birds			
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	-	-
Inland Thornbill	<i>Acanthiza apicalis</i>	-	-
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	-	-
Yellow Thornbill	<i>Acanthiza nana</i>	-	-
Brown Thornbill	<i>Acanthiza pusilla</i>	-	-
Chestnut-tailed Thornbill	<i>Acanthiza uropygialis</i>	-	-
Collared Sparrowhawk	<i>Accipiter cirrocephalus</i>	-	-
Brown Goshawk	<i>Accipiter fasciatus</i>	-	-

Common Name	Species Name	EPBC Act Status	NC Act Status
Australian Reed-warbler	<i>Acrocephalus australis</i>	-	-
Common Sandpiper	<i>Actitis hypoleucos</i>	-	-
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	-	-
Australian Brush-turkey	<i>Alectura lathamii</i>	-	-
Australian King-parrot	<i>Alisterus scapularis</i>	-	-
White-browed Crane	<i>Amauornis cinerea</i>	-	-
Pale-vented Bush-hen	<i>Amauornis moluccana</i>	-	-
Chestnut Teal	<i>Anas castanea</i>	-	-
Grey Teal	<i>Anas gracilis</i>	-	-
Northern Mallard	<i>Anas platyrhynchos</i>	-	-
Australasian Shoveler	<i>Anas rhynchos</i>	-	-
Pacific Black Duck	<i>Anas superciliosa</i>	-	-
Australasian Darter	<i>Anhinga novaehollandiae</i>	-	-
Magpie Goose	<i>Anseranas semipalmata</i>	-	-
Australasian Pipit	<i>Anthus novaeseelandiae</i>	-	-
Red-winged Parrot	<i>Aprosmictus erythropterus</i>	-	-
Fork-tailed Swift	<i>Apus pacificus</i>	Mi	
Wedge-tailed Eagle	<i>Aquila audax</i>	-	-
Cattle Egret	<i>Ardea ibis</i>	Mi	
Intermediate Egret	<i>Ardea intermedia</i>	-	-
Eastern Great Egret	<i>Ardea modesta</i>	-	-
Great Egret	<i>Ardea alba</i>	Mi	
White-necked Heron	<i>Ardea pacifica</i>	-	-
Australian Bustard	<i>Ardeotis australis</i>	-	-
Ruddy Turnstone	<i>Arenaria interpres</i>	-	-
Black-faced Woodswallow	<i>Artamus cinereus</i>	-	-
Dusky Woodswallow	<i>Artamus cyanopterus</i>	-	-
White-breasted Woodswallow	<i>Artamus leucorhynchus</i>	-	-
Little Woodswallow	<i>Artamus minor</i>	-	-
Masked Woodswallow	<i>Artamus personatus</i>	-	-
White-browed Woodswallow	<i>Artamus superciliosus</i>	-	-
Pacific Baza	<i>Aviceda subcristata</i>	-	-
White-eyed Duck	<i>Aythya australis</i>	-	-
Musk Duck	<i>Biziura lobata</i>	-	-
Bush Stone-curlew	<i>Burhinus grallarius</i>	-	-
Striated Heron	<i>Butorides striata</i>	-	-
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	-	-
Galah	<i>Cacatua roseicapilla</i>	-	-
Little Corella	<i>Cacatua sanguinea</i>	-	-
Long-billed Corella	<i>Cacatua tenuirostris</i>	-	-
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	-	-
Pallid Cuckoo	<i>Cacomantis pallidus</i>	-	-
Brush Cuckoo	<i>Cacomantis variolosus</i>	-	-
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	-	-
Sanderling	<i>Calidris alba</i>	-	-
Red Knot	<i>Calidris canutus</i>	-	-
Curlew Sandpiper	<i>Calidris ferruginea</i>	-	-
Pectoral Sandpiper	<i>Calidris melanotos</i>	-	-
Red-necked Stint	<i>Calidris ruficollis</i>	-	-
Great Knot	<i>Calidris tenuirostris</i>	-	-
Red-tailed Black-cockatoo	<i>Calyptorhynchus banksii</i>	-	-
Yellow-tailed Black-cockatoo	<i>Calyptorhynchus funereus</i>	-	-

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Large-tailed Nightjar	<i>Caprimulgus macrurus</i>	-	-
White-eared Monarch	<i>Carternornis leucotis</i>	-	-
Pheasant Coucal	<i>Centropus phasianinus</i>	-	-
Azure Kingfisher	<i>Ceyx azureus</i>	-	-
Little Kingfisher	<i>Ceyx pusilla</i>	-	-
Horsfield's Bronze-cuckoo	<i>Chalcites basalís</i>	-	-
Shining Bronze-cuckoo	<i>Chalcites lucidus</i>	-	-
Little Bronze-cuckoo	<i>Chalcites minutillus</i>	-	-
Black-eared Cuckoo	<i>Chalcites osculans</i>	-	-
Greater Sand Plover	<i>Charadrius leschenaultii</i>	-	-
Lesser Sand Plover	<i>Charadrius mongolus</i>	Mi	-
Red-capped Plover	<i>Charadrius ruficapillus</i>	-	-
Australian Wood Duck	<i>Chenonetta jubata</i>	-	-
White-backed Swallow	<i>Cheramoeca leucosterna</i>	-	-
Spotted Bowerbird	<i>Chlamydera maculata</i>	-	-
Whiskered Tern	<i>Chlidonias hybrida</i>	-	-
White-winged Black Tern	<i>Chlidonias leucopterus</i>	-	-
Silver Gull	<i>Chroicocephalus novaehollandiae</i>	-	-
Speckled Warbler	<i>Chthonicola sagittata</i>	-	-
Brown Songlark	<i>Cincloramphus cruralis</i>	-	-
Rufous Songlark	<i>Cincloramphus mathewsi</i>	-	-
Swamp Harrier	<i>Circus approximans</i>	-	-
Spotted Harrier	<i>Circus assimilis</i>	-	-
Golden-headed Cisticola	<i>Cisticola exilis</i>	-	-
Streaked Cisticola	<i>Cisticola juncidis</i>	-	NT
Brown Tree creeper	<i>Climacteris picumnus</i>	-	-
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	-	-
Little Shrike-thrush	<i>Colluricincla megarhyncha</i>	-	-
Rock Dove	<i>Columba livia</i>	-	-
Rufous-throated Honeyeater	<i>Conopophila rufogularis</i>	-	-
Ground Cuckoo-shrike	<i>Coracina maxima</i>	-	-
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	-	-
White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	-	-
Cicadabird	<i>Coracina tenuirostris</i>	-	-
White-winged Chough	<i>Corcorax melanorhamphos</i>	-	-
Little Crow	<i>Corvus bennetti</i>	-	-
Australian Raven	<i>Corvus coronoides</i>	-	-
Torresian Crow	<i>Corvus orru</i>	-	-
Stubble Quail	<i>Coturnix pectoralis</i>	-	-
Brown Quail	<i>Coturnix ypsilophora</i>	-	-
Pied Butcherbird	<i>Cracticus nigrogularis</i>	-	-
Black Butcherbird	<i>Cracticus quoyi</i>	-	-
Australian Magpie	<i>Cracticus tibicen</i>	-	-
Grey Butcherbird	<i>Cracticus torquatus</i>	-	-
Oriental Cuckoo	<i>Cuculus optatus</i>	-	-
Pallid Cuckoo	<i>Cuculus pallidus</i>	-	-
Black Swan	<i>Cygnus atratus</i>	-	-
Blue-winged Kookaburra	<i>Dacelo leachii</i>	-	-
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	-	-
Varied Sittella	<i>Daphoenositta chrysoptera</i>	-	-
Wandering Whistling Duck	<i>Dendrocygna arcuata</i>	-	-
Plumed Whistling Duck	<i>Dendrocygna eytoni</i>	-	-

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Mistletoebird	<i>Dicaeum hirundinaceum</i>	-	-
Spangled Drongo	<i>Dicrurus bracteatus</i>	-	-
Emu	<i>Dromaius novaehollandiae</i>	-	-
Pied Imperial Pigeon	<i>Ducula bicolor</i>	-	-
Little Egret	<i>Egretta garzetta</i>	-	-
White-faced Heron	<i>Egretta novaehollandiae</i>	-	-
Pied Heron	<i>Egretta picata</i>	-	-
Eastern Reef Egret	<i>Egretta sacra</i>	-	-
Black-shouldered Kite	<i>Elanus axillaris</i>	-	-
Black-fronted Dotterel	<i>Elseya melanops</i>	-	-
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>	-	-
Galah	<i>Eolophus roseicapillus</i>	-	-
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	-	NT
Red-kneed Dotterel	<i>Erythronyx cinctus</i>	-	-
Red Goshawk	<i>Erythrotriorchis radiatus</i>	E/Mi	V
Beach Stone-curlew	<i>Esacus magnirostris</i>	-	V
Eastern Koel	<i>Eudynamis orientalis</i>	-	-
White-throated Nightjar	<i>Eurostopodus mystacalis</i>	-	-
Dollarbird	<i>Eurystomus orientalis</i>	-	-
King Quail	<i>Excalfactoria chinensis</i>	-	-
Brown Falcon	<i>Falco berigora</i>	-	-
Nankeen Kestrel	<i>Falco cenchroides</i>	-	-
Grey Falcon	<i>Falco hypoleucos</i>	-	-
Australian Hobby	<i>Falco longipennis</i>	-	-
Peregrine Falcon	<i>Falco peregrinus</i>	-	-
Black Falcon	<i>Falco subniger</i>	-	-
Common Coot	<i>Fulica atra</i>	-	-
Latham's Snipe	<i>Gallinago hardwickii</i>	Mi	
Dusky Moorhen	<i>Gallinula tenebrosa</i>	-	-
Buff-banded Rail	<i>Gallirallus philippensis</i>	-	-
Gull-billed Tern	<i>Gelochelidon nilotica</i>	-	-
Diamond Dove	<i>Geopelia cuneata</i>	-	-
Bar-shouldered Dove	<i>Geopelia humeralis</i>	-	-
Peaceful Dove	<i>Geopelia placida</i>	-	-
Peaceful Dove	<i>Geopelia striata</i>	-	-
Squatter Pigeon (Southern)	<i>Geophaps scripta scripta</i>	V	V
White-throated Gerygone	<i>Gerygone albogularis</i>	-	-
Western Gerygone	<i>Gerygone fusca</i>	-	-
Mangrove Gerygone	<i>Gerygone levigaster</i>	-	-
Brown Gerygone	<i>Gerygone mouki</i>	-	-
Fairy Gerygone	<i>Gerygone palpebrosa</i>	-	-
Little Lorikeet	<i>Glossopsitta pusilla</i>	-	-
Magpie-lark	<i>Grallina cyanoleuca</i>	-	-
Sarus Crane	<i>Grus antigone</i>	Mi	
Brolga	<i>Grus rubicunda</i>	-	-
Sooty Oystercatcher	<i>Haematopus fuliginosus</i>	-	NT
Australian Pied Oystercatcher	<i>Haematopus longirostris</i>	-	-
White-bellied Sea-eagle	<i>Haliaeetus leucogaster</i>	Mi	-
Brahminy Kite	<i>Haliastur indus</i>	-	-
Whistling Kite	<i>Haliastur sphenurus</i>	-	-
Black-breasted Buzzard	<i>Hamirostra melanosternon</i>	-	-
Pictorella Mannikin	<i>Heteromunia pectoralis</i>	-	-

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Little Eagle	<i>Hieraaetus morphnoides</i>	-	-
Black-winged Stilt	<i>Himantopus himantopus</i>	-	-
White-throated Needletail	<i>Hirundapus caudacutus</i>	Mi	-
Welcome Swallow	<i>Hirundo neoxena</i>	-	-
Barn Swallow	<i>Hirundo rustica</i>	Mi	-
Caspian Tern	<i>Hydroprogne caspia</i>	-	-
Comb-crested Jacana	<i>Irediparra gallinacea</i>	-	-
Varied Triller	<i>Lalage leucomela</i>	-	-
White-winged Triller	<i>Lalage sueurii</i>	-	-
White-winged Triller	<i>Lalage tricolor</i>	-	-
Pacific Gull	<i>Larus pacificus</i>	-	-
Wonga Pigeon	<i>Leucosarcia melanoleuca</i>	-	-
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	-	-
Mangrove Honeyeater	<i>Lichenostomus fasciocularis</i>	-	-
Yellow Honeyeater	<i>Lichenostomus flavus</i>	-	-
Bridled Honeyeater	<i>Lichenostomus frenatus</i>	-	-
Fuscous Honeyeater	<i>Lichenostomus fuscus</i>	-	-
White-eared Honeyeater	<i>Lichenostomus leucotis</i>	-	-
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	-	-
Grey-fronted Honeyeater	<i>Lichenostomus plumulus</i>	-	-
White-gaped Honeyeater	<i>Lichenostomus unicolor</i>	-	-
Singing Honeyeater	<i>Lichenostomus virescens</i>	-	-
Brown Honeyeater	<i>Lichmera indistincta</i>	-	-
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	Mi	-
Bar-tailed Godwit	<i>Limosa lapponica</i>	-	-
Black-tailed Godwit	<i>Limosa limosa</i>	Mi	-
Chestnut-breasted Mannikin	<i>Lonchura castaneothorax</i>	-	-
Nutmeg Mannikin	<i>Lonchura punctulata</i>	-	-
Square-tailed Kite	<i>Lophoictinia isura</i>	-	NT
Topknot Pigeon	<i>Lopholaimus antarcticus</i>	-	-
Southern Giant-petrel	<i>Macronectes giganteus</i>	E	E
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>	-	-
Superb Fairy-wren	<i>Malurus cyaneus</i>	-	-
Variegated Fairy-wren	<i>Malurus lamberti</i>	-	-
White-winged Fairy-wren	<i>Malurus leucopterus</i>	-	-
Red-backed Fairy-wren	<i>Malurus melanocephalus</i>	-	-
Yellow-throated Miner	<i>Manorina flavigula</i>	-	-
Noisy Miner	<i>Manorina melanocephala</i>	-	-
Little Grassbird	<i>Megalurus grammurus</i>	-	-
Tawny Grassbird	<i>Megalurus timoriensis</i>	-	-
Lewin's Honeyeater	<i>Meliphaga lewinii</i>	-	-
White-throated Honeyeater	<i>Melithreptus albogularis</i>	-	-
Black-chinned Honeyeater	<i>Melithreptus gularis</i>	-	NT
White-naped Honeyeater	<i>Melithreptus lunatus</i>	-	-
Budgerigar	<i>Melopsittacus undulatus</i>	-	-
Rainbow Bee-eater	<i>Merops ornatus</i>	Mi	-
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	-	-
Jacky Winter	<i>Microeca fascians</i>	-	-
Lemon-bellied Flycatcher	<i>Microeca flavigaster</i>	-	-
Black Kite	<i>Milvus migrans</i>	-	-
Horsfield's Bushlark	<i>Mirafrja javanica</i>	-	-
Black-faced Monarch	<i>Monarcha melanopsis</i>	Mi	-
Spectacled Monarch	<i>Monarcha trivirgatus</i>	Mi	-
Spectacled Monarch	<i>Myiagra cyanoleuca</i>	Mi	-

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Restless Flycatcher	<i>Myiagra inquieta</i>	-	-
Leaden Flycatcher	<i>Myiagra rubecula</i>	-	-
Dusky Honeyeater	<i>Myzomela obscura</i>	-	-
Scarlet Honeyeater	<i>Myzomela sanguinolenta</i>	-	-
Olive-backed Sunbird	<i>Nectarinia jugularis</i>	-	-
Plum-headed Finch	<i>Neochmia modesta</i>	-	-
Crimson Finch	<i>Neochmia phaeton</i>	-	-
Star Finch (Eastern)	<i>Neochmia ruficauda ruficauda</i>	E	E
Red-browed Finch	<i>Neochmia temporalis</i>	-	-
Cotton Pygmy-goose	<i>Nettapus coromandelianus</i>	Mi	-
Green Pygmy-goose	<i>Nettapus pulchellus</i>	-	-
Barking Owl	<i>Ninox connivens</i>	-	-
Southern Boobook	<i>Ninox novaeseelandiae</i>	-	-
Blue Bonnet	<i>Northiella haematogaster</i>	-	-
Eastern Curlew	<i>Numenius madagascariensis</i>	-	NT
Little Curlew	<i>Numenius minutus</i>	Mi	-
Whimbrel	<i>Numenius phaeopus</i>	-	-
Nankeen Night-heron	<i>Nycticorax caledonicus</i>	-	-
Cockatiel	<i>Nymphicus hollandicus</i>	-	-
Crested Pigeon	<i>Ocyphaps lophotes</i>	-	-
Bridled Tern	<i>Onychoprion anaethetus</i>	-	-
Crested Bellbird	<i>Oreoica gutturalis</i>	-	-
Olive-backed Oriole	<i>Oriolus sagittatus</i>	-	-
Rufous Whistler	<i>Pachycephala rufiventris</i>	-	-
Eastern Osprey	<i>Pandion cristatus</i>	-	-
Spotted Pardalote	<i>Pardalotus punctatus</i>	-	-
Striated Pardalote	<i>Pardalotus striatus</i>	-	-
House Sparrow	<i>Passer domesticus</i>	-	-
Indian Peafowl	<i>Pavo cristatus</i>	-	-
Australian Pelican	<i>Pelecanus conspicillatus</i>	-	-
Fairy Martin	<i>Petrochelidon ariel</i>	-	-
Tree Martin	<i>Petrochelidon nigricans</i>	-	-
Red-capped Robin	<i>Petroica goodenovii</i>	-	-
Great Cormorant	<i>Phalacrocorax carbo</i>	-	-
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	-	-
Pied Cormorant	<i>Phalacrocorax varius</i>	-	-
Common Bronzewing	<i>Phaps chalcoptera</i>	-	-
Brush Bronzewing	<i>Phaps elegans</i>	-	-
Helmeted Friarbird	<i>Philemon buceroides</i>	-	-
Little Friarbird	<i>Philemon citreogularis</i>	-	-
Noisy Friarbird	<i>Philemon comiculatus</i>	-	-
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	-	-
Royal Spoonbill	<i>Platalea regia</i>	-	-
Pale-headed Rosella	<i>Platycercus adscitus</i>	-	-
Striped Honeyeater	<i>Plectorhyncha lanceolata</i>	-	-
Glossy Ibis	<i>Plegadis falcinellus</i>	-	-
Pacific Golden Plover	<i>Pluvialis fulva</i>	-	-
Grey Plover	<i>Pluvialis squatarola</i>	-	-
Tawny Frogmouth	<i>Podargus strigoides</i>	-	-
Great Crested Grebe	<i>Podiceps cristatus</i>	-	-
Black-throated Finch (Southern)	<i>Poephila cincta cincta</i>	E	E
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>	-	-
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	-	-
Purple Swamphen	<i>Porphyrio porphyrio</i>	-	-
Swamphen	<i>Porphyrio porphyrio</i>	-	-
Baillon's Crake	<i>Porzana pusilla</i>	-	-
Kermadec Petrel (Western)	<i>Pterodroma neglecta neglecta</i>	V	-
Superb Fruit-dove	<i>Ptilinopus superbus</i>	-	-
Spotted Bowerbird	<i>Ptilonorhynchus maculatus</i>	-	-

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Great Bowerbird	<i>Ptilonorhynchus nuchalis</i>	-	-
Bar-breasted Honeyeater	<i>Ramsayornis fasciatus</i>	-	-
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>	-	-
Grey Fantail	<i>Rhipidura albiscapa</i>	-	-
Willie Wagtail	<i>Rhipidura leucophrys</i>	-	-
Rufous Fantail	<i>Rhipidura rufifrons</i>	-	-
Australian Painted Snipe	<i>Rostratula australis</i>	V/Mi	V
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>	-	-
Restless Flycatcher	<i>Seisura inquieta</i>	-	-
White-browed Scrubwren	<i>Sericornis frontalis</i>	-	-
Weebill	<i>Smicronis brevirostris</i>	-	-
Australasian Figbird	<i>Sphecotheres vieilloti</i>	-	-
Common Tern	<i>Sterna hirundo</i>	-	-
Black-naped Tern	<i>Sterna sumatrana</i>	-	-
Little Tern	<i>Sternula albifrons</i>	Mi	-
Freckled Duck	<i>Stictonetta naevosa</i>	-	-
Australian Pratincole	<i>Stiltia isabella</i>	-	-
Pied Currawong	<i>Strepera graculina</i>	-	-
Spotted Dove	<i>Streptopelia chinensis</i>	-	-
Apostlebird	<i>Struthidea cinerea</i>	-	-
Common Myna	<i>Sturnus tristis</i>	-	-
Common Starling	<i>Sturnus vulgaris</i>	-	-
Brown Booby	<i>Sula leucogaster</i>	-	-
Spectacled Monarch	<i>Symposiachrus trivirgatus</i>	-	-
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	-	-
Radjah Shelduck	<i>Tadorna radjah</i>	-	-
Double-barred Finch	<i>Taeniopygia bichenovii</i>	-	-
Zebra Finch	<i>Taeniopygia guttata</i>	-	-
Buff-breasted Paradise-kingfisher	<i>Tanysiptera sylvia</i>	-	-
Lesser Crested Tern	<i>Thalasseus bengalensis</i>	-	-
Crested Tern	<i>Thalasseus bergii</i>	-	-
Australian White Ibis	<i>Threskiornis molucca</i>	-	-
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	-	-
Collared Kingfisher	<i>Todiramphus chloris</i>	-	-
Forest Kingfisher	<i>Todiramphus macleayii</i>	-	-
Red-backed Kingfisher	<i>Todiramphus pyrrhopygius</i>	-	-
Sacred Kingfisher	<i>Todiramphus sanctus</i>	-	-
Black-tailed Native-hen	<i>Tribonyx ventralis</i>	-	-
Scaly-breasted Lorikeet	<i>Trichoglossus chlorolepidotus</i>	-	-
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	-	-
Grey-tailed Tattler	<i>Tringa brevipes</i>	-	-
Wandering Tattler	<i>Tringa incana</i>	-	-
Common Greenshank	<i>Tringa nebularia</i>	Mi	-
Marsh Sandpiper	<i>Tringa stagnatilis</i>	Mi	-
Red-backed Button-quail	<i>Turnix maculosus</i>	-	-
Red-chested Button-quail	<i>Turnix pyrrhotorax</i>	-	-
Little Button-quail	<i>Turnix velox</i>	-	-
Eastern Barn Owl	<i>Tyto javanica</i>	-	-
Masked Lapwing	<i>Vanellus miles</i>	-	-
Banded Lapwing	<i>Vanellus tricolor</i>	-	-
Terek Sandpiper	<i>Xenus cinereus</i>	-	-
Silvereye	<i>Zosterops lateralis</i>	-	-
Yellow White-eye	<i>Zosterops luteus</i>	-	-
Mammals			
Rufous Bettong	<i>Aepyprymnus rufescens</i>	-	-
Blue Whale	<i>Balaenoptera musculus</i>	E	-
	<i>Canis lupus</i>	-	-
Northern Mastiff-bat	<i>Chaerophon jobensis</i>	-	-

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Goulds Wattle Bat	<i>Chalinolobus gouldii</i>	-	-
Northern Quoll	<i>Dasyurus hallucatus</i>	E	-
Dugong	<i>Dugong dugon</i>	Mi	V
Northern Brown Bandicoot	<i>Isodon macrourus</i>	-	-
Spectacled Hare-wallaby	<i>Lagorchestes conspicillatus</i>	-	-
Northern Hairy-nosed Wombat	<i>Lasiorninus krefftii</i>	E	E
Forrests Mouse	<i>Leggadina forresti</i>	-	-
Agile Wallaby	<i>Macropus agilis</i>	-	-
Black-striped Wallaby	<i>Macropus dorsalis</i>	-	-
Whiptail Wallaby	<i>Macropus parryi</i>	-	-
Common Wallaroo	<i>Macropus robustus</i>	-	-
Red Kangaroo	<i>Macropus rufus</i>	-	-
Humpback Whale	<i>Megaptera novaeangliae</i>	V	-
Beccaris Mastiff-bat	<i>Mormopterus beccarii</i>	-	-
Little Mastiff-bat	<i>Mormopterus planiceps</i>	-	-
	<i>Mormopterus sp.</i>	-	-
House Mouse	<i>Mus musculus</i>	-	-
Eastern Long-eared Bat	<i>Nyctophilus timoriensis</i>	V	-
Rabbit	<i>Oryctolagus cuniculus</i>	-	-
Greater Glider	<i>Petauroides volans</i>	-	-
Sugar Glider	<i>Petaurus breviceps</i>	-	-
	<i>Petrogale assimilis</i>	-	-
Plain Rock-wallaby	<i>Petrogale inornata</i>	-	-
Koala	<i>Phascolarctos cinereus</i>	-	-
Common Planigale	<i>Planigale maculata</i>	-	-
Delicate Mouse	<i>Pseudomys delicatulus</i>	-	-
Desert Mouse	<i>Pseudomys desertor</i>	-	-
Eastern Chestnut Mouse	<i>Pseudomys gracilicaudatus</i>	-	-
Pebble-mound Mouse	<i>Pseudomys patrius</i>	-	-
Black Flying-fox	<i>Pteropus alecto</i>	-	-
Spectacled Flying-fox	<i>Pteropus conspicillatus</i>	V	-
Little Red Flying-fox	<i>Pteropus scapulatus</i>	-	-
Canefield Rat	<i>Rattus sordidus</i>	-	-
	<i>Rattus sp.</i>	-	-
Pale Field Rat	<i>Rattus tunneyi</i>	-	-
Western Broad-nosed Bat	<i>Scotorepens balstoni</i>	-	-
Little Broad-nosed Bat	<i>Scotorepens greyii</i>	-	-
Stripe-faced Dunnart	<i>Sminthopsis macroura</i>	-	-
Common Dunnart	<i>Sminthopsis murina</i>	-	-
	<i>Sminthopsis sp.</i>	-	-
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	-	-
Coastal Sheath-tail-bat	<i>Taphozous australis</i>	-	V
Common Sheath-tail-bat	<i>Taphozous georgianus</i>	-	-
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	-	-
	<i>Vespadelus finlaysoni</i>	-	-
	<i>Vespadelus troughtoni</i>	-	-
Swamp Wallaby	<i>Wallabia bicolor</i>	-	-
False Water Rat	<i>Xeromys myoides</i>	V	V

Source: 1, EPBC Protected Matters Search; 2, GHD 2010; 3, Queensland Museum; 4, Bird Atlas; 5, DERM Wildlife Online.



Appendix 6. Fauna Habitat Assessment

Table 30. Fauna Habitat Assessment

Site No	Latitude	Longitude	Date	Landform	Veg Description	Veg. Layer	Under-storey	Leaf Litter % Cover	Weeds	Ground Cover %	Distance Water	Distance Riparian	Weather Conditions	Ground Logs / 50 m plot	Fire Evidence	Habitat Condition 1-10	Notes	Rocky Substrate	Tree Hollow Avg / 250 m ²
S01	-19.9889	147.9397	24/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	20	Rare	0	501 m - 2 km	501 m - 2 km	Dry / Warm	3	>3 years ago	4	Appears to be a mellealeuca seasonal swamp with dense stands of Regent Bull Oak.	No rocks	1
S02	-20.0002	147.9119	24/07/10	Creekline / riverine	Forest	3	Shrubs / Grasses	70	Moderately common	0	0 - 10 m	0 - 10 m	Dry / Warm	5	>3 years ago	7	Large mellealeuca lined creek with semi-perm water.	Outcropping rock	8
S03	-20.0648	147.8692	26/07/10	Creekline / riverine	Open forest	3	Shrubs	20	Widespread and abundant	0	0 - 10 m	0 - 10 m	Dry / Warm	6	>3 years ago	4	Large paperbark and EVR eucalypt watercourse with Rubber Vine, Mexican Poppy. Grazed.	No rocks	6
S04	-20.1657	147.8157	26/07/10	Hill lower slope	Woodland	3	Shrubs / Grasses	20	Rare	0	11 - 50m	11 - 50 m	Dry / Warm	2	>3 years ago	5	Open grassy eucalypt woodland fringing creek with gallery forest.	No rocks	4
S05a	-20.2919	147.7936	26/07/10	Creekline / riverine	Woodland	3	Shrubs / Grasses	50	Widespread and abundant	0	0 - 10 m	0 - 10 m	Dry / Warm	2	No signs of fire	4	Degraded weedy gallery forest on creek but with EVR eucalypt. major infestation of Rubber Vine.	No rocks	3
S06	-20.3212	147.7821	26/07/10	Hill lower slope	Woodland	2	Grasses	5	Moderately common	0	501 m - 2 km	151 - 500 m	Dry / Warm	2	No signs of fire	5	Eucalypt woodland with grass ground layer.	No rocks	6
S07	-20.4023	147.7471	26/07/10	Creekline / riverine	Woodland	3	Grasses	10	Rare	0	0 - 10 m	0 - 10 m	Dry / Warm	5	No signs of fire	5	Dry creekline - small paperbarks and <i>Mellealeuca bracteata</i> .	Surface rocks	3
S07b	-20.4014	147.7468	26/07/10	Creekline / riverine	Woodland	2	Grasses	10	Rare	0	11 - 50 m	11 - 50 m	Dry / Warm	4	No signs of fire	4	Rocky creekline.	Surface rocks and outcrops	3
S10	-20.4797	147.7418	25/07/10	Creekline / riverine	Woodland	3	Grasses	40	Moderately common	0	0 - 10 m	0 - 10 m	Dry / Warm	2	No signs of fire	4	Grazed eucalypt watercourse.	No rocks	6

Site No	Latitude	Longitude	Date	Landform	Veg Description	Veg. Layer	Under-storey	Leaf Litter % Cover	Weeds	Ground Cover %	Distance Water	Distance Riparian	Weather Conditions	Ground Logs / 50 m plot	Fire Evidence	Habitat Condition 1-10	Notes	Rocky Substrate	Tree Hollow Avg / 250 m ²
S10b	-20.4808	147.7411	26/07/10	Creekline / riverine	Sparse woodland	2	Grasses	10	Moderately common	0	0 - 10 m	0 - 10 m	Dry / Warm	1	No signs of fire	3	Preferred crossing point with no vulnerable eucalypts. Still subject to strict constraints.	Surface rocks & outcrops	1
S11	-20.4860	147.7485	26/07/10	Depression	Grassland	1	Grasses	0	Rare	0	>2 km	>2 km	Dry / Warm	0	>3 years ago	6	Dichanthum grassland.	No rocks	0
S12	-20.5272	147.7348	25/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	10	Absent	0	>2 km	>2 km	Dry / Warm	1	No signs of fire	4	Grazed Brigalow.	No rocks	2
S13	-20.5775	147.7173	25/07/10	Hill lower slope	Woodland	3	Shrubs / Grasses	60	Rare	0	>2 km	>2 km	Dry / Warm	6	No signs of fire	7	Rosewood woodland on slight rise. Dense to medium understorey.	Surface rocks	2
S14	-20.6056	147.7166	26/07/10	Creekline / riverine	Woodland	3	Shrubs / Grasses	10	Moderately common	0	0 - 10 m	0 - 10 m	Dry / Warm	4	>3 years ago	4	Creek crossing with eucalypt. Various weeds.	Surface rocks & outcrops	5
S15	-20.6337	147.7109	25/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	10	Absent	0	>2 km	>2 km	Dry / Warm	2	No signs of fire	6	Brigalow woodland. Small patches through this area.	No rocks	4
S16	-20.7307	147.7145	25/07/10	Creekline / riverine	Open forest	3	Herbs	10	Widespread and abundant	0	0 - 10 m	0 - 10 m	Dry / Warm	0	No signs of fire	5	Melaleuca gallery forest with weed ground layer. Parthenium, datura, Thistles, argemone.	No rocks	4
S17	-20.8594	147.7253	25/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	10	Moderately common	0	51 - 150 m	51 - 150 m	Dry / Warm	1	No signs of fire	5	Eucalypt woodland on river flat. Grazed and parthenium.	No rocks	5
S18	-20.9183	147.7234	25/07/10	Hill lower slope	Sparse woodland	3	Shrubs / Grasses	10	Rare	0	51 - 150 m	51 - 150 m	Dry / Warm	2	>3 years ago	4	Open woodland with native grasses on undulating hills.	Surface rocks	3
S19	-20.9459	147.7264	25/07/10	Creekline / riverine	Woodland	3	Shrubs / Grasses	50	Widespread and abundant	0	11 - 50 m	11 - 50 m	Dry / Warm	4	No signs of fire	4	Open woodland on creek - heavily grazed and considerable amounts of parthenium.	No rocks	6

Site No	Latitude	Longitude	Date	Landform	Veg Description	Veg. Layer	Under-storey	Leaf Litter % Cover	Weeds	Ground Cover %	Distance Water	Distance Riparian	Weather Conditions	Ground Logs / 50 m plot	Fire Evidence	Habitat Condition 1-10	Notes	Rocky Substrate	Tree Hollow Avg / 250 m ²
S20	-21.0635	147.7045	23/07/10	Hill mid slope	Woodland	3	Shrubs / Grasses	50	Absent	0	>2 km	>2 km	Dry / Warm	2	>3 years ago	8	<i>E. crebra</i> woodland with numerous understorey sp and native grasses. Very good condition.	No rocks	8
S21	-21.0676	147.6878	23/07/10	Creekline / riverine	Woodland	3	Shrubs / Grasses	10	Absent	0	0 - 10 m	0 - 10 m	Dry / Warm	5	>3 years ago	7	Eucalypt riparian area with melaleuca and lomandra - steep banks / some grazing.	No rocks	8
S22	-21.1077	147.6462	23/07/10	Hill lower slope	Woodland	3	Shrubs / Grasses	40	Absent	0	>2 km	>2 km	Dry / Warm	2	>3 years ago	6	Eucalypt woodland - grazed. Extensive ground cover.	Surface pebbles	5
S23	-21.1865	147.6059	23/07/10	Hill mid slope	Woodland	3	Shrubs / Grasses	20	Absent	0	151 - 500 m	151 - 500 m	Dry / Warm	5	>3 years ago	5	Eucalypt woodland on low stony rise. Extensive sheet erosion.	Surface rocks	5
S24	-21.2579	147.5742	23/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	40	Absent	0	151 - 500 m	151 - 500 m	Dry / Warm	4	No signs of fire	6	Small area of brigalow in ok condition. Not on the line.	No rocks	2
S25	-21.3370	147.5445	23/07/10	Hill upper slope	Sparse woodland	2	Grasses	10	Absent	0	>2 km	>2 km	Dry / Warm	6	>3 years ago	4	Severely burnt open eucalypt woodland on undulating sedimentary hills - mostly bare rock. Extensive area of this country in the area.	Surface rocks & outcrops	0
S26	-21.3682	147.4978	22/07/10	Hill upper slope	Woodland	3	Shrubs / Grasses	60	Absent	0	>2 km	>2 km	Dry / Warm	6	>3 years ago	7	Lancewood on stony ridge. Reasonably large cutting required to go through here.	Surface rocks & outcrops	4
S27	-21.4159	147.4265	22/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	20	Absent	0	501 m - 2 km	501 m - 2 km	Dry / Warm	3	No signs of fire	7	Part of a large, intact remnant in good condition.	No rocks	6
S28	-21.4731	147.3801	22/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	10	Moderately common	0	51 - 150 m	51 - 150 m	Dry / Warm	3	>3 years ago	4	Woodland with Buffel Grass.	No rocks	6

Site No	Latitude	Longitude	Date	Landform	Veg Description	Veg. Layer	Under-storey	Leaf Litter % Cover	Weeds	Ground Cover %	Distance Water	Distance Riparian	Weather Conditions	Ground Logs / 50 m plot	Fire Evidence	Habitat Condition 1-10	Notes	Rocky Substrate	Tree Hollow Avg / 250 m ²
S29	-21.5189	147.3487	22/07/10	Depression	Woodland	3	Grasses	20	Rare	0	501 m - 2 km	501 m - 2 km	Dry / Warm	4	No signs of fire	4	Grazed gidgee area, subject to seasonal flooding.	No rocks	4
S30	-21.5992	147.1761	23/07/10	Creekline / riverine	Woodland	3	Shrubs / Grasses	30	Widespread and abundant	0	0 - 10 m	0 - 10 m	Dry / Warm	5	No signs of fire	6	Watercourse with coolibah / good condition.	No rocks	8
S31	-21.6266	147.1686	23/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	20	Moderately common	0	151 - 500 m	151 - 500 m	Dry / Warm	5	No signs of fire	6	Brigalow woodland with grass understorey. Parthenium in area.	No rocks	4
S32	-21.6551	147.1565	22/07/10	Hill upper slope	Sparse woodland	3	Grasses	10	Moderately common	0	501 m - 2 km	501 m - 2 km	Dry / Warm	1	>3 years ago	3	Degraded eucalypt woodland.	No rocks	2
S33	-21.7320	147.1241	22/07/10	Creekline / riverine	Woodland	3	Shrubs / Grasses	20	Rare	0	>2 km	51 - 150 m	Dry / Warm	4	>3 years ago	5	Eucalypt woodland / some scattered brigalow.	No rocks	4
S34	-21.7569	147.1114	21/07/10	Depression	Dense woodland	3	Shrubs / Grasses	80	Absent	0	>2 km	>2 km	Dry / Warm	6	No signs of fire	8	Nice lancewood area with dense grass. Good habitat for reptiles etc.	No rocks	2
S35	-21.7579	147.1127	21/07/10	Hill upper slope	Sparse woodland	2	Hummock Grasses	20	Absent	0	>2 km	>2 km	Dry / Warm	1	>3 years ago	8	Eucalypt woodland with spinifex	Surface rocks	3
S36	-21.7863	147.1020	21/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	20	Absent	0	>2 km	>2 km	Dry / Warm	3	>3 years ago	6	Eucalypt woodland with spinifex / grasses.	Surface pebbles	5
S37	-21.8890	147.0968	22/07/10	Flat / plain	Woodland	2	Shrubs / Grasses	15	Moderately common	0	>2 km	>2 km	Dry / Warm	5	>3 years ago	3	Degraded gidgee woodland / Buffel Grass.	No rocks	0
S38	-21.9132	147.0945	22/07/10	Flat / plain	Grassland	1	Grasses	0	Widespread and abundant	0	501 m - 2 km	501 m - 2 km	Dry / Warm	0	>3 years ago	1	Buffel and lots of parthenium.	No rocks	0
S39	-21.9855	147.0888	22/07/10	Flat / plain	Woodland	2	Shrubs / Grasses	50	Widespread and abundant	0	>2 km	>2 km	Dry / Warm	6	>3 years ago	3	Very degraded woodland - heavily grazed and Buffel Grass.	No rocks	5
S40	-22.0280	147.0772	21/07/10	Flat / plain	Woodland	2	Shrubs / Grasses	10	Moderately common	0	>2 km	>2 km	Dry / Warm	1	>3 years ago	4	Open woodland with some Buffel Grass.	No rocks	2
S41	-22.0965	147.0465	21/07/10	Creekline / riverine	Woodland	3	Shrubs / Grasses	20	Widespread and abundant	0	0 - 10 m	0 - 10 m	Dry / Warm	2	>3 years ago	5	Degraded but major feature is large trees / permanent water. Turtles here.	No rocks	7

Site No	Latitude	Longitude	Date	Landform	Veg Description	Veg. Layer	Under-storey	Leaf Litter % Cover	Weeds	Ground Cover %	Distance Water	Distance Riparian	Weather Conditions	Ground Logs / 50 m plot	Fire Evidence	Habitat Condition 1-10	Notes	Rocky Substrate	Tree Hollow Avg / 250 m ²
S42	-22.2720	146.9376	21/07/10	Flat / plain	Sparse woodland	2	Grasses	10	Widespread and abundant	0	>2km	>2 km	Dry / Warm	5	>3 years ago	2	Highly degraded brigalow.	No rocks	1
S43	-22.2896	146.9230	21/07/10	Flat / plain	Sparse woodland	2	Herbs & grasses	10	Widespread and abundant	0	>2 km	>2 km	Dry / Cool	1	>3 years ago	3	Highly degraded linear strip of brigalow along fence.	No rocks	2
S44	-22.3493	146.8846	21/07/10	Creekline / riverine	Woodland	3	Shrubs / Grasses	40	Moderately common	0	0 - 10 m	0 - 10 m	Dry / Warm	4	No signs of fire	6	Parthenium in this area. Grazed creekline / nice trees.	No rocks	7
S45	-22.3775	146.8685	21/07/10	Hill upper slope	Sparse woodland	3	Shrubs / Grasses	20	Absent	0	>2 km	>2 km	Dry / Warm	1	No signs of fire	7	Low rocky ridge.	Surface rocks & outcrops	2
S46	-22.4587	146.8199	20/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	40	Rare	0	>2 km	>2 km	Dry / Warm	3	No signs of fire	6	Scattered brigalow in eucalypt woodland.	No rocks	5
S47	-22.5205	146.7884	20/07/10	Flat / plain	Woodland	2	Grasses	20	Rare	0	>2 km	>2 km	Dry / Warm	1	1-3 years ago	4	Grazed sparse woodland.	No rocks	2
S48	-22.5551	146.7629	20/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	50	Absent	0	>2 km	>2 km	Dry / Warm	6	No signs of fire	8	Good brigalow / can we move line back to the west at the cleared area – 250 m.	No rocks	4
S49	-22.6161	146.6897	20/07/10	Depression	Woodland	3	Shrubs / Grasses	20	Absent	0	151 - 500 m	151 - 500 m	Dry / Warm	3	No signs of fire	4	Heavily grazed. Buffel Grass	No rocks	2
S50	-22.6356	146.6846	20/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	20	Rare	0	>2 km	>2 km	Dry / Warm	5	No signs of fire	7	along edge, otherwise in good condition.	No rocks	4
S51	-22.6635	146.6608	20/07/10	Flat / plain	Woodland	3	Grasses	20	Widespread and abundant	0	151 - 500 m	>2 km	Dry / Warm	4	No signs of fire	3	Heavy Buffel Grass understorey.	No rocks	6
S53	-22.8361	146.5419	20/07/10	Creekline / riverine	Open forest	3	Shrubs / Grasses	45	Widespread and abundant	0	0 - 10 m	0 - 10 m	Dry / Warm	5	No signs of fire	6	Creekline with large eucalypts and lomandra in ground layer. Noogoora Burr common.	No rocks	10
S54	-22.8994	146.5242	20/07/10	Flat / plain	Woodland	3	Shrubs / Grasses	40	Absent	0	>2 km	>2 km	Dry / Warm	3	>3 years ago	7	Poplar box woodland.	No rocks	5
S55	-22.9845	146.5268	19/07/10	Creekline / riverine	Open forest	3	Shrubs / Grasses	30	Widespread and abundant	0	0 - 10 m	0 - 10 m	Dry / Warm	4	No signs of fire	5	Watercourse with large River Red Gums / grazed heavily / Buffel Grass.	No rocks	12

Site No	Latitude	Longitude	Date	Landform	Veg Description	Veg. Layer	Under-storey	Leaf Litter % Cover	Weeds	Ground Cover %	Distance Water	Distance Riparian	Weather Conditions	Ground Logs / 50 m plot	Fire Evidence	Habitat Condition 1-10	Notes	Rocky Substrate	Tree Hollow Avg / 250 m ²
S56	-23.0571	146.5236	19/07/10	Flat / plain	Woodland	2	Grasses	30	Absent	0	>2 km	>2 km	Dry / Warm	1	No signs of fire	7	Open grassy woodland - no weeds / no Buffel Grass/ occasional Spinifex.	No rocks	3
S57	-23.1384	146.5225	19/07/10	Creekline / riverine	Woodland	3	Grasses	20	Rare	80	0 - 10 m	0 - 10 m	Dry / Warm	4	>3 years ago	6		No rocks	8

Appendix 7. Regionally Significant Fauna Species of the Brigalow Belt North Bioregion

Table 31. Regionally Significant Fauna Species of the Brigalow Belt North Bioregion

Common name	Species name	Importance of bioregion for species
Cotton Pygmy-goose	<i>Nettapus coromandelianus</i>	Moderate
Sarus Crane	<i>Grus antigone</i>	Minor
Common Noddy	<i>Anous stolidus</i>	Moderate
Black Noddy	<i>Anous minutus</i>	Moderate
White-headed Pigeon	<i>Columba leucomela</i>	Minor
Wompoo Fruit-dove	<i>Ptilinopus magnificus</i>	Minor
Superb Fruit-dove	<i>Ptilinopus superbus</i>	Moderate
Gould's Bronze-cuckoo	<i>Chrysococcyx russatus</i>	Moderate
White-rumped Swiftlet	<i>Aerodramus spodiopygius</i>	Moderate
Buff-breasted Paradise-kingfisher	<i>Tanysiptera sylvia</i>	Minor
Noisy Pitta	<i>Pitta versicolor</i>	Minor
Lovely Fairy-wren	<i>Malurus amabilis</i>	Minor
Yellow-throated Scrubwren	<i>Sericornis citreogularis</i>	Minor
Fairy Gerygone	<i>Gerygone palpebrosa</i>	Moderate
Yellow-spotted Honeyeater	<i>Meliphaga notata</i>	Moderate
Bridled Honeyeater	<i>Lichenostomus frenatus</i>	Minor
Eungella Honeyeater	<i>Lichenostomus hindwoodi</i>	Major
Varied Honeyeater	<i>Lichenostomus versicolor</i>	Major
Mangrove Honeyeater	<i>Lichenostomus fasciocularis</i>	Moderate
Yellow Honeyeater	<i>Lichenostomus flavus</i>	Moderate
Brown-backed Honeyeater	<i>Ramsayornis modestus</i>	Moderate
Pale-yellow Robin	<i>Tregellasia capito</i>	Minor
Yellow-breasted Boatbill	<i>Machaerirhynchus flaviventer</i>	Minor
White-eared Monarch	<i>Monarcha leucotis</i>	Moderate
Barred Cuckoo-shrike	<i>Coracina lineata</i>	Minor
Regent Bowerbird	<i>Sericulus chrysocephalus</i>	Minor
Black-throated Finch	<i>Poephila cincta</i>	Minor
Olive-backed Sunbird	<i>Nectarinia jugularis</i>	Moderate
Russet-tailed Thrush	<i>Zoothera heinei</i>	Moderate
Metallic Starling	<i>Aplonis metallica</i>	Minor

Appendix 8. Regionally Significant Fauna Species of the Desert Uplands Bioregion

Freshwater fish

Craterocephalus sp.
Hypseleotris sp. A
Hypseleotris sp. B
Neosilurus mollespiculum
Neosilurus sp. D
Scortum hilli

Myross Hardyhead
 Lake's Carp Gudgeon
 Midgley's Carp Gudgeon
 Soft-spined Catfish
 Bulloo Falsespined Catfish
 Leathery Grunter

Frogs

Pseudophryne major
Uperoleia lithomoda

Great Brown Broodfrog
 Stonemason Gungan

Reptiles

Anomalopus gowi
Ctenotus rosarius
Diplodactylus vittatus
Diporiphora winneckeii
Egernia stokesii
Lerista sp.
Suta spectabilis dwyeri
Tiliqua multifasciata
Tympanocryptis cephalus
Varanus mertensi

Skink
 Skink
 Wood Gecko
 Winnecke's Dragon
 Gidgee Skink
 Desert Uplands' skink
 Blackheaded / Dwyer's Snake
 Centralian Blue-tongued Lizard
 Gunther's Earless Dragon
 Merten's Water Monitor

Birds

Acanthiza pusilla
Ardeotis australis
Burhinus grallarius
Climacteris picumnus
Emblema pictum
Eremiornis carteri
Falco subniger
Lichenostomus leucotis
Melanodryas cucullata
Pomatostomus temporalis
Pyrrholaemus sagittatus
Tyto novaehollandiae

Brown Thornbill
 Australian Bustard
 Bush Stonecurlew
 Brown Treecreeper
 Painted Finch
 Spinifex Bird
 Black Falcon
 White-eared Honeyeater
 Hooded Robin
 Grey-crowned Babbler
 Speckled Warbler
 Masked Owl

Mammals

Aepyprymnus rufescens
Lagorchestes conspicillatus
Leggadina lakedownensis
Nyctophilus gouldi
Petauroides volans
Petaurus norfolcensis
Phascogale cinereus
Planigale maculata
Pseudomys desertor
Pseudomys patrius
Sminthopsis murina
Trichosurus vulpecula
Vespadelus baverstocki
Vespadelus finlaysoni
Wallabia bicolor
Zyzomys argurus

Rufous Bettong
 Spectacled Hare-wallaby
 Lakeland Downs Mouse
 Gould's Long-eared Bat
 Greater Glider
 Squirrel Glider
 Koala
 Common Planigale
 Desert Mouse
 Queensland Pebble-mound Mouse
 Common Dunnart
 Common Brushtail Possum
 Inland Forest Bat
 Inland Cave Bat
 Swamp Wallaby
 Common Rockrat