Appendix A TOR response reference table

ToR Number	Winchester ToR	Section Reference
Flora and Fauna - Existing Environment		
11.16	Identify and describe MSES, state and regionally significant biodiversity and natural environmental values of the terrestrial and aquatic ecology likely to be impacted by the project, including watercourses impacted by groundwater drawdown or diversion; Isaac River floodplain ecology (especially as it relates to changes from levees and groundwater drawdown impacts); groundwater-dependent ecosystems and high ecological significance wetlands. Where MSES have been addressed in the section on MNES, cross referencing may be appropriate.	4.3, 4.5, 4.6, 4.8, 5, 6.2, 7.6
Flora and Fauna - Impact assessment		
11.17	Describe the potential direct and indirect impacts on the biodiversity and natural environmental values of affected areas such as breeding, roosting, nesting and foraging habitat arising from the construction, operation and eventual decommissioning of the project (including potential/likely and known impacts) in accordance with DES EIS information guidelines (see Appendix 1).	7, 8
11.18	Assess the need for buffer zones and the retention, rehabilitation or planting of movement corridors. Detail measures that would avoid the need for waterway barriers or measures to mitigate the impacts of their construction and operation where unavoidable.	7.2, 10.4, 10.6 Waterway barriers are discussed in the aquatic assessment.
11.19	Describe how the achievement of the rehabilitation objectives would be monitored and audited, and how corrective actions would be managed.	10.6
11.20	Take into account all proposed avoidance and/or mitigation measures, the assessment should include, but not be limited to, the following key elements:	
	(a) MSES	8.2, 10 and Table 24
	(b) terrestrial and aquatic ecosystems (including groundwater-dependent ecosystems) and their interaction	10.1, 10.2, 10.4, 10.6
	(c) biological diversity including listed flora and fauna species and regional ecosystems	4, 5, 6, 10
	(d) the existing integrity and connectivity of ecological processes and ecosystems, including habitats of threatened, near-threatened or special least-concern species	4, 5, 6
	(e) the integrity of landscapes and places, including wilderness and similar natural places	4, 5, 7, 10
	(f) actions of the project that require an authority under the *Nature Conservation Act 1992*, and/or would be assessable development for the purposes of the *Vegetation Management Act 1999*[5]	7.2.2
	(g) chronic, low-level exposure to contaminants or the bio-accumulation of contaminants	*N/A*
	(h) impacts on native fauna due to wastes on the site, particularly those related to any form of toxicants in supernatant water of any tailings storage facility.	*N/A*
11.21	Include maps at suitable scales showing the location of disturbance areas, estimates of disturbance for MSES likely to be impacted as a result of the project, and quantify the extent of habitat for listed threatened species and communities adjacent to the project site to provide clarity on the regional context of these habitats on the project site. Where MSES have been addressed in the section on MNES, cross referencing may be appropriate.	6.2, Figures 13 to 18 and 21A to E
11.22	Describe the cumulative impacts of the proposed project, in conjunction with existing development and possible future development (as described by approved plans and existing project approvals), to ecosystem resilience, flora and fauna and impacts to the Isaac River floodplain ecology.	7.13

[5] This is notwithstanding that the *Vegetation Management Act 1999* does not apply to mining projects on resource tenements. Refer also to https://www.qld.gov.au/environment/land/management/vegetation/exemptions

ToR Number	Winchester ToR	Section Reference
Flora and Fauna - Mitigation measures		
11.23	Describe how the achievement of the flora and fauna objectives would be monitored, audited and reported, and how corrective/preventative actions would be managed for all phases of the project.	10.5
11.24	Propose practical measures for protecting or enhancing natural values and assess how the nominated quantitative indicators and standards are to be achieved for nature conservation management. In particular, address measures to protect or preserve any threatened or near-threatened species.	10,11
11.25	The measures proposed for the progressive rehabilitation of disturbed areas should include rehabilitation success criteria in relation to natural values that would be used to measure the progress and adjust practices if necessary to ensure success over time.	10.4, 10.6
11.26	Proposals for the rehabilitation of disturbed areas should incorporate, where appropriate, provision of nest hollows, watering points and ground litter.	10.6
Flora and Fauna - Offsets		
11.27	The EIS should identify whether the project will result in a significant residual impact on MSES with reference to the Queensland Environmental Offsets Policy, Significant Residual Impact Guideline 2014. The EIS should reference relevant parts of the Guide to determining terrestrial habitat quality (see Appendix 1) and must demonstrate that offsetting is the preferred option after all avoidance and mitigation measures have been considered, in accordance with the *Environmental Offsets Act 2014*.	8, 10, 11
11.28	Identify and illustrate the extent of any overlap between MNES and MSES.	6
11.29	For any significant residual impact, propose offsets that are consistent with the following requirements as set out in applicable State and Commonwealth legislation or policies:	
	(a) where a significant residual impact will occur on a prescribed environmental matter as outlined in the Environmental Offsets Regulation 2014, the offset proposal(s) must be consistent with the requirements of Queensland's *Environmental Offsets Act 2014* and the latest version of the Queensland Environmental Offsets Policy (Version 1.6) 2018 (see Appendix 1)	11
	(b) where Commonwealth offset policy requires an offset for significant residual impacts on a MNES, the offset proposal(s) must be consistent with the requirements of the EPBC Act Environmental Offsets Policy (October 2012), the Offsets assessment guide and relevant guidelines.	11
11.30	For staged offsets, the full extent of potential impacts on prescribed environmental matters from the entire proposal needs to be taken into account as part of the significant residual impact test.	11, Appendix G, Appendix H
Biosecurity - Existing environment		
11.31	Detail any known issues with weeds, pest and vector agents within the project area.	4.7, 5.5
Biosecurity - Impact assessment		
11.32	Detail the potential impacts of project operations on the spread of weeds, pest and vector agents within and adjacent to the project area.	7.7, 7.8
Biosecurity - Mitigation measures		
11.33	Propose detailed measures to control and limit the spread of restricted matters including noxious fish, invasive plants and invasive animals on the project site and adjacent areas as per Schedule 2 of the Biosecurity Regulation 2016, and any relevant local government area Biosecurity Plans.	10.4.2, 10.4.3
11.34	Provide information relating to the distribution and abundance of invasive plants which are considered to be weeds of national significance (WoNS) on the project sites.	4.7
11.35	Provide details of any proposed vertebrate pest and weed control programs to be implemented by the project.	10.8, 10.9

ToR Number	Winchester ToR	Section Reference
Matters of national environmental significance (MNES) - Background and context		
11.141	On 13 May 2019, the proponent referred the project as three separate proposed actions for a 'controlled action' decision under the EPBC Act (EPBC 2019/8460 Mine Site and Access Road; EPBC 2019/8459 Water Pipeline; EPBC 2019/8458 Electricity Transmission Line). It is expected that the EIS will relate to all three proposed actions.	1.1, 8.1
11.142	The Commonwealth Minister for the Environment may determine that the project will have or is likely to have a significant impact upon the following matters of national environmental significance under the EPBC Act: (a) For the Winchester South Project Mine Site and Access Road (EPBC 2019/8460): • listed threatened species and communities (sections 18 and 18A) • a water resource, in relation to coal seam gas and large coal mining (sections 24D and 24E). (b) For the Winchester South Water Pipeline (EPBC 2019/8459): • listed threatened species and communities (sections 18 and 18A). (c) Winchester South Project Electricity Transmission Line (EPBC 2019/8458): • listed threatened species and communities (sections 18 and 18A).	
11.143	The EIS is to be prepared pursuant to the Bilateral Agreement. It must meet the impact assessment requirements under both Commonwealth and Queensland legislation. The projects will require approval from the responsible Commonwealth minister under Part 9 of the EPBC Act before they can proceed.	1.1
11.144	Therefore, the EIS should include a stand-alone MNES chapter providing description and detailed assessment of the impacts for the proposed mine and access road (EPBC 2019/8460), the proposed water pipeline (EPBC 2019/8459) and the proposed electricity and transmission line (EPBC 2019/8458) separately, inclusive of any avoidance, mitigation and offset measures. All information relevant to the assessment of the above controlling provisions must be included in the MNES chapter and reference to other chapters in the EIS or appendices must be kept to a minimum.	N/A
11.145	Once the EIS has been prepared to the satisfaction of the Coordinator-General and MNES addressed to the satisfaction of the Commonwealth Department of the Environment and Energy, the EIS will be made available for public comment.	N/A
11.146	The proponent may be required by the Coordinator-General or the Department of the Environment and Energy to provide additional material to address matters raised in submissions on the EIS.	N/A
11.147	At the conclusion of the environmental assessment process, the Coordinator-General will provide a copy of the report to the Commonwealth Minister for the Environment, in accordance with Part 13, section 36(2) of the State Development and Public Works Organisation Regulation 2010 (Qld).	N/A
11.148	After receiving the evaluation report and sufficient information about the relevant impacts of the actions, the Commonwealth Minister for the Environment has 30 business days to consider whether the impacts of the proposals are acceptable, or not, and to decide whether or not to approve each controlling provision.	N/A
11.149	The Commonwealth Minister's decision is separate to the approval decisions made by Queensland state agencies and other entities with jurisdiction on state or local matters.	N/A
11.150	In accordance with the Bilateral Agreement, the EIS must:	
	(a) assess all relevant impacts that each proposed action has, will have or is likely to have;	7, 8.1, Appendix G
	(b) provide enough information about each proposed action and its relevant impacts to allow the Commonwealth Minister for the Environment to make an informed decision whether or not to approve the action under Part 9 of the EPBC Act; and	7, 8.1, Appendix G
	(c) address the matters mentioned in Division 5.2 of the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth) (EPBC Regulations).	7, 8.1, Appendix G

ToR Number	Winchester ToR	Section Reference
11.151	A cross-reference to the relevant sections in the MNES chapter that addresses each of the matters mentioned in Division 5.2 of the EPBC Regulations should be provided.	Refer to Main Text of the EIS
11.152	Consideration is to be given to any relevant information, advice, policy statements and guidelines (available at **www.environment.gov.au**) including but not limited to:	
	(a) Significant impact guidelines 1.1 - Matters of National Environmental Significance (see Appendix 1)	8.1, Appendix G
	(b) Significant impact guidelines 1.3 - coal seam gas and large coal mining developments – impacts on water resources (see Appendix 1)	*N/A*
	(c) *Environmental Protection and Biodiversity Conservation Act 1999*	8.1, Appendix G
	(d) EPBC Act Environmental Offsets Policy (see Appendix 1)	11
	(e) Species Profile and Threats (SPRAT) Database; and	8.1, Appendix G
	(f) any approved conservation advices, recovery plans and threat abatement plans (as relevant) for listed threatened species and ecological communities.	8.1, 10.2, Appendix G
11.153	The proposed mine and access road (EPBC 2019/8460), the proposed water pipeline (EPBC 2019/8459) and the proposed electricity and transmission line (EPBC 2019/8458) should each initially be assessed in their own right. How each proposed action relates to the other proposed actions should also be addressed.	8.1
11.154	Predictions of the extent of threat (risk), impact and the benefits of any avoidance, mitigation and management measures proposed, must be scientifically robust, supported by relevant suitably qualified experts and/or supported by technical data. Reference all sources of information relied upon and provide an estimate of the reliability of predictions.	7, 8, 9,10, 13
11.155	Any positive impacts on relevant MNES may be identified and evaluated.	10.3, 10.4, 11
11.156	The MNES chapter should describe any additional new field work, modelling or testing that, when used in conjunction with existing information, provides sufficient confidence in predictions so that well-informed decisions can be made. The extent of any new field work, modelling or testing should be commensurate with risk.	3
Matters of national environmental significance (MNES) - Assessment requirements		
11.157	The MNES chapter is to provide background to each proposed action and describe in detail all aspects of each proposed action, including but not limited to, the construction, operational and (if relevant) decommissioning aspects, including:	
	(a) the precise location of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of each aspect that may have impacts on any matter protected under each relevant controlling provision; and	Figure 2
	(b) details on how the works are to be undertaken (including stages of development and their timing) and design parameters for those parts of the structures or elements that may have relevant impacts.	11 and Figure 25
11.158	The MNES chapter must also provide details on the current state of each proposed action as well as the consequences of not proceeding with each proposed action and the project as a whole.	Refer to Main Text of the EIS
11.159	Project alternatives must be discussed in accordance with Schedule 4, section 2.01(g) of the EPBC Regulations, including:	Refer to Main Text of the EIS
	(a) if relevant, the alternative of taking no action;	Refer to Main Text of the EIS
	(b) a comparative description of the impacts of each alternative on the triggered MNES protected by controlling provisions of Part 3 of the EPBC Act for the action; and	Refer to Main Text of the EIS
	(c) sufficient detail to make clear why any alternative or option is preferred to another.	Refer to Main Text of the EIS

ToR Number	Winchester ToR	Section Reference
11.160	The short, medium and long-term advantages and disadvantages of the alternatives must be discussed.	Refer to Main Text of the EIS
Listed threatened species and communities (sections 18 and 18A) - Existing Environment		
11.161	The MNES chapter must describe the listed threatened species and ecological communities identified below (including EPBC Act listing status, distribution, life history and habitat).	4.5, 5.3 ,5.4, Appendix D, Appendix G
11.162	Provide details of the scope, methodology, timing and effort of surveys for each proposed action (including areas outside of each proposed action area which may be impacted by each proposed action); and include details of:	3
	(a) the application of best practice survey guidelines;	3.2
	(b) how studies or surveys are consistent with (or a justification for divergence from) published Australian Government guidelines and policy statements;	3.2
11.163	The MNES chapter must include records identified from field surveys of the below listed threatened species and ecological communities within and/or adjacent to the project site for each proposed action. The records must include a description of the habitat in which the record was identified.	4.5, 5.3, 8.1 and Appendix B
11.164	The MNES chapter must include known historical records of the below listed threatened species and ecological communities in the broader region. All known records must include the source (i.e. Commonwealth and State databases, published research, publicly available survey reports, etc.), the year of the record and a description of the habitat in which the record was identified.	Appendix B, Figure 9 and Figure19
11.165	The MNES chapter must include a detailed habitat assessment for each of the below listed threatened species and ecological communities within the project site of each proposed action. The habitat assessment must: (a) consider habitat use requirements (e.g. denning, foraging, breeding, nesting, dispersal, etc.); (b) be informed by desktop analysis and field surveys; (c) be in accordance with a departmental, state or local government habitat quality assessment methodology, and be included in an appendix to the EIS, along with the justification for using the chosen methodology; (d) consider relevant departmental documents (e.g. approved conservation advices, recovery plans, draft referral guidelines and listing advices), the SPRAT Database; and (e) be supported by relevant published research (if required).	3, 4.5, 5.3, Table 19, Appendix D, Appendix G
11.166	The MNES chapter must include the area (in hectares) and quality of all suitable habitats within each proposed action.	5.3, Table 27
11.167	The MNES chapter must include detailed mapping of suitable habitat for the below listed threatened species and ecological communities within each proposed action, which must: (a) be specific to the habitat assessment undertaken for each listed threatened species and ecological community (Note: provision of Queensland Regional Ecosystems alone is not adequate); (b) include an overlay of the disturbance footprint; (c) include known records of individuals from desktop analysis and/or field surveys; and (d) be provided separately as attachments in a JPEG format.	Figures 8A-E, 12 to 18
Listed threatened species and communities (sections 18 and 18A) - Impact assessment		
11.168	For each proposed action, describe and assess the impacts (direct, indirect and consequently) to each listed threatened species and ecological community identified below, and any others that are found to be or may potentially be present in areas that may be impacted by any stages of each proposed action in accordance with the Significant impact guidelines 1.1 - Matters of National Environmental Significance (see Appendix 1).	8, Appendix G

ToR Number	Winchester ToR	Section Reference
11.169	Identify which aspect of each proposed action is of relevance to each listed threatened species or ecological community or if the threat of impact relates to consequential actions.	8, Appendix G
11.170	The MNES chapter must identify and address cumulative impacts, where potential project impacts are in addition to existing impacts of other activities (including known potential future projects by the proponent and/or other proponents in the region and vicinity).	7.13, 8, Appendix G
11.171	The impacts must be assessed in accordance with relevant departmental policies and guidelines, and information provided in the SPRAT Database. Any technical data and other information used or needed to make a detailed assessment of the relevant impacts must be included as appendices to the EIS.	8, Appendix G
11.172	Where relevant, the MNES chapter is to demonstrate that each proposed action will have regard to any approved conservation advice.	8, Appendix G
11.173	Where relevant, the EIS must demonstrate that each proposed action will not be inconsistent with:	
	(a) Australia's obligations under: iv. the Biodiversity Convention; v. the Convention on the Conservation of Nature in the South Pacific (Apia Convention);	Refer to Main Text of the EIS
	(b) any recovery plans or threat abatement plans.	3.2.3, 8.9, 10.4.3, Appendix H
Listed threatened species and communities (sections 18 and 18A) - Mitigation measures		
11.174	The MNES chapter must include detailed descriptions of measures proposed to be undertaken by the proponent to avoid, mitigate and manage relevant impacts of all stages of each proposed action on listed threatened species and communities. The proposed measures should be based on best available practices, appropriate standards and supported by scientific evidence. The MNES chapter must include:	10
	(a) proposed measures to be undertaken to avoid and mitigate the relevant impacts of each proposed action on listed threatened species and communities, including those required by other Commonwealth, State and local government approvals;	10, 10.2, 10.3
	(b) an assessment of the predicted effectiveness of the proposed measures;	10.3, Table 25
	(c) any statutory or policy basis for the proposed measures, including reference to the SPRAT Database and relevant approved conservation advices, and a discussion on whether the proposed measures are not inconsistent with relevant recovery plans and threat abatement plans;	10.3
	(d) details of ongoing management, including monitoring programs to support an adaptive management approach and determine the effectiveness of the proposed measures;	10.4, 10.5
	(e) details on measures, if any, proposed to be undertaken by State and local government, including the name of the agency responsible for approving each measure; and	N/A
	(f) information on the timing, frequency and duration of the measures to be implemented.	10
11.175	All proposed measures should consider the 'S.M.A.R.T' principle: (a) S – Specific (what and how); (b) M – Measurable (baseline information, number/value, auditable); (c) A – Achievable (timeframe, money, personnel); (d) R – Relevant (conservation advices, recovery plans, threat abatement plans, scientific evidence); and (e) T – Time-bound (specific timeframe to complete).	10

ToR Number	Winchester ToR	Section Reference
11.176	An outline of an Environmental Management Plan (EMP) that sets out the framework for management, mitigation and monitoring of relevant impacts of the proposed actions, including any provisions for independent environmental auditing, may be included as an appendix to the EIS.	10.4
List of potential listed threatened species		
11.177	The MNES chapter is to address impacts on, but not limited to, the following listed threatened species for each proposed action:	
Bird	(a) Red Goshawk (*Erythrotriorchis radiatus*) - vulnerable;	8.1
	(b) Squatter Pigeon (southern) (*Geophaps scripta scripta*) - vulnerable;	8.1, Appendix G
	(c) Painted Honeyeater (*Grantiella picta*) - vulnerable;	8.1
	(d) Star Finch (eastern) (*Neochmia ruficauda ruficauda*) - endangered;	8.1
	(e) Australian Painted Snipe (*Rostratula australis*) - endangered;	8.1, Appendix G
	(f) Curlew Sandpiper (*Calidris ferruginea*) - migratory, critically endangered;	8.1
Fish	(a) Murray Cod (*Maccullochella peelii*) - vulnerable;	N/A
Mammal	(a) Northern Quoll (*Dasyurus hallucatus*) - endangered;	8.1
	(b) Ghost Bat (*Macroderma gigas*) - vulnerable;	8.1
	(c) Corbens Long-eared Bat (*Nyctophilus corbeni*) - vulnerable;	8.1
	(d) Greater Glider (*Petauroides volans*) - vulnerable;	8.1, Appendix G
	(e) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (*Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)*) - vulnerable;	8.1, Appendix G
Reptile	(a) Southern Snapping Turtle (*Elseya albagula*) - critically endangered;	N/A
	(b) Fitzroy River Turtle (*Rheodytes leukops*) - vulnerable;	N/A
	(c) Yakka Skink (*Egernia rugosa*) - vulnerable;	8.1
	(d) Dunmall's Snake (*Furina dunmalli*) - vulnerable;	8.1
	(e) Allan's Lerista (*Lerista allanae*) - endangered;	8.1
	(f) Ornamental Snake (*Denisonia maculata*) - vulnerable;	8.1, Appendix G
Flora	(a) Marlborough Blue (*Cycas ophiolitica*) - endangered;	8.1
	(b) King Blue-grass (*Dichanthium queenslandicum*) - endangered;	8.1
	(c) Quassia (*Samadera bidwillii*) - vulnerable;	8.1
List of potential listed threatened ecological communities		
11.178	The EIS is to address impacts on, but not limited to, the following listed threatened ecological communities for each proposed action:	
	(a) Brigalow (*Acacia harpophylla* dominant and co-dominant) - endangered; and	8.1, Appendix G
	(b) Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin - endangered.	8.1, Appendix G
	(c) Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions - endangered.	8.1, Appendix G

Appendix B Database search results

B.1 Summary of previous threatened species records within desktop search extent

Common Name	Scientific Name	Conservation Status		EPBC Act Protected Matters Search[3]	Wild Net[4]	Bird Life Australia[5]	ALA[6]	Recorded in Previous Studies and/or Surveys[7]	Regional Context
		NC Act[1]	EPBC Act[2]						
Flora									
-	*Capparis humistrata*	E	-	-	-	-	✓	-	Closest Record is approx. 30 km North East of the Study Area.
marlborough blue	*Cycas ophiolitica*	E	E	✓	-	-	-	-	No Records within Desktop Search Extent.
king blue-grass	*Dichanthium queenslandicum*	V	E	-	-	✓	-	-	Closest Record is approx. 11 km South East of the Study Area.
bluegrass	*Dichanthium setosum*	-	V	-	-	-	-	D, F	Closest Record is approx. 27 km South East of the Study Area.
-	*Kelita uncinella*	E	-	-	✓	-	-	-	Closest Record is approx. 40 km North West of the Study Area.
quassia	*Samadera bidwillii*	V	V	✓	-	-	-	-	No Records within Desktop Search Extent.
-	*Solanum adenophorum*	E	-	-	✓	-	✓	-	Records present within the Study Area.
-	*Solanum elachophyllum*	E	-	-	-	-	-	K	Closest Record is approx. 6.5 km North East of the Study Area.
black iron box	*Eucalyptus raveretiana*	-	V	-	✓	-	-	-	Closest Record is > 40 km North East of the Study Area.
reptiles									
fitzroy turtle	*Rheodytes leukops*	V	V	✓	-	-	-	-	No Records within Desktop Search Extent.
white-throated snapping turtle	*Elseya albagula*	E	CE	✓	-	-	-	-	No Records within Desktop Search Extent.
yakka skink	*Egernia rugosa*	V	V	✓	-	-	-	-	No Records within Desktop Search Extent.

Common Name	Scientific Name	Conservation Status		EPBC Act Protected Matters Search[3]	Wild Net[4]	Bird Life Australia[5]	ALA[6]	Recorded in Previous Studies and/or Surveys[7]	Regional Context
		NC Act[1]	EPBC Act[2]						
allan's lerista/ retro slider	*Lerista allanae*	E	E	✓	-	-	-	-	No Records within Desktop Search Extent.
common death adder	*Acanthophis antarcticus*	V	-	-	✓	-	✓	-	Closest Record is approx. 3.5 km due East of the Study Area.
ornamental snake	*Denisonia maculata*	V	V	✓	✓	-	✓	B, D, E, F, G, J	Records present within the Study Area.
Dunmall's Snake	*Furina dunmalli*	V	V	✓	-	-	-	-	No Records within Desktop search Extent.
Birds									
red goshawk	*Erythrotriorchis radiatus*	E	V	✓	-	-	-	-	No Records within Desktop Search Extent.
Australian painted snipe	*Rostratula australis*	V	E	✓	✓	✓	✓	D, G, J	One historic record present within the Study Area. A second record is also located approximately 1.5 km west of MLA 700065, thought to be the same individual.
curlew sandpiper	*Calidris ferruginea*	E	CE	✓	-	-	-	-	No Records within Desktop Search Extent.
squatter pigeon (southern subspecies)	*Geophaps scripta scripta*	V	V	✓	-	✓	✓	B, D, F, H, J, K	Records present within the Study Area.
painted honeyeater	*Grantiella picta*	V	V	✓	-	-	-	-	No Records within Desktop Search Extent.
star finch (eastern subspecies)	*Neochmia ruficauda ruficauda*	E	E	✓	-	-	-	-	No Records within Desktop Search Extent.
black-throated finch (southern subspecies)	*Peophila cincta cincta*	E	E	✓	-	-	-	-	No Records within Desktop Search Extent.
glossy black-cockatoo	*Calyptorphynuchus lathami erebus*	V	-	-	-	-	-	J	Closest Record is approx. 22 km North East of the Study Area.
red-tailed tropic bird	*Phaethon rubicauda*	V	-	-	✓	-	-	-	Closest Record is > 40 Km South West of the Study Area.

Common Name	Scientific Name	Conservation Status		EPBC Act Protected Matters Search[3]	Wild Net[4]	Bird Life Australia[5]	ALA[6]	Recorded in Previous Studies and/or Surveys[7]	Regional Context
		NC Act[1]	EPBC Act[2]						
Mammals									
northern quoll	*Dasyurus hallucatus*	-	E	✓	✓	-	-	-	A single Record is located > 40 km North East of the Study Area.
koala	*Phascolarctos cinereus*	V	V	✓	✓	-	✓	B, F, G, I, J, K	Records present within the Study Area.
greater glider	*Petauroides volans volans*	V	V	✓	✓	-	✓	I, J	Records present within the Study Area.
ghost bat	*Macroderma gigas*	E	V	✓	-	-	-	-	No Records within Desktop Search Extent.
Corben's long-eared bat	*Nyctophilus corbeni*	V	V	✓	-	-	-	-	No Records within Desktop Search Extent.
northern hairy-nosed wombat	*Lasiorhinus krefftii*	E	CE	-	✓	-	-	-	Closest Record is > 40 km South of the Study Area.

1 Conservation status under the NC Act (current as at July 2020). E = Endangered, V = Vulnerable.
2 Conservation status under the EPBC Act (current as at July 2020). E = Endangered, V = Vulnerable.
3 DEE (2019a-b)
4 DES (2020d)
5 Bird Life Australia (2019, 2020)
6 Atlas of Living Australia (2020)
7
- A GHD (2006)
- B BHP Billiton Mitsubishi Alliance (2009)
- C Peabody Energy Inc. (2011)
- D SKM (2011)
- E 3D Environmental (2012)
- F URS Australia (2013)
- G Ecological Survey & Management (2013)
- H Stanmore IP South (2006)
- I Department of Environment and Natural Resource Regulation (2005)
- J DPM Envirosciences (2018a)
- K DPM Envirosciences (2018c)

B.2 EPBC Act Protected Matters Search Tool

Australian Government
Department of the Environment and Energy

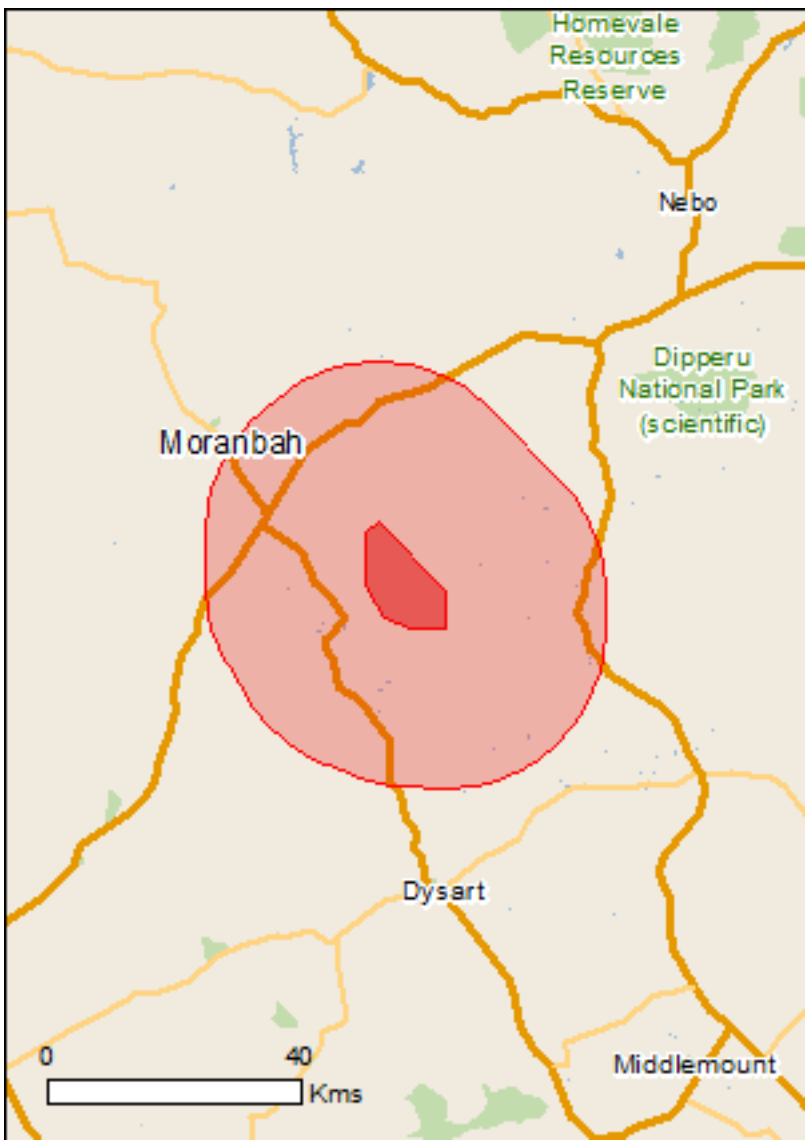
EPBC Act Protected Matters Report

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

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

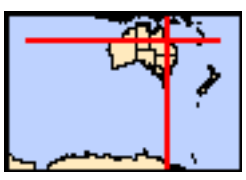
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 25/06/19 12:22:57



Coordinates

Buffer: 25.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	25
Listed Migratory Species:	12

Other Matters Protected by the EPBC Act

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

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

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

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

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	20
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

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

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Community likely to occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Mammals		
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Macroderma gigas		
Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Cycas ophiolitica		
[55797]	Endangered	Species or species habitat likely to occur within area
Dichanthium queenslandicum		
King Blue-grass [5481]	Endangered	Species or species habitat likely to occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat may occur within area
Eucalyptus raveretiana		
Black Ironbox [16344]	Vulnerable	Species or species habitat likely to occur within area
Samadera bidwillii		
Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Denisonia maculata		
Ornamental Snake [1193]	Vulnerable	Species or species habitat known to occur within area
Egernia rugosa		
Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
Elseya albagula		
Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat likely to occur within area
Furina dunmalli		
Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Lerista allanae		
Allan's Lerista, Retro Slider [1378]	Endangered	Species or species habitat may occur within area
Rheodytes leukops		
Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species	[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.	
Name	Threatened	Type of Presence
Migratory Marine Birds		

Name	Threatened	Type of Presence
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata		
Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur

Name	Threatened	Type of Presence within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda		Species or species habitat likely to occur

Name	Status	Type of Presence
[18913]		within area
Jatropha gossypifolia		
Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara		
Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp.		
Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata		
Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus		
Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Vachellia nilotica		
Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-22.2451 148.3012,-22.2312 148.2622,-22.189 148.2349,-22.122 148.2343,-22.1063 148.2551,-22.1986 148.3507,-22.2469 148.3507,-22.2451 148.3012

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact Us page.

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B.3 DES WildNet and HERBRECS Flora Search Results

Family	Scientific name	Common name	NC Act status	EPBC Act status	WildNet	HERBRECS
Acanthaceae	*Brunoniella australis*	blue trumpet	LC	-		✓
	Dicliptera glabra		LC	-	✓	
	Hypoestes floribunda		LC	-	✓	
	Rostellularia adscendens		LC	-		✓
	Rostellularia adscendens var. hispida		LC	-		✓
Amaranthaceae	*Alternanthera denticulata var. micrantha*		LC	-		✓
	Alternanthera nana	hairy joyweed	LC	-		✓
	Gomphrena celosioides		I	-	✓	
	Nyssanthes erecta		LC	-		✓
Annonaceae	*Cyathostemma micranthum*		LC	-	✓	
	Meiogyne verrucosa		LC	-	✓	
	Polyalthia xanthocarpa		LC	-	✓	
	Pseuduvaria froggattii		LC	-	✓	
	Pseuduvaria mulgraveana var. glabrescens		LC	-	✓	
Apiaceae	*Eryngium plantagineum*	long eryngium	LC	-		✓
Apocynaceae	*Alstonia constricta*	bitterbark	LC	-	✓	✓
	Alyxia ruscifolia		LC	-	✓	✓
	Hoya australis subsp. australis		LC	-		✓
	Marsdenia viridiflora		LC	-		✓
	Parsonsia eucalyptophylla	gargaloo	LC	-		✓
	Parsonsia lanceolata	northern silkpod	LC	-		✓
	Parsonsia straminea		LC	-	✓	
Araliaceae	*Polyscias australiana*		LC	-	✓	
	Schefflera actinophylla		I	-	✓	
Asteraceae	*Ageratum conyzoides subsp. conyzoides*		I	-	✓	
	Apowollastonia spilanthoides		LC	-		✓
	Blumea axillaris		LC	-		✓
	Calotis dentex	white burr daisy	LC	-	✓	✓
	Coronidium rupicola		LC	-		✓
	Cyanthillium cinereum		LC	-		✓
	Gamochaeta pensylvanica		I	-		✓
	Olearia canescens subsp. canescens		LC	-	✓	
	Olearia ramulosa		LC	-	✓	
	Praxelis clematidea		I	-		✓
	Rutidosis leucantha		LC	-		✓
	Sphaeromorphaea australis		LC	-		✓
	Tagetes minuta		I	-	✓	
	Tridax procumbens	tridax daisy	I	-		✓
	Vittadinia pustulata		LC	-		✓
Byttneriaceae	*Hannafordia shanesii*		LC	-		✓
	Seringia hookeriana		LC	-	✓	
Cactaceae	*Opuntia stricta*		I	-		✓
	Opuntia tomentosa	velvety tree pear	I	-		✓
Caesalpiniaceae	*Chamaecrista absus var. absus*		LC	-		✓
	Chamaecrista mimosoides		LC	-	✓	
	Petalostylis labicheoides		LC	-	✓	
	Senna gaudichaudii		LC	-	✓	
Campanulaceae	*Wahlenbergia queenslandica*		LC	-		✓
Capparaceae	*Capparis canescens*		LC	-		✓
	Capparis umbonata		LC	-		✓

Family	Scientific name	Common name	NC Act status	EPBC Act status	WildNet	HERBRECS
Casuarinaceae	*Allocasuarina luehmannii*	bull oak	LC	-		✓
Celastraceae	*Denhamia cunninghamii*		LC	-		✓
	Denhamia disperma		LC	-		✓
	Elaeodendron australe var. australe		LC	-	✓	
Chenopodiaceae	*Einadia nutans subsp. linifolia*		LC	-		✓
	Enchylaena tomentosa var. glabra		LC	-		✓
	Enchylaena tomentosa var. tomentosa		LC	-	✓	
	Salsola australis		LC	-	✓	
	Sclerolaena tetracuspis	brigalow burr	LC	-		✓
Cleomaceae	*Cleome viscosa*		LC	-	✓	
Clusiaceae	*Hypericum gramineum*		LC	-	✓	✓
Commelinaceae	*Commelina diffusa*	wandering jew	LC	-	✓	✓
Convolvulaceae	*Evolvulus alsinoides*		LC	-		✓
	Ipomoea brownii		LC	-		✓
	Ipomoea calobra		LC	-		✓
	Ipomoea pes-caprae subsp. brasiliensis		LC	-	✓	
	Jacquemontia paniculata		LC	-		✓
	Operculina turpethum		LC	-	✓	
	Xenostegia tridentata		LC	-	✓	✓
Cyperaceae	*Cyperus alopecuroides*		LC	-		✓
	Cyperus compressus		I	-		✓
	Cyperus difformis		LC	-	✓	
	Cyperus fulvus		LC	-		✓
	Cyperus gracilis		LC	-		✓
	Cyperus iria		LC	-		✓
	Cyperus isabellinus		LC	-		✓
	Cyperus javanicus		LC	-	✓	✓
	Cyperus nutans var. eleusinoides		LC	-	✓	
	Cyperus polystachyos var. polystachyos		LC	-		✓
	Fimbristylis ferruginea		LC	-	✓	
	Fimbristylis signata		LC	-	✓	
	Fuirena ciliaris		LC	-	✓	
	Gahnia aspera		LC	-		✓
	Lipocarpha microcephala		LC	-	✓	
	Scleria sphacelata		LC	-		✓
Dracaenaceae	*Pleomele angustifolia*		LC	-	✓	
Ebenaceae	*Diospyros compacta*		LC	-	✓	
	Diospyros humilis	small-leaved ebony	LC	-		✓
Erythroxylaceae	*Erythroxylum australe*	cocaine tree	LC	-		✓
Euphorbiaceae	*Adriana tomentosa var. tomentosa*		LC	-		✓
	Bertya pedicellata		NT	-	✓	✓
	Croton insularis	Queensland cascarilla	LC	-		✓
	Euphorbia bifida		LC	-	✓	
	Euphorbia tannensis subsp. eremophila		LC	-		✓
Fabaceae	*Alysicarpus vaginalis*		LC	-	✓	
	Crotalaria juncea	sunhemp	I	-		✓
	Crotalaria laburnifolia		I	-	✓	
	Desmodium filiforme		LC	-	✓	✓
	Desmodium macrocarpum		LC	-		✓

Family	Scientific name	Common name	NC Act status	EPBC Act status	WildNet	HERBRECS
	Desmodium tortuosum	Florida beggar-weed	I	-		✓
	Galactia tenuiflora var. lucida		LC	-		✓
	Glycine tabacina	glycine pea	LC	-		✓
	Glycine tomentella	woolly glycine	LC	-		✓
	Indigofera hirsuta	hairy indigo	LC	-		✓
	Lablab purpureus	lablab	I	-		✓
	Pueraria montana var. lobata		I	-	✓	
	Rhynchosia minima var. australis		LC	-	✓	
	Tephrosia filipes subsp. filipes		LC	-	✓	
	Tephrosia juncea		LC	-	✓	
	Tephrosia savannicola		LC	-	✓	
	Tephrosia sp.		LC	-	✓	
	Zornia muelleriana subsp. muelleriana		LC	-		✓
Flagellariaceae	*Flagellaria indica*		LC	-	✓	
Goodeniaceae	*Goodenia grandiflora*		LC	-	✓	✓
	Goodenia rotundifolia		LC	-		✓
	Goodenia sp. (Mt Castletower M.D.Crisp 2753)		LC	-		✓
	Scaevola humilis		LC	-	✓	
Hemerocallidaceae	*Dianella nervosa*		LC	-		✓
	Dianella odorata		LC	-	✓	
Hypoxidaceae	*Molineria capitulata*		LC	-	✓	
Lamiaceae	*Clerodendrum floribundum*		LC	-	✓	
	Leucas lavandulifolia		I	-		✓
	Plectranthus		LC	-		✓
	Prostanthera collina		LC	-		✓
	Teucrium integrifolium		LC	-		✓
	Teucrium junceum		LC	-		✓
Lauraceae	*Cassytha filiformis*		LC	-	✓	
	Cassytha pubescens	downy devil's twine	LC	-		✓
Laxmanniaceae	*Laxmannia gracilis*	slender wire lily	LC	-		✓
	Lomandra longifolia		LC	-		✓
	Thysanotus tuberosus subsp. tuberosus		LC	-	✓	
Loganiaceae	*Mitrasacme pygmaea*		LC	-		✓
Lythraceae	*Pemphis acidula*		LC	-	✓	
Malvaceae	*Abelmoschus ficulneus*	native rosella	LC	-		✓
	Abutilon fraseri subsp. fraseri		LC	-	✓	
	Abutilon micropetalum		LC	-	✓	✓
	Abutilon oxycarpum var. subsagittatum		LC	-		✓
	Abutilon sp.		LC	-	✓	
	Gossypium australe		LC	-		✓
	Hibiscus divaricatus		LC	-		✓
	Hibiscus heterophyllus		LC	-		✓
	Hibiscus sp. (Emerald S.L.Everist 2124)		LC	-		✓
	Hibiscus splendens	pink hibiscus	LC	-		✓
	Hibiscus sturtii		LC	-		✓
	Hibiscus sturtii var. sturtii		LC	-		✓
	Hibiscus verdcourtii		LC	-		✓
	Malvastrum americanum var. stellatum		LC	-		✓
	Sida atherophora		LC	-		✓
	Sida fibulifera		LC	-		✓

Family	Scientific name	Common name	NC Act status	EPBC Act status	WildNet	HERBRECS
	Sida sp. (Charters Towers E.J.THompson+ CHA456)		LC	-		✓
	Sida sp. (Musselbrook M.B.Thomas+ MRS437)		LC	-		✓
	Sida spinosa	spiny sida	I	-		✓
	Sida trichopoda		LC	-		✓
Meliaceae	*Owenia x reliqua*		LC	-		✓
Menispermaceae	*Tinospora smilacina*	snakevine	LC	-		✓
Mimosaceae	*Acacia argyrodendron*		LC	-		✓
	Acacia bancroftiorum		LC	-		✓
	Acacia conferta		LC	-		✓
	Acacia cowleana		LC	-		✓
	Acacia faucium		LC	-		✓
	Acacia flavescens	oothed wattle	LC	-		✓
	Acacia fodinalis		LC	-		✓
	Acacia julifera subsp. curvinervia		LC	-		✓
	Acacia leiocalyx		LC	-		✓
	Acacia oswaldii	miljee	LC	-		✓
	Acacia rhodoxylon	ringy rosewood	LC	-		✓
	Acacia shirleyi	lancewood	LC	-		✓
	Acacia spania		NT	-		✓
	Albizia canescens		LC	-		✓
Molluginaceae	*Glinus lotoides*	hairy carpet weed	LC	-		✓
Myrsinaceae	*Myrsine variabilis*		LC	-		✓
Myrtaceae	*Corymbia aureola*		LC	-	✓	✓
	Corymbia bloxsomei		LC	-	✓	
	Corymbia citriodora subsp. citriodora		LC	-		✓
	Corymbia citriodora subsp. variegata		LC	-	✓	
	Corymbia clarksoniana		LC	-	✓	✓
	Corymbia petalophylla		LC	-	✓	
	Eucalyptus apothalassica		LC	-		✓
	Eucalyptus baileyana		LC	-	✓	
	Eucalyptus bakeri		LC	-	✓	
	Eucalyptus chloroclada		LC	-	✓	
	Eucalyptus conglomerata		LC	-	✓	
	Eucalyptus conica		LC	-	✓	
	Eucalyptus crebra	narrow-leaved red ironbark	LC	-	✓	✓
	Eucalyptus curtisii		LC	-	✓	
	Eucalyptus dealbata		LC	-	✓	
	Eucalyptus drepanophylla		LC	-	✓	✓
	Eucalyptus eugenioides		LC	-	✓	
	Eucalyptus exilipes		LC	-	✓	
	Eucalyptus exserta	Queensland peppermint	LC	-	✓	✓
	Eucalyptus fibrosa subsp. fibrosa		LC	-	✓	
	Eucalyptus melanoleuca		LC	-	✓	
	Eucalyptus persistens		LC	-	✓	✓
	Eucalyptus racemosa subsp. racemosa		LC	-	✓	
	Eucalyptus seeana		LC	-	✓	
	Eucalyptus tholiformis		LC	-	✓	✓
	Eucalyptus thozetiana		LC	-		✓
	Eucalyptus virens		LC	-	✓	

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	Eucalyptus viridis		LC	-	✓	
	Eucalyptus xanthoclada		LC	-	✓	
	Gossia bidwillii		LC	-		✓
	Lysicarpus angustifolius	budgeroo	LC	-		✓
	Melaleuca fluviatilis		LC	-		✓
	Melaleuca nervosa		LC	-	✓	✓
	Micromyrtus capricornia		LC	-	✓	✓
	Syzygium angophoroides		LC	-	✓	
Nyctaginaceae	*Boerhavia mutabilis*		LC	-	✓	
Oleaceae	*Jasminum simplicifolium subsp. australiense*		LC	-	✓	
Orthotrichaceae	*Macromitrium aurescens*		LC	-		✓
Pandanaceae	*Pandanus tectorius*		LC	-	✓	
Passifloraceae	*Passiflora foetida*		I	-		✓
Pentapetaceae	*Melhania oblongifolia*		LC	-		✓
Phyllanthaceae	*Breynia oblongifolia*		LC	-	✓	
	Phyllanthus amarus		LC	-	✓	
	Phyllanthus sp.		LC	-	✓	
	Phyllanthus virgatus		LC	-		✓
Picrodendraceae	*Petalostigma pubescens*	quinine tree	LC	-		✓
Pittosporaceae	*Auranticarpa rhombifolia*		LC	-	✓	
	Bursaria spinosa subsp. spinosa		LC	-		✓
Plantaginaceae	*Scoparia dulcis*	scoparia	I	-		✓
	Veronica plebeia		LC	-	✓	
Poaceae	*Alloteropsis cimicina*		LC	-		✓
	Ancistrachne uncinulata	hooky grass	LC	-	✓	✓
	Aristida benthamii		LC	-		✓
	Aristida benthamii var. benthamii		LC	-	✓	✓
	Aristida calycina var. calycina		LC	-	✓	✓
	Aristida caput-medusae		LC	-	✓	
	Aristida echinata		LC	-		✓
	Aristida holathera var. holathera		LC	-	✓	✓
	Aristida jerichoensis var. subspinulifera		LC	-	✓	✓
	Aristida latifolia	feathertop wiregrass	LC	-	✓	✓
	Aristida muricata		LC	-	✓	✓
	Aristida personata		LC	-	✓	✓
	Aristida queenslandica		LC	-		✓
	Aristida ramosa	purple wiregrass	LC	-		✓
	Arundinella nepalensis	reedgrass	LC	-	✓	✓
	Astrebla squarrosa		LC	-	✓	
	Austrostipa nodosa		LC	-	✓	
	Bothriochloa bladhii subsp. bladhii		LC	-	✓	✓
	Bothriochloa decipiens var. decipiens		LC	-		✓
	Bothriochloa ewartiana	desert bluegrass	LC	-		✓
	Bothriochloa pertusa		I	-		✓
	Calyptochloa gracillima subsp. gracillima		LC	-	✓	✓
	Chloris divaricata var. divaricata		LC	-	✓	✓
	Chloris inflata		I	-	✓	
	Chloris pectinata	comb chloris	LC	-		✓
	Chrysopogon fallax		LC	-	✓	✓
	Cymbopogon ambiguus	lemon grass	LC	-		✓

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	Cymbopogon queenslandicus		LC	-		✓
	Cymbopogon refractus	barbed-wire grass	LC	-		✓
	Dichanthium aristatum	angleton grass	I	-		✓
	Dichanthium queenslandicum		V	E		✓
	Dichanthium sericeum subsp. sericeum		LC	-	✓	✓
	Digitaria ammophila	silky umbrella grass	LC	-		✓
	Digitaria breviglumis		LC	-		✓
	Digitaria brownii		LC	-		✓
	Digitaria divaricatissima	spreading umbrella grass	LC	-		✓
	Digitaria eriantha		I	-	✓	
	Digitaria hystrichoides	umbrella grass	LC	-	✓	✓
	Digitaria orbata		LC	-		✓
	Dinebra decipiens var. asthenes		LC	-	✓	
	Dinebra ligulata		LC	-	✓	
	Diplachne fusca var. fusca		LC	-	✓	✓
	Enneapogon virens		LC	-		✓
	Entolasia stricta	wiry panic	LC	-		✓
	Eragrostis		LC	-		✓
	Eragrostis brownii	Brown's lovegrass	LC	-		✓
	Eragrostis leptostachya		LC	-	✓	✓
	Eragrostis longipedicellata		LC	-	✓	✓
	Eragrostis sororia		LC	-	✓	✓
	Eragrostis speciosa		LC	-		✓
	Eriachne burkittii		LC	-	✓	
	Eriachne mucronata		LC	-	✓	
	Eriachne mucronata forma (Alpha C.E.Hubbard 7882)		LC	-		✓
	Eriachne rara		LC	-	✓	✓
	Eriochloa crebra	spring grass	LC	-		✓
	Eriochloa procera		LC	-	✓	
	Eulalia aurea	silky browntop	LC	-		✓
	Heteropogon contortus	black speargrass	LC	-		✓
	Hyparrhenia rufa subsp. rufa		I	-		✓
	Iseilema vaginiflorum	red flinders grass	LC	-		✓
	Megathyrsus maximus var. maximus		I	-		✓
	Moorochloa eruciformis		I	-		✓
	Panicum decompositum var. decompositum		LC	-	✓	✓
	Panicum effusum		LC	-	✓	✓
	Panicum queenslandicum var. acuminatum		LC	-		✓
	Panicum queenslandicum var. queenslandicum		LC	-	✓	
	Panicum simile		LC	-	✓	
	Paspalidium albovillosum		LC	-	✓	✓
	Paspalidium criniforme		LC	-		✓
	Paspalidium distans	shotgrass	LC	-		✓
	Paspalidium gracile	slender panic	LC	-		✓
	Paspalum mandiocanum		I	-		✓
	Schizachyrium fragile		LC	-	✓	
	Sehima nervosum		LC	-		✓
	Setaria paspalidioides		LC	-	✓	✓

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	Sporobolus natalensis		I	-		✓
	Sporobolus scabridus		LC	-	✓	
	Thellungia advena	coolibah grass	LC	-		✓
	Themeda triandra	kangaroo grass	LC	-		✓
	Urochloa distachya		I	-	✓	
	Urochloa foliosa		LC	-	✓	
	Urochloa mosambicensis	sabi grass	I	-		✓
Polygonaceae	*Duma florulenta*		LC	-	✓	
	Persicaria attenuata		LC	-		✓
Polypodiaceae	*Dictymia brownii*		LC	-	✓	
	Pyrrosia rupestris		LC	-	✓	
Pontederiaceae	*Monochoria cyanea*		LC	-		✓
Proteaceae	*Grevillea pteridifolia*	golden parrot tree	LC	-		✓
	Hakea lorea subsp. lorea		LC	-	✓	
	Persoonia amaliae		LC	-		✓
	Persoonia falcata		LC	-	✓	✓
Pteridaceae	*Adiantum atroviride*		LC	-		✓
	Cheilanthes distans	bristly cloak fern	LC	-		✓
	Cheilanthes sieberi subsp. sieberi		LC	-		✓
Putranjivaceae	*Drypetes deplanchei*	grey boxwood	LC	-		✓
Rhamnaceae	*Alphitonia excelsa*	soap tree	LC	-		✓
	Ventilago viminalis		LC	-	✓	
Rubiaceae	*Coelospermum reticulatum*		LC	-	✓	
	Everistia vacciniifolia		LC	-	✓	
	Larsenaikia ochreata		LC	-	✓	✓
	Oldenlandia biflora		LC	-	✓	
	Oldenlandia coerulescens		LC	-		✓
	Pavetta australiensis var. australiensis - P. granitica		LC	-		✓
	Psydrax odorata subsp. australiana		LC	-		✓
	Psydrax oleifolia		LC	-		✓
	Psydrax saligna		LC	-	✓	
	Richardia brasiliensis	white eye	I	-		✓
	Spermacoce multicaulis		LC	-		✓
Rutaceae	*Acronychia laevis*	glossy acronychia	LC	-		✓
	Citrus glauca		LC	-	✓	
	Flindersia australis		LC	-	✓	
	Geijera parviflora		LC	-	✓	
	Geijera salicifolia		LC	-	✓	
	Murraya ovatifoliolata		LC	-	✓	
Santalaceae	*Choretrum candollei*		LC	-	✓	
	Santalum lanceolatum		LC	-	✓	
Sapotaceae	*Planchonella pohlmaniana*		LC	-	✓	✓
Scrophulariaceae	*Myoporum acuminatum*	coastal boobialla	LC	-		✓
Selaginellaceae	*Selaginella longiciliata*		LC	-	✓	
Smilacaceae	*Smilax australis*		LC	-	✓	
Solanaceae	*Solanum ellipticum*	potato bush	LC	-		✓
	Solanum nemophilum		LC	-	✓	
	Solanum nodiflorum		I	-	✓	
	Solanum parvifolium subsp. parvifolium		LC	-		✓
	Solanum stelligerum		LC	-	✓	
Stylidiaceae	*Stylidium eglandulosum*		LC	-		✓

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	Stylidium laricifolium		LC	-	✓	
Surianaceae	*Suriana maritima*		LC	-	✓	
Thymelaeaceae	*Jedda multicaulis*		V	-	✓	
Ulmaceae	*Celtis philippensis*		LC	-	✓	
Violaceae	*Afrohybanthus enneaspermus*		LC	-		✓
Zygophyllaceae	*Tribulus cistoides*		LC	-	✓	
	Zygophyllum apiculatum		LC	-	✓	

B.4 DES WildNet Fauna Search Results

Family	Scientific name	Common name	NC Act status	EPBC Act status
Amphibians				
Bufonidae	*Rhinella marina*	cane toad	I	-
Hylidae	*Cyclorana alboguttata*	greenstripe frog	LC	-
	Cyclorana novaehollandiae	eastern snapping frog	LC	-
	Cyclorana verrucosa	rough collared frog	LC	-
	Litoria caerulea	common green treefrog	LC	-
	Litoria inermis	bumpy rocketfrog	LC	-
	Litoria latopalmata	broad palmed rocketfrog	LC	-
	Litoria rothii	northern laughing treefrog	LC	-
	Litoria rubella	ruddy treefrog	LC	-
Limnodynastidae	*Limnodynastes salmini*	salmon striped frog	LC	-
	Limnodynastes tasmaniensis	spotted grassfrog	LC	-
	Platyplectrum ornatum	ornate burrowing frog	LC	-
Birds				
Acanthizidae	*Acanthiza apicalis*	inland thornbill	LC	-
	Acanthiza chrysorrhoa	yellow-rumped thornbill	LC	-
	Acanthiza reguloides	buff-rumped thornbill	LC	-
	Chthonicola sagittata	speckled warbler	LC	-
	Gerygone olivacea	white-throated gerygone	LC	-
	Smicrornis brevirostris	weebill	LC	-
Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk	LC	-
	Accipiter fasciatus	brown goshawk	LC	-
	Aquila audax	wedge-tailed eagle	LC	-
	Circus approximans	swamp harrier	LC	-
	Circus assimilis	spotted harrier	LC	-
	Elanus scriptus	letter-winged kite	LC	-
	Haliastur sphenurus	whistling kite	LC	-
	Hieraaetus morphnoides	little eagle	LC	-
Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar	LC	-
Alaudidae	*Mirafra javanica*	Horsfield's bushlark	LC	-
Anatidae	*Anas gracilis*	grey teal	LC	-
	Anas rhynchotis	Australasian shoveler	LC	-
	Anas superciliosa	Pacific black duck	LC	-
	Aythya australis	hardhead	LC	-
	Chenonetta jubata	Australian wood duck	LC	-
	Cygnus atratus	black swan	LC	-
	Dendrocygna arcuata	wandering whistling-duck	LC	-
	Dendrocygna eytoni	plumed whistling-duck	LC	-
	Nettapus coromandelianus	cotton pygmy-goose	LC	-
Anhingidae	*Anhinga novaehollandiae*	Australasian darter	LC	-
Ardeidae	*Ardea alba modesta*	eastern great egret	LC	Marine
	Ardea intermedia	intermediate egret	LC	-
	Ardea pacifica	white-necked heron	LC	-
	Bubulcus ibis	cattle egret	LC	Marine
	Egretta novaehollandiae	white-faced heron	LC	-
Artamidae	*Artamus cinereus*	black-faced woodswallow	LC	-
	Artamus cyanopterus	dusky woodswallow	LC	-
	Artamus leucorynchus	white-breasted woodswallow	LC	-
	Artamus personatus	masked woodswallow	LC	-
	Cracticus nigrogularis	pied butcherbird	LC	-
	Cracticus tibicen	Australian magpie	LC	-
	Cracticus torquatus	grey butcherbird	LC	-
	Strepera graculina	pied currawong	LC	-
Burhinidae	*Burhinus grallarius*	bush stone-curlew	LC	-

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Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo	LC	-
	Eolophus roseicapilla	galah	LC	-
Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike	LC	-
	Coracina tenuirostris	cicadabird	LC	-
	Lalage tricolor	white-winged triller	LC	-
Casuariidae	*Dromaius novaehollandiae*	emu	LC	-
Charadriidae	*Elseyornis melanops*	black-fronted dotterel	LC	-
	Vanellus miles	masked lapwing	LC	-
	Vanellus miles novaehollandiae	masked lapwing (southern subspecies)	LC	-
Cisticolidae	*Cisticola exilis*	golden-headed cisticola	LC	-
Columbidae	*Geopelia humeralis*	bar-shouldered dove	LC	-
	Geopelia striata	peaceful dove	LC	-
	Geophaps scripta scripta	squatter pigeon (southern subspecies)	V	V
	Ocyphaps lophotes	crested pigeon	LC	-
	Phaps chalcoptera	common bronzewing	LC	-
Coraciidae	*Eurystomus orientalis*	dollarbird	LC	-
Corcoracidae	*Corcorax melanorhamphos*	white-winged chough	LC	-
	Struthidea cinerea	apostlebird	LC	-
Corvidae	*Corvus orru*	Torresian crow	LC	-
Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo	LC	-
	Cacomantis pallidus	pallid cuckoo	LC	-
	Centropus phasianinus	pheasant coucal	LC	-
	Chalcites basalis	Horsfield's bronze-cuckoo	LC	-
	Chalcites lucidus	shining bronze-cuckoo	LC	-
	Chalcites minutillus	little bronze-cuckoo	LC	-
Dicruridae	*Dicrurus bracteatus*	spangled drongo	LC	-
Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin	LC	-
	Neochmia modesta	plum-headed finch	LC	-
	Taeniopygia bichenovii	double-barred finch	LC	-
Eurostopodidae	*Eurostopodus mystacalis*	white-throated nightjar	LC	-
Falconidae	*Falco berigora*	brown falcon	LC	-
	Falco cenchroides	nankeen kestrel	LC	-
Gruidae	*Grus rubicunda*	brolga	LC	-
Halcyonidae	*Dacelo leachii*	blue-winged kookaburra	LC	-
	Dacelo novaeguineae	laughing kookaburra	LC	-
	Todiramphus macleayii	forest kingfisher	LC	-
	Todiramphus pyrrhopygius	red-backed kingfisher	LC	-
	Todiramphus sanctus	sacred kingfisher	LC	-
Hirundinidae	*Petrochelidon nigricans*	tree martin	LC	-
Jacanidae	*Irediparra gallinacea*	comb-crested jacana	LC	-
Maluridae	*Malurus cyaneus*	superb fairy-wren	LC	-
	Malurus lamberti	variegated fairy-wren	LC	-
	Malurus melanocephalus	red-backed fairy-wren	LC	-
Megaluridae	*Megalurus timoriensis*	tawny grassbird	LC	-
Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater	LC	-
	Gavicalis virescens	singing honeyeater	LC	-
	Lichmera indistincta	brown honeyeater	LC	-
	Manorina flavigula	yellow-throated miner	LC	-
	Manorina melanocephala	noisy miner	LC	-
	Meliphaga lewinii	Lewin's honeyeater	LC	-
	Melithreptus albogularis	white-throated honeyeater	LC	-
	Melithreptus lunatus	white-naped honeyeater	LC	-
	Philemon citreogularis	little friarbird	LC	-
	Philemon corniculatus	noisy friarbird	LC	-
	Plectorhyncha lanceolata	striped honeyeater	LC	-
Meropidae	*Merops ornatus*	rainbow bee-eater	LC	Marine

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Monarchidae	*Carterornis leucotis*	white-eared monarch	LC	-
	Grallina cyanoleuca	magpie-lark	LC	-
	Myiagra rubecula	leaden flycatcher	LC	-
Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird	LC	-
Neosittidae	*Daphoenositta chrysoptera*	varied sittella	LC	-
Oriolidae	*Oriolus sagittatus*	olive-backed oriole	LC	-
Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush	LC	-
	Pachycephala rufiventris	rufous whistler	LC	-
Pardalotidae	*Pardalotus striatus*	striated pardalote	LC	-
Pelecanidae	*Pelecanus conspicillatus*	Australian pelican	LC	-
Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant	LC	-
	Phalacrocorax sulcirostris	little black cormorant	LC	-
Phasianidae	*Coturnix pectoralis*	stubble quail	LC	-
	Coturnix ypsilophora	brown quail	LC	-
Podargidae	*Podargus strigoides*	tawny frogmouth	LC	-
Podicipedidae	*Podiceps cristatus*	great crested grebe	LC	-
	Tachybaptus novaehollandiae	Australasian grebe	LC	-
Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler	LC	-
Psittacidae	*Aprosmictus erythropterus*	red-winged parrot	LC	-
	Melopsittacus undulatus	budgerigar	LC	-
	Neophema pulchella	turquoise parrot	LC	-
	Platycercus adscitus	pale-headed rosella	LC	-
	Platycercus adscitus palliceps	pale-headed rosella (southern form)	LC	-
	Trichoglossus haematodus moluccanus	rainbow lorikeet	LC	-
Ptilonorhynchidae	*Sericulus chrysocephalus*	regent bowerbird	LC	-
Rallidae	*Fulica atra*	Eurasian coot	LC	-
	Gallinula tenebrosa	dusky moorhen	LC	-
	Porphyrio melanotus	purple swamphen	LC	-
Recurvirostridae	*Himantopus himantopus*	black-winged stilt	LC	-
Rhipiduridae	*Rhipidura albiscapa*	grey fantail	LC	-
	Rhipidura leucophrys	willie wagtail	LC	-
Rostratulidae	*Rostratula australis*	Australian painted snipe	E	E; Marine
Strigidae	*Ninox boobook*	southern boobook	LC	-
Threskiornithidae	*Threskiornis molucca*	Australian white ibis	LC	-
	Threskiornis spinicollis	straw-necked ibis	LC	-
Timaliidae	*Zosterops lateralis*	silvereye	LC	-
Turnicidae	*Turnix varius*	painted button-quail	LC	-
Insects				
Nymphalidae	*Acraea andromacha andromacha*	glasswing	-	-
	Danaus petilia	lesser wanderer	-	-
	Euploea corinna	common crow	-	-
	Hypolimnas bolina nerina	varied eggfly	-	-
	Junonia villida villida	meadow argus	-	-
	Tirumala hamata hamata	blue tiger	-	-
Papilionidae	*Papilio anactus*	dainty swallowtail	-	-
Pieridae	*Belenois java teutonia*	caper white	-	-
	Catopsilia pomona	lemon migrant	-	-
	Cepora perimale scyllara	caper gull (Australian subspecies)	-	-
	Elodina parthia	striated pearl-white	-	-
Mammals				
Canidae	*Canis sp.*		I	-
Dasyuridae	*Sminthopsis macroura*	stripe-faced dunnart	LC	-

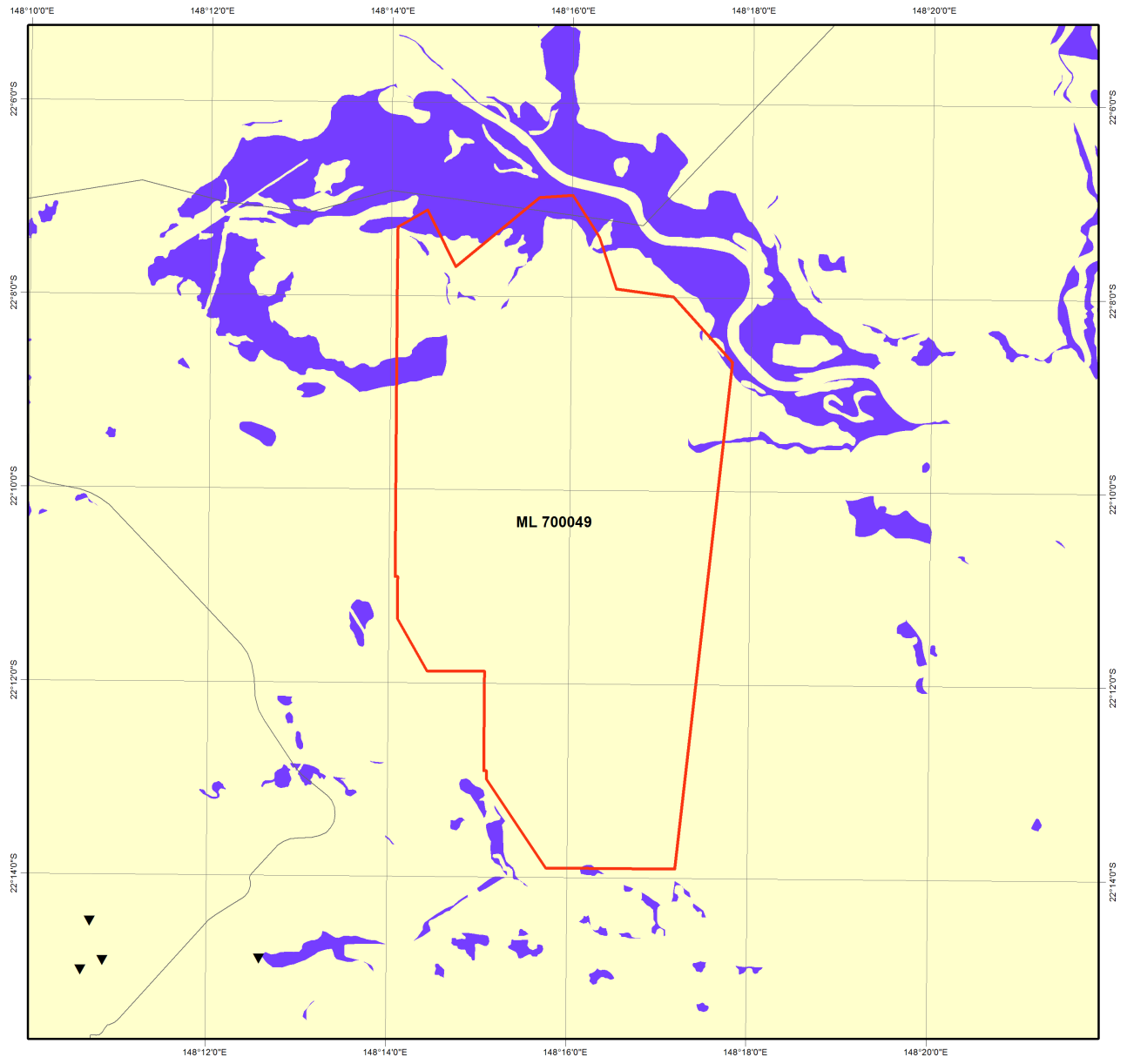
Family	Scientific name	Common name	NC Act status	EPBC Act status
Emballonuridae	*Saccolaimus flaviventris*	yellow-bellied sheathtail bat	LC	-
Leporidae	*Oryctolagus cuniculus*	rabbit	I	-
Macropodidae	*Lagorchestes conspicillatus*	spectacled hare-wallaby	LC	-
	Macropus dorsalis	black-striped wallaby	LC	-
	Macropus giganteus	eastern grey kangaroo	LC	-
	Macropus robustus	common wallaroo	LC	-
	Wallabia bicolor	swamp wallaby	LC	-
Miniopteridae	*Miniopterus australis*	little bent-wing bat	LC	-
Molossidae	*Chaerephon jobensis*	northern freetail bat	LC	-
Muridae	*Hydromys chrysogaster*	water rat	LC	-
	Mus musculus	house mouse	I	-
	Pseudomys delicatulus	delicate mouse	LC	-
Petauridae	*Petaurus sp.*	striped possum and wrist-winged gliders	I	-
Phalangeridae	*Trichosurus vulpecula*	common brushtail possum	LC	-
Phascolarctidae	*Phascolarctos cinereus*	koala	V	V
Potoroidae	*Aepyprymnus rufescens*	rufous bettong	LC	-
Pseudocheiridae	*Petauroides volans*	greater glider	V	V
Pteropodidae	*Pteropus scapulatus*	little red flying-fox	LC	-
Suidae	*Sus scrofa*	pig	I	-
Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna	SL	-
Vespertilionidae	*Chalinolobus gouldii*	Gould's wattled bat	LC	-
	Chalinolobus morio	chocolate wattled bat	LC	-
	Chalinolobus picatus	little pied bat	LC	-
	Nyctophilus gouldi	Gould's long-eared bat	LC	-
	Scotorepens greyii	little broad-nosed bat	LC	-
Reptiles				
Agamidae	*Diporiphora australis*	tommy roundhead	LC	-
Boidae	*Antaresia maculosa*	spotted python	LC	-
Carphodactylidae	*Nephrurus asper*	spiny knob-tailed gecko	LC	-
Colubridae	*Boiga irregularis*	brown tree snake	LC	-
Diplodactylidae	*Diplodactylus platyurus*	eastern fat-tailed gecko	LC	-
	Diplodactylus vittatus	wood gecko	LC	-
	Lucasium steindachneri	Steindachner's gecko	LC	-
	Oedura monilis	ocellated velvet gecko	LC	-
	Strophurus williamsi	soft-spined gecko	LC	-
Elapidae	*Acanthophis antarcticus*	common death adder	V	-
	Denisonia maculata	ornamental snake	V	V
	Hoplocephalus bitorquatus	pale-headed snake	LC	-
	Pseudonaja textilis	eastern brown snake	LC	-
	Suta suta	myall snake	LC	-
Gekkonidae	*Gehyra catenata*	chain-backed dtella	LC	-
	Gehyra dubia	dubious dtella	LC	-
	Gehyra versicolor		LC	-
	Heteronotia binoei	Bynoe's gecko	LC	-
Pygopodidae	*Lialis burtonis*	Burton's legless lizard	LC	-
Scincidae	*Carlia pectoralis sensu lato*		LC	-
	Carlia rubigo	orange-flanked rainbow skink	LC	-
	Carlia schmeltzii	robust rainbow-skink	LC	-
	Cryptoblepharus pannosus	ragged snake-eyed skink	LC	-
	Cryptoblepharus pulcher pulcher	elegant snake-eyed skink	LC	-
	Cryptoblepharus virgatus sensu lato		LC	-
	Ctenotus ingrami	unspotted yellow-sided ctenotus	LC	-

Family	Scientific name	Common name	NC Act status	EPBC Act status
	Ctenotus spaldingi	straight-browed ctenotus	LC	-
	Ctenotus taeniolatus	copper-tailed skink	LC	-
	Eulamprus sp.		LC	-
	Glaphyromorphus punctulatus	fine-spotted mulch-skink	LC	-
	Lerista fragilis	eastern mulch slider	LC	-
	Lerista punctatovittata	eastern robust slider	LC	-
	Lygisaurus foliorum	tree-base litter-skink	LC	-
	Morethia boulengeri	south-eastern morethia skink	LC	-
	Morethia taeniopleura	fire-tailed skink	LC	-
	Pygmaeascincus timlowi	dwarf litter-skink	LC	-
Typhlopidae	*Anilios affinis*	small-headed blind snake	LC	-
	Anilios unguirostris	claw-snouted blind snake	LC	-

B.5 DES Environmentally Sensitive Areas Map

Centred on tenure: ml: 700049

Map requested: 05/11/2020 10:36:52



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

- Selected Mining Lease (ML)

CATEGORY A

- National Parks
- Conservation Parks
- Forest Reserves
- Wet Tropics World Heritage Area
- Great Barrier Reef Marine Park Area
- Marine Parks other than General Use Zones

CATEGORY B

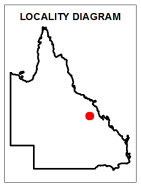
- Queensland Heritage Register Places
- Ramsar Sites
- Cultural Heritage Registered Areas and DLA's other than Stanbroke
- Special Forestry Areas
- Seaward Side of Highest Astronomical Tide
- Fish Habitat Areas
- Coordinated Conservation Areas
- Endangered Regional Ecosystems - regrowth and remnant (Biodiversity Status)
- General Use Zones of Marine Parks
- Marine Plants

CATEGORY C

- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- River Improvement Areas
- Stanbroke DLA
- Coastal Management District
- Dams and Weirs

OTHERS

- Towns
- Roads
- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands
- Queensland



N

0 1,100 2,200 3,300 4,400 5,500 m

This product is projected into GDA 1994 MGA Zone 55

Information presented on this product is distributed by the Queensland Government as an information source only. While every care is taken to ensure the accuracy of this data, The State of Queensland makes no statements, representations or warranties about the accuracy, reliability, completeness or suitability of any information contained in this product.

The State of Queensland disclaims all responsibility for information contained in this product and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

NOTE TO USER: Themes presented in this map are indicative only. Field survey may be required to verify the 'true' spatial extent and value. Not all environmentally sensitive areas are presented in this map. A user should refer to the particular circumstances relevant to their situation to assess the 'completeness' of themes provided.

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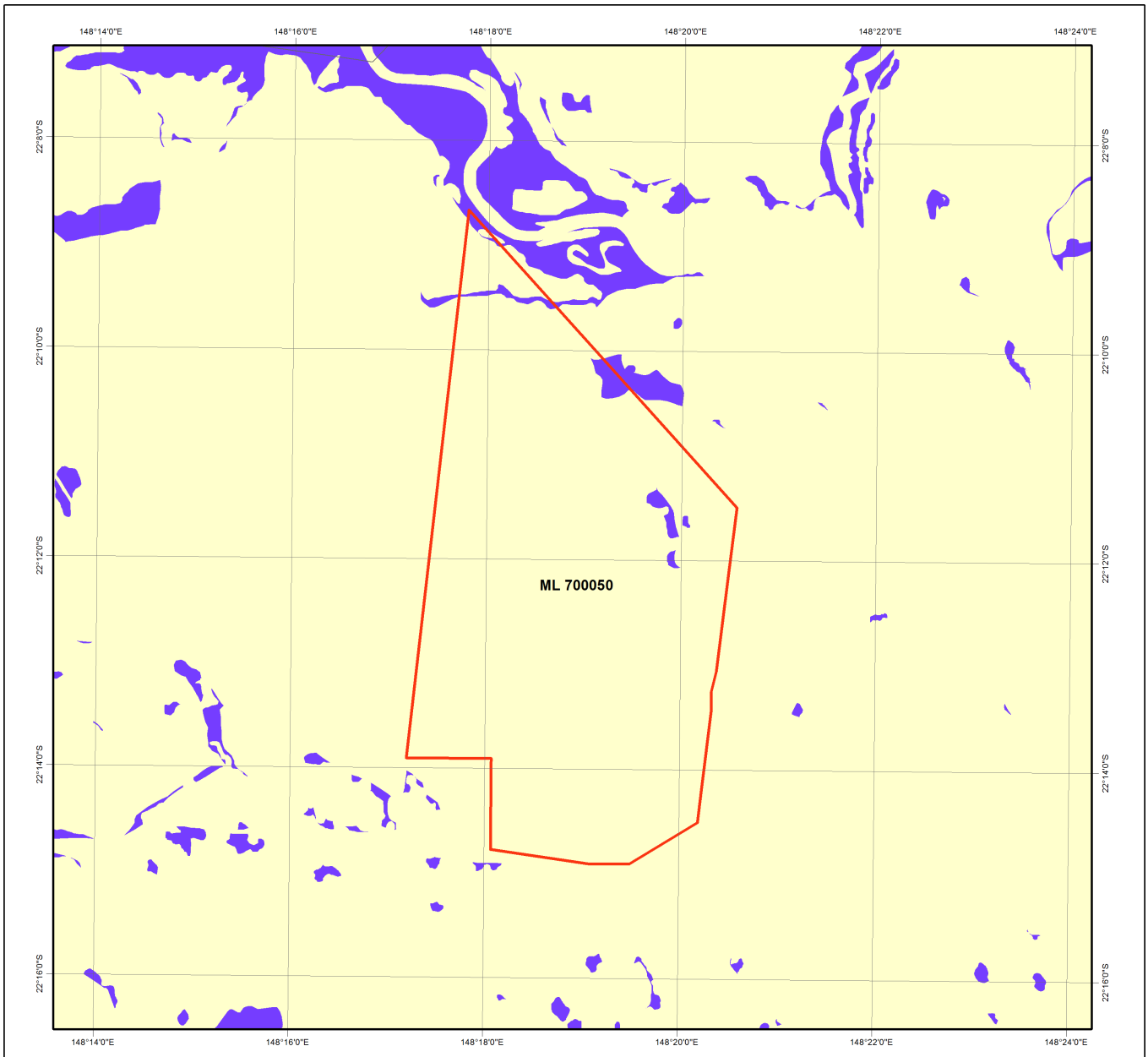

ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

- Selected Mining Lease (ML)

CATEGORY A
- National Parks
- Conservation Parks
- Forest Reserves
- Wet Tropics World Heritage Area
- Great Barrier Reef Marine Park Area
- Marine Parks other than General Use Zones

CATEGORY B
- Queensland Heritage Register Places
- Ramsar Sites
- Cultural Heritage Registered Areas and DLA's other than Stanbroke
- Special Forestry Areas
- Seaward Side of Highest Astronomical Tide
- Fish Habitat Areas
- Coordinated Conservation Areas
- Endangered Regional Ecosystems - regrowth and remnant (Biodiversity Status)
- General Use Zones of Marine Parks
- Marine Plants

CATEGORY C
- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- River Improvement Areas
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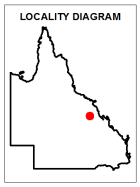
- Dams and Weirs

OTHERS
- Towns
- Roads
- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands
- Queensland

LOCALITY DIAGRAM



N

0 990 1,980 2,970 3,960 4,950 m

This product is projected into GDA 1994 MGA Zone 55

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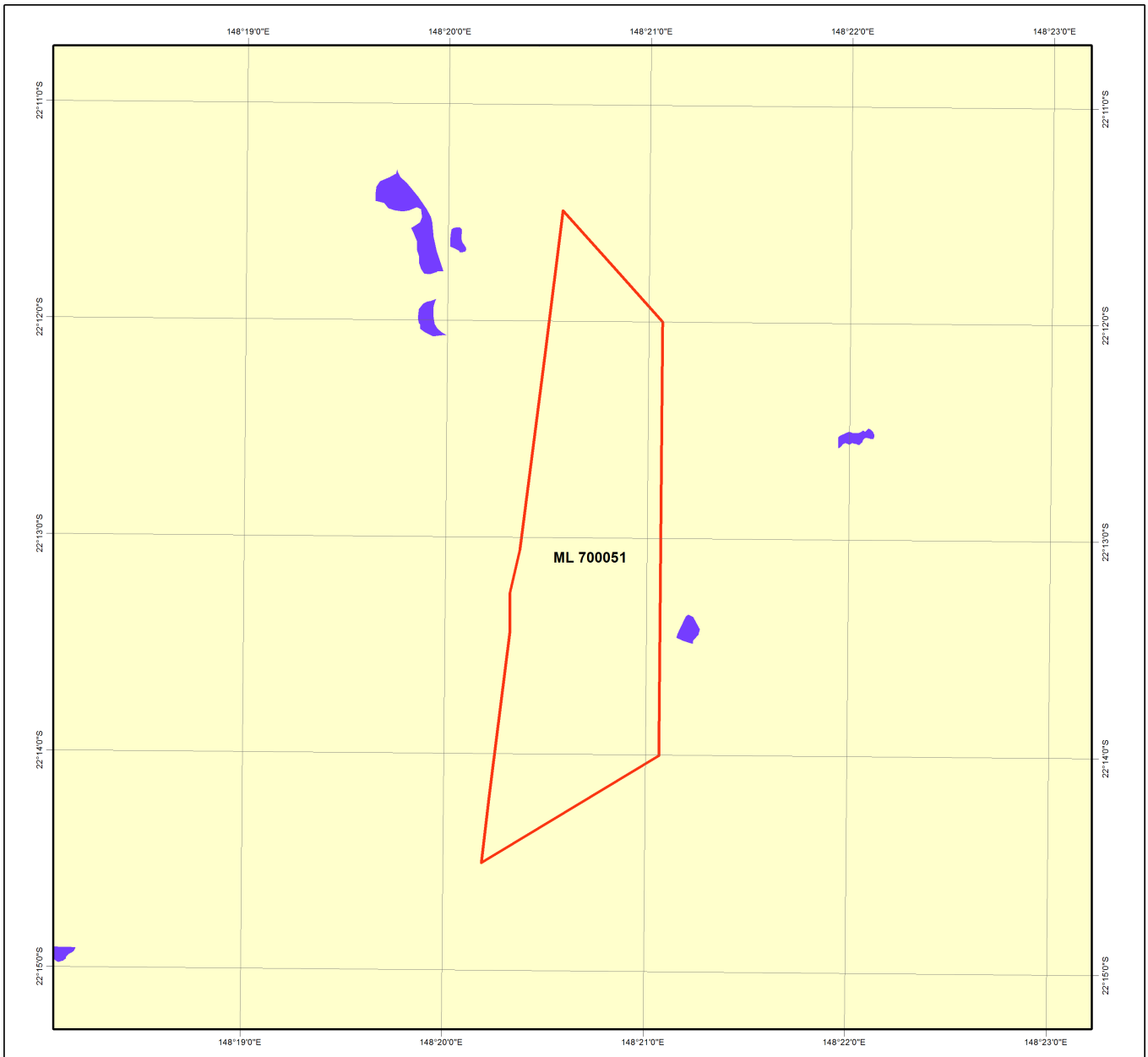
Centred on tenure: ml: 700051

Map requested: 05/11/2020 10:37:17



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

- Selected Mining Lease (ML)

CATEGORY A

- National Parks
- Conservation Parks
- Forest Reserves
- Wet Tropics World Heritage Area
- Great Barrier Reef Marine Park Area
- Marine Parks other than General Use Zones

CATEGORY B

- Queensland Heritage Register Places
- Ramsar Sites
- Cultural Heritage Registered Areas and DLA's other than Stanbroke
- Special Forestry Areas
- Seaward Side of Highest Astronomical Tide
- Fish Habitat Areas
- Coordinated Conservation Areas
- Endangered Regional Ecosystems - regrowth and remnant (Biodiversity Status)
- General Use Zones of Marine Parks
- Marine Plants

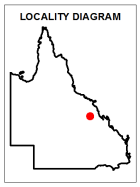
CATEGORY C

- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- River Improvement Areas
- Stanbroke DLA
- Coastal Management District
- Dams and Weirs

OTHERS

- Towns
- Roads
- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands
- Queensland

LOCALITY DIAGRAM



N

0 475 950 1,425 1,900 2,375 m

This product is projected into GDA 1994 MGA Zone 55

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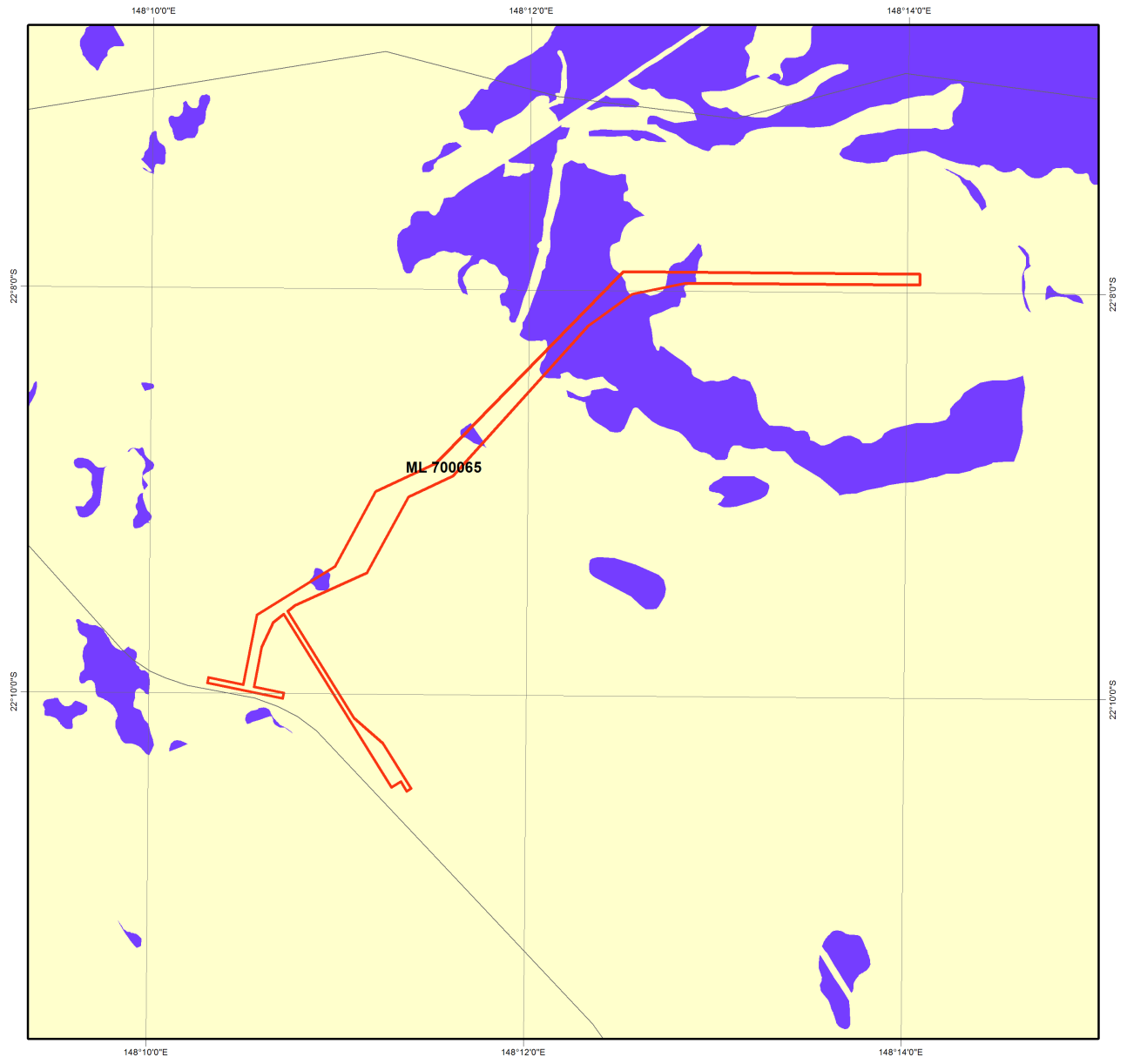

ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

- Selected Mining Lease (ML)

CATEGORY A
- National Parks
- Conservation Parks
- Forest Reserves
- Wet Tropics World Heritage Area
- Great Barrier Reef Marine Park Area
- Marine Parks other than General Use Zones

CATEGORY B
- Queensland Heritage Register Places
- Ramsar Sites
- Cultural Heritage Registered Areas and DLA's other than Stanbroke
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- Fish Habitat Areas
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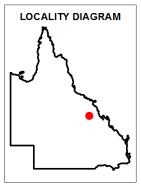
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands
- Queensland



N

0 525 1,050 1,575 2,100 2,625 m

This product is projected into GDA 1994 MGA Zone 55

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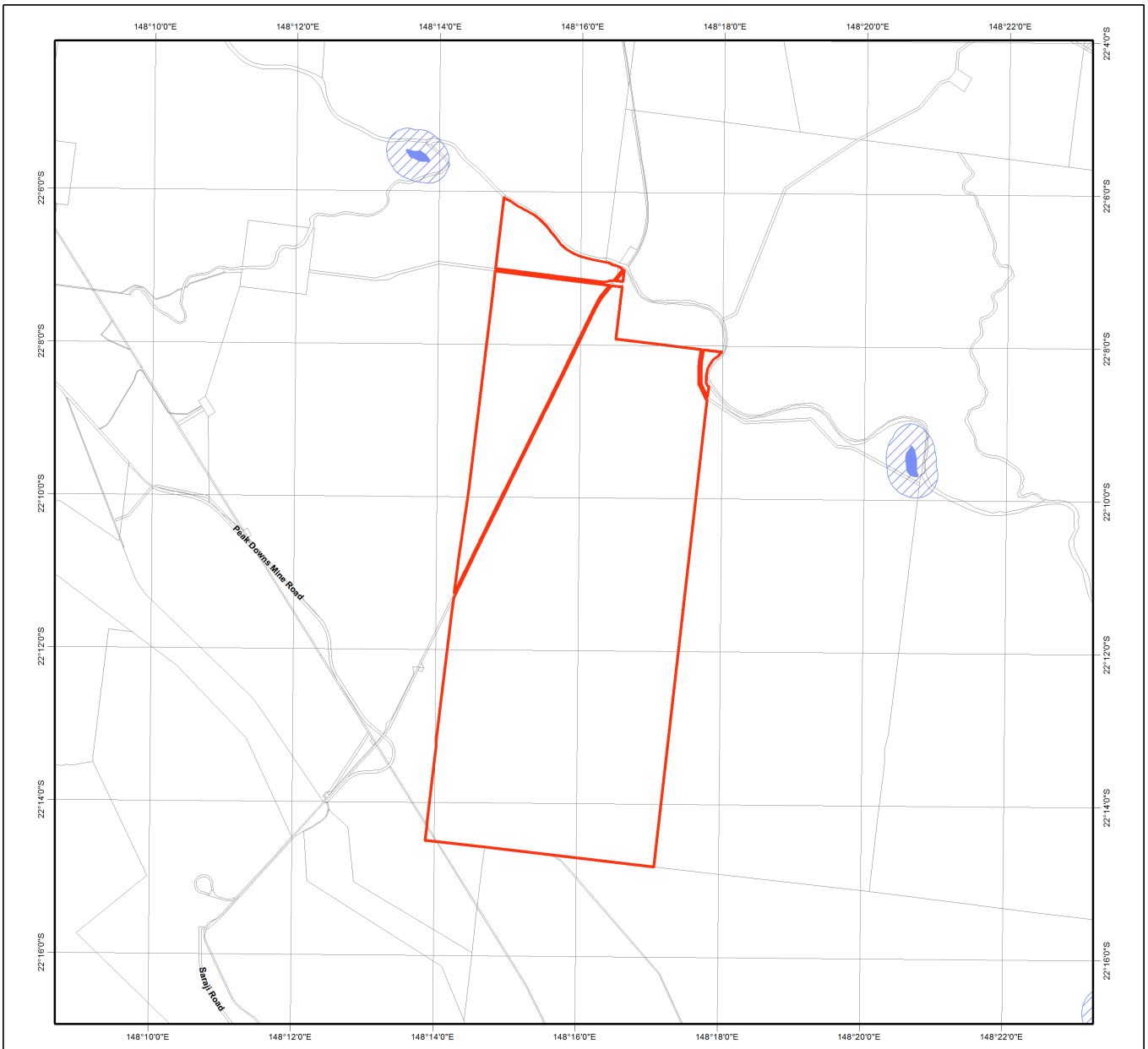
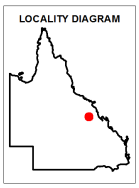
B.6 DES Referable Wetlands Map



Map of Great Barrier Reef Wetland Protection Areas

- Selected Lot and Plan
- Cadastral Boundary
- Wetland in a wetland protection area
- Great Barrier Reef wetland protection area

LOCALITY DIAGRAM



N

Note:
This map shows the location of wetland protection areas which are defined under the Environmental Protection Regulation 2008. Within wetland protection areas, certain types of development involving high impact earthworks are made assessable under Schedule 3 of the Sustainable Planning Regulation 2009.

The Department of State Development, Manufacturing, Infrastructure and Planning is the State Assessment Referral Agency (SARA) under Schedule 7 of the Sustainable Planning Regulation 2009 for assessable development involving high impact earthworks within wetland protection areas. The Department of Environment and Science is a technical agency.

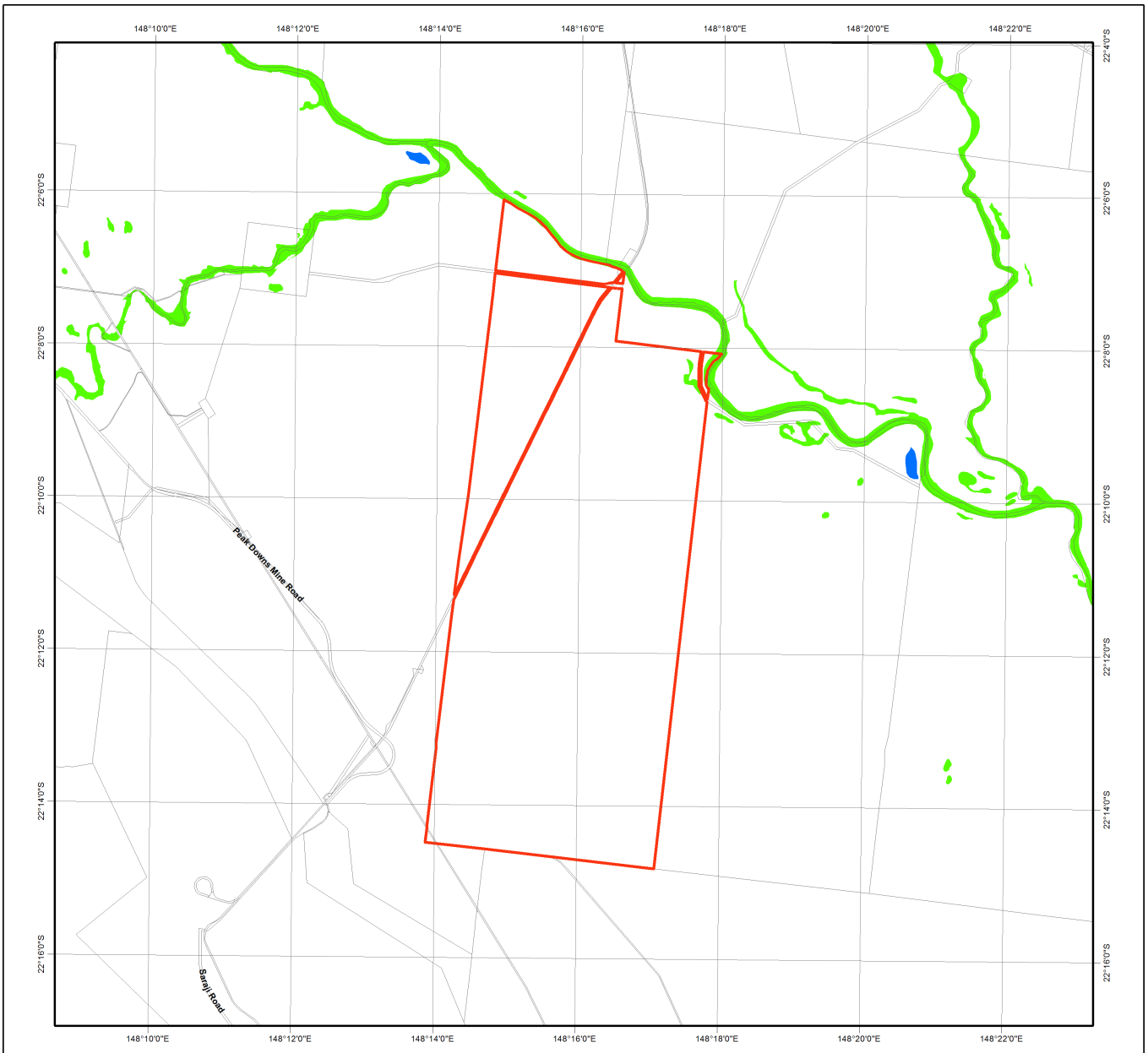
The policy outcome and assessment criteria for assessing these applications are described in the State Development Assessment Provisions (SDAP) *State Code 9 : Great Barrier Reef Wetland Protection Areas.*

This map is produced at a scale relevant to the size of the lot on plan identified and should be printed at A4 size in portrait orientation. Consideration of the effects of mapped scale is necessary when interpreting data at a large scale.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science, email planning.support@des.qld.gov.au.

0 1300 2600 3900 5200 6500 m

This product is projected into GDA 1994 MGA Zone 55



Map of Queensland Wetland Environmental Values

Selected Lot and Plan

Cadastral Boundary

High ecological values waters management intent

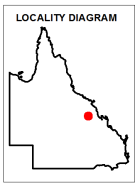
Wetlands assessed under section 7

GBR wetland of high ecological significance

Wetland of high ecological significance

Wetland of general ecological significance

LOCALITY DIAGRAM



N

Note:
This map shows the location of wetlands on the Map of Queensland Wetland Environmental Values under the Environmental Protection (Wetland and Water Biodiversity) Policy 2019. The map also shows high ecological value waters management intent under Schedule 2 of the Environmental Protection (Water and Wetland Biodiversity) Policy 2019.

Wetlands are assessed for ecological significance using the environmental values for wetlands in section 7 of the Environmental Protection (Wetland and Water Biodiversity) Policy 2019. Wetlands are considered either High Ecological Significance (HES) or of General Ecological Significance (GES) for the purposes of the environmental values.

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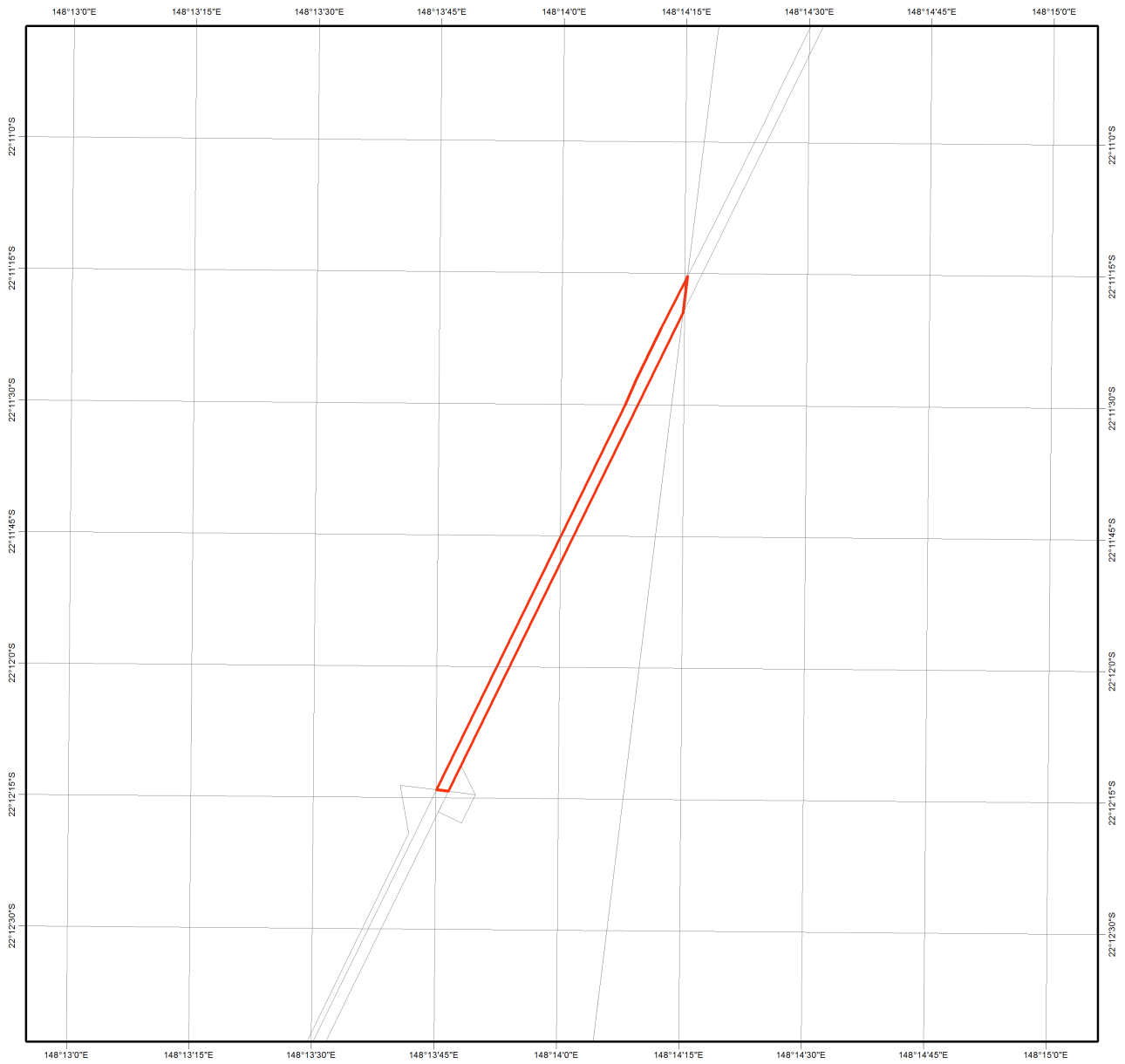
0 1300 2600 3900 5200 6500 m

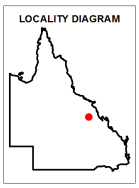
This product is projected into GDA 1994 MGA Zone 55



Map of Great Barrier Reef Wetland Protection Areas

- Selected Lot and Plan
- Cadastral Boundary
- Wetland in a wetland protection area
- Great Barrier Reef wetland protection area

LOCALITY DIAGRAM



N

Note:
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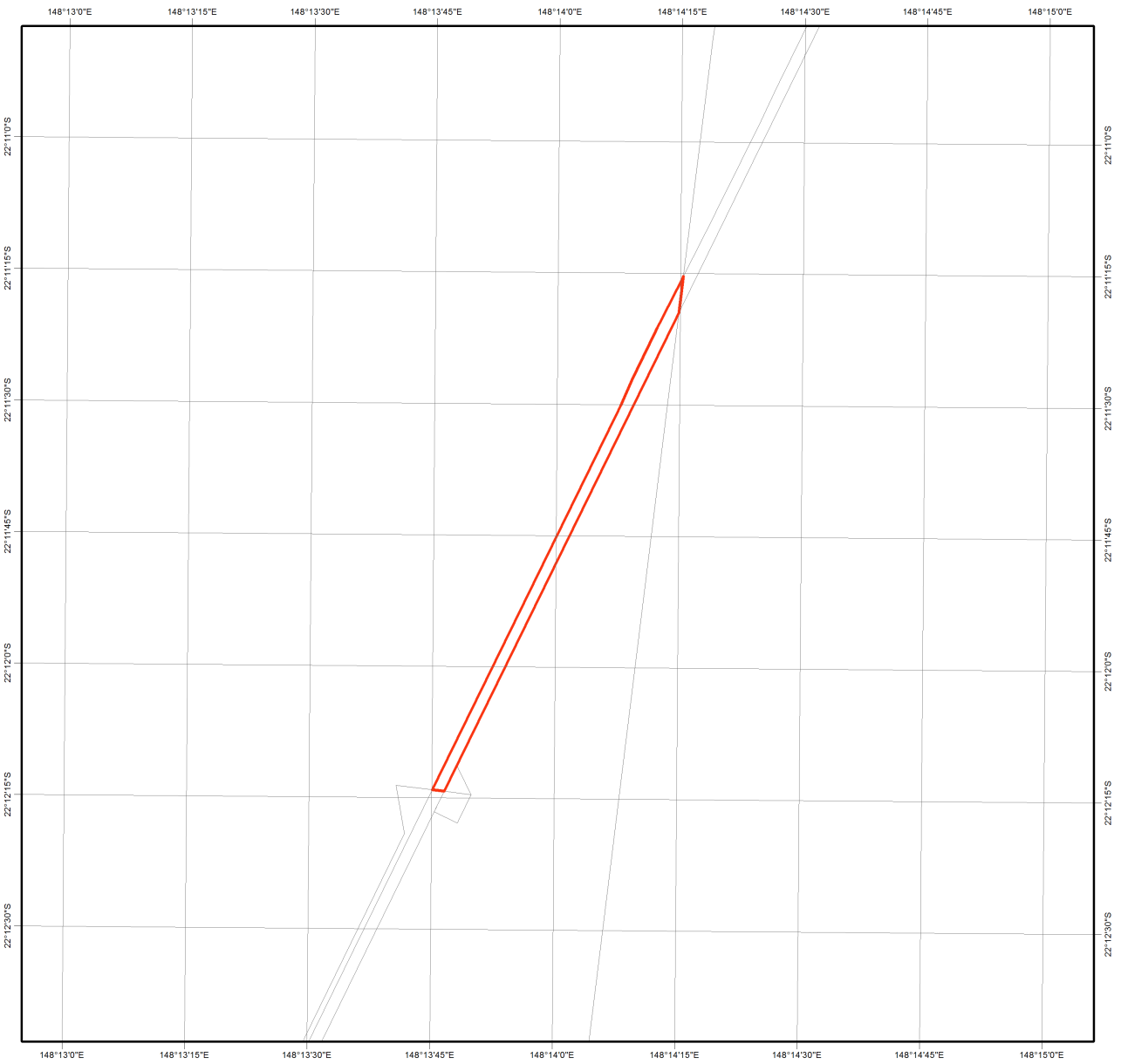
0 200 400 600 800 1000 m

This product is projected into GDA 1994 MGA Zone 55



Map of Queensland Wetland Environmental Values

Selected Lot and Plan

Cadastral Boundary

High ecological values waters management intent

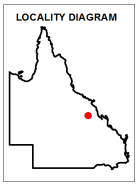
Wetlands assessed under section 7

GBR wetland of high ecological significance

Wetland of high ecological significance

Wetland of general ecological significance

LOCALITY DIAGRAM



N

Note:
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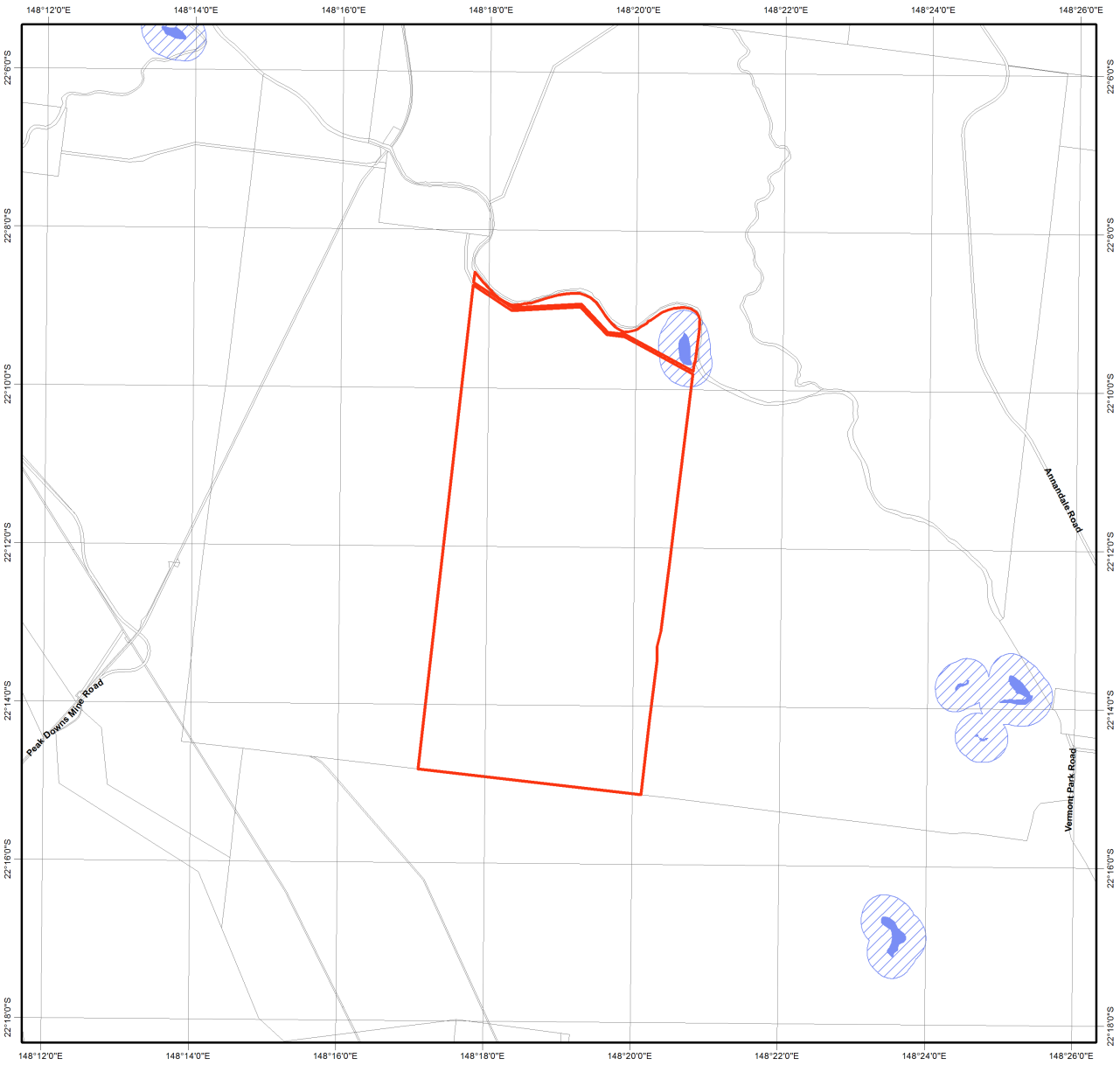
0 200 400 600 800 1000 m

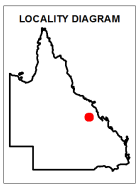
This product is projected into GDA 1994 MGA Zone 55



Map of Great Barrier Reef Wetland Protection Areas

- Selected Lot and Plan
- Cadastral Boundary
- Wetland in a wetland protection area
- Great Barrier Reef wetland protection area

LOCALITY DIAGRAM



N

Note:
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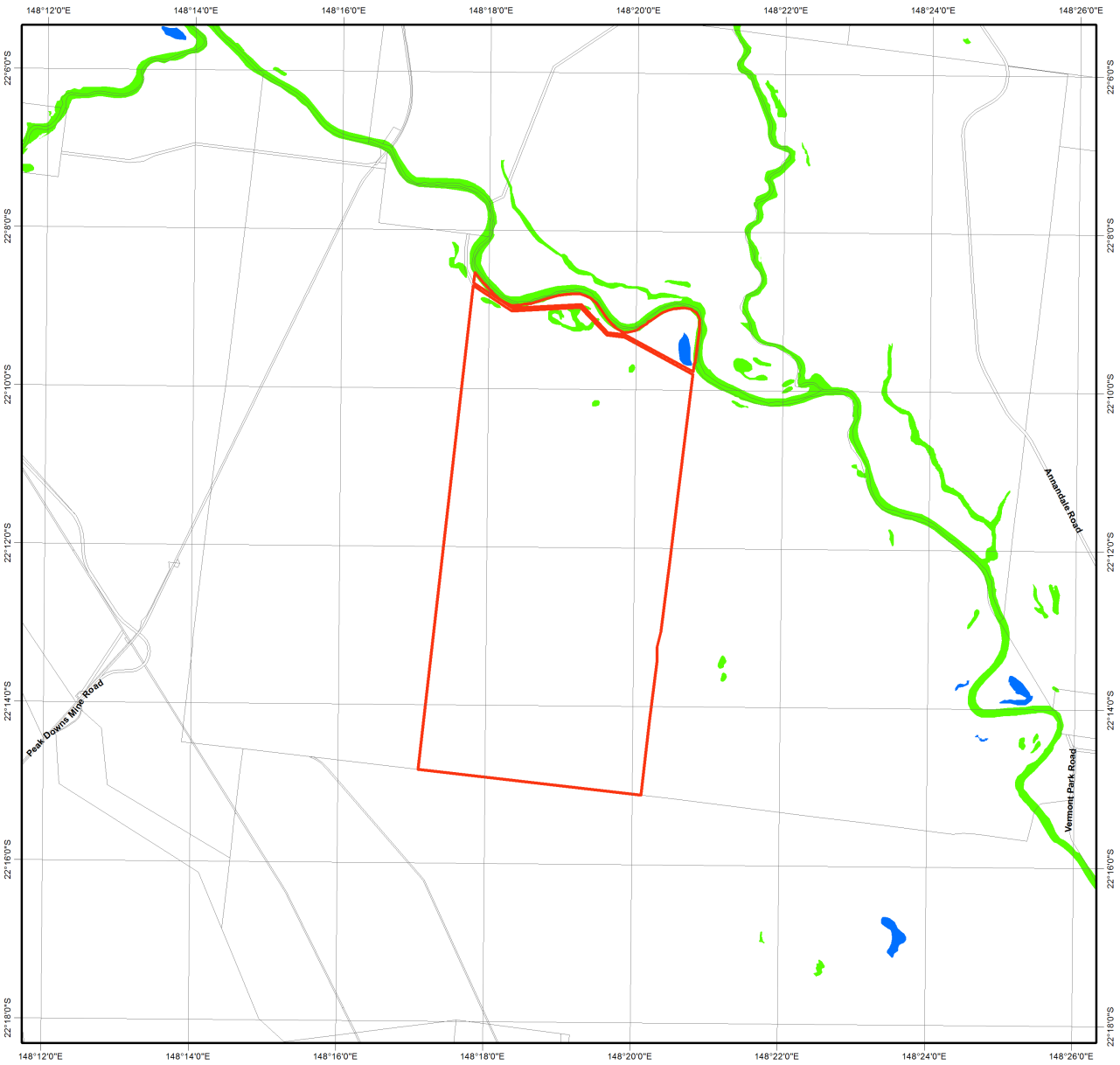
This product is projected into GDA 1994 MGA Zone 55



Map of Queensland Wetland Environmental Values

Selected Lot and Plan

Cadastral Boundary

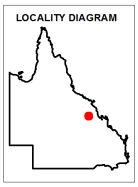
High ecological values waters management intent

Wetlands assessed under section 7

GBR wetland of high ecological significance

Wetland of high ecological significance

Wetland of general ecological significance



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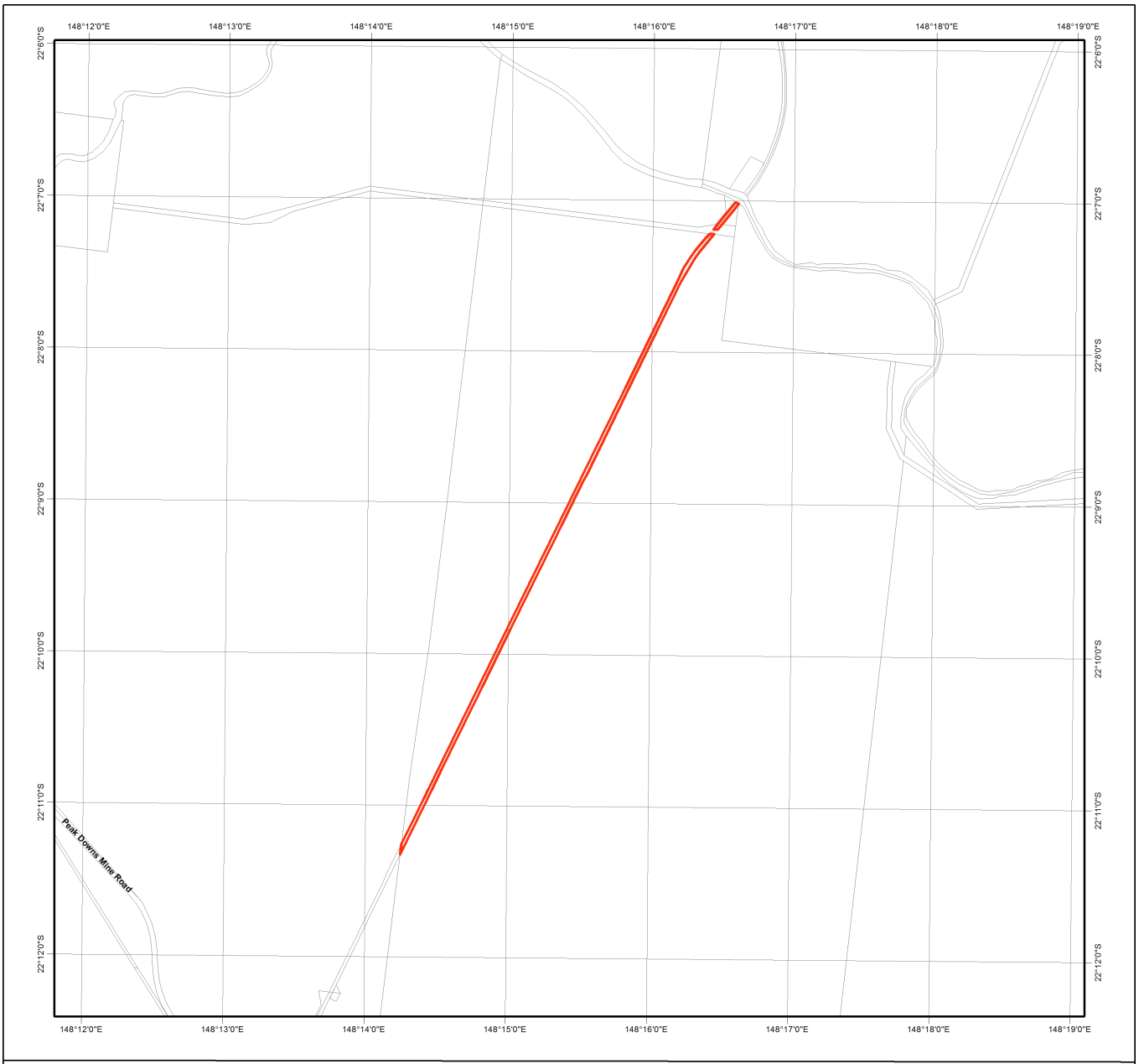
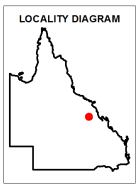


Map of Great Barrier Reef Wetland Protection Areas

Selected Lot and Plan
Cadastral Boundary
Wetland in a wetland protection area
Great Barrier Reef wetland protection area

LOCALITY DIAGRAM



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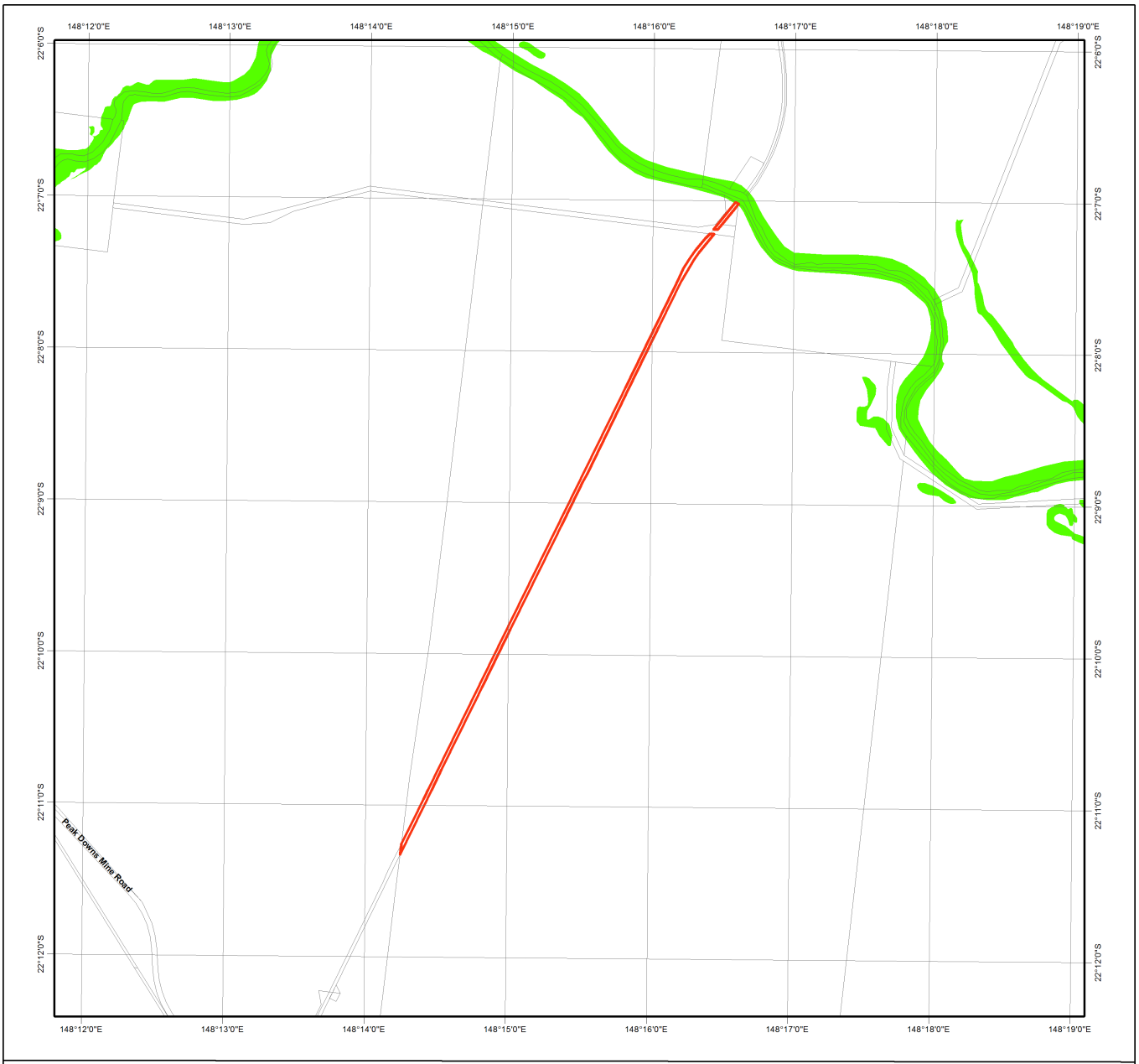

Map of Queensland Wetland Environmental Values

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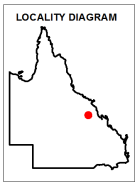

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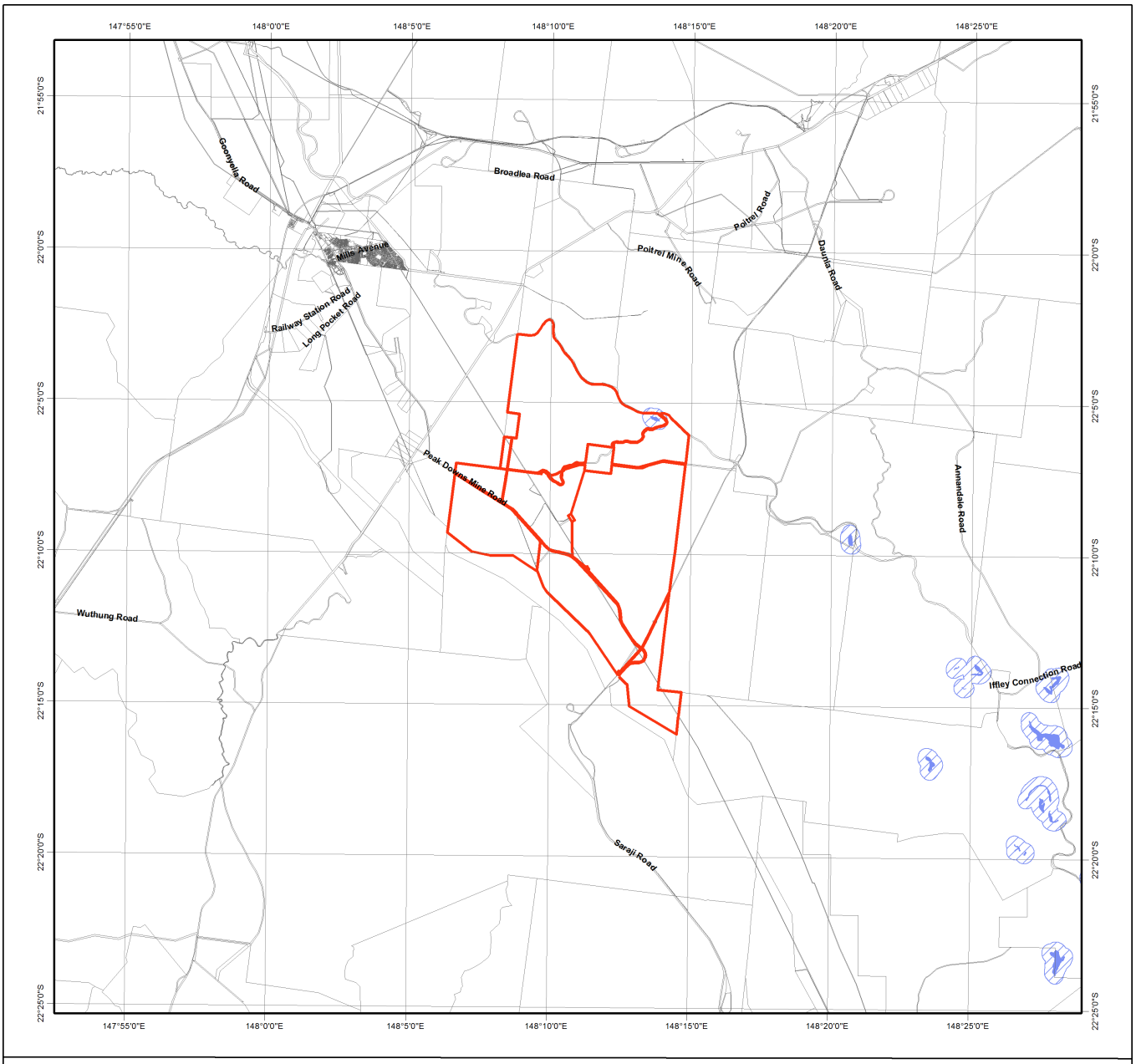
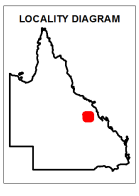


Map of Great Barrier Reef Wetland Protection Areas

- Selected Lot and Plan
- Cadastral Boundary
- Wetland in a wetland protection area
- Great Barrier Reef wetland protection area



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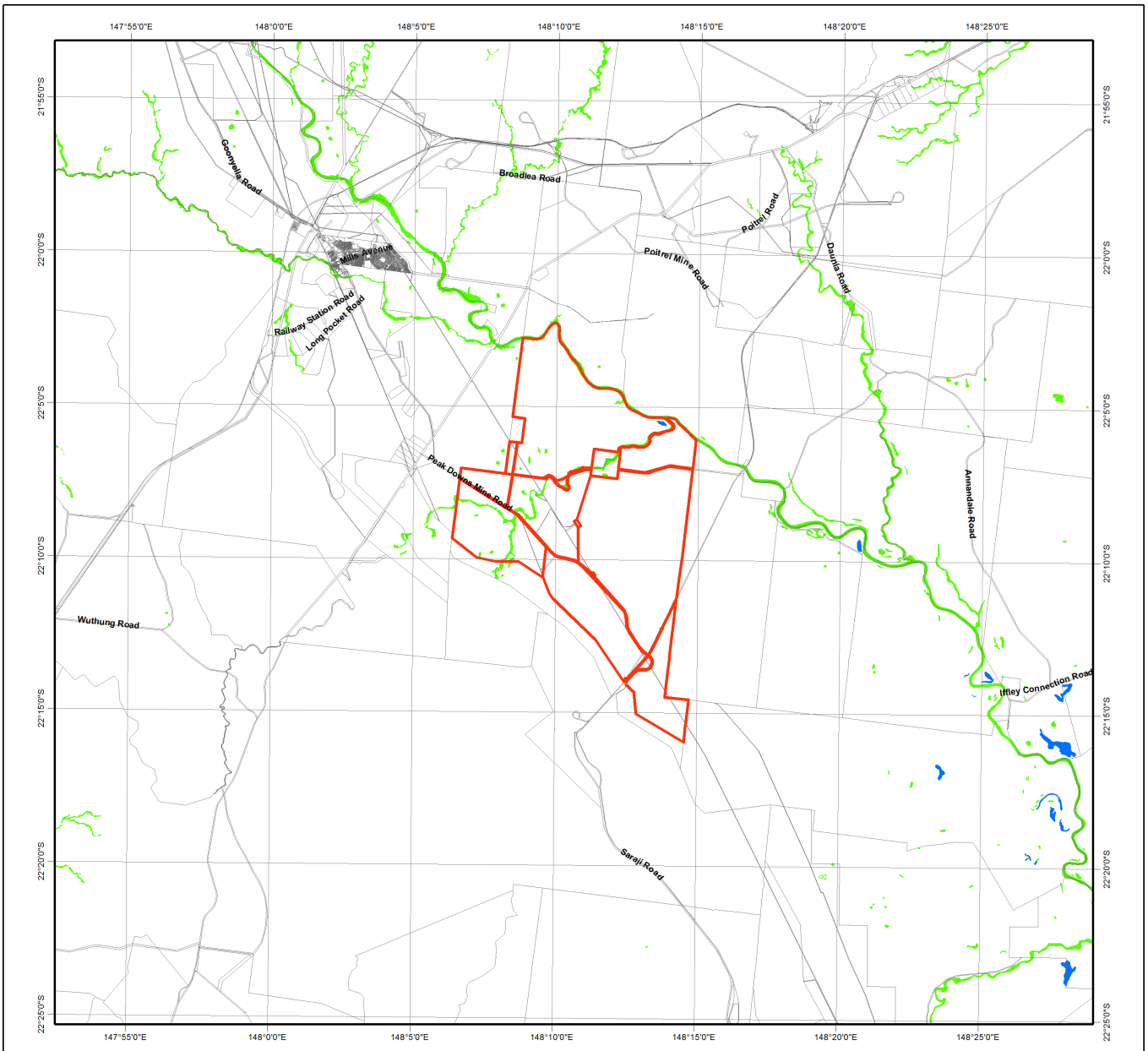

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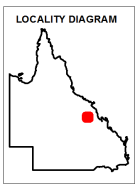

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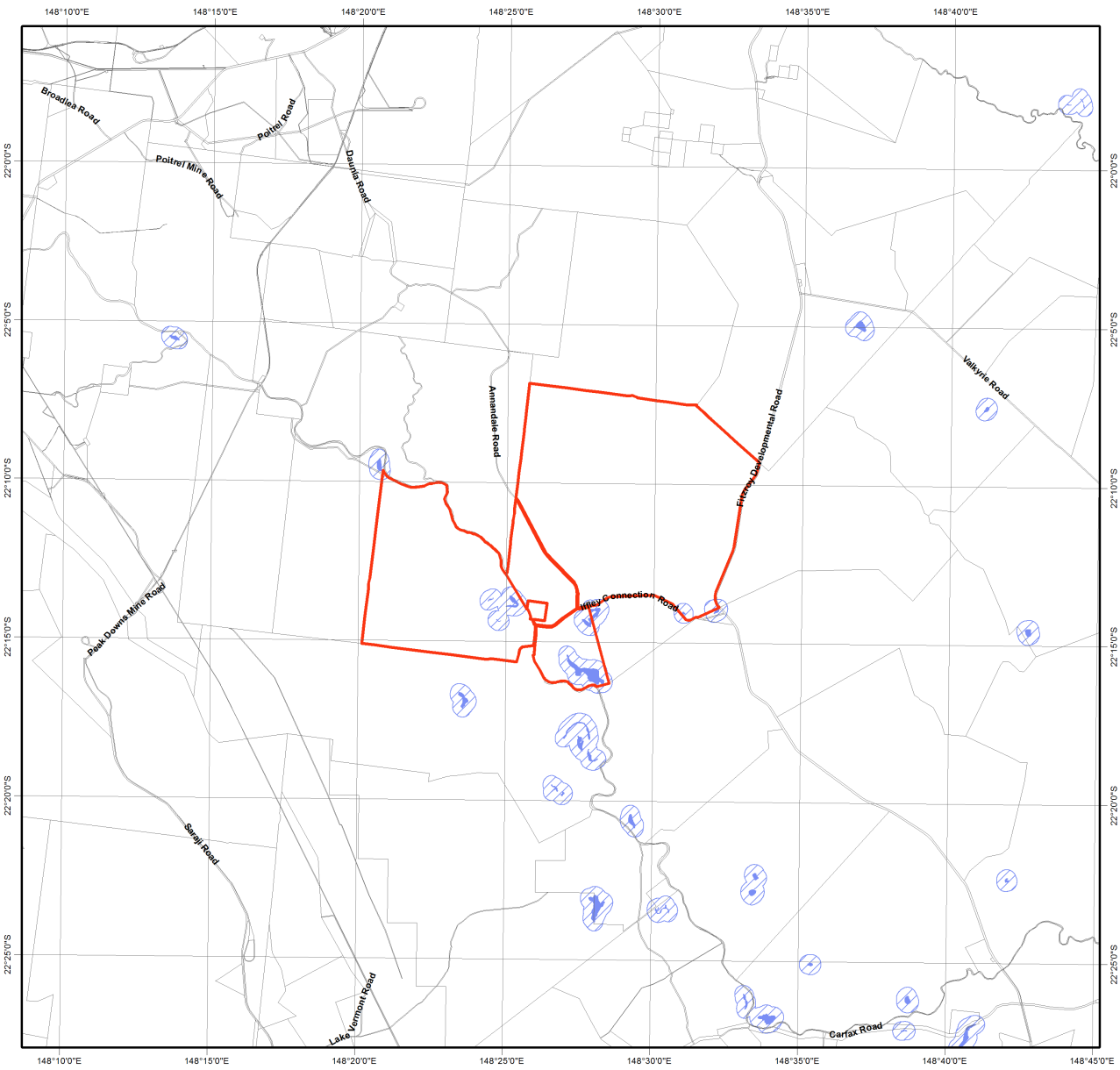

Map of Great Barrier Reef Wetland Protection Areas

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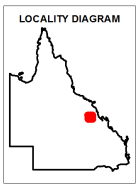
Wetland in a wetland protection area
Great Barrier Reef wetland protection area



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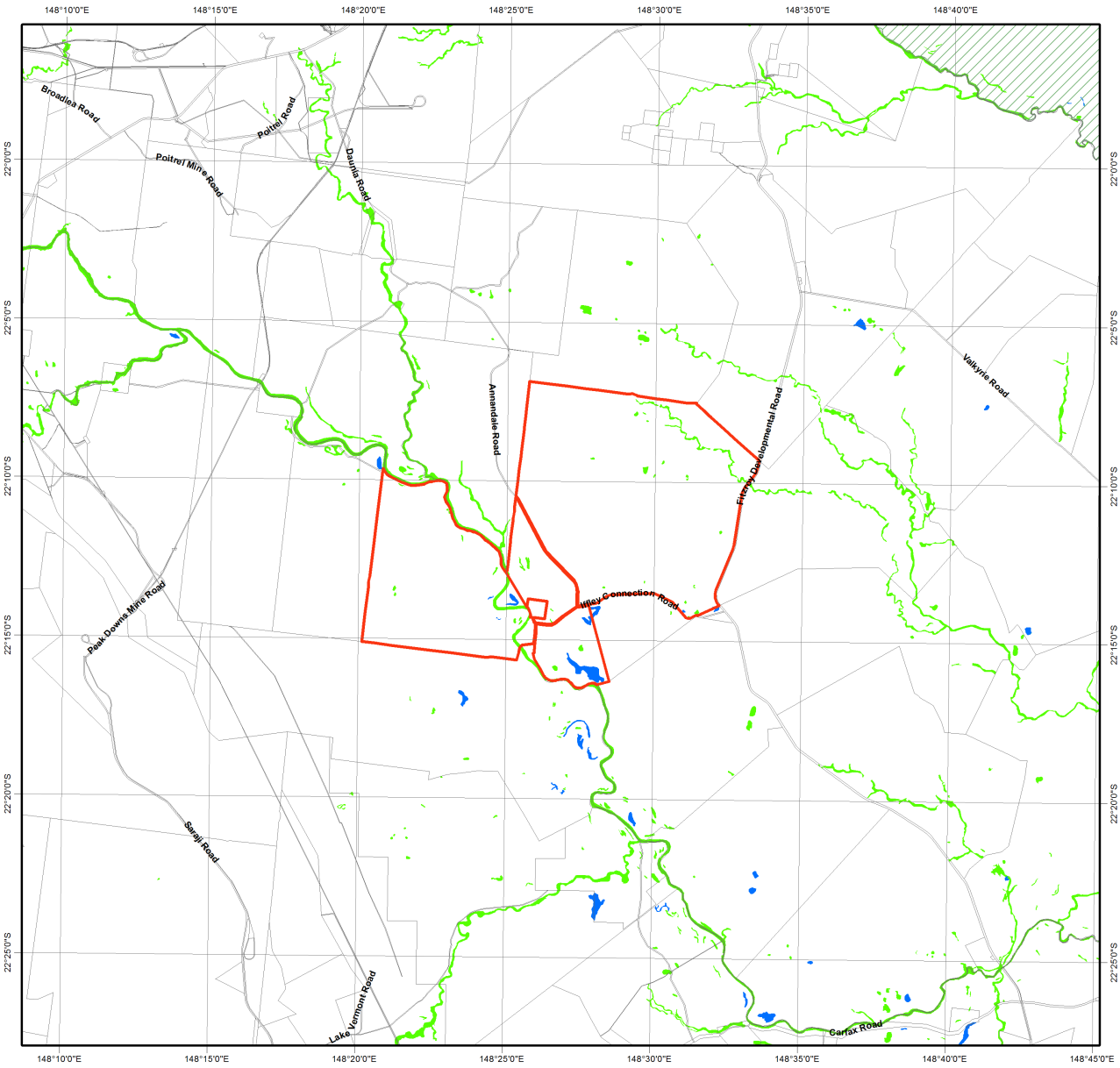

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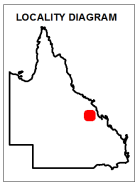

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B.7 DES Biodiversity Planning Assessment Map

Queensland Government

Department of Environment and Science

Environmental Reports

Biodiversity and Conservation Values

Biodiversity Planning Assessments and Aquatic Conservation Assessments

For the selected area of interest
ml: 700051

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or Area of Interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "Central co-ordinates" option, the resulting assessment area encompasses an area extending from 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: biodiversity.planning@des.qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.

Table of Contents

Summary Information

Tables 1 to 8 provide an overview of the AOI with respect to selected topographic and environmental values.

Table 1: Area of interest details: ml: 700051

Size (ha)	550.1
Local Government(s)	Isaac Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Isaac - Comet Downs
Catchment(s)	Fitzroy

The following table identifies available Biodiversity Planning Assessments (BPAs) and Aquatic Conservation Assessments (ACAs) with respect to the AOI.

Table 2: Available Biodiversity Planning and Aquatic Conservation Assessments

Assessment Type	Assessment Area and Version
Biodiversity Planning Assessment(s)	Brigalow Belt v2.1
Aquatic Conservation Assessment(s) (riverine)	Great Barrier Reef Catchments v1.1
Aquatic Conservation Assessment(s) (non-riverine)	Great Barrier Reef Catchments v1.3

Table 3: Remnant regional ecosystems within the AOI as per the Qld Herbarium's 'biodiversity status'

Biodiversity Status	Area (Ha)	% of AOI
Endangered	0.0	0.0
Of concern	0.0	0.0
No concern at present	67.62	12.29

The following table identifies the extent and proportion of the user specified area of interest (AOI) which is mapped as being of "State", "Regional" or "Local" significance via application of the Queensland Department of Environment and Science's *Biodiversity Assessment and Mapping Methodology* (BAMM).

Table 4: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	0.0	0.0
State	71.29	12.96
Regional	0.0	0.0
Local or Other Values	0.0	0.0

Table 5: Non-riverine wetlands intersecting the AOI

Non-riverine wetland types intersecting the area of interest	#
(No Records)	

NB. The figures presented in the table above are derived from the relevant non-riverine Aquatic Conservation Assessment(s). Later releases of wetland mapping produced via the Queensland Wetland Mapping Program may provide more recent

information in regards to wetland extent.

Table 6: Named waterways intersecting the AOI

(no results)

Refer to **Map 1** for general locality information.

The following two tables identify the extent and proportion of the user specified AOI which is mapped as being of "Very High", "High", "Medium", "Low", or "Very Low" aquatic conservation value for riverine and non-riverine wetlands via application of the Queensland Department of Environment and Science's *Aquatic Biodiversity Assessment and Mapping Method* (AquaBAMM).

Table 7: Summary table, aquatic conservation significance (riverine)

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	550.1	100.0
Low	0.0	0.0
Very Low	0.0	0.0

Table 8: Summary table, aquatic conservation significance (non-riverine)

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
(No Records)		

Biodiversity Planning Assessments

Introduction

The Department of Environment and Science (DES) attributes biodiversity significance on a bioregional scale through a Biodiversity Planning Assessment (BPA). A BPA involves the integration of ecological criteria using the *Biodiversity assessment and Mapping Methodology* (BAMM) and is developed in two stages: 1) **diagnostic criteria**, and 2) **expert panel criteria**. The diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion, while the expert panel criteria allows for the refinement of the mapped information from the diagnostic output by incorporating local knowledge and expert opinion.

The BAMM methodology has application for identifying areas with various levels of significance solely for biodiversity reasons. These include threatened ecosystems or taxa, large tracts of habitat in good condition, ecosystem diversity, landscape context and connection, and buffers to wetlands or other types of habitat important for the maintenance of biodiversity or ecological processes. While natural resource values such as dryland salinity, soil erosion potential or land capability are not dealt with explicitly, they are included to some extent within the biodiversity status of regional ecosystems recognised by the DES.

Biodiversity Planning Assessments (BPAs) assign three levels of overall biodiversity significance.

- **State significance** - areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed by other studies/processes as being significant at national or international scales. In addition, areas flagged as being of State significance due to the presence of endangered, vulnerable and/or near threatened taxa, are identified as "State Habitat for EVNT taxa".
- **Regional significance** - areas assessed as being significant for biodiversity at the subregional scale. These areas have lower significance for biodiversity than areas assessed as being of State significance.
- **Local significance and/or other values** - areas assessed as not being significant for biodiversity at state or regional scales. Local values are of significance at the local government scale.

For further information on released BPAs and a copy of the underlying methodology, go to:

http://www.qld.gov.au/environment/plants-animals/biodiversity/planning/

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

http://qspatial.information.qld.gov.au/geoportal/

The following table identifies the extent and proportion of the user specified AOI which is mapped as being of "State", "Regional" or "Local" significance via application of the BAMM.

Table 9: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	0.0	0.0
State	71.29	12.96
Regional	0.0	0.0
Local or Other Values	0.0	0.0

Refer to **Map 2** for further information.

Diagnostic Criteria

Diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion. These criteria are diagnostic in that they are used to filter the available data and provide a "first-cut" or initial determination of biodiversity significance. This initial assessment is then combined through a second group of other essential criteria.

A description of the individual diagnostic criteria is provided in the following sections.

Criteria A. Habitat for EVNT taxa: Classifies areas according to their significance based on the presence of endangered, vulnerable and/or rare (EVNT) taxa. EVNT taxa are those scheduled under the *Nature Conservation Act 1992* and/or the

Environment Protection and Biodiversity Conservation Act 1999. It excludes highly mobile fauna taxa which are instead considered in Criterion H and brings together information on EVNT taxa using buffering of recorded sites or habitat suitability models (HSM) where available.

Criteria B. Ecosystem value: Classifies on the basis of biodiversity status of regional ecosystems, their extent in protected areas (presence of poorly conserved regional ecosystems), the presence of significant wetlands; and areas of national importance such as the presence of Threatened Ecological Communities, World Heritage areas and Ramsar sites. Ecosystem value is applied at a bioregional (**B1**) and regional (**B2**) scale.

Criteria C. Tract size: Measures the relative size of tracts of vegetation in the landscape. The size of any tract is a major indicator of ecological significance, and is also strongly correlated with the long-term viability of biodiversity values. Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts.

Criteria D. Relative size of regional ecosystems: Classifies the relative size of each regional ecosystem unit within its bioregion (**D1**) and its subregion (**D2**). Remnant units are compared with all other occurrences with the same regional ecosystem. Large examples of a regional ecosystem are more significant than smaller examples of the same regional ecosystem because they are more representative of the biodiversity values particular to the regional ecosystem, are more resilient to the effects of disturbance, and constitute a significant proportion of the total area of the regional ecosystem.

Criteria F. Ecosystem diversity: Is an indicator of the number of regional ecosystems occurring within an area. An area with high ecosystem diversity will have many regional ecosystems and ecotones relative to other areas within the bioregion.

Criteria G. Context and connection: Represents the extent to which a remnant unit incorporates, borders or buffers areas such as significant wetlands, endangered ecosystems; and the degree to which it is connected to other vegetation.

A summary of the biodiversity status based upon the diagnostic criteria is provided in the following table.

Table 10: Summary of biodiversity significance based upon diagnostic criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Remnant contains at least 1 Vulnerable or Near Threatened species (A) & Nat. Threatened Ecol. Community (B1)	71.29	12.96

Assessment of diagnostic criteria with respect to the AOI

The following table reflects an assessment of the individual diagnostic criteria noted above in regards to the AOI.

Table 11: Assessment of individual diagnostic criteria with respect to the AOI

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
A: Habitat for EVNT Taxa			71.28	13.0				
B1: Ecosystem Value (Bioregion)	71.28	13.0						
B2: Ecosystem Value (Subregion)			71.28	13.0				
C: Tract Size					33.35	6.1	37.93	6.9
D1: Relative RE Size (Bioregion)							71.28	13.0
D2: Relative RE Size (Subregion)							71.28	13.0
F: Ecosystem Diversity							71.28	13.0
G: Context and Connection	0.01				2.01	0.4	69.26	12.6

Other Essential Criteria

Other essential criteria (also known as expert panel criteria) are based on non-uniform information sources and which may rely more upon expert opinion than on quantitative data. These criteria are used to provide a "second-cut" determination of biodiversity significance, which is then combined with the diagnostic criteria for an overall assessment of relative biodiversity significance. A summary of the biodiversity status based upon the other essential criteria is provided in the following table.

Table 12: Summary of biodiversity significance based upon other essential criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
Regional	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	71.29	12.96

A description of each of the other essential criteria and associated assessment in regards to the AOI is provided in the following sections.

Criteria H. Essential and general habitat for priority taxa: Priority taxa are those which are at risk or of management concern, taxa of scientific interest as relictual (ancient or primitive), endemic taxa or locally significant populations (such as a flying fox camp or heronry), highly specialised taxa whose habitat requirements are complex and distributions are not well correlated with any particular regional ecosystem, taxa important for maintaining genetic diversity (such as complex spatial patterns of genetic variation, geographic range limits, highly disjunct populations), taxa critical for management or monitoring of biodiversity (functionally important or ecological indicators), or economic and culturally important taxa.

Criteria I. Special biodiversity values: areas with special biodiversity values are important because they contain multiple taxa in a unique ecological and often highly biodiverse environment. Areas with special biodiversity values can include the following:

- Ia - centres of endemism - areas where concentrations of taxa are endemic to a bioregion or subregion are found.
- Ib - wildlife refugia (Morton *et al*. 1995), for example, islands, mound springs, caves, wetlands, gorges, mountain ranges and topographic isolates, ecological refuges, refuges from exotic animals, and refuges from clearing. The latter may include large areas that are not suitable for clearing because of land suitability/capability.
- Ic - areas with concentrations of disjunct populations.
- Id - areas with concentrations of taxa at the limits of their geographic ranges.
- Ie - areas with high species richness.
- If - areas with concentrations of relictual populations (ancient and primitive taxa).
- Ig - areas containing REs with distinct variation in species composition associated with geomorphology and other environmental variables.
- Ih - an artificial waterbody or managed/manipulated wetland considered by the panel/s to be of ecological significance.
- Ii - areas with a high density of hollow-bearing trees that provide habitat for animals.
- Ij - breeding or roosting sites used by a significant number of individuals.
- Ik - climate change refuge.

The following table identifies the value and extent area of the Other Essential Criteria H and I within the AOI.

Table 13: Relative importance of expert panel criteria (H and I) used to access overall biodiversity significance with respect to the AOI

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
H: Core Habitat Priority Taxa								
Ia: Centres of Endemism								
Ib: Wildlife Refugia			71.28	13.0				
Ic: Disjunct Populations								
Id: Limits of Geographic Ranges								
Ie: High Species Richness								
If: Relictual Populations								
Ig: Variation in Species Composition								
Ih: Artificial Wetland								

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
Ii: Hollow Bearing Trees								
Ij: Breeding or Roosting Site								
Ik: Climate Refugia								

NB. Whilst biodiversity values associated with Criteria I may be present within the site (refer to tables 12 and 15), for the New England Tableland and Central Queensland Coast BPAs, area and % area figures associated with Criteria Ia through to Ij cannot be listed in the table above (due to slight variations in data formats between BPAs).

Criteria J. Corridors: areas identified under this criterion qualify either because they are existing vegetated corridors important for contiguity, or cleared areas that could serve this purpose if revegetated. Some examples of corridors include riparian habitats, transport corridors and "stepping stones".

Bioregional and subregional conservation corridors have been identified in the more developed bioregions of Queensland through the BPAs, using an intensive process involving expert panels. Map 3 displays the location of corridors as identified under the Statewide Corridor network. The Statewide Corridor network incorporates BPA derived corridors and for bioregions where no BPA has been assessed yet, corridors derived under other planning processes. *Note: as a result of updating and developing a statewide network, the alignment of corridors may differ slightly in some instances when compared to those used in individual BPAs.*

The functions of these corridors are:

- **Terrestrial** Bioregional corridors, in conjunction with large tracts of remnant vegetation, maintain ecological and evolutionary processes at a landscape scale, by:

  • Maintaining long term evolutionary/genetic processes that allow the natural change in distributions of species and connectivity between populations of species over long periods of time;

  • Maintaining landscape/ecosystems processes associated with geological, altitudinal and climatic gradients, to allow for ecological responses to climate change;

  • Maintaining large scale seasonal/migratory species processes and movement of fauna;

  • Maximising connectivity between large tracts/patches of remnant vegetation;

  • Identifying key areas for rehabilitation and offsets; and

- **Riparian** Bioregional Corridors also maintain and encourage connectivity of riparian and associated ecosystems.

The location of the corridors is determined by the following principles:

- Terrestrial

  • Complement riparian landscape corridors (i.e. minimise overlap and maximise connectivity);

  • Follow major watershed/catchment and/or coastal boundaries;

  • Incorporate major altitudinal/geological/climatic gradients;

  • Include and maximise connectivity between large tracts/patches of remnant vegetation;

  • Include and maximise connectivity between remnant vegetation in good condition; and

- Riparian

  • Located on the major river or creek systems within the bioregion in question.

The total extent of remnant vegetation triggered as being of "State", "Regional" or "Local" significance due to the presence of an overlying BPA derived terrestrial or riparian corridor within the AOI, is provided in the following table. For further information on how remnant vegetation is triggered due to the presence of an overlying BPA derived corridor, refer to the relevant landscape BPA expert panel report(s).

Table 14: Extent of triggered remnant vegetation due to the presence of BPA derived corridors with respect to the AOI

Biodiversity Significance	Area (Ha)	% of AOI
State	0.0	0.0
Regional	0.0	0.0
Local	0.0	0.0

NB: area figures associated with the extent of corridor triggered remnant vegetation are only available for those bioregions where a BPA has been undertaken.

Refer to **Map 3** for further information.

Threatening process/condition (Criteria K) - areas identified by experts under this criterion may be used to amend (upgrade or downgrade) biodiversity significance arising from the "first-cut" analysis. The condition of remnant vegetation is affected by threatening processes such as weeds, ferals, grazing and burning regime, selective timber harvesting/removal, salinity, soil erosion, and climate change.

Assessment of Criteria K with respect to the AOI is not currently included in the "Biodiversity and Conservation Values" report, as it has not been applied to the majority of Queensland due to data/information limitations and availability.

Special Area Decisions

Expert panel derived "Special Area Decisions" are used to assign values to Other Essential Criteria. The specific decisions which relate to the AOI in question are listed in the table below.

Table 15: Expert panel decisions for assigning levels of biodiversity significance with respect to the AOI

Decision Number	Description	Panel Recommended Significance	Criteria Values
brbn_l_89	Relictual subregions (less than 30% remnant vegetation) - remnant vegetation	Regional	Ib (refugia): VH

Expert panel decision descriptions:

brbn_l_89

A summary of research on landscape thresholds for remnant vegetation is provided by James Saunders (2001). The evidence suggests that once remnant vegetation falls below 30%, there are significant declines in biodiversity.

The following subregions have less than 30% remnant vegetation in the southern Brigalow Belt: Relictual subregions (less than 30% remnant vegetation remaining) for the Brigalow Belt include; Upper Belyando Flood out (11.8), Isaac - Comet Downs (11.11), Callide Creek Downs (11.19), Dawson River Downs (11.21), Taroom Downs (11.25), Dulacca Downs (11.28), Weribone High (11.29), Tara Downs (11.30), Eastern Darling Downs (11.31), Moonie R. - Commoron Creek Floodout (11.33), Moonie - Barwon Interfluve (11.34), Warrambool - Moonie (11.35), Macintyre - Weir Fan (11.36), Narrandool (11.38).

Remnant vegetation provides a refuge from clearing in fragmented subregions and should be retained to maintain biodiversity.

Refer to brbs_l_15 for the southern BRB implementation of this decision.

Aquatic Conservation Assessments

Introduction

The Aquatic Biodiversity Assessment and Mapping Method or AquaBAMM (Clayton *et al.* 2006), was developed to assess conservation values of wetlands in queensland, and may also have application in broader geographical contexts. It is a comprehensive method that uses available data, including data resulting from expert opinion, to identify relative wetland conservation/ecological values within a specified study area (usually a catchment). The product of applying this method is an Aquatic Conservation Assessment (ACA) for the study area.

An ACA using AquaBAMM is non-social, non-economic and identifies the conservation/ecological values of wetlands at a user-defined scale. It provides a robust and objective conservation assessment using criteria, indicators and measures that are founded upon a large body of national and international literature. The criteria, each of which may have variable numbers of indicators and measures, are naturalness (aquatic), naturalness (catchment), diversity and richness, threatened species and ecosystems, priority species and ecosystems, special features, connectivity and representativeness. An ACA using AquaBAMM is a powerful decision support tool that is easily updated and simply interrogated through a geographic information system (GIS).

Where they have been conducted, ACAs can provide a source of baseline wetland conservation/ecological information to support natural resource management and planning processes. They are useful as an independent product or as an important foundation upon which a variety of additional environmental and socio-economic elements can be added and considered (i.e. an early input to broader 'triple-bottom-line' decision-making processes). An ACA can have application in:

- determining priorities for protection, regulation or rehabilitation of wetlands and other aquatic ecosystems
- on-ground investment in wetlands and other aquatic ecosystems
- contributing to impact assessment of large-scale development (e.g. dams)
- water resource and strategic regional planning prcesses

For a detailed explanation of the methodology please refer to the summary and expert panel reports relevant to the ACA utilised in this assessment. These reports can be accessed at Wetland *Info*:

http://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

http://qspatial.information.qld.gov.au/geoportal/

Explanation of Criteria

Under the AquaBAMM, eight criteria are assessed to derive an overall conservation value. Similar to the Biodiversity Assessment and Mapping Methodology, the criteria may be primarily diagnostic (quantitative) or primarily expert opinion (qualitative) in nature. The following sections provide a brief description of each of the 8 criteria.

Criteria 1. Naturalness - Aquatic: This attribute reflects the extent to which a wetland's (riverine, non-riverine, estuarine) aquatic state of naturalness is affected through relevant influencing indicators which include: presence of exotic flora and fauna; presence of aquatic communities; degree of habitat modification and degree of hydrological modification.

Criteria 2. Naturalness - Catchment: The naturalness of the terrestrial systems of a catchment can have an influence on many wetland characteristics including: natural ecological processes e.g. nutrient cycling, riparian vegetation, water chemistry, and flow. The indicators utilised to assess this criterion include: presence of exotic flora and/or fauna; riparian, catchment and flow modification.

Criteria 3. Naturalness - Diversity and Richness: This criterion is common to many ecological assessment methods and can include both physical and biological features. It includes such indicators as species richness, riparian ecosystem richness and geomorphological diversity.

Criteria 4. Threatened Species and Ecosystems: This criterion evaluates ecological rarity characteristics of a wetland. This includes both species rarity and rarity of communities / assemblages. The communities and assemblages are best represented by regional ecosystems. Species rarity is determined by NCA and EPBC status with Endangered, Vulnerable or Near-threatened species being included in the evaluation. Ecosystem rarity is determined by regional ecosystem biodiversity status i.e. Endangered, Of Concern, or Not of Concern.

Criteria 5. Priority Species and Ecosystems: Priority flora and fauna species lists are expert panel derived. These are aquatic, semi-aquatic and riparian species which exhibit at least 1 particular trait in order to be eligible for consideration. For

flora species the traits included:

- It forms significant macrophyte beds (in shallow or deep water).
- It is an important food source.
- It is important/critical habitat.
- It is implicated in spawning or reproduction for other fauna and/or flora species.
- It is at its distributional limit or is a disjunct population.
- It provides stream bank or bed stabilisation or has soil binding properties.
- It is a small population and subject to threatening processes.

Fauna species are included if they meet at least one of the following traits:

- It is endemic to the study area (>75 per cent of its distribution is in the study area/catchment).
- It has experienced, or is suspected of experiencing, a serious population decline.
- It has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area/catchment.
- It is currently a small population and threatened by loss of habitat.
- It is a significant disjunct population.
- It is a migratory species (other than birds).
- A significant proportion of the breeding population (>one per cent for waterbirds, >75 per cent other species) occurs in the waterbody (see Ramsar criterion 6 for waterbirds).
- Limit of species range.

See the individual expert panel reports for the priority species traits specific to an ACA.

Criteria 6. Special Features: Special features are areas identified by flora, fauna and ecology expert panels which exhibit characteristics beyond those identified in other criteria and which the expert panels consider to be of the highest ecological importance. Special feature traits can relate to, but are not solely restricted to geomorphic features, unique ecological processes, presence of unique or distinct habitat, presence of unique or special hydrological regimes e.g. spring-fed streams. Special features are rated on a 1 - 4 scale (4 being the highest).

Criteria 7. Connectivity: This criterion is based on the concept that appropriately connected aquatic ecosystems are healthy and resilient, with maximum potential biodiversity and delivery of ecosystem services.

Criteria 8. Representativeness: This criterion applies primarily to non-riverine assessments, evaluates the rarity and uniqueness of a wetland type in relation to specific geographic areas. Rarity is determined by the degree of wetland protection within "protected Areas" estate or within an area subject to the *Fisheries Act 1994*, *Coastal Protection and Management Act 1995*, or *Marine Parks Act 2004*. Wetland uniqueness evaluates the relative abundance and size of a wetland or wetland management group within geographic areas such as catchment and subcatchment.

Riverine Wetlands

Riverine wetlands are all wetlands and deepwater habitats within a channel. The channels are naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water. AquaBAMM, when applied to riverine wetlands uses a discrete spatial unit termed subsections. A subsection can be considered as an area which encompasses discrete homogeneous stream sections in terms of their natural attributes (i.e. physical, chemical, biological and utilitarian values) and natural resources. Thus in an ACA, an aquatic conservation significance score is calculated for each subsection and applies to all streams within a subsection, rather than individual streams as such.

Please note, the area figures provided in Tables 16 and 17, are derived using the extent of riverine subsections within the AOI. Refer to **Map 5** for further information. A summary of the conservation significance of riverine wetlands within the AOI is provided in the following table.

Table 16: Overall level/s of riverine aquatic conservation significance

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
High	0.0	0.0
Medium	550.1	100.0
Low	0.0	0.0
Very Low	0.0	0.0

The individual aquatic conservation criteria ratings for riverine wetlands within the AOI are listed below.

Table 17: Level/s of riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic					550.1	100.0		
2. Naturalness catchment			550.1	100.0				
3. Diversity and richness			550.1	100.0				
4. Threatened species and ecosystems			550.1	100.0				
5. Priority species and ecosystems	520.26	94.6	29.84	5.4				
6. Special features								
7. Connectivity					520.26	94.6	29.84	5.4
8. Representative-ness								

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to riverine wetlands within the AOI.

Table 18: Expert panel decisions for assigning overall levels of riverine aquatic conservation significance

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
(No Records)				

4 is the highest rating/value

Expert panel decision descriptions:

(No Records)

Non-riverine Wetlands

Non-riverine wetlands include both lacustrine and palustrine wetlands, however, do not currently incorporate estuarine, marine or subterranean wetland types. A summary of the conservation significance of non-riverine wetlands within the AOI is provided in the following table. Refer to **Map 6** for further information.

Table 19: Overall level/s of non-riverine aquatic conservation significance

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
(No Records)		

The following table provides an assessment of non-riverine wetlands within the AOI and associated aquatic conservation criteria values.

Table 20: Level/s of non-riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
(No Records)								

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to non-riverine wetlands within the AOI.

Table 21: Expert panel decisions for assigning overall levels of non-riverine aquatic conservation significance.

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
(No Records)				

4 is the highest rating/value

Expert panel decision descriptions:

(No Records)

Threatened and Priority Species

Introduction

This chapter contains a list of threatened and priority flora and/or fauna species that have been recorded on, or within 4km of the Assessment Area.

The information presented in this chapter with respect to species presence is derived from compiled databases developed primarily for the purpose of BPAs and ACAs. Data is collated from a number of sources and is updated periodically.

It is important to note that the list of species provided in this report, may differ when compared to other reports generated from other sources such as the State government's WildNet, Herbrecs or the federal government's EPBC database for a number of reasons.

Records for threatened and priority species are filtered and checked based on a number of rules including:

- Taxonomic nomenclature - current scientific names and status,
- Location - cross-check co-ordinates with location description,
- Taxon by location - requires good knowledge of the taxon and history of the record,
- Duplicate records - identify and remove,
- Expert panels - check records and provide new records,
- Flora cultivated records excluded,
- Use precise records less than or equal to 2000m,
- Use recent records greater than or equal to 1975 animals, greater than or equal to 1950 plants.

Threatened Species

Threatened species are those species classified as "Endangered" or "Vulnerable" under the *Environment Protection and Biodiversity Conservation Act 1999* or "Endangered", "Vulnerable" or "Near threatened" under the *Nature Conservation Act 1992*.

The following threatened species have been recorded on, or within approximately 4km of the AOI.

Table 22: Threatened species recorded on, or within 4km of the AOI

Species	Common name	NCA status	EPBC status	Back on Track rank	Migratory species*	Wetland species**	Identified flora/fauna
Acanthophis antarcticus	common death adder	V		Medium			FA
Phascolarctos cinereus	koala	V	V	Low			FA
Solanum adenophorum		E		High			FL

NB. Please note that the threatened species listed in this section are based upon the most recently compiled DES internal state-wide threatened species dataset. This dataset may contain additional records that were not originally available for inclusion in the relevant individual BPAs and ACAs.

**JAMBA - Japan-Australia Migratory Bird Agreement; CAMBA - China-Australia Migratory Bird Agreement; ROKAMBA - Republic of Korea-Australia Migratory Bird Agreement; CMS - Convention on the Conservation of Migratory Species*.

***Y - wetland indicator species*.

BPA Priority Species

A list of BPA priority species that have been recorded on, or within approximately 4km of the AOI is contained in the following table.

Table 23: Priority species recorded on, or within 4km of the AOI

Species	Common name	Back on Track rank	Identified flora/fauna
Carlia rubigo	Orange-flanked Rainbow Skink	None	FA

NB. Please note that the list of priority species is based on those species identified in the BPAs, however records for these species may be more recent than the originals used. furthermore, the BPA priority species databases are updated from time to time. At each update, the taxonomic details for all species are amended as necessary to reflect current taxonomic name and/or status changes.

ACA Priority Species

A list of ACA priority species used in riverine and non-riverine ACAs that have been recorded on, or within approximately 4km of the AOI are contained in the following tables.

Table 24: Priority species recorded on, or within 4 km of the AOI - riverine

(no results)

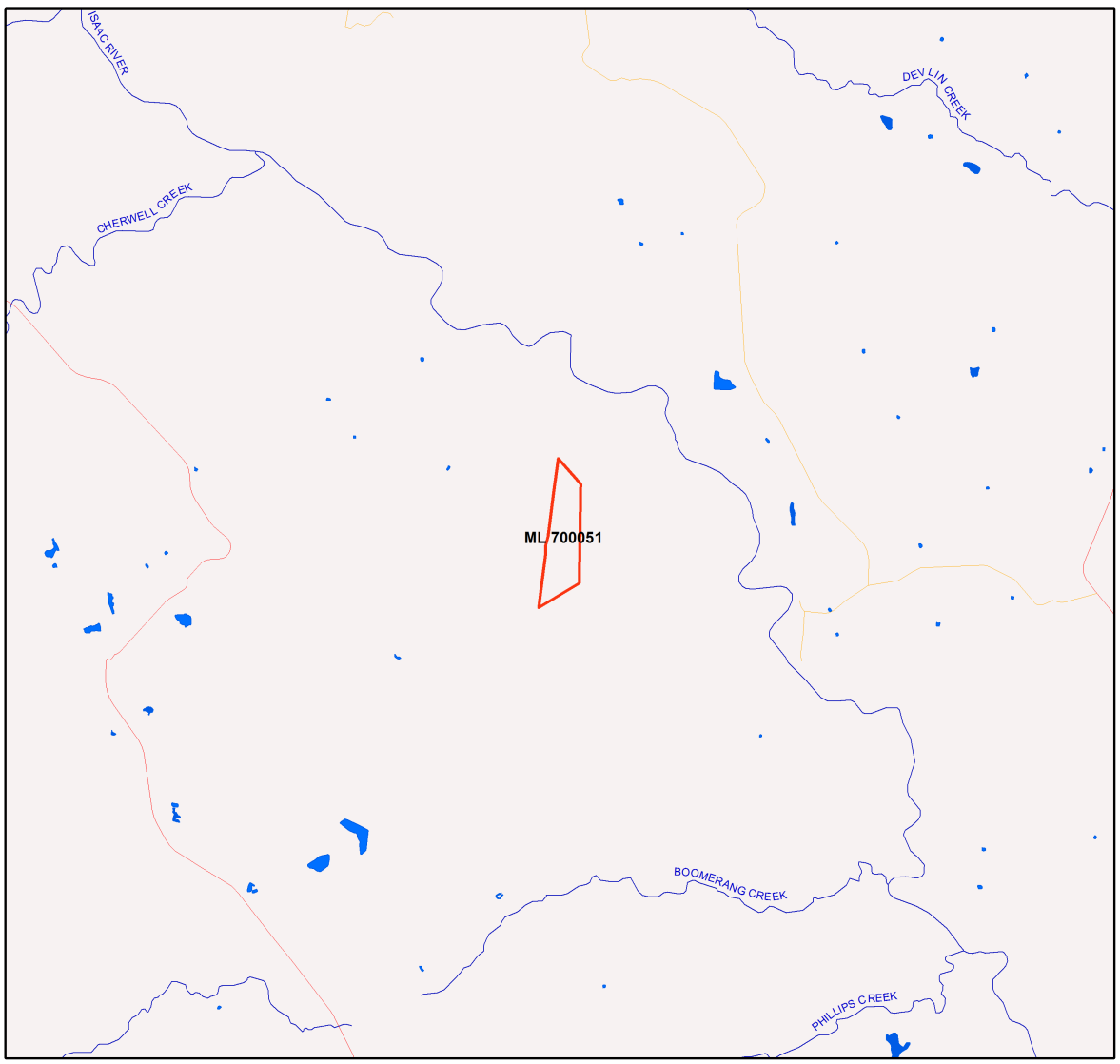
Table 25: Priority species recorded on, or within 4 km of the AOI - non-riverine

(no results)

NB. Please note that the priority species records used in the above two tables are comprised of those adopted for the released individual ACAs. The ACA riverine and non-riverine priority species databases are updated from time to time to reflect new release of ACAs. At each update, the taxonomic details for all ACAs records are amended as necessary to reflect current taxonomic name and/or status changes.

Maps

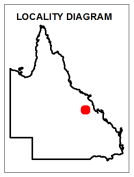
Map 1 - Locality Map



Locality Map

Legend

- Selected Mining Lease (ML)
- Towns
- Highway
- Connector
- Street/Local Road
- Reservoirs
- Lakes
- National Park (Scientific)
- National Park
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Coordinated Conservation Areas
- Major rivers/creeks
- Queensland



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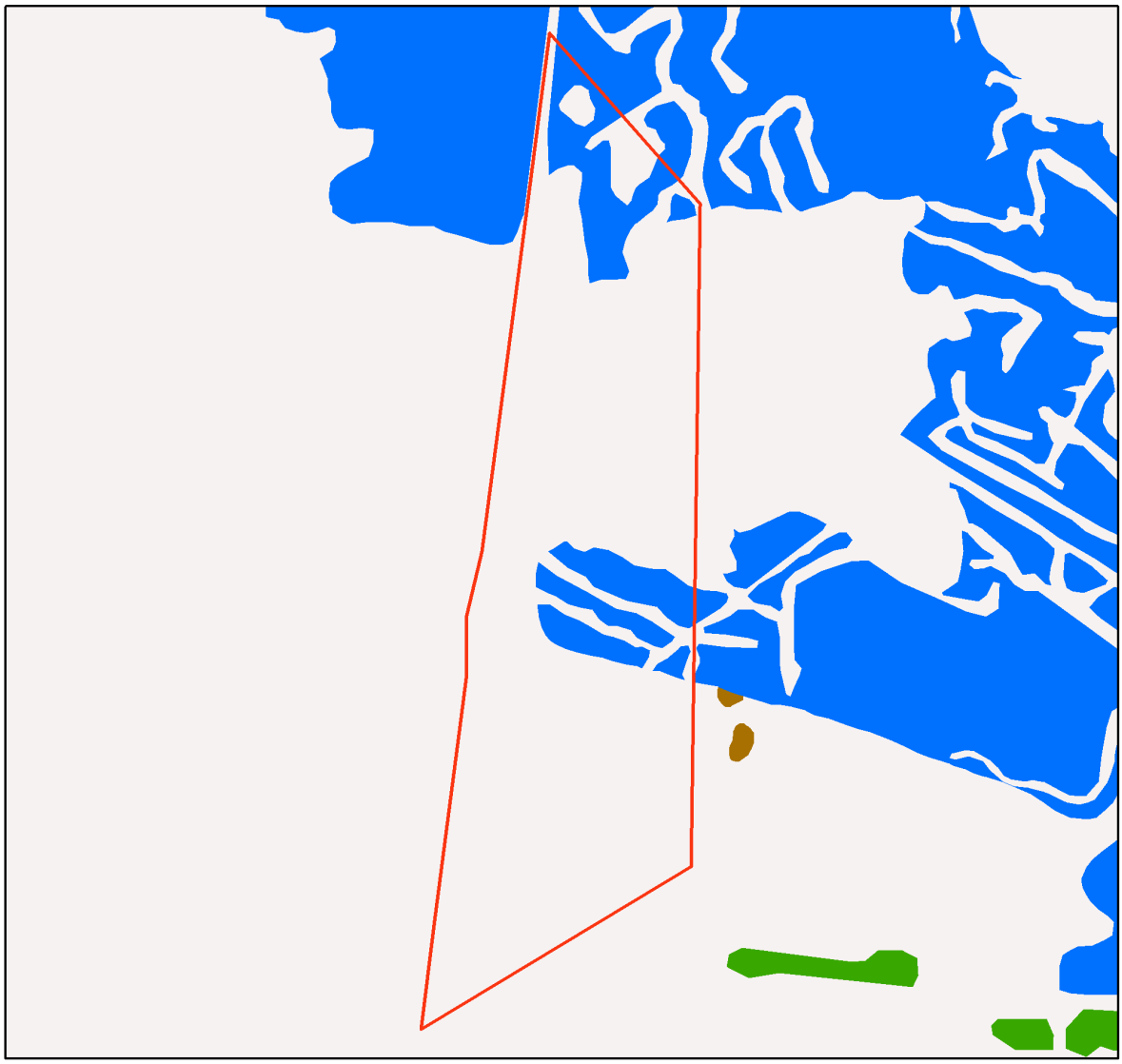
Map 2 - Biodiversity Planning Assessment (BPA)



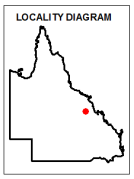
Biodiversity Planning Assessments

Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Major rivers/creeks
- Queensland

Biodiversity Planning Assessment

- State Habitat for EVNT taxa
- State
- Regional
- Local or Other Values
- Non Bioregion Ecosystem



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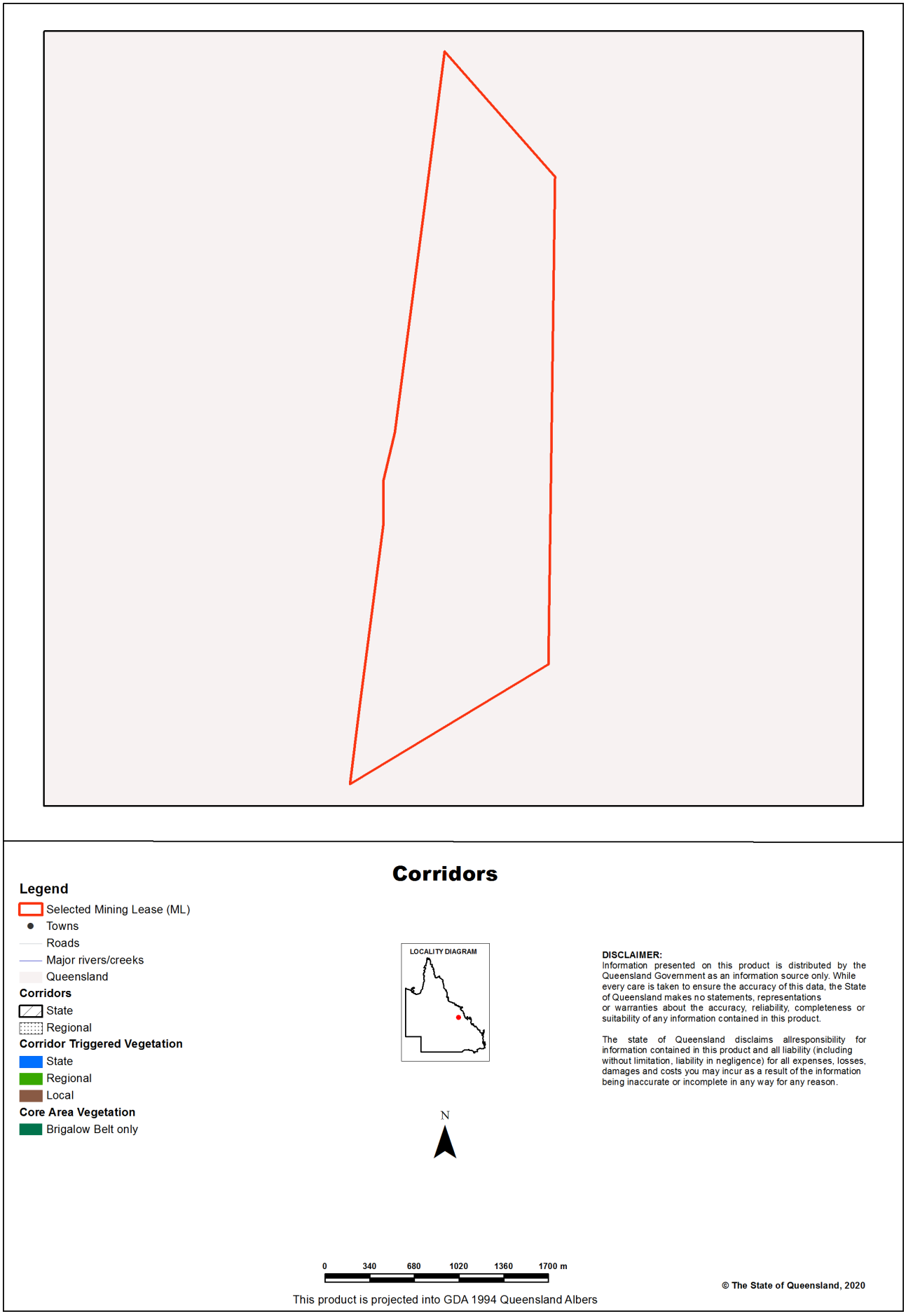
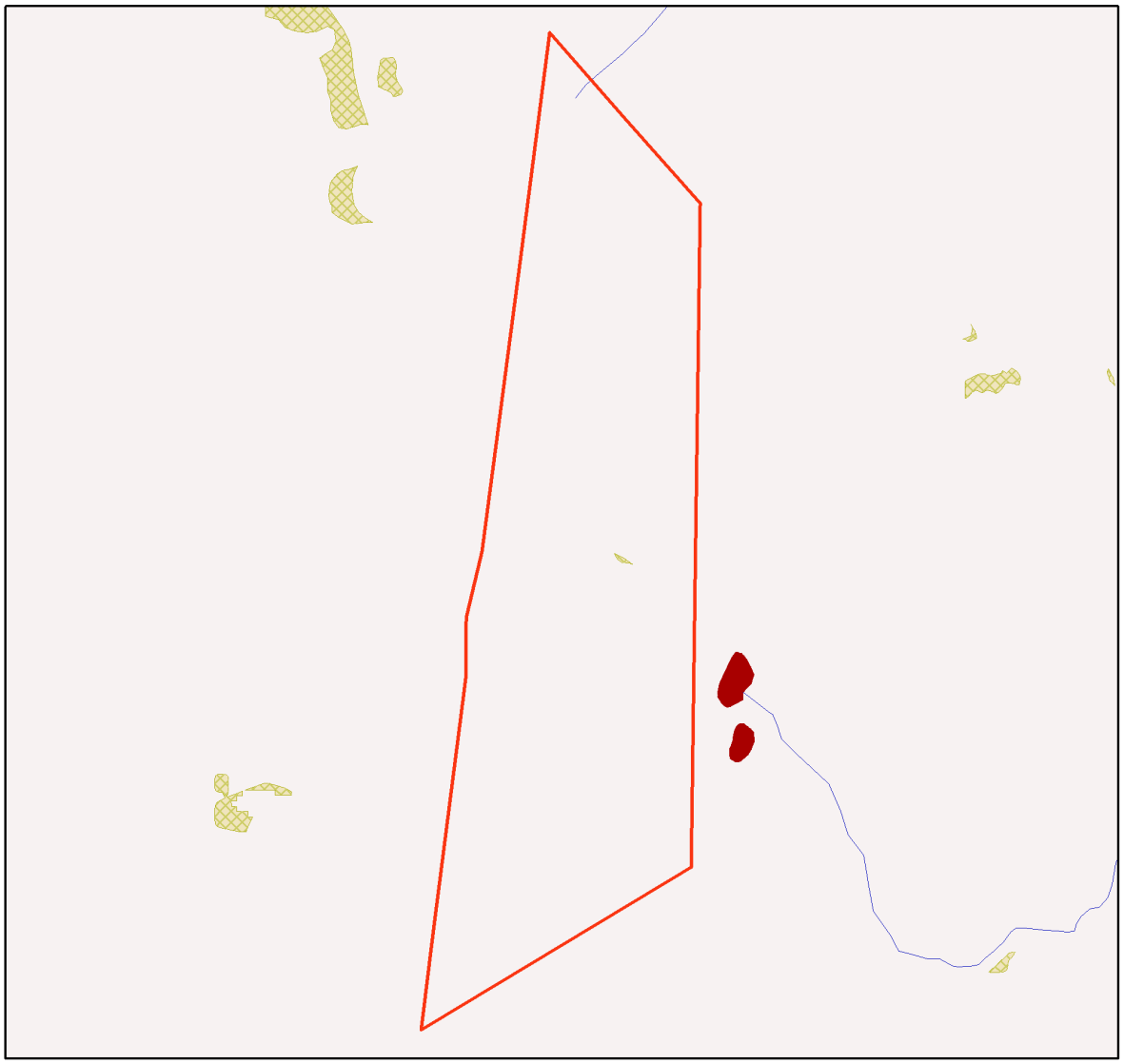
Map 3 - Corridors



Map 4 - Wetlands and waterways



Wetlands and Waterways

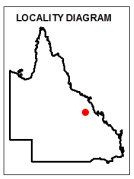
Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Springs
- Rivers/Creeks
- Directory of Important Wetlands
- Ramsar Sites - QLD
- Queensland

Wetland Type

- Marine Waterbodies
- Estuarine Waterbodies
- Riverine Waterbodies
- Lacustrine Waterbodies
- Palustrine Waterbodies
- Marine RE
- Estuarine RE
- Riverine RE
- Lacustrine RE
- Palustrine RE
- RE 51-80% wetland (mosaic units)
- RE 1-50% wetland (mosaic units)

LOCALITY DIAGRAM



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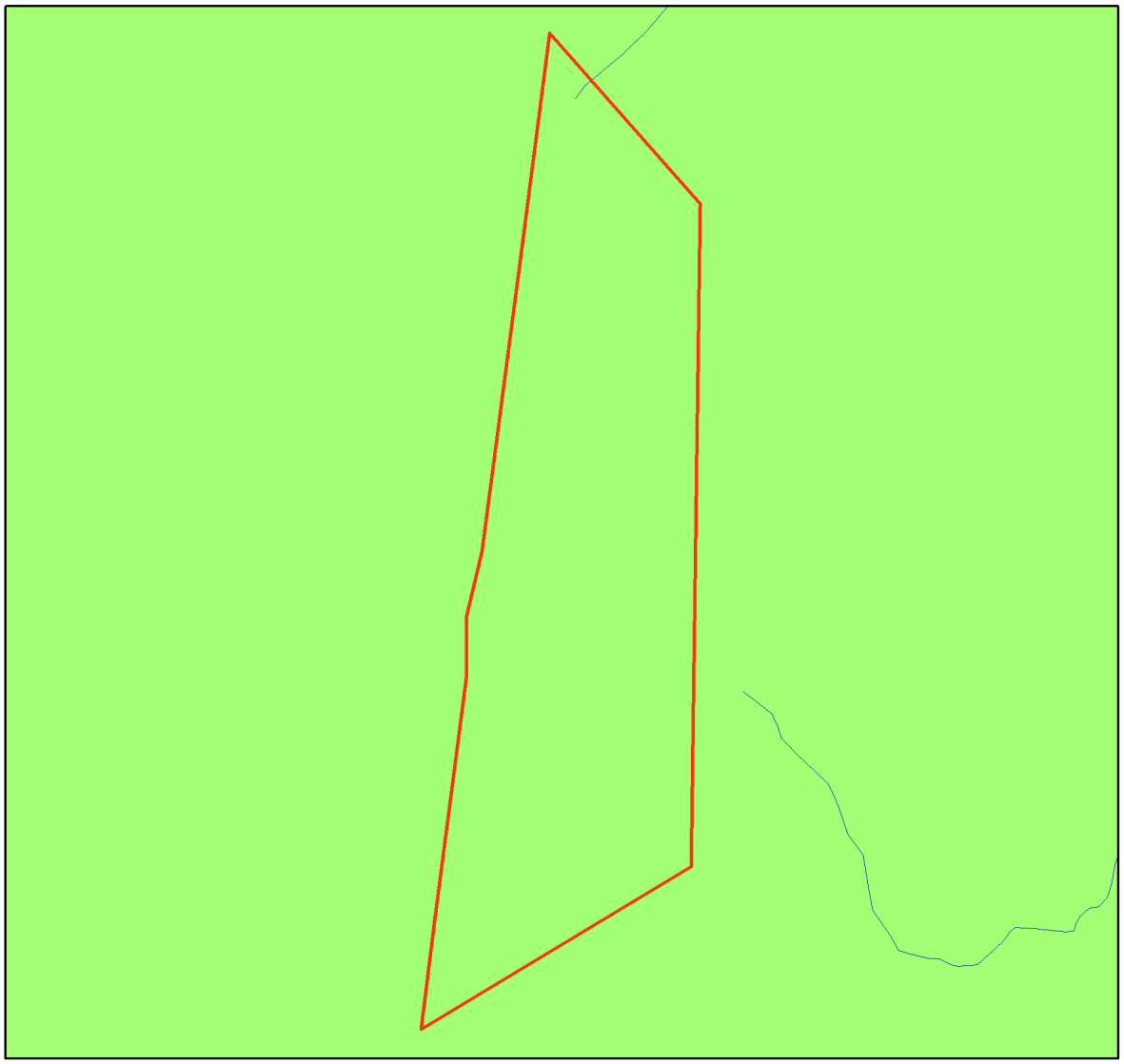
Map 5 - Aquatic Conservation Assessment (ACA) - riverine



Aquatic Conservation Assessment (ACA) - riverine

Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Rivers/Creeks
- Queensland

ACA Riverine - Subcatchment Significance

- Very High
- High
- Medium
- Low
- Very Low

LOCALITY DIAGRAM

N

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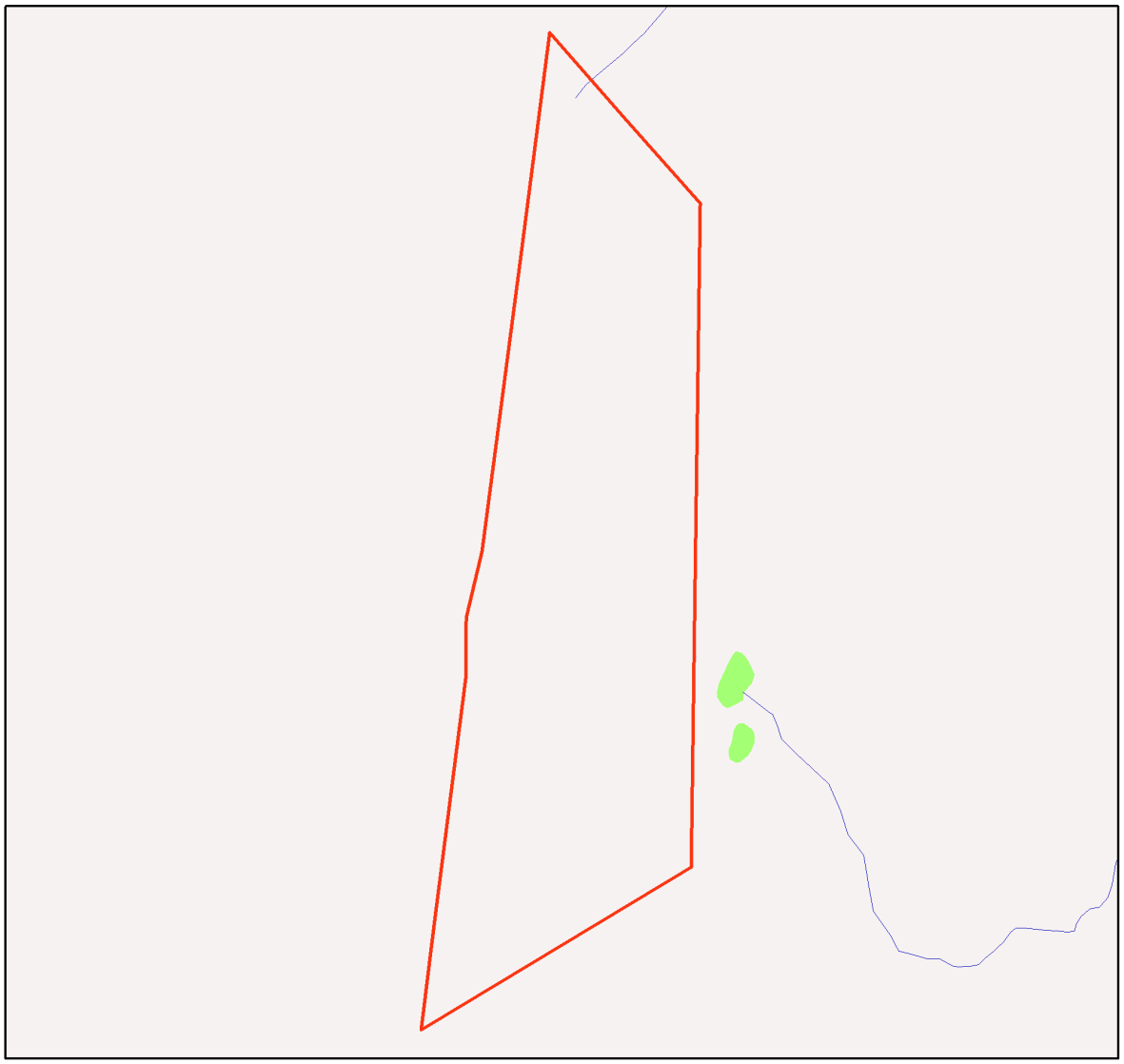
Map 6 - Aquatic Conservation Assessment (ACA) - non-riverine



Aquatic Conservation Assessment (ACA) - nonriverine

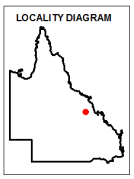
Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Rivers/Creeks
- Queensland

ACA Non-riverine

- Very High
- High
- Medium
- Low
- Very Low

LOCALITY DIAGRAM



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Appendices

Appendix 1 - Source Data

Theme	Datasets
Aquatic Conservation Assessments Non-riverine*	Combination of the following datasets: Cape York Peninsula Non-riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Non-riverine v1.3 Lake Eyre and Bulloo Basins v1.1 QMDB Non-riverine ACA v1.4 Southeast Queensland ACA v1.1 WBB Non-riverine ACA v1.1 Southern Gulf Catchments Non-riverine ACA v1.1
Aquatic Conservation Assessments Riverine*	Combination of the following datasets: Cape York Peninsula Riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Riverine v1.1 Lake Eyre and Bulloo Basins v1.1 QMDB Riverine ACA v1.4 Southeast Queensland ACA v1.1 WBB Riverine ACA v1.1 Southern Gulf Catchments Riverine ACA v1.1
Biodiversity Planning Assessments*	Combination of the following datasets: Brigalow Belt BPA v2.1 Cape York Peninsula BPA v1.1 Central Queensland Coast BPA v1.3 Channel Country BPA v1.1 Desert Uplands BPA v1.3 Einasleigh Uplands BPA v1.1 Gulf Plains BPA v1.1 Mitchell Grass Downs BPA v1.1 Mulga Lands BPA v1.4 New England Tableland v2.3 Northwest Highlands v1.1 Southeast Queensland v4.1 Wet Tropics v1.1
Statewide BPA Corridors*	Statewide corridors v1.6
Threatened Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.
BPA Priority Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.
ACA Priority Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.

***These datasets are available at:**

http://dds.information.qld.gov.au/DDS

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
ACA	- Aquatic Conservation Assessment
AQUABAMM	- Aquatic Biodiversity Assessment and Mapping Methodology
BAMM	- Biodiversity Assessment and Mapping Methodology
BoT	- Back on Track
BPA	- Biodiversity Planning Assessment
CAMBA	- China-Australia Migratory Bird Agreement
DES	- Department of Environment and Science
EPBC	- *Environment Protection and Biodiversity Conservation Act 1999*
EVNT	- Endangered, Vulnerable, Near Threatened
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
JAMBA	- Japan-Australia Migratory Bird Agreement
NCA	- *Nature Conservation Act 1992*
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
ROKAMBA	- Republic of Korea-Australia Migratory Bird Agreement

Queensland Government

Department of Environment and Science

Environmental Reports

Biodiversity and Conservation Values

Biodiversity Planning Assessments and Aquatic Conservation Assessments

For the selected area of interest
ml: 700050

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or Area of Interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "Central co-ordinates" option, the resulting assessment area encompasses an area extending from 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: biodiversity.planning@des.qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.

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Summary Information

Tables 1 to 8 provide an overview of the AOI with respect to selected topographic and environmental values.

Table 1: Area of interest details: ml: 700050

Size (ha)	4,363.69
Local Government(s)	Isaac Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Northern Bowen Basin, Isaac - Comet Downs
Catchment(s)	Fitzroy

The following table identifies available Biodiversity Planning Assessments (BPAs) and Aquatic Conservation Assessments (ACAs) with respect to the AOI.

Table 2: Available Biodiversity Planning and Aquatic Conservation Assessments

Assessment Type	Assessment Area and Version
Biodiversity Planning Assessment(s)	Brigalow Belt v2.1
Aquatic Conservation Assessment(s) (riverine)	Great Barrier Reef Catchments v1.1
Aquatic Conservation Assessment(s) (non-riverine)	Great Barrier Reef Catchments v1.3

Table 3: Remnant regional ecosystems within the AOI as per the Qld Herbarium's 'biodiversity status'

Biodiversity Status	Area (Ha)	% of AOI
Endangered	34.28	0.79
Of concern	8.86	0.2
No concern at present	203.64	4.67

The following table identifies the extent and proportion of the user specified area of interest (AOI) which is mapped as being of "State", "Regional" or "Local" significance via application of the Queensland Department of Environment and Science's *Biodiversity Assessment and Mapping Methodology* (BAMM).

Table 4: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	2.4	0.05
State	248.64	5.7
Regional	5.95	0.14
Local or Other Values	0.0	0.0

Table 5: Non-riverine wetlands intersecting the AOI

Non-riverine wetland types intersecting the area of interest	#
Number of Palustrine wetlands	1
Number of Lacustrine wetlands	0
Total number of non-riverine wetlands	1

NB. The figures presented in the table above are derived from the relevant non-riverine Aquatic Conservation Assessment(s). Later releases of wetland mapping produced via the Queensland Wetland Mapping Program may provide more recent information in regards to wetland extent.

Table 6: Named waterways intersecting the AOI

(no results)

Refer to **Map 1** for general locality information.

The following two tables identify the extent and proportion of the user specified AOI which is mapped as being of "Very High", "High", "Medium", "Low", or "Very Low" aquatic conservation value for riverine and non-riverine wetlands via application of the Queensland Department of Environment and Science's *Aquatic Biodiversity Assessment and Mapping Method* (AquaBAMM).

Table 7: Summary table, aquatic conservation significance (riverine)

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	4,363.85	100.0
Low	0.0	0.0
Very Low	0.0	0.0

Table 8: Summary table, aquatic conservation significance (non-riverine)

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	2.84	0.07
Low	0.0	0.0
Very Low	0.0	0.0

Biodiversity Planning Assessments

Introduction

The Department of Environment and Science (DES) attributes biodiversity significance on a bioregional scale through a Biodiversity Planning Assessment (BPA). A BPA involves the integration of ecological criteria using the *Biodiversity assessment and Mapping Methodology* (BAMM) and is developed in two stages: 1) **diagnostic criteria**, and 2) **expert panel criteria**. The diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion, while the expert panel criteria allows for the refinement of the mapped information from the diagnostic output by incorporating local knowledge and expert opinion.

The BAMM methodology has application for identifying areas with various levels of significance solely for biodiversity reasons. These include threatened ecosystems or taxa, large tracts of habitat in good condition, ecosystem diversity, landscape context and connection, and buffers to wetlands or other types of habitat important for the maintenance of biodiversity or ecological processes. While natural resource values such as dryland salinity, soil erosion potential or land capability are not dealt with explicitly, they are included to some extent within the biodiversity status of regional ecosystems recognised by the DES.

Biodiversity Planning Assessments (BPAs) assign three levels of overall biodiversity significance.

- **State significance** - areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed by other studies/processes as being significant at national or international scales. In addition, areas flagged as being of State significance due to the presence of endangered, vulnerable and/or near threatened taxa, are identified as "State Habitat for EVNT taxa".
- **Regional significance** - areas assessed as being significant for biodiversity at the subregional scale. These areas have lower significance for biodiversity than areas assessed as being of State significance.
- **Local significance and/or other values** - areas assessed as not being significant for biodiversity at state or regional scales. Local values are of significance at the local government scale.

For further information on released BPAs and a copy of the underlying methodology, go to:

http://www.qld.gov.au/environment/plants-animals/biodiversity/planning/

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

http://qspatial.information.qld.gov.au/geoportal/

The following table identifies the extent and proportion of the user specified AOI which is mapped as being of "State", "Regional" or "Local" significance via application of the BAMM.

Table 9: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	2.4	0.05
State	248.64	5.7
Regional	5.95	0.14
Local or Other Values	0.0	0.0

Refer to **Map 2** for further information.

Diagnostic Criteria

Diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion. These criteria are diagnostic in that they are used to filter the available data and provide a "first-cut" or initial determination of biodiversity significance. This initial assessment is then combined through a second group of other essential criteria.

A description of the individual diagnostic criteria is provided in the following sections.

Criteria A. Habitat for EVNT taxa: Classifies areas according to their significance based on the presence of endangered, vulnerable and/or rare (EVNT) taxa. EVNT taxa are those scheduled under the *Nature Conservation Act 1992* and/or the

Environment Protection and Biodiversity Conservation Act 1999. It excludes highly mobile fauna taxa which are instead considered in Criterion H and brings together information on EVNT taxa using buffering of recorded sites or habitat suitability models (HSM) where available.

Criteria B. Ecosystem value: Classifies on the basis of biodiversity status of regional ecosystems, their extent in protected areas (presence of poorly conserved regional ecosystems), the presence of significant wetlands; and areas of national importance such as the presence of Threatened Ecological Communities, World Heritage areas and Ramsar sites. Ecosystem value is applied at a bioregional (**B1**) and regional (**B2**) scale.

Criteria C. Tract size: Measures the relative size of tracts of vegetation in the landscape. The size of any tract is a major indicator of ecological significance, and is also strongly correlated with the long-term viability of biodiversity values. Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts.

Criteria D. Relative size of regional ecosystems: Classifies the relative size of each regional ecosystem unit within its bioregion (**D1**) and its subregion (**D2**). Remnant units are compared with all other occurrences with the same regional ecosystem. Large examples of a regional ecosystem are more significant than smaller examples of the same regional ecosystem because they are more representative of the biodiversity values particular to the regional ecosystem, are more resilient to the effects of disturbance, and constitute a significant proportion of the total area of the regional ecosystem.

Criteria F. Ecosystem diversity: Is an indicator of the number of regional ecosystems occurring within an area. An area with high ecosystem diversity will have many regional ecosystems and ecotones relative to other areas within the bioregion.

Criteria G. Context and connection: Represents the extent to which a remnant unit incorporates, borders or buffers areas such as significant wetlands, endangered ecosystems; and the degree to which it is connected to other vegetation.

A summary of the biodiversity status based upon the diagnostic criteria is provided in the following table.

Table 10: Summary of biodiversity significance based upon diagnostic criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Nat. Threatened Ecol. Community (B1)	0.58	0.01
State	Remnant contains at least 1 Endangered or 2 Vulnerable or Near Threatened species (A) & Nat. Threatened Ecol. Community (B1)	2.4	0.05
State	Remnant contains at least 1 Endangered RE (B1) & Nat. Threatened Ecol. Community (B1)	58.91	1.35
State	Remnant contains at least 1 Vulnerable or Near Threatened species (A) & Nat. Threatened Ecol. Community (B1)	188.97	4.33
Regional	Remnant contains at least 1 Vulnerable or Near Threatened species (A)	3.28	0.08
Regional	Remnant contains at least one Of Concern RE (B1)	2.84	0.07

Assessment of diagnostic criteria with respect to the AOI

The following table reflects an assessment of the individual diagnostic criteria noted above in regards to the AOI.

Table 11: Assessment of individual diagnostic criteria with respect to the AOI

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
A: Habitat for EVNT Taxa	2.4	0.1	250.01	5.7	4.6	0.1		
B1: Ecosystem Value (Bioregion)	250.89	5.7	2.84	0.1				
B2: Ecosystem Value (Subregion)	47.47	1.1	197.97	4.5	8.29	0.2		
C: Tract Size	23.33	0.5	27.05	0.6	196.29	4.5	7.06	0.2
D1: Relative RE Size (Bioregion)							253.73	5.8
D2: Relative RE Size (Subregion)					9.18	0.2	244.55	5.6
F: Ecosystem Diversity	23.33	0.5	1.37		48.8	1.1	180.23	4.1
G: Context and Connection	47.83	1.1	24.54	0.6	181.36	4.2		

Other Essential Criteria

Other essential criteria (also known as expert panel criteria) are based on non-uniform information sources and which may rely more upon expert opinion than on quantitative data. These criteria are used to provide a "second-cut" determination of biodiversity significance, which is then combined with the diagnostic criteria for an overall assessment of relative biodiversity significance. A summary of the biodiversity status based upon the other essential criteria is provided in the following table.

Table 12: Summary of biodiversity significance based upon other essential criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I) & Remnant forms part of a bioregional corridor (J)	0.17	0.0
State	Remnant forms part of a bioregional corridor (J)	1.12	0.03
Regional	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	227.25	5.21
Local	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	2.67	0.06

A description of each of the other essential criteria and associated assessment in regards to the AOI is provided in the following sections.

Criteria H. Essential and general habitat for priority taxa: Priority taxa are those which are at risk or of management concern, taxa of scientific interest as relictual (ancient or primitive), endemic taxa or locally significant populations (such as a flying fox camp or heronry), highly specialised taxa whose habitat requirements are complex and distributions are not well correlated with any particular regional ecosystem, taxa important for maintaining genetic diversity (such as complex spatial patterns of genetic variation, geographic range limits, highly disjunct populations), taxa critical for management or monitoring of biodiversity (functionally important or ecological indicators), or economic and culturally important taxa.

Criteria I. Special biodiversity values: areas with special biodiversity values are important because they contain multiple taxa in a unique ecological and often highly biodiverse environment. Areas with special biodiversity values can include the following:

- Ia - centres of endemism - areas where concentrations of taxa are endemic to a bioregion or subregion are found.
- Ib - wildlife refugia (Morton *et al*. 1995), for example, islands, mound springs, caves, wetlands, gorges, mountain ranges and topographic isolates, ecological refuges, refuges from exotic animals, and refuges from clearing. The latter may include large areas that are not suitable for clearing because of land suitability/capability.
- Ic - areas with concentrations of disjunct populations.
- Id - areas with concentrations of taxa at the limits of their geographic ranges.
- Ie - areas with high species richness.
- If - areas with concentrations of relictual populations (ancient and primitive taxa).
- Ig - areas containing REs with distinct variation in species composition associated with geomorphology and other environmental variables.
- Ih - an artificial waterbody or managed/manipulated wetland considered by the panel/s to be of ecological significance.
- Ii - areas with a high density of hollow-bearing trees that provide habitat for animals.
- Ij - breeding or roosting sites used by a significant number of individuals.
- Ik - climate change refuge.

The following table identifies the value and extent area of the Other Essential Criteria H and I within the AOI.

Table 13: Relative importance of expert panel criteria (H and I) used to access overall biodiversity significance with respect to the AOI

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
H: Core Habitat Priority Taxa								
Ia: Centres of Endemism								
Ib: Wildlife Refugia			227.27	5.2	2.84	0.1		

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
Ic: Disjunct Populations								
Id: Limits of Geographic Ranges								
Ie: High Species Richness								
If: Relictual Populations								
Ig: Variation in Species Composition								
Ih: Artificial Wetland								
Ii: Hollow Bearing Trees								
Ij: Breeding or Roosting Site								
Ik: Climate Refugia								

NB. Whilst biodiversity values associated with Criteria I may be present within the site (refer to tables 12 and 15), for the New England Tableland and Central Queensland Coast BPAs, area and % area figures associated with Criteria Ia through to Ij cannot be listed in the table above (due to slight variations in data formats between BPAs).

Criteria J. Corridors: areas identified under this criterion qualify either because they are existing vegetated corridors important for contiguity, or cleared areas that could serve this purpose if revegetated. Some examples of corridors include riparian habitats, transport corridors and "stepping stones".

Bioregional and subregional conservation corridors have been identified in the more developed bioregions of Queensland through the BPAs, using an intensive process involving expert panels. Map 3 displays the location of corridors as identified under the Statewide Corridor network. The Statewide Corridor network incorporates BPA derived corridors and for bioregions where no BPA has been assessed yet, corridors derived under other planning processes. *Note: as a result of updating and developing a statewide network, the alignment of corridors may differ slightly in some instances when compared to those used in individual BPAs.*

The functions of these corridors are:

- **Terrestrial** Bioregional corridors, in conjunction with large tracts of remnant vegetation, maintain ecological and evolutionary processes at a landscape scale, by:

  • Maintaining long term evolutionary/genetic processes that allow the natural change in distributions of species and connectivity between populations of species over long periods of time;

  • Maintaining landscape/ecosystems processes associated with geological, altitudinal and climatic gradients, to allow for ecological responses to climate change;

  • Maintaining large scale seasonal/migratory species processes and movement of fauna;

  • Maximising connectivity between large tracts/patches of remnant vegetation;

  • Identifying key areas for rehabilitation and offsets; and

- **Riparian** Bioregional Corridors also maintain and encourage connectivity of riparian and associated ecosystems.

The location of the corridors is determined by the following principles:

- Terrestrial

  • Complement riparian landscape corridors (i.e. minimise overlap and maximise connectivity);

  • Follow major watershed/catchment and/or coastal boundaries;

- Incorporate major altitudinal/geological/climatic gradients;
- Include and maximise connectivity between large tracts/patches of remnant vegetation;
- Include and maximise connectivity between remnant vegetation in good condition; and

- Riparian
  - Located on the major river or creek systems within the bioregion in question.

The total extent of remnant vegetation triggered as being of "State", "Regional" or "Local" significance due to the presence of an overlying BPA derived terrestrial or riparian corridor within the AOI, is provided in the following table. For further information on how remnant vegetation is triggered due to the presence of an overlying BPA derived corridor, refer to the relevant landscape BPA expert panel report(s).

Table 14: Extent of triggered remnant vegetation due to the presence of BPA derived corridors with respect to the AOI

Biodiversity Significance	Area (Ha)	% of AOI
State	1.29	0.03
Regional	0.0	0.0
Local	0.0	0.0

NB: area figures associated with the extent of corridor triggered remnant vegetation are only available for those bioregions where a BPA has been undertaken.

Refer to **Map 3** for further information.

Threatening process/condition (Criteria K) - areas identified by experts under this criterion may be used to amend (upgrade or downgrade) biodiversity significance arising from the "first-cut" analysis. The condition of remnant vegetation is affected by threatening processes such as weeds, ferals, grazing and burning regime, selective timber harvesting/removal, salinity, soil erosion, and climate change.

Assessment of Criteria K with respect to the AOI is not currently included in the "Biodiversity and Conservation Values" report, as it has not been applied to the majority of Queensland due to data/information limitations and availability.

Special Area Decisions

Expert panel derived "Special Area Decisions" are used to assign values to Other Essential Criteria. The specific decisions which relate to the AOI in question are listed in the table below.

Table 15: Expert panel decisions for assigning levels of biodiversity significance with respect to the AOI

Decision Number	Description	Panel Recommended Significance	Criteria Values
brbn_l_18a	None	None	None
brbn_l_89	Relictual subregions (less than 30% remnant vegetation) - remnant vegetation	Regional	Ib (refugia): VH
brbn_l_93	Locally significant natural palustrine & lacustrine wetlands	Local	Ib (refugia): M

Expert panel decision descriptions:

brbn_l_18a

None

brbn_l_89

A summary of research on landscape thresholds for remnant vegetation is provided by James Saunders (2001). The evidence suggests that once remnant vegetation falls below 30%, there are significant declines in biodiversity.

The following subregions have less than 30% remnant vegetation in the southern Brigalow Belt: Relictual subregions (less than 30% remnant vegetation remaining) for the Brigalow Belt include; Upper Belyando Flood out (11.8), Isaac - Comet Downs (11.11), Callide Creek Downs (11.19), Dawson River Downs (11.21), Taroom Downs (11.25), Dulacca Downs (11.28), Weribone High (11.29), Tara Downs (11.30), Eastern Darling Downs (11.31), Moonie R. - Commoron Creek Floodout (11.33), Moonie - Barwon Interfluve (11.34), Warrambool - Moonie (11.35), Macintyre - Weir Fan (11.36), Narrandool (11.38).

Remnant vegetation provides a refuge from clearing in fragmented subregions and should be retained to maintain biodiversity.

Refer to brbs_l_15 for the southern BRB implementation of this decision.

brbn_l_93

The panel considered that relatively natural palustrine and lacustrine wetlands and waterbodies within the Brigalow Belt bioregion act as important refugia, especially during periods of drought.

Whilst State significant wetlands are captured under Criterion B1, and regionally significant wetlands under the decision brbn_l_92, the panel agreed that all remaining relatively natural wetland complexes of less than 5ha in size be classed as being of at least local significance.

Refer to brbn_l_48 for the southern BRB implementation of this decision.

Aquatic Conservation Assessments

Introduction

The Aquatic Biodiversity Assessment and Mapping Method or AquaBAMM (Clayton *et al.* 2006), was developed to assess conservation values of wetlands in queensland, and may also have application in broader geographical contexts. It is a comprehensive method that uses available data, including data resulting from expert opinion, to identify relative wetland conservation/ecological values within a specified study area (usually a catchment). The product of applying this method is an Aquatic Conservation Assessment (ACA) for the study area.

An ACA using AquaBAMM is non-social, non-economic and identifies the conservation/ecological values of wetlands at a user-defined scale. It provides a robust and objective conservation assessment using criteria, indicators and measures that are founded upon a large body of national and international literature. The criteria, each of which may have variable numbers of indicators and measures, are naturalness (aquatic), naturalness (catchment), diversity and richness, threatened species and ecosystems, priority species and ecosystems, special features, connectivity and representativeness. An ACA using AquaBAMM is a powerful decision support tool that is easily updated and simply interrogated through a geographic information system (GIS).

Where they have been conducted, ACAs can provide a source of baseline wetland conservation/ecological information to support natural resource management and planning processes. They are useful as an independent product or as an important foundation upon which a variety of additional environmental and socio-economic elements can be added and considered (i.e. an early input to broader 'triple-bottom-line' decision-making processes). An ACA can have application in:

- determining priorities for protection, regulation or rehabilitation of wetlands and other aquatic ecosystems
- on-ground investment in wetlands and other aquatic ecosystems
- contributing to impact assessment of large-scale development (e.g. dams)
- water resource and strategic regional planning prcesses

For a detailed explanation of the methodology please refer to the summary and expert panel reports relevant to the ACA utilised in this assessment. These reports can be accessed at Wetland *Info*:

http://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

http://qspatial.information.qld.gov.au/geoportal/

Explanation of Criteria

Under the AquaBAMM, eight criteria are assessed to derive an overall conservation value. Similar to the Biodiversity Assessment and Mapping Methodology, the criteria may be primarily diagnostic (quantitative) or primarily expert opinion (qualitative) in nature. The following sections provide a brief description of each of the 8 criteria.

Criteria 1. Naturalness - Aquatic: This attribute reflects the extent to which a wetland's (riverine, non-riverine, estuarine) aquatic state of naturalness is affected through relevant influencing indicators which include: presence of exotic flora and fauna; presence of aquatic communities; degree of habitat modification and degree of hydrological modification.

Criteria 2. Naturalness - Catchment: The naturalness of the terrestrial systems of a catchment can have an influence on many wetland characteristics including: natural ecological processes e.g. nutrient cycling, riparian vegetation, water chemistry, and flow. The indicators utilised to assess this criterion include: presence of exotic flora and/or fauna; riparian, catchment and flow modification.

Criteria 3. Naturalness - Diversity and Richness: This criterion is common to many ecological assessment methods and can include both physical and biological features. It includes such indicators as species richness, riparian ecosystem richness and geomorphological diversity.

Criteria 4. Threatened Species and Ecosystems: This criterion evaluates ecological rarity characteristics of a wetland. This includes both species rarity and rarity of communities / assemblages. The communities and assemblages are best represented by regional ecosystems. Species rarity is determined by NCA and EPBC status with Endangered, Vulnerable or Near-threatened species being included in the evaluation. Ecosystem rarity is determined by regional ecosystem biodiversity status i.e. Endangered, Of Concern, or Not of Concern.

Criteria 5. Priority Species and Ecosystems: Priority flora and fauna species lists are expert panel derived. These are aquatic, semi-aquatic and riparian species which exhibit at least 1 particular trait in order to be eligible for consideration. For

flora species the traits included:

- It forms significant macrophyte beds (in shallow or deep water).
- It is an important food source.
- It is important/critical habitat.
- It is implicated in spawning or reproduction for other fauna and/or flora species.
- It is at its distributional limit or is a disjunct population.
- It provides stream bank or bed stabilisation or has soil binding properties.
- It is a small population and subject to threatening processes.

Fauna species are included if they meet at least one of the following traits:

- It is endemic to the study area (>75 per cent of its distribution is in the study area/catchment).
- It has experienced, or is suspected of experiencing, a serious population decline.
- It has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area/catchment.
- It is currently a small population and threatened by loss of habitat.
- It is a significant disjunct population.
- It is a migratory species (other than birds).
- A significant proportion of the breeding population (>one per cent for waterbirds, >75 per cent other species) occurs in the waterbody (see Ramsar criterion 6 for waterbirds).
- Limit of species range.

See the individual expert panel reports for the priority species traits specific to an ACA.

Criteria 6. Special Features: Special features are areas identified by flora, fauna and ecology expert panels which exhibit characteristics beyond those identified in other criteria and which the expert panels consider to be of the highest ecological importance. Special feature traits can relate to, but are not solely restricted to geomorphic features, unique ecological processes, presence of unique or distinct habitat, presence of unique or special hydrological regimes e.g. spring-fed streams. Special features are rated on a 1 - 4 scale (4 being the highest).

Criteria 7. Connectivity: This criterion is based on the concept that appropriately connected aquatic ecosystems are healthy and resilient, with maximum potential biodiversity and delivery of ecosystem services.

Criteria 8. Representativeness: This criterion applies primarily to non-riverine assessments, evaluates the rarity and uniqueness of a wetland type in relation to specific geographic areas. Rarity is determined by the degree of wetland protection within "protected Areas" estate or within an area subject to the *Fisheries Act 1994*, *Coastal Protection and Management Act 1995*, or *Marine Parks Act 2004*. Wetland uniqueness evaluates the relative abundance and size of a wetland or wetland management group within geographic areas such as catchment and subcatchment.

Riverine Wetlands

Riverine wetlands are all wetlands and deepwater habitats within a channel. The channels are naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water. AquaBAMM, when applied to riverine wetlands uses a discrete spatial unit termed subsections. A subsection can be considered as an area which encompasses discrete homogeneous stream sections in terms of their natural attributes (i.e. physical, chemical, biological and utilitarian values) and natural resources. Thus in an ACA, an aquatic conservation significance score is calculated for each subsection and applies to all streams within a subsection, rather than individual streams as such.

Please note, the area figures provided in Tables 16 and 17, are derived using the extent of riverine subsections within the AOI. Refer to **Map 5** for further information. A summary of the conservation significance of riverine wetlands within the AOI is provided in the following table.

Table 16: Overall level/s of riverine aquatic conservation significance

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
High	0.0	0.0
Medium	4,363.85	100.0
Low	0.0	0.0
Very Low	0.0	0.0

The individual aquatic conservation criteria ratings for riverine wetlands within the AOI are listed below.

Table 17: Level/s of riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic					4,363.85	100.0		
2. Naturalness catchment	1,344.69	30.8	3,019.16	69.2				
3. Diversity and richness			3,019.16	69.2	1,344.69	30.8		
4. Threatened species and ecosystems			4,363.85	100.0				
5. Priority species and ecosystems	1,732.99	39.7	1,286.17	29.5				
6. Special features								
7. Connectivity					3,077.68	70.5	1,286.17	29.5
8. Representative-ness								

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to riverine wetlands within the AOI.

Table 18: Expert panel decisions for assigning overall levels of riverine aquatic conservation significance

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
(No Records)				

4 is the highest rating/value

Expert panel decision descriptions:

(No Records)

Non-riverine Wetlands

Non-riverine wetlands include both lacustrine and palustrine wetlands, however, do not currently incorporate estuarine, marine or subterranean wetland types. A summary of the conservation significance of non-riverine wetlands within the AOI is provided in the following table. Refer to **Map 6** for further information.

Table 19: Overall level/s of non-riverine aquatic conservation significance

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	2.84	0.07
Low	0.0	0.0
Very Low	0.0	0.0

The following table provides an assessment of non-riverine wetlands within the AOI and associated aquatic conservation criteria values.

Table 20: Level/s of non-riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic	2.84	0.1						
2. Naturalness catchment			2.84	0.1				
3. Diversity and richness					2.84	0.1		
4. Threatened species and ecosystems			2.84	0.1				
5. Priority species and ecosystems			2.84	0.1				
6. Special features								
7. Connectivity								
8. Representative-ness					2.84	0.1		

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to non-riverine wetlands within the AOI.

Table 21: Expert panel decisions for assigning overall levels of non-riverine aquatic conservation significance.

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
is_nr_fl_01	Regional Ecosystems 8.3.4 and 11.3.27	Isaac	5.2.1	3

4 is the highest rating/value

Expert panel decision descriptions:

is_nr_fl_01

These regional ecosystems contain significant habitat values that are under threat from threatening processes such as physical alteration/ destruction and invasion by **hymenachne**.

Note: This priority ecosystem decision applies to the following catchments: Calliope, Comet, Dawson, Fitzroy, Isaac, Mackenzie, Misc Other Islands, Nogoa, O'Connell, Pioneer, Plane, Proserpine, Shoalwater, Styx and Waterpark.

Threatened and Priority Species

Introduction

This chapter contains a list of threatened and priority flora and/or fauna species that have been recorded on, or within 4km of the Assessment Area.

The information presented in this chapter with respect to species presence is derived from compiled databases developed primarily for the purpose of BPAs and ACAs. Data is collated from a number of sources and is updated periodically.

It is important to note that the list of species provided in this report, may differ when compared to other reports generated from other sources such as the State government's WildNet, Herbrecs or the federal government's EPBC database for a number of reasons.

Records for threatened and priority species are filtered and checked based on a number of rules including:

- Taxonomic nomenclature - current scientific names and status,
- Location - cross-check co-ordinates with location description,
- Taxon by location - requires good knowledge of the taxon and history of the record,
- Duplicate records - identify and remove,
- Expert panels - check records and provide new records,
- Flora cultivated records excluded,
- Use precise records less than or equal to 2000m,
- Use recent records greater than or equal to 1975 animals, greater than or equal to 1950 plants.

Threatened Species

Threatened species are those species classified as "Endangered" or "Vulnerable" under the *Environment Protection and Biodiversity Conservation Act 1999* or "Endangered", "Vulnerable" or "Near threatened" under the *Nature Conservation Act 1992*.

The following threatened species have been recorded on, or within approximately 4km of the AOI.

Table 22: Threatened species recorded on, or within 4km of the AOI

Species	Common name	NCA status	EPBC status	Back on Track rank	Migratory species*	Wetland species**	Identified flora/fauna
Geophaps scripta scripta	squatter pigeon (southern subspecies)	V	V	Medium			FA
Petauroides volans	greater glider	V	V	Low			FA
Phascolarctos cinereus	koala	V	V	Low			FA
Rostratula australis	Australian painted snipe	E	E	Medium		Y	FA
Solanum adenophorum		E		High			FL

NB. Please note that the threatened species listed in this section are based upon the most recently compiled DES internal state-wide threatened species dataset. This dataset may contain additional records that were not originally available for inclusion in the relevant individual BPAs and ACAs.

**JAMBA - Japan-Australia Migratory Bird Agreement; CAMBA - China-Australia Migratory Bird Agreement; ROKAMBA - Republic of Korea-Australia Migratory Bird Agreement; CMS - Convention on the Conservation of Migratory Species*.

***Y - wetland indicator species*.

BPA Priority Species

A list of BPA priority species that have been recorded on, or within approximately 4km of the AOI is contained in the following table.

Table 23: Priority species recorded on, or within 4km of the AOI

Species	Common name	Back on Track rank	Identified flora/fauna
Carlia rubigo	Orange-flanked Rainbow Skink	None	FA

NB. Please note that the list of priority species is based on those species identified in the BPAs, however records for these species may be more recent than the originals used. furthermore, the BPA priority species databases are updated from time to time. At each update, the taxonomic details for all species are amended as necessary to reflect current taxonomic name and/or status changes.

ACA Priority Species

A list of ACA priority species used in riverine and non-riverine ACAs that have been recorded on, or within approximately 4km of the AOI are contained in the following tables.

Table 24: Priority species recorded on, or within 4 km of the AOI - riverine

(no results)

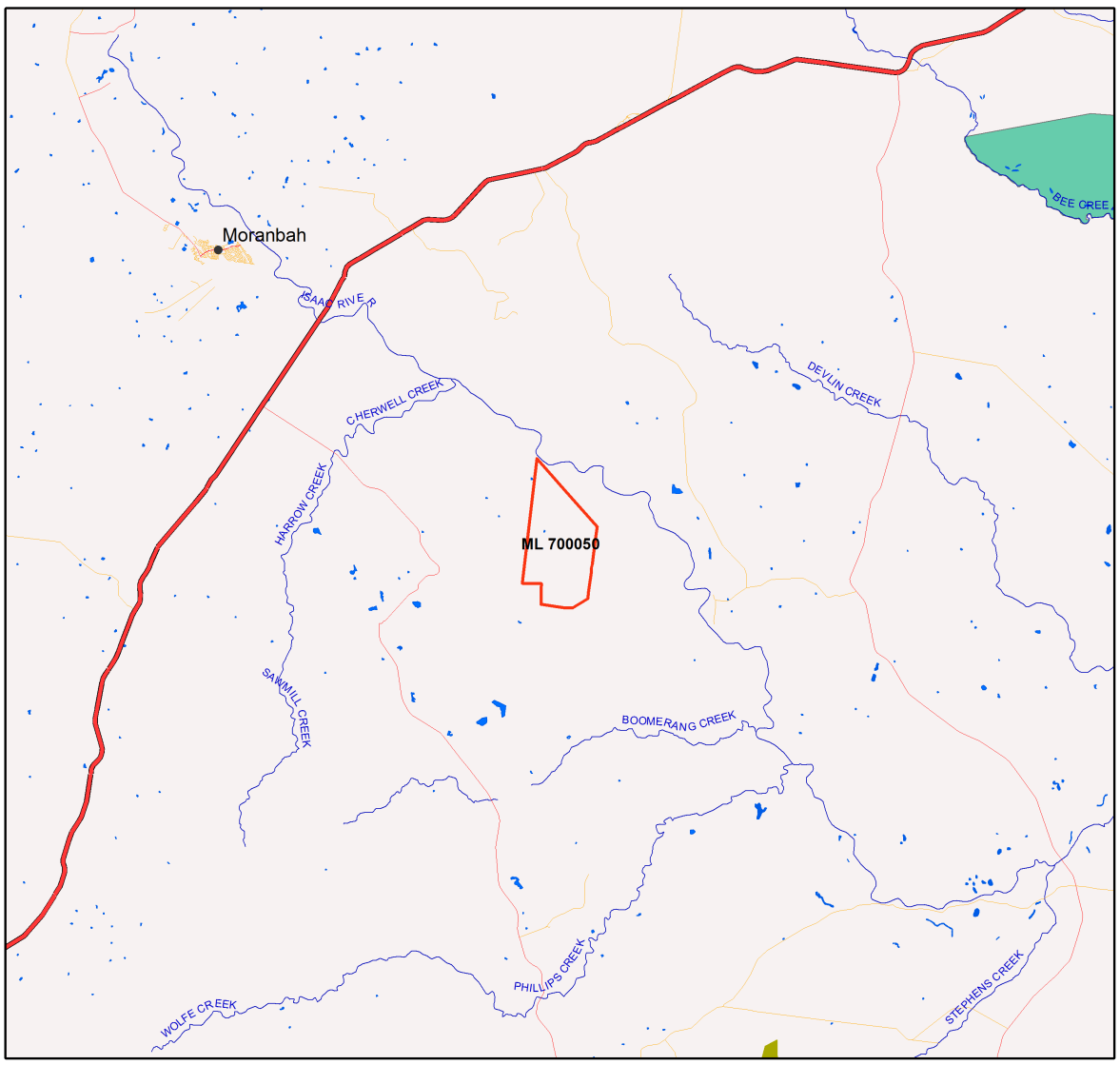
Table 25: Priority species recorded on, or within 4 km of the AOI - non-riverine

(no results)

NB. Please note that the priority species records used in the above two tables are comprised of those adopted for the released individual ACAs. The ACA riverine and non-riverine priority species databases are updated from time to time to reflect new release of ACAs. At each update, the taxonomic details for all ACAs records are amended as necessary to reflect current taxonomic name and/or status changes.

Maps

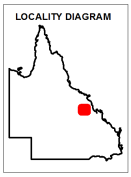
Map 1 - Locality Map



Locality Map

Legend

- Selected Mining Lease (ML)
- Towns
- Highway
- Connector
- Street/Local Road
- Reservoirs
- Lakes
- National Park (Scientific)
- National Park
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Coordinated Conservation Areas
- Major rivers/creeks
- Queensland



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0 4600 9200 13800 18400 23000 m

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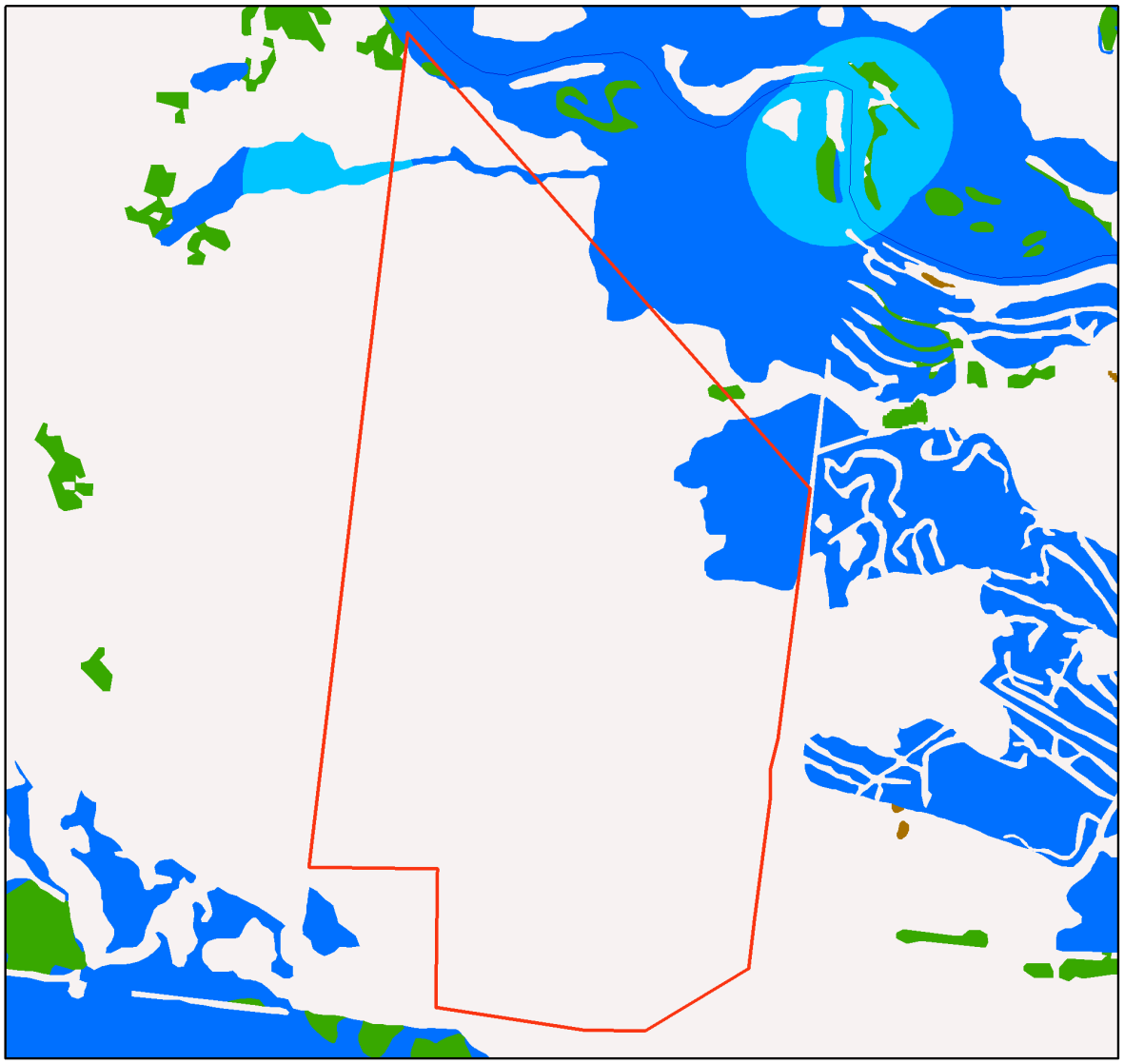
Map 2 - Biodiversity Planning Assessment (BPA)



Biodiversity Planning Assessments

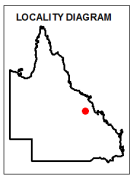
Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Major rivers/creeks
- Queensland

Biodiversity Planning Assessment

- State Habitat for EVNT taxa
- State
- Regional
- Local or Other Values
- Non Bioregion Ecosystem

LOCALITY DIAGRAM



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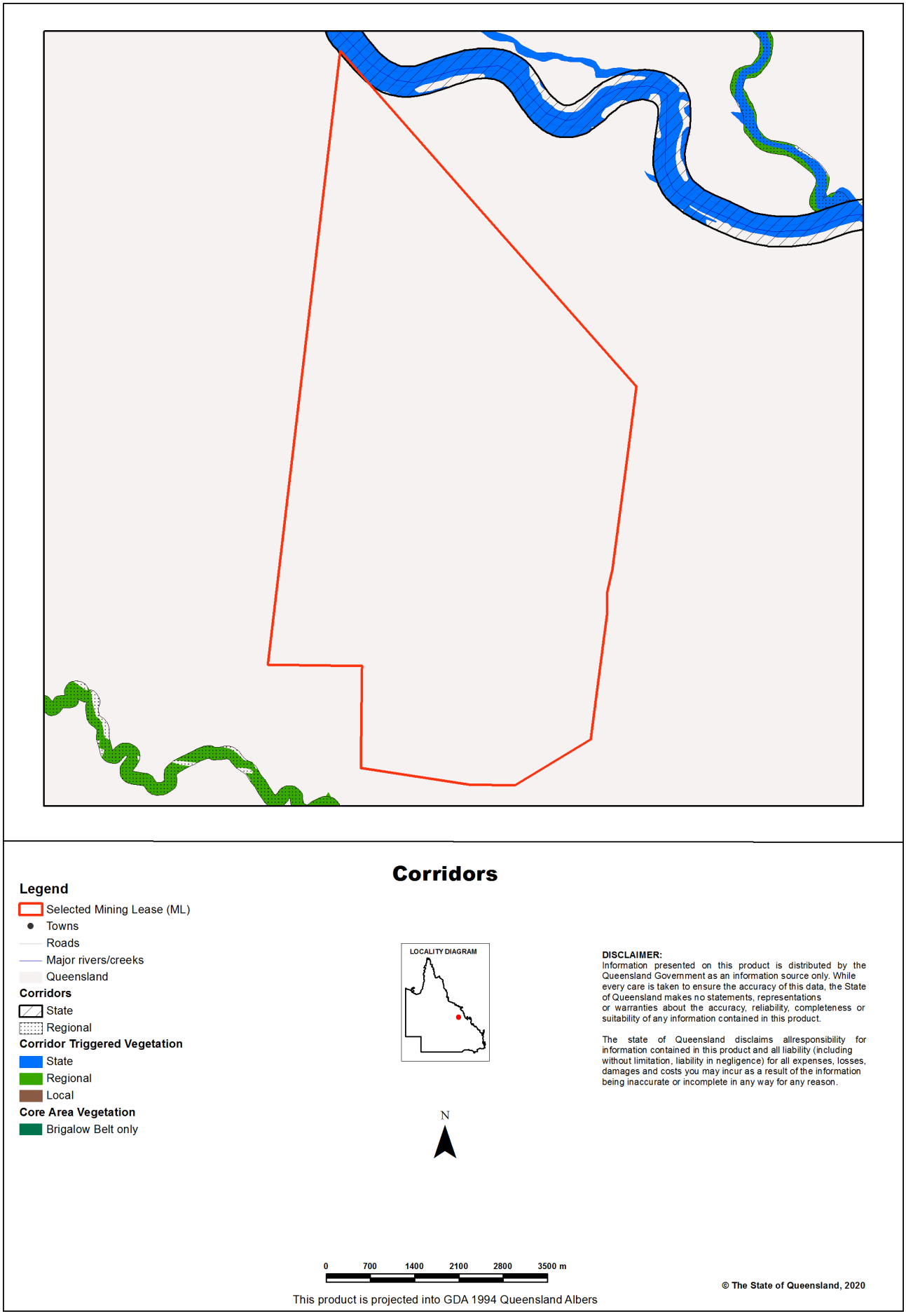
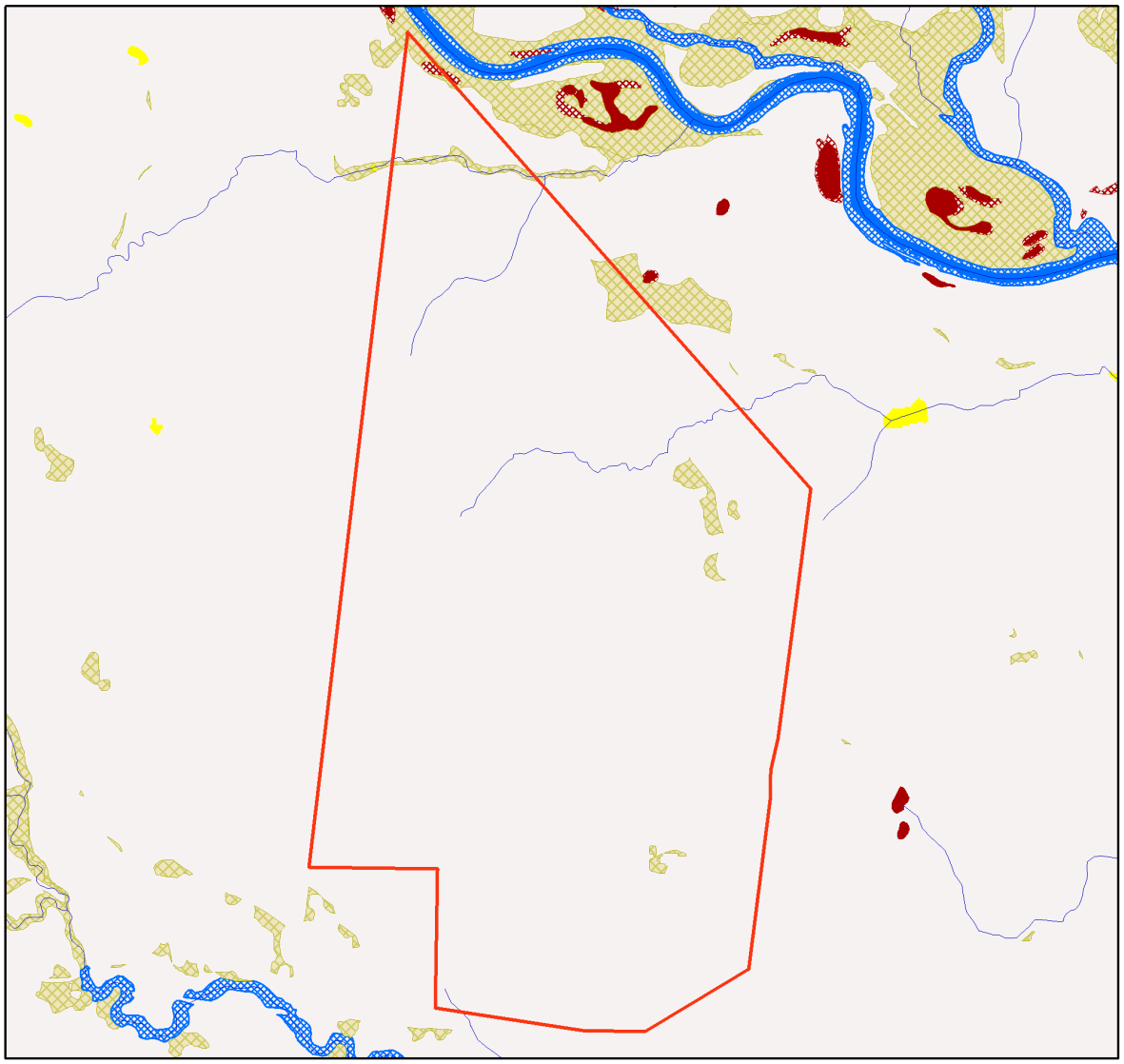
Map 3 - Corridors



Map 4 - Wetlands and waterways



Wetlands and Waterways

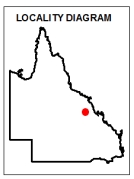
Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Springs
- Rivers/Creeks
- Directory of Important Wetlands
- Ramsar Sites - QLD
- Queensland

Wetland Type

- Marine Waterbodies
- Estuarine Waterbodies
- Riverine Waterbodies
- Lacustrine Waterbodies
- Palustrine Waterbodies
- Marine RE
- Estuarine RE
- Riverine RE
- Lacustrine RE
- Palustrine RE
- RE 51-80% wetland (mosaic units)
- RE 1-50% wetland (mosaic units)

LOCALITY DIAGRAM



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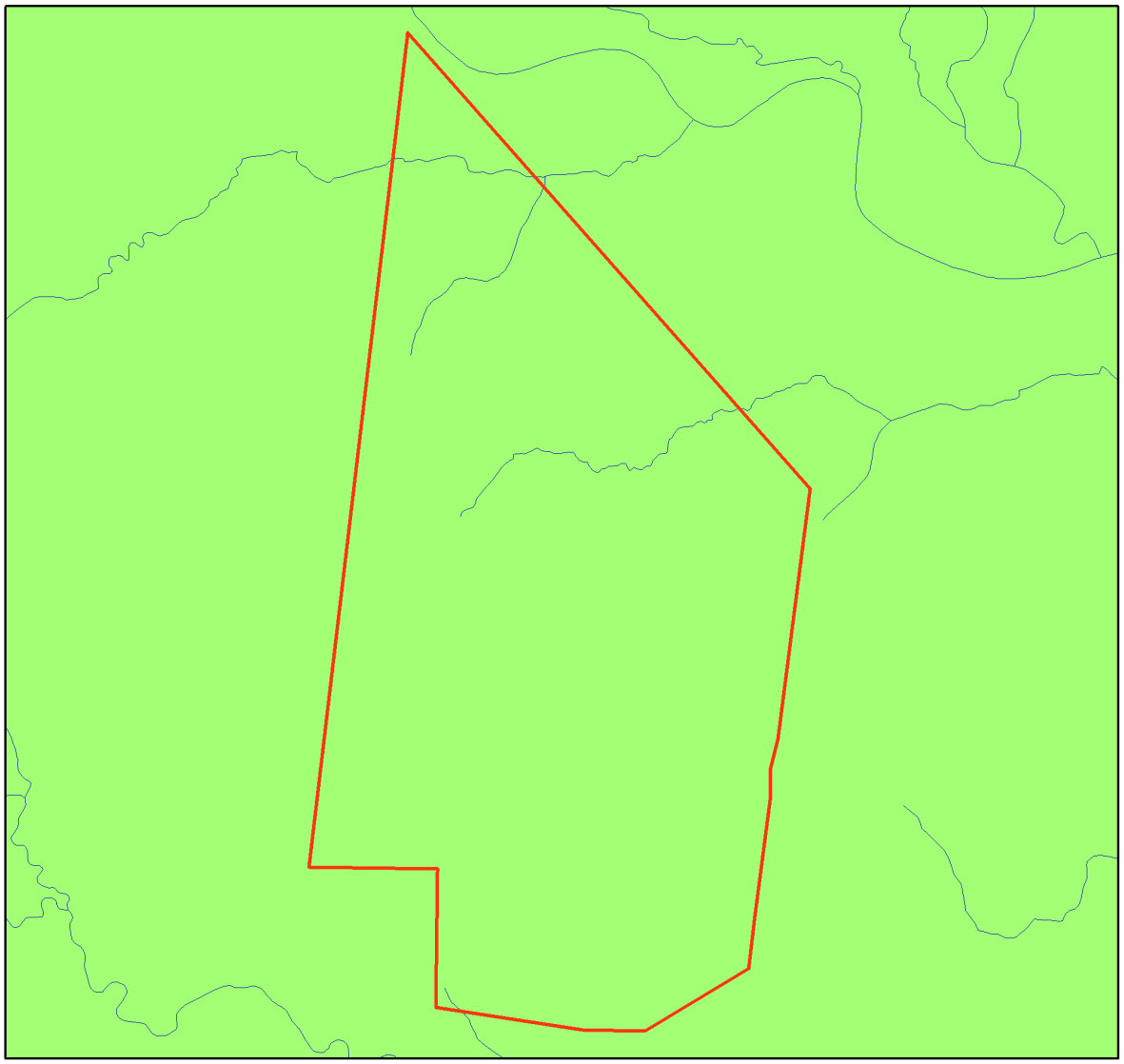
Map 5 - Aquatic Conservation Assessment (ACA) - riverine



Aquatic Conservation Assessment (ACA) - riverine

Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Rivers/Creeks
- Queensland

ACA Riverine - Subcatchment Significance

- Very High
- High
- Medium
- Low
- Very Low

LOCALITY DIAGRAM

N

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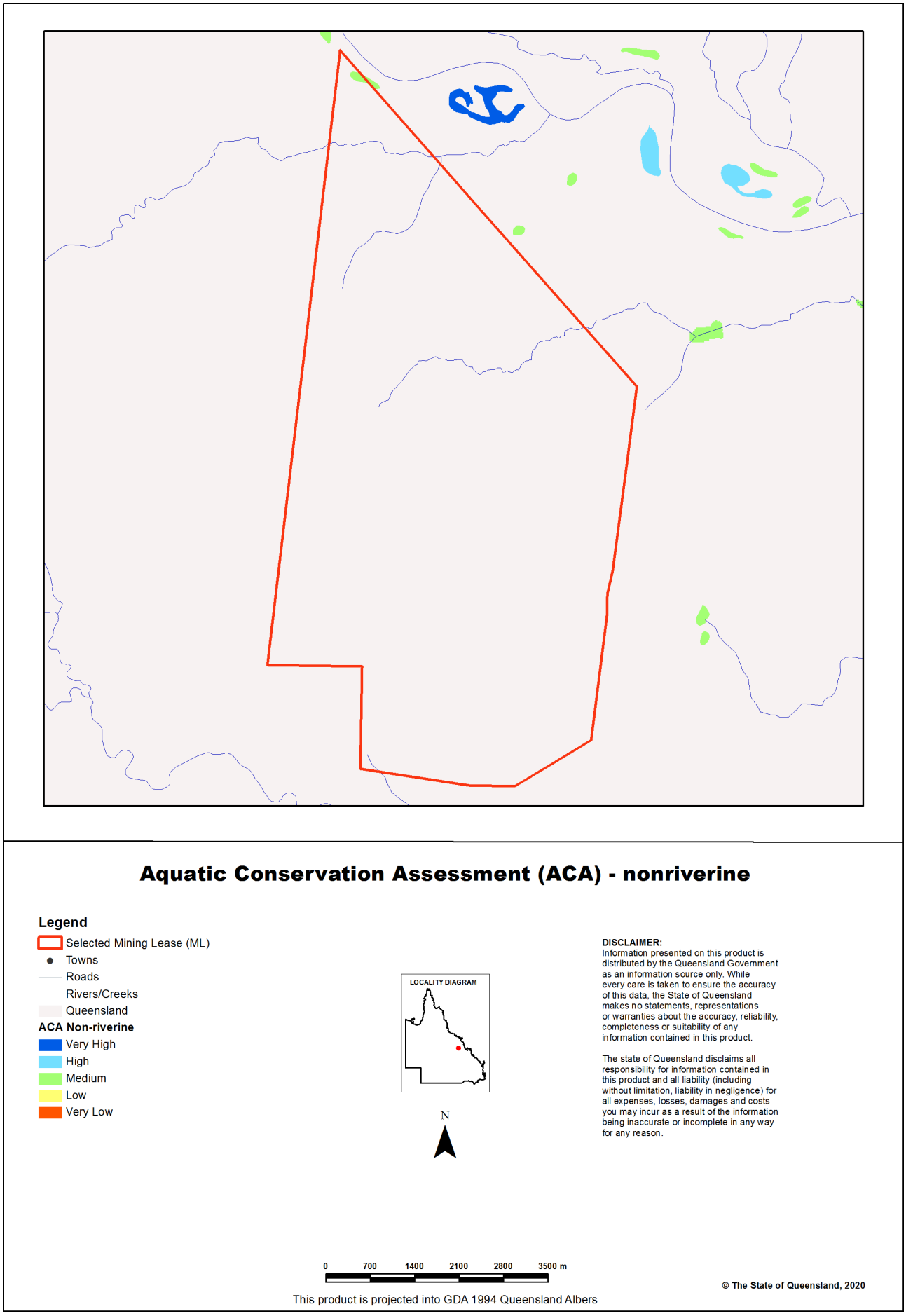
Map 6 - Aquatic Conservation Assessment (ACA) - non-riverine



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http://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca/

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Morton, S. R., Short, J. and Barker, R. D. with an Appendix by G.F. Griffin and G. Pearce (1995). *Refugia for Biological Diversity in Arid and Semi-arid Australia. Biodiversity Series* , Paper No. 4, Biodiversity Unit, Environment Australia.

Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.

Appendices

Appendix 1 - Source Data

Theme	Datasets
Aquatic Conservation Assessments Non-riverine*	Combination of the following datasets: Cape York Peninsula Non-riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Non-riverine v1.3 Lake Eyre and Bulloo Basins v1.1 QMDB Non-riverine ACA v1.4 Southeast Queensland ACA v1.1 WBB Non-riverine ACA v1.1 Southern Gulf Catchments Non-riverine ACA v1.1
Aquatic Conservation Assessments Riverine*	Combination of the following datasets: Cape York Peninsula Riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Riverine v1.1 Lake Eyre and Bulloo Basins v1.1 QMDB Riverine ACA v1.4 Southeast Queensland ACA v1.1 WBB Riverine ACA v1.1 Southern Gulf Catchments Riverine ACA v1.1
Biodiversity Planning Assessments*	Combination of the following datasets: Brigalow Belt BPA v2.1 Cape York Peninsula BPA v1.1 Central Queensland Coast BPA v1.3 Channel Country BPA v1.1 Desert Uplands BPA v1.3 Einasleigh Uplands BPA v1.1 Gulf Plains BPA v1.1 Mitchell Grass Downs BPA v1.1 Mulga Lands BPA v1.4 New England Tableland v2.3 Northwest Highlands v1.1 Southeast Queensland v4.1 Wet Tropics v1.1
Statewide BPA Corridors*	Statewide corridors v1.6
Threatened Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.
BPA Priority Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.
ACA Priority Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.

***These datasets are available at:**

http://dds.information.qld.gov.au/DDS

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
ACA	- Aquatic Conservation Assessment
AQUABAMM	- Aquatic Biodiversity Assessment and Mapping Methodology
BAMM	- Biodiversity Assessment and Mapping Methodology
BoT	- Back on Track
BPA	- Biodiversity Planning Assessment
CAMBA	- China-Australia Migratory Bird Agreement
DES	- Department of Environment and Science
EPBC	- *Environment Protection and Biodiversity Conservation Act 1999*
EVNT	- Endangered, Vulnerable, Near Threatened
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
JAMBA	- Japan-Australia Migratory Bird Agreement
NCA	- *Nature Conservation Act 1992*
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
ROKAMBA	- Republic of Korea-Australia Migratory Bird Agreement

Queensland Government

Department of Environment and Science

Environmental Reports

Biodiversity and Conservation Values

Biodiversity Planning Assessments and Aquatic Conservation Assessments

For the selected area of interest
ml: 700049

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or Area of Interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "Central co-ordinates" option, the resulting assessment area encompasses an area extending from 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: biodiversity.planning@des.qld.gov.au

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Table of Contents

Summary Information

Tables 1 to 8 provide an overview of the AOI with respect to selected topographic and environmental values.

Table 1: Area of interest details: ml: 700049

Size (ha)	6,192.97
Local Government(s)	Isaac Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Northern Bowen Basin, Isaac - Comet Downs
Catchment(s)	Fitzroy

The following table identifies available Biodiversity Planning Assessments (BPAs) and Aquatic Conservation Assessments (ACAs) with respect to the AOI.

Table 2: Available Biodiversity Planning and Aquatic Conservation Assessments

Assessment Type	Assessment Area and Version
Biodiversity Planning Assessment(s)	Brigalow Belt v2.1
Aquatic Conservation Assessment(s) (riverine)	Great Barrier Reef Catchments v1.1
Aquatic Conservation Assessment(s) (non-riverine)	Great Barrier Reef Catchments v1.3

Table 3: Remnant regional ecosystems within the AOI as per the Qld Herbarium's 'biodiversity status'

Biodiversity Status	Area (Ha)	% of AOI
Endangered	92.76	1.5
Of concern	40.39	0.65
No concern at present	633.7	10.23

The following table identifies the extent and proportion of the user specified area of interest (AOI) which is mapped as being of "State", "Regional" or "Local" significance via application of the Queensland Department of Environment and Science's *Biodiversity Assessment and Mapping Methodology* (BAMM).

Table 4: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	86.55	1.4
State	484.1	7.82
Regional	393.68	6.36
Local or Other Values	0.0	0.0

Table 5: Non-riverine wetlands intersecting the AOI

Non-riverine wetland types intersecting the area of interest	#
Number of Palustrine wetlands	1
Number of Lacustrine wetlands	0
Total number of non-riverine wetlands	1

NB. The figures presented in the table above are derived from the relevant non-riverine Aquatic Conservation Assessment(s). Later releases of wetland mapping produced via the Queensland Wetland Mapping Program may provide more recent information in regards to wetland extent.

Table 6: Named waterways intersecting the AOI

(no results)

Refer to **Map 1** for general locality information.

The following two tables identify the extent and proportion of the user specified AOI which is mapped as being of "Very High", "High", "Medium", "Low", or "Very Low" aquatic conservation value for riverine and non-riverine wetlands via application of the Queensland Department of Environment and Science's *Aquatic Biodiversity Assessment and Mapping Method* (AquaBAMM).

Table 7: Summary table, aquatic conservation significance (riverine)

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	6,192.91	100.0
Low	0.0	0.0
Very Low	0.0	0.0

Table 8: Summary table, aquatic conservation significance (non-riverine)

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	5.29	0.09
Low	0.0	0.0
Very Low	0.0	0.0

Biodiversity Planning Assessments

Introduction

The Department of Environment and Science (DES) attributes biodiversity significance on a bioregional scale through a Biodiversity Planning Assessment (BPA). A BPA involves the integration of ecological criteria using the *Biodiversity assessment and Mapping Methodology* (BAMM) and is developed in two stages: 1) **diagnostic criteria**, and 2) **expert panel criteria**. The diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion, while the expert panel criteria allows for the refinement of the mapped information from the diagnostic output by incorporating local knowledge and expert opinion.

The BAMM methodology has application for identifying areas with various levels of significance solely for biodiversity reasons. These include threatened ecosystems or taxa, large tracts of habitat in good condition, ecosystem diversity, landscape context and connection, and buffers to wetlands or other types of habitat important for the maintenance of biodiversity or ecological processes. While natural resource values such as dryland salinity, soil erosion potential or land capability are not dealt with explicitly, they are included to some extent within the biodiversity status of regional ecosystems recognised by the DES.

Biodiversity Planning Assessments (BPAs) assign three levels of overall biodiversity significance.

- **State significance** - areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed by other studies/processes as being significant at national or international scales. In addition, areas flagged as being of State significance due to the presence of endangered, vulnerable and/or near threatened taxa, are identified as "State Habitat for EVNT taxa".
- **Regional significance** - areas assessed as being significant for biodiversity at the subregional scale. These areas have lower significance for biodiversity than areas assessed as being of State significance.
- **Local significance and/or other values** - areas assessed as not being significant for biodiversity at state or regional scales. Local values are of significance at the local government scale.

For further information on released BPAs and a copy of the underlying methodology, go to:

http://www.qld.gov.au/environment/plants-animals/biodiversity/planning/

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

http://qspatial.information.qld.gov.au/geoportal/

The following table identifies the extent and proportion of the user specified AOI which is mapped as being of "State", "Regional" or "Local" significance via application of the BAMM.

Table 9: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	86.55	1.4
State	484.1	7.82
Regional	393.68	6.36
Local or Other Values	0.0	0.0

Refer to **Map 2** for further information.

Diagnostic Criteria

Diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion. These criteria are diagnostic in that they are used to filter the available data and provide a "first-cut" or initial determination of biodiversity significance. This initial assessment is then combined through a second group of other essential criteria.

A description of the individual diagnostic criteria is provided in the following sections.

Criteria A. Habitat for EVNT taxa: Classifies areas according to their significance based on the presence of endangered, vulnerable and/or rare (EVNT) taxa. EVNT taxa are those scheduled under the *Nature Conservation Act 1992* and/or the

Environment Protection and Biodiversity Conservation Act 1999. It excludes highly mobile fauna taxa which are instead considered in Criterion H and brings together information on EVNT taxa using buffering of recorded sites or habitat suitability models (HSM) where available.

Criteria B. Ecosystem value: Classifies on the basis of biodiversity status of regional ecosystems, their extent in protected areas (presence of poorly conserved regional ecosystems), the presence of significant wetlands; and areas of national importance such as the presence of Threatened Ecological Communities, World Heritage areas and Ramsar sites. Ecosystem value is applied at a bioregional (**B1**) and regional (**B2**) scale.

Criteria C. Tract size: Measures the relative size of tracts of vegetation in the landscape. The size of any tract is a major indicator of ecological significance, and is also strongly correlated with the long-term viability of biodiversity values. Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts.

Criteria D. Relative size of regional ecosystems: Classifies the relative size of each regional ecosystem unit within its bioregion (**D1**) and its subregion (**D2**). Remnant units are compared with all other occurrences with the same regional ecosystem. Large examples of a regional ecosystem are more significant than smaller examples of the same regional ecosystem because they are more representative of the biodiversity values particular to the regional ecosystem, are more resilient to the effects of disturbance, and constitute a significant proportion of the total area of the regional ecosystem.

Criteria F. Ecosystem diversity: Is an indicator of the number of regional ecosystems occurring within an area. An area with high ecosystem diversity will have many regional ecosystems and ecotones relative to other areas within the bioregion.

Criteria G. Context and connection: Represents the extent to which a remnant unit incorporates, borders or buffers areas such as significant wetlands, endangered ecosystems; and the degree to which it is connected to other vegetation.

A summary of the biodiversity status based upon the diagnostic criteria is provided in the following table.

Table 10: Summary of biodiversity significance based upon diagnostic criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Nat. Threatened Ecol. Community (B1)	8.99	0.15
State	Remnant contains at least 1 Endangered or 2 Vulnerable or Near Threatened species (A) & Nat. Threatened Ecol. Community (B1)	86.55	1.4
State	Remnant contains at least 1 Endangered RE (B1) & Nat. Threatened Ecol. Community (B1)	92.56	1.49
State	Remnant contains at least 1 Vulnerable or Near Threatened species (A) & Nat. Threatened Ecol. Community (B1)	382.48	6.18
Regional	Remnant contains at least 1 Vulnerable or Near Threatened species (A)	388.45	6.27
Regional	Remnant contains at least one Of Concern RE (B1)	5.3	0.09

Assessment of diagnostic criteria with respect to the AOI

The following table reflects an assessment of the individual diagnostic criteria noted above in regards to the AOI.

Table 11: Assessment of individual diagnostic criteria with respect to the AOI

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
A: Habitat for EVNT Taxa	86.54	1.4	863.48	13.9	14.29	0.2		
B1: Ecosystem Value (Bioregion)	570.56	9.2	5.3	0.1	195.07	3.1		
B2: Ecosystem Value (Subregion)	5.3	0.1	100.15	1.6	665.48	10.7		
C: Tract Size	609.9	9.8					161.03	2.6
D1: Relative RE Size (Bioregion)					23.08	0.4	747.85	12.1
D2: Relative RE Size (Subregion)			5.3	0.1	385.66	6.2	379.97	6.1
F: Ecosystem Diversity	24.68	0.4	186.94	3.0	365.21	5.9	194.1	3.1
G: Context and Connection	121.11	2.0	215.63	3.5	371.13	6.0	63.06	1.0

Other Essential Criteria

Other essential criteria (also known as expert panel criteria) are based on non-uniform information sources and which may rely more upon expert opinion than on quantitative data. These criteria are used to provide a "second-cut" determination of biodiversity significance, which is then combined with the diagnostic criteria for an overall assessment of relative biodiversity significance. A summary of the biodiversity status based upon the other essential criteria is provided in the following table.

Table 12: Summary of biodiversity significance based upon other essential criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	22.55	0.36
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I) & Remnant forms part of a bioregional corridor (J)	0.08	0.0
State	Remnant forms part of a bioregional corridor (J)	0.53	0.01
Regional	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	5.22	0.08
Local	Refer to Expert Panel data for additional information	162.16	2.62

A description of each of the other essential criteria and associated assessment in regards to the AOI is provided in the following sections.

Criteria H. Essential and general habitat for priority taxa: Priority taxa are those which are at risk or of management concern, taxa of scientific interest as relictual (ancient or primitive), endemic taxa or locally significant populations (such as a flying fox camp or heronry), highly specialised taxa whose habitat requirements are complex and distributions are not well correlated with any particular regional ecosystem, taxa important for maintaining genetic diversity (such as complex spatial patterns of genetic variation, geographic range limits, highly disjunct populations), taxa critical for management or monitoring of biodiversity (functionally important or ecological indicators), or economic and culturally important taxa.

Criteria I. Special biodiversity values: areas with special biodiversity values are important because they contain multiple taxa in a unique ecological and often highly biodiverse environment. Areas with special biodiversity values can include the following:

- Ia - centres of endemism - areas where concentrations of taxa are endemic to a bioregion or subregion are found.
- Ib - wildlife refugia (Morton *et al*. 1995), for example, islands, mound springs, caves, wetlands, gorges, mountain ranges and topographic isolates, ecological refuges, refuges from exotic animals, and refuges from clearing. The latter may include large areas that are not suitable for clearing because of land suitability/capability.
- Ic - areas with concentrations of disjunct populations.
- Id - areas with concentrations of taxa at the limits of their geographic ranges.
- Ie - areas with high species richness.
- If - areas with concentrations of relictual populations (ancient and primitive taxa).
- Ig - areas containing REs with distinct variation in species composition associated with geomorphology and other environmental variables.
- Ih - an artificial waterbody or managed/manipulated wetland considered by the panel/s to be of ecological significance.
- Ii - areas with a high density of hollow-bearing trees that provide habitat for animals.
- Ij - breeding or roosting sites used by a significant number of individuals.
- Ik - climate change refuge.

The following table identifies the value and extent area of the Other Essential Criteria H and I within the AOI.

Table 13: Relative importance of expert panel criteria (H and I) used to access overall biodiversity significance with respect to the AOI

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
H: Core Habitat Priority Taxa					162.18	2.6		
Ia: Centres of Endemism								

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
Ib: Wildlife Refugia	22.55	0.4	5.3	0.1				
Ic: Disjunct Populations								
Id: Limits of Geographic Ranges								
Ie: High Species Richness								
If: Relictual Populations								
Ig: Variation in Species Composition								
Ih: Artificial Wetland								
Ii: Hollow Bearing Trees								
Ij: Breeding or Roosting Site	22.55	0.4						
Ik: Climate Refugia								

NB. Whilst biodiversity values associated with Criteria I may be present within the site (refer to tables 12 and 15), for the New England Tableland and Central Queensland Coast BPAs, area and % area figures associated with Criteria Ia through to Ij cannot be listed in the table above (due to slight variations in data formats between BPAs).

Criteria J. Corridors: areas identified under this criterion qualify either because they are existing vegetated corridors important for contiguity, or cleared areas that could serve this purpose if revegetated. Some examples of corridors include riparian habitats, transport corridors and "stepping stones".

Bioregional and subregional conservation corridors have been identified in the more developed bioregions of Queensland through the BPAs, using an intensive process involving expert panels. Map 3 displays the location of corridors as identified under the Statewide Corridor network. The Statewide Corridor network incorporates BPA derived corridors and for bioregions where no BPA has been assessed yet, corridors derived under other planning processes. *Note: as a result of updating and developing a statewide network, the alignment of corridors may differ slightly in some instances when compared to those used in individual BPAs.*

The functions of these corridors are:

- **Terrestrial** Bioregional corridors, in conjunction with large tracts of remnant vegetation, maintain ecological and evolutionary processes at a landscape scale, by:

  • Maintaining long term evolutionary/genetic processes that allow the natural change in distributions of species and connectivity between populations of species over long periods of time;

  • Maintaining landscape/ecosystems processes associated with geological, altitudinal and climatic gradients, to allow for ecological responses to climate change;

  • Maintaining large scale seasonal/migratory species processes and movement of fauna;

  • Maximising connectivity between large tracts/patches of remnant vegetation;

  • Identifying key areas for rehabilitation and offsets; and

- **Riparian** Bioregional Corridors also maintain and encourage connectivity of riparian and associated ecosystems.

The location of the corridors is determined by the following principles:

- Terrestrial

- Complement riparian landscape corridors (i.e. minimise overlap and maximise connectivity);
- Follow major watershed/catchment and/or coastal boundaries;
- Incorporate major altitudinal/geological/climatic gradients;
- Include and maximise connectivity between large tracts/patches of remnant vegetation;
- Include and maximise connectivity between remnant vegetation in good condition; and

- Riparian
  - Located on the major river or creek systems within the bioregion in question.

The total extent of remnant vegetation triggered as being of "State", "Regional" or "Local" significance due to the presence of an overlying BPA derived terrestrial or riparian corridor within the AOI, is provided in the following table. For further information on how remnant vegetation is triggered due to the presence of an overlying BPA derived corridor, refer to the relevant landscape BPA expert panel report(s).

Table 14: Extent of triggered remnant vegetation due to the presence of BPA derived corridors with respect to the AOI

Biodiversity Significance	Area (Ha)	% of AOI
State	0.6	0.01
Regional	0.0	0.0
Local	0.0	0.0

NB: area figures associated with the extent of corridor triggered remnant vegetation are only available for those bioregions where a BPA has been undertaken.

Refer to **Map 3** for further information.

Threatening process/condition (Criteria K) - areas identified by experts under this criterion may be used to amend (upgrade or downgrade) biodiversity significance arising from the "first-cut" analysis. The condition of remnant vegetation is affected by threatening processes such as weeds, ferals, grazing and burning regime, selective timber harvesting/removal, salinity, soil erosion, and climate change.

Assessment of Criteria K with respect to the AOI is not currently included in the "Biodiversity and Conservation Values" report, as it has not been applied to the majority of Queensland due to data/information limitations and availability.

Special Area Decisions

Expert panel derived "Special Area Decisions" are used to assign values to Other Essential Criteria. The specific decisions which relate to the AOI in question are listed in the table below.

Table 15: Expert panel decisions for assigning levels of biodiversity significance with respect to the AOI

Decision Number	Description	Panel Recommended Significance	Criteria Values
brbn_l_18a	None	None	None
brbn_l_75	Gilgai Remnants	State	Ib (refugia): VH; Ij (aggregation site):VH
brbn_l_92	Regionally significant natural palustrine & lacustrine wetlands	Regional	Ib (refugia): H

Expert panel decision descriptions:

brbn_l_18a

None

brbn_l_75

The gilgai wetland systems in the Brigalow Belt tend to be dominated by acacia and casuarina (mostly brigalow Acacia harpophylla and belah Casuarina cristata). Melaleuca, Corymbia and Eucalyptus species are also common along with Astrebla or Dichanthium spp. grassland. Gilgai systems are widespread and some are in good condition while others are largely cleared. The range of threatened wildlife present may use inundated gilgai as a water source at some stage of their life or are closely associated with the cracking clay soil habitat and wetlands.

Gilgai reptiles include the death adder Acanthophis antarcticus, De Vis' banded snake Denisonia devisi and ornamental snake D. maculata. Amphibians that use gilgai include salmon striped frog Limnodynastes salmini, scarlet-sided pobblebonk L. terraereginae and striped burrowing frog Cyclorana alboguttata. Other fauna which may use gilgai habitat at various times include bridled nailtail wallaby Onychogalea fraenata, black-striped wallaby Macropus dorsalis and the glossy black cockatoo Calyptorhynchus lathami.

(Source: WetlandInfo https://wetlandinfo.des.qld.gov.au/wetlands/).

Refer to brbs_l_49 for the southern BRB implementation of this decision.

brbn_l_92

The panel considered that relatively natural palustrine and lacustrine wetlands and waterbodies within the Brigalow Belt bioregion act as important refugia, especially during periods of drought.

Whilst State significant wetlands are captured under Criterion B1, the panel agreed that all such natural wetland complexes with a combined area of greater than or equal to 5ha in size should be classed as being of at least regional significance.

Refer to brbs_l_47 for the southern BRB implementation of this decision.

Aquatic Conservation Assessments

Introduction

The Aquatic Biodiversity Assessment and Mapping Method or AquaBAMM (Clayton *et al.* 2006), was developed to assess conservation values of wetlands in queensland, and may also have application in broader geographical contexts. It is a comprehensive method that uses available data, including data resulting from expert opinion, to identify relative wetland conservation/ecological values within a specified study area (usually a catchment). The product of applying this method is an Aquatic Conservation Assessment (ACA) for the study area.

An ACA using AquaBAMM is non-social, non-economic and identifies the conservation/ecological values of wetlands at a user-defined scale. It provides a robust and objective conservation assessment using criteria, indicators and measures that are founded upon a large body of national and international literature. The criteria, each of which may have variable numbers of indicators and measures, are naturalness (aquatic), naturalness (catchment), diversity and richness, threatened species and ecosystems, priority species and ecosystems, special features, connectivity and representativeness. An ACA using AquaBAMM is a powerful decision support tool that is easily updated and simply interrogated through a geographic information system (GIS).

Where they have been conducted, ACAs can provide a source of baseline wetland conservation/ecological information to support natural resource management and planning processes. They are useful as an independent product or as an important foundation upon which a variety of additional environmental and socio-economic elements can be added and considered (i.e. an early input to broader 'triple-bottom-line' decision-making processes). An ACA can have application in:

- determining priorities for protection, regulation or rehabilitation of wetlands and other aquatic ecosystems
- on-ground investment in wetlands and other aquatic ecosystems
- contributing to impact assessment of large-scale development (e.g. dams)
- water resource and strategic regional planning prcesses

For a detailed explanation of the methodology please refer to the summary and expert panel reports relevant to the ACA utilised in this assessment. These reports can be accessed at Wetland *Info*:

http://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

http://qspatial.information.qld.gov.au/geoportal/

Explanation of Criteria

Under the AquaBAMM, eight criteria are assessed to derive an overall conservation value. Similar to the Biodiversity Assessment and Mapping Methodology, the criteria may be primarily diagnostic (quantitative) or primarily expert opinion (qualitative) in nature. The following sections provide a brief description of each of the 8 criteria.

Criteria 1. Naturalness - Aquatic: This attribute reflects the extent to which a wetland's (riverine, non-riverine, estuarine) aquatic state of naturalness is affected through relevant influencing indicators which include: presence of exotic flora and fauna; presence of aquatic communities; degree of habitat modification and degree of hydrological modification.

Criteria 2. Naturalness - Catchment: The naturalness of the terrestrial systems of a catchment can have an influence on many wetland characteristics including: natural ecological processes e.g. nutrient cycling, riparian vegetation, water chemistry, and flow. The indicators utilised to assess this criterion include: presence of exotic flora and/or fauna; riparian, catchment and flow modification.

Criteria 3. Naturalness - Diversity and Richness: This criterion is common to many ecological assessment methods and can include both physical and biological features. It includes such indicators as species richness, riparian ecosystem richness and geomorphological diversity.

Criteria 4. Threatened Species and Ecosystems: This criterion evaluates ecological rarity characteristics of a wetland. This includes both species rarity and rarity of communities / assemblages. The communities and assemblages are best represented by regional ecosystems. Species rarity is determined by NCA and EPBC status with Endangered, Vulnerable or Near-threatened species being included in the evaluation. Ecosystem rarity is determined by regional ecosystem biodiversity status i.e. Endangered, Of Concern, or Not of Concern.

Criteria 5. Priority Species and Ecosystems: Priority flora and fauna species lists are expert panel derived. These are aquatic, semi-aquatic and riparian species which exhibit at least 1 particular trait in order to be eligible for consideration. For

flora species the traits included:

- It forms significant macrophyte beds (in shallow or deep water).
- It is an important food source.
- It is important/critical habitat.
- It is implicated in spawning or reproduction for other fauna and/or flora species.
- It is at its distributional limit or is a disjunct population.
- It provides stream bank or bed stabilisation or has soil binding properties.
- It is a small population and subject to threatening processes.

Fauna species are included if they meet at least one of the following traits:

- It is endemic to the study area (>75 per cent of its distribution is in the study area/catchment).
- It has experienced, or is suspected of experiencing, a serious population decline.
- It has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area/catchment.
- It is currently a small population and threatened by loss of habitat.
- It is a significant disjunct population.
- It is a migratory species (other than birds).
- A significant proportion of the breeding population (>one per cent for waterbirds, >75 per cent other species) occurs in the waterbody (see Ramsar criterion 6 for waterbirds).
- Limit of species range.

See the individual expert panel reports for the priority species traits specific to an ACA.

Criteria 6. Special Features: Special features are areas identified by flora, fauna and ecology expert panels which exhibit characteristics beyond those identified in other criteria and which the expert panels consider to be of the highest ecological importance. Special feature traits can relate to, but are not solely restricted to geomorphic features, unique ecological processes, presence of unique or distinct habitat, presence of unique or special hydrological regimes e.g. spring-fed streams. Special features are rated on a 1 - 4 scale (4 being the highest).

Criteria 7. Connectivity: This criterion is based on the concept that appropriately connected aquatic ecosystems are healthy and resilient, with maximum potential biodiversity and delivery of ecosystem services.

Criteria 8. Representativeness: This criterion applies primarily to non-riverine assessments, evaluates the rarity and uniqueness of a wetland type in relation to specific geographic areas. Rarity is determined by the degree of wetland protection within "protected Areas" estate or within an area subject to the *Fisheries Act 1994*, *Coastal Protection and Management Act 1995*, or *Marine Parks Act 2004*. Wetland uniqueness evaluates the relative abundance and size of a wetland or wetland management group within geographic areas such as catchment and subcatchment.

Riverine Wetlands

Riverine wetlands are all wetlands and deepwater habitats within a channel. The channels are naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water. AquaBAMM, when applied to riverine wetlands uses a discrete spatial unit termed subsections. A subsection can be considered as an area which encompasses discrete homogeneous stream sections in terms of their natural attributes (i.e. physical, chemical, biological and utilitarian values) and natural resources. Thus in an ACA, an aquatic conservation significance score is calculated for each subsection and applies to all streams within a subsection, rather than individual streams as such.

Please note, the area figures provided in Tables 16 and 17, are derived using the extent of riverine subsections within the AOI. Refer to **Map 5** for further information. A summary of the conservation significance of riverine wetlands within the AOI is provided in the following table.

Table 16: Overall level/s of riverine aquatic conservation significance

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
High	0.0	0.0
Medium	6,192.91	100.0
Low	0.0	0.0
Very Low	0.0	0.0

The individual aquatic conservation criteria ratings for riverine wetlands within the AOI are listed below.

Table 17: Level/s of riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic					6,192.91	100.0		
2. Naturalness catchment	4,994.59	80.6	1,198.32	19.3				
3. Diversity and richness			1,198.32	19.3	4,994.59	80.6		
4. Threatened species and ecosystems			6,192.91	100.0				
5. Priority species and ecosystems			1,198.32	19.3				
6. Special features								
7. Connectivity					4,994.59	80.6	1,198.32	19.3
8. Representative-ness								

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to riverine wetlands within the AOI.

Table 18: Expert panel decisions for assigning overall levels of riverine aquatic conservation significance

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
(No Records)				

4 is the highest rating/value

Expert panel decision descriptions:

(No Records)

Non-riverine Wetlands

Non-riverine wetlands include both lacustrine and palustrine wetlands, however, do not currently incorporate estuarine, marine or subterranean wetland types. A summary of the conservation significance of non-riverine wetlands within the AOI is provided in the following table. Refer to **Map 6** for further information.

Table 19: Overall level/s of non-riverine aquatic conservation significance

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	5.29	0.09
Low	0.0	0.0
Very Low	0.0	0.0

The following table provides an assessment of non-riverine wetlands within the AOI and associated aquatic conservation criteria values.

Table 20: Level/s of non-riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic	5.29	0.1						
2. Naturalness catchment			5.29	0.1				
3. Diversity and richness					5.29	0.1		
4. Threatened species and ecosystems			5.29	0.1				
5. Priority species and ecosystems			5.29	0.1				
6. Special features								
7. Connectivity								
8. Representative-ness					5.29	0.1		

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to non-riverine wetlands within the AOI.

Table 21: Expert panel decisions for assigning overall levels of non-riverine aquatic conservation significance.

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
is_nr_fl_01	Regional Ecosystems 8.3.4 and 11.3.27	Isaac	5.2.1	3

4 is the highest rating/value

Expert panel decision descriptions:

is_nr_fl_01

These regional ecosystems contain significant habitat values that are under threat from threatening processes such as physical alteration/ destruction and invasion by **hymenachne**.

Note: This priority ecosystem decision applies to the following catchments: Calliope, Comet, Dawson, Fitzroy, Isaac, Mackenzie, Misc Other Islands, Nogoa, O'Connell, Pioneer, Plane, Proserpine, Shoalwater, Styx and Waterpark.

Threatened and Priority Species

Introduction

This chapter contains a list of threatened and priority flora and/or fauna species that have been recorded on, or within 4km of the Assessment Area.

The information presented in this chapter with respect to species presence is derived from compiled databases developed primarily for the purpose of BPAs and ACAs. Data is collated from a number of sources and is updated periodically.

It is important to note that the list of species provided in this report, may differ when compared to other reports generated from other sources such as the State government's WildNet, Herbrecs or the federal government's EPBC database for a number of reasons.

Records for threatened and priority species are filtered and checked based on a number of rules including:

- Taxonomic nomenclature - current scientific names and status,
- Location - cross-check co-ordinates with location description,
- Taxon by location - requires good knowledge of the taxon and history of the record,
- Duplicate records - identify and remove,
- Expert panels - check records and provide new records,
- Flora cultivated records excluded,
- Use precise records less than or equal to 2000m,
- Use recent records greater than or equal to 1975 animals, greater than or equal to 1950 plants.

Threatened Species

Threatened species are those species classified as "Endangered" or "Vulnerable" under the *Environment Protection and Biodiversity Conservation Act 1999* or "Endangered", "Vulnerable" or "Near threatened" under the *Nature Conservation Act 1992*.

The following threatened species have been recorded on, or within approximately 4km of the AOI.

Table 22: Threatened species recorded on, or within 4km of the AOI

Species	Common name	NCA status	EPBC status	Back on Track rank	Migratory species*	Wetland species**	Identified flora/fauna
Denisonia maculata	ornamental snake	V	V	Medium			FA
Geophaps scripta scripta	squatter pigeon (southern subspecies)	V	V	Medium			FA
Petauroides volans	greater glider	V	V	Low			FA
Phascolarctos cinereus	koala	V	V	Low			FA
Rostratula australis	Australian painted snipe	E	E	Medium		Y	FA
Solanum adenophorum		E		High			FL

NB. Please note that the threatened species listed in this section are based upon the most recently compiled DES internal state-wide threatened species dataset. This dataset may contain additional records that were not originally available for inclusion in the relevant individual BPAs and ACAs.

**JAMBA - Japan-Australia Migratory Bird Agreement; CAMBA - China-Australia Migratory Bird Agreement; ROKAMBA - Republic of Korea-Australia Migratory Bird Agreement; CMS - Convention on the Conservation of Migratory Species*.

***Y - wetland indicator species*.

BPA Priority Species

A list of BPA priority species that have been recorded on, or within approximately 4km of the AOI is contained in the following table.

Table 23: Priority species recorded on, or within 4km of the AOI

Species	Common name	Back on Track rank	Identified flora/fauna
Carlia rubigo	Orange-flanked Rainbow Skink	None	FA
Petaurus australis australis	Yellow-bellied Glider (southern subsp.)	H	FA
Sclerolaena tetracuspis	brigalow burr	None	FL

NB. Please note that the list of priority species is based on those species identified in the BPAs, however records for these species may be more recent than the originals used. furthermore, the BPA priority species databases are updated from time to time. At each update, the taxonomic details for all species are amended as necessary to reflect current taxonomic name and/or status changes.

ACA Priority Species

A list of ACA priority species used in riverine and non-riverine ACAs that have been recorded on, or within approximately 4km of the AOI are contained in the following tables.

Table 24: Priority species recorded on, or within 4 km of the AOI - riverine

(no results)

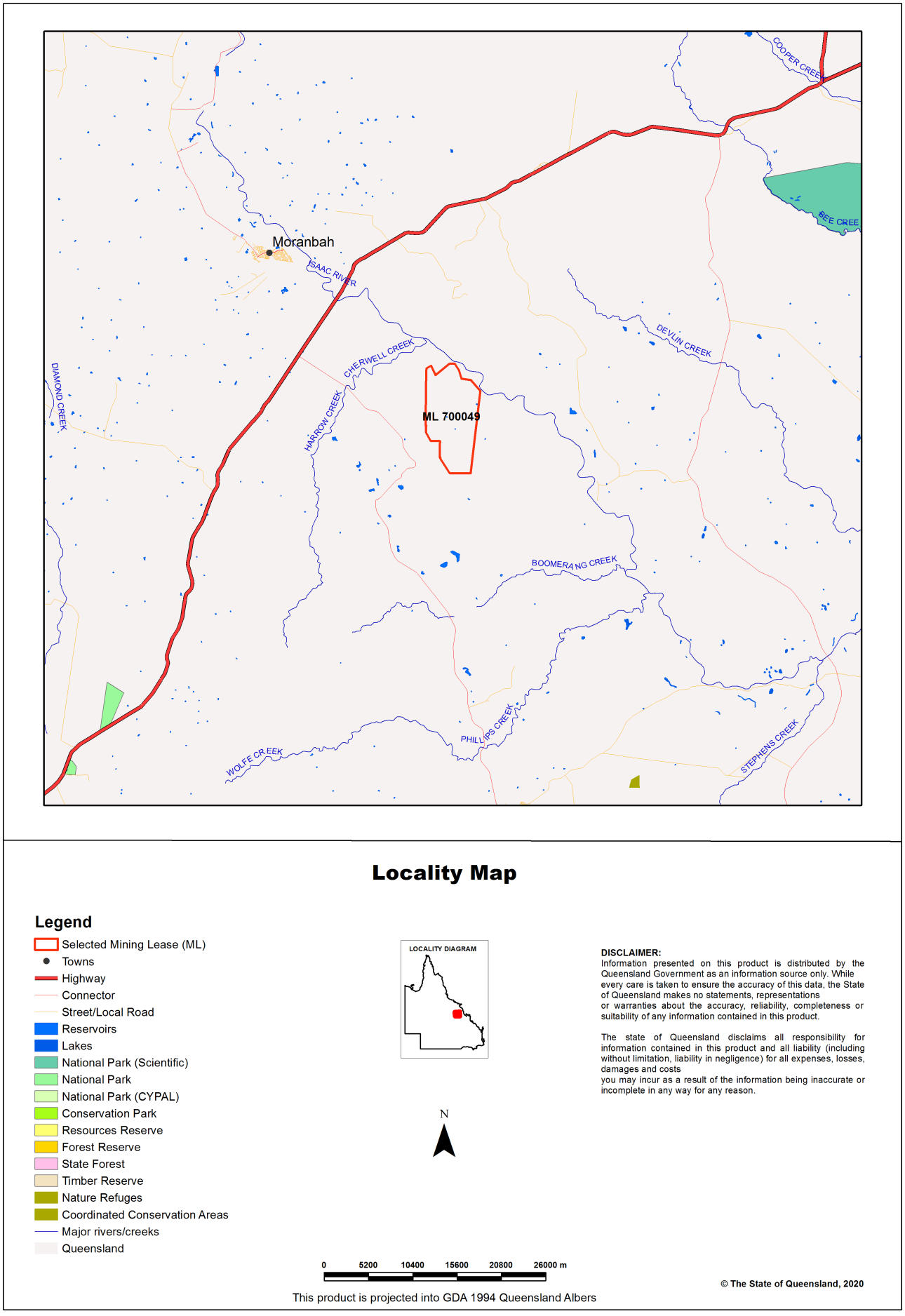
Table 25: Priority species recorded on, or within 4 km of the AOI - non-riverine

(no results)

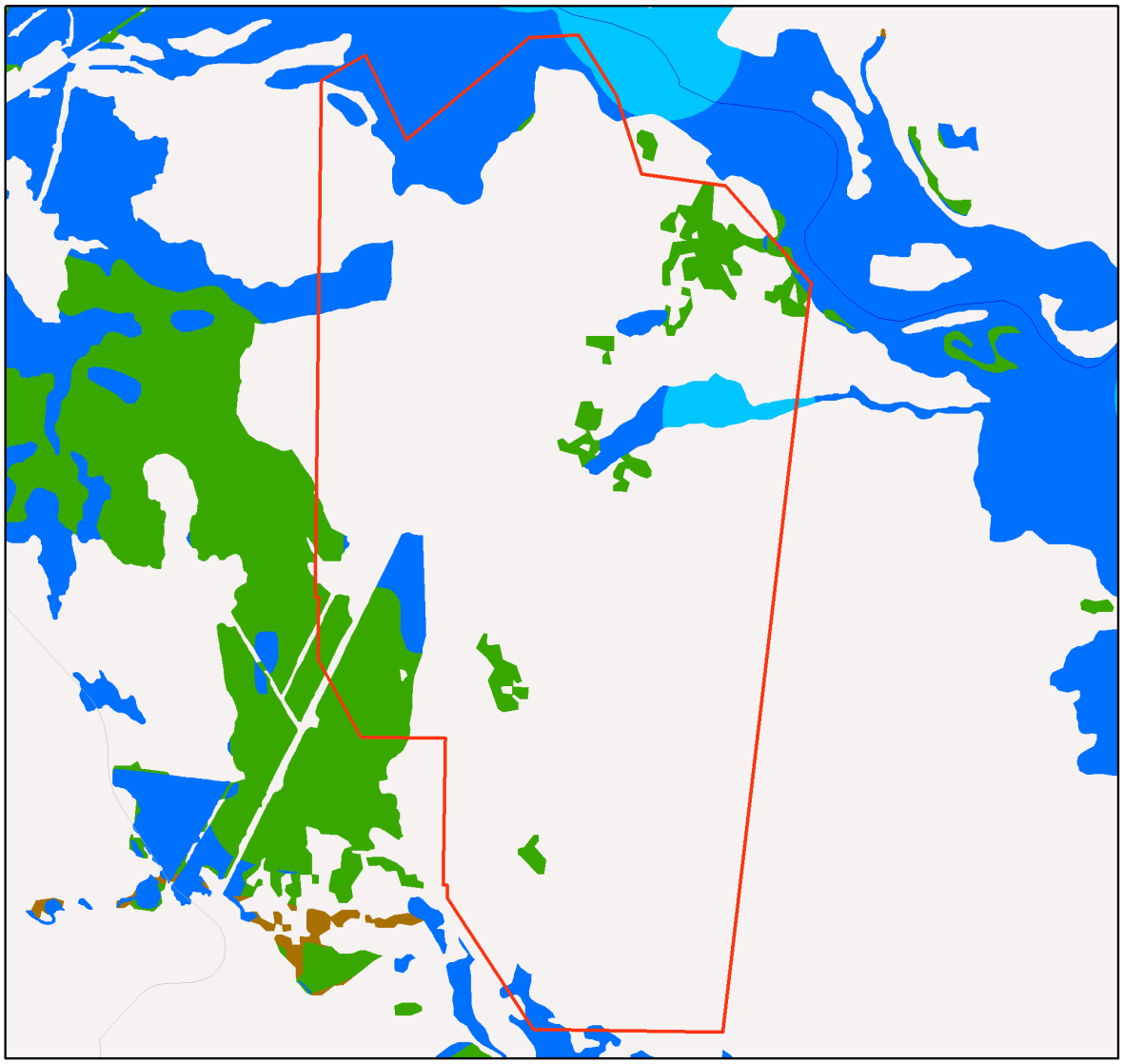
NB. Please note that the priority species records used in the above two tables are comprised of those adopted for the released individual ACAs. The ACA riverine and non-riverine priority species databases are updated from time to time to reflect new release of ACAs. At each update, the taxonomic details for all ACAs records are amended as necessary to reflect current taxonomic name and/or status changes.

Maps

Map 1 - Locality Map



Map 2 - Biodiversity Planning Assessment (BPA)



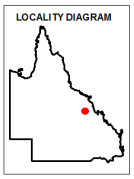
Biodiversity Planning Assessments

Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Major rivers/creeks
- Queensland

Biodiversity Planning Assessment

- State Habitat for EVNT taxa
- State
- Regional
- Local or Other Values
- Non Bioregion Ecosystem



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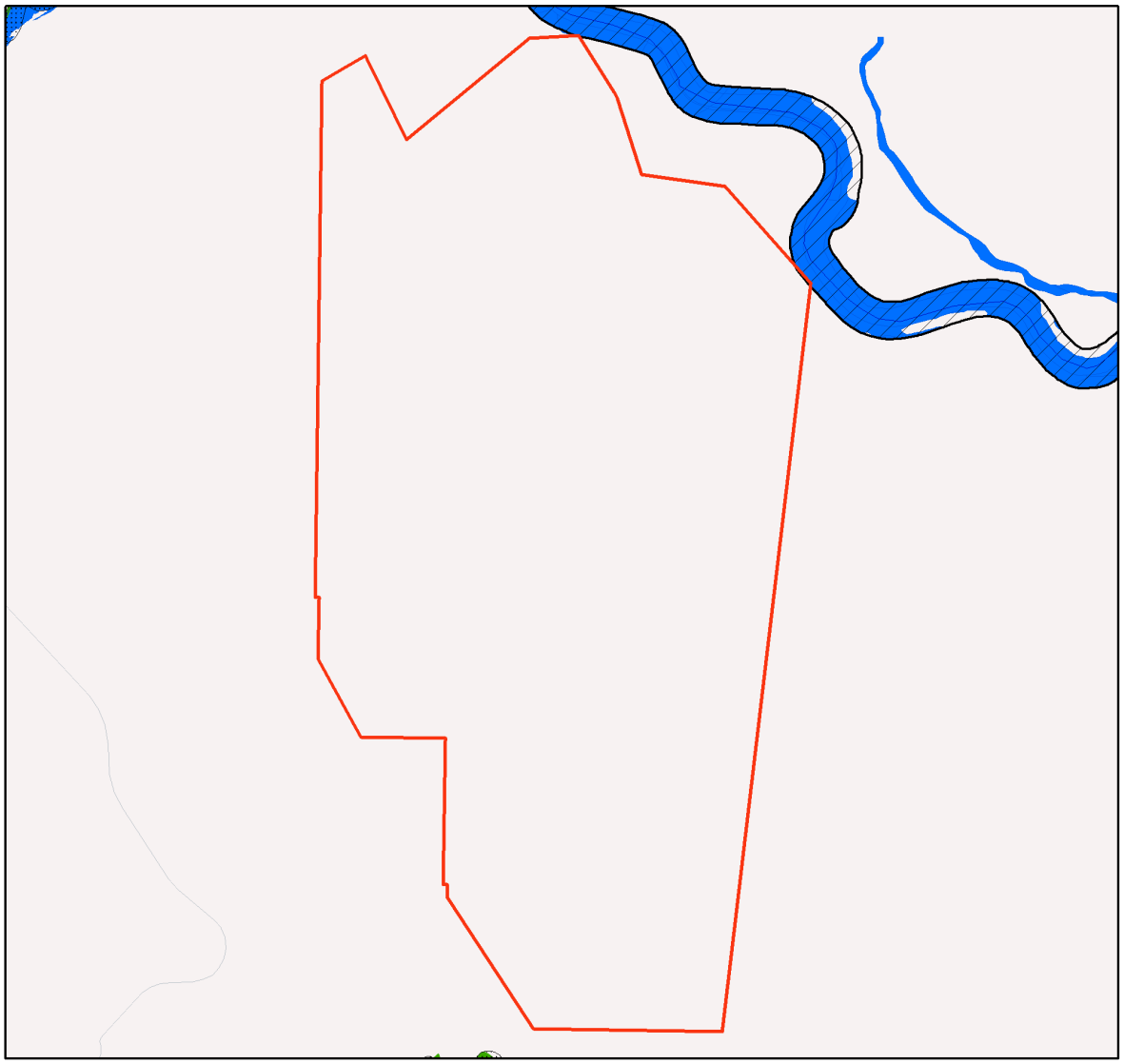
0 780 1560 2340 3120 3900 m

This product is projected into GDA 1994 Queensland Albers

Map 3 - Corridors



Corridors

Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Major rivers/creeks
- Queensland

Corridors

- State
- Regional

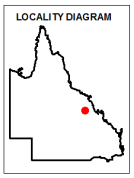
Corridor Triggered Vegetation

- State
- Regional
- Local

Core Area Vegetation

- Brigalow Belt only

LOCALITY DIAGRAM



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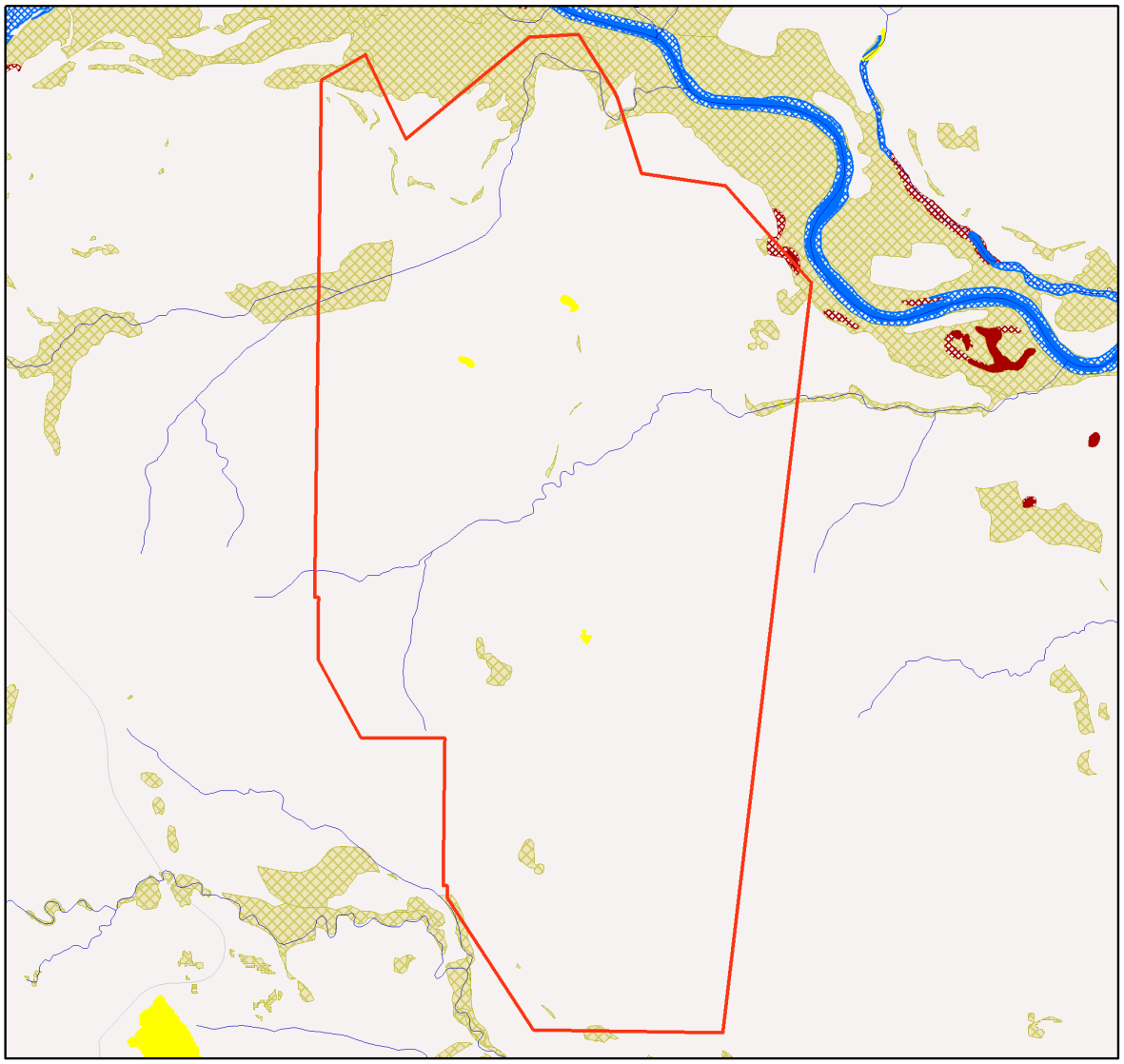
Map 4 - Wetlands and waterways



Wetlands and Waterways

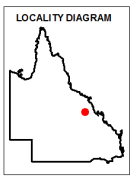
Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Springs
- Rivers/Creeks
- Directory of Important Wetlands
- Ramsar Sites - QLD
- Queensland

Wetland Type

- Marine Waterbodies
- Estuarine Waterbodies
- Riverine Waterbodies
- Lacustrine Waterbodies
- Palustrine Waterbodies
- Marine RE
- Estuarine RE
- Riverine RE
- Lacustrine RE
- Palustrine RE
- RE 51-80% wetland (mosaic units)
- RE 1-50% wetland (mosaic units)

LOCALITY DIAGRAM



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0 780 1560 2340 3120 3900 m

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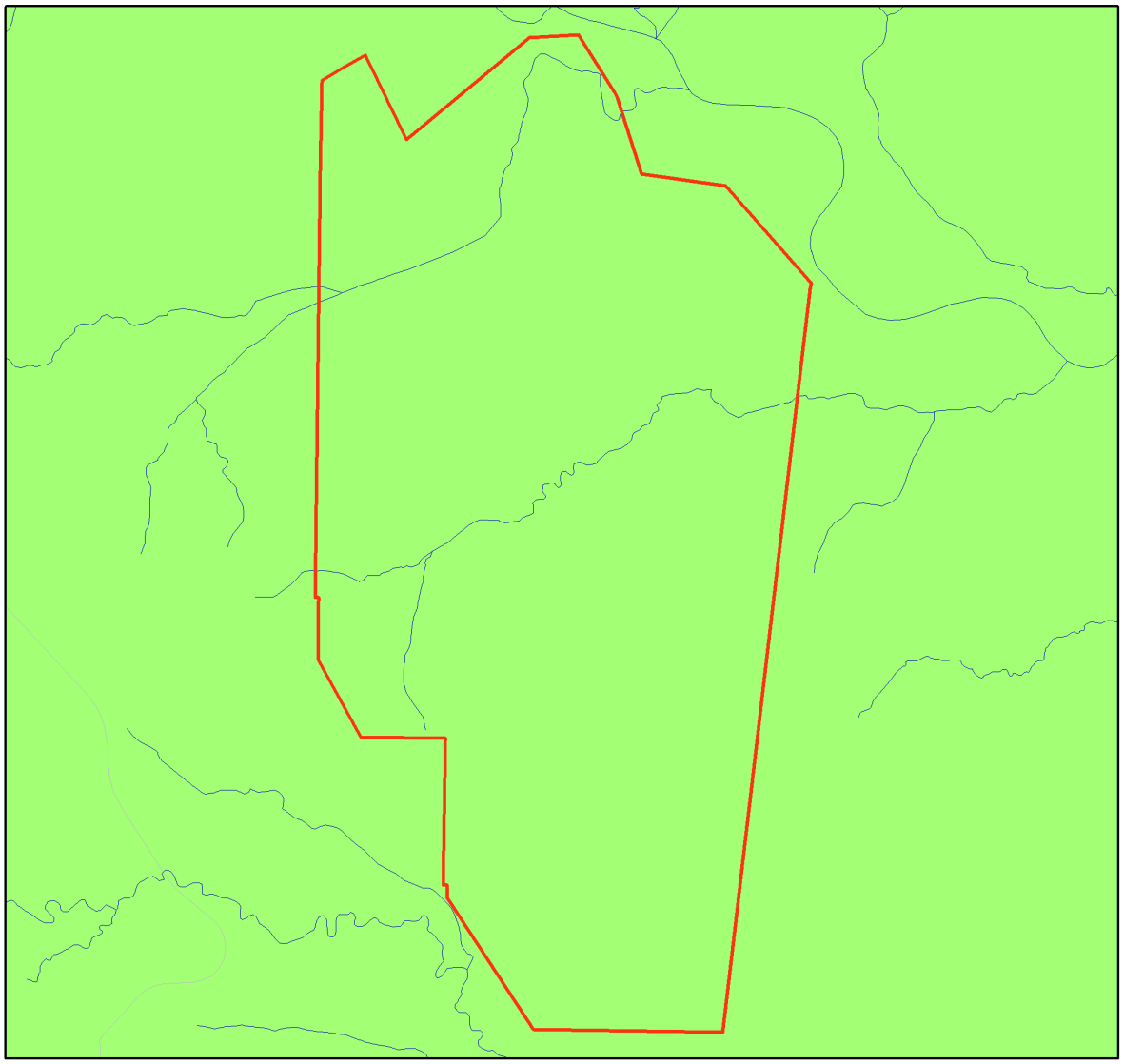
Map 5 - Aquatic Conservation Assessment (ACA) - riverine



Aquatic Conservation Assessment (ACA) - riverine

Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Rivers/Creeks
- Queensland

ACA Riverine - Subcatchment Significance

- Very High
- High
- Medium
- Low
- Very Low

LOCALITY DIAGRAM

N

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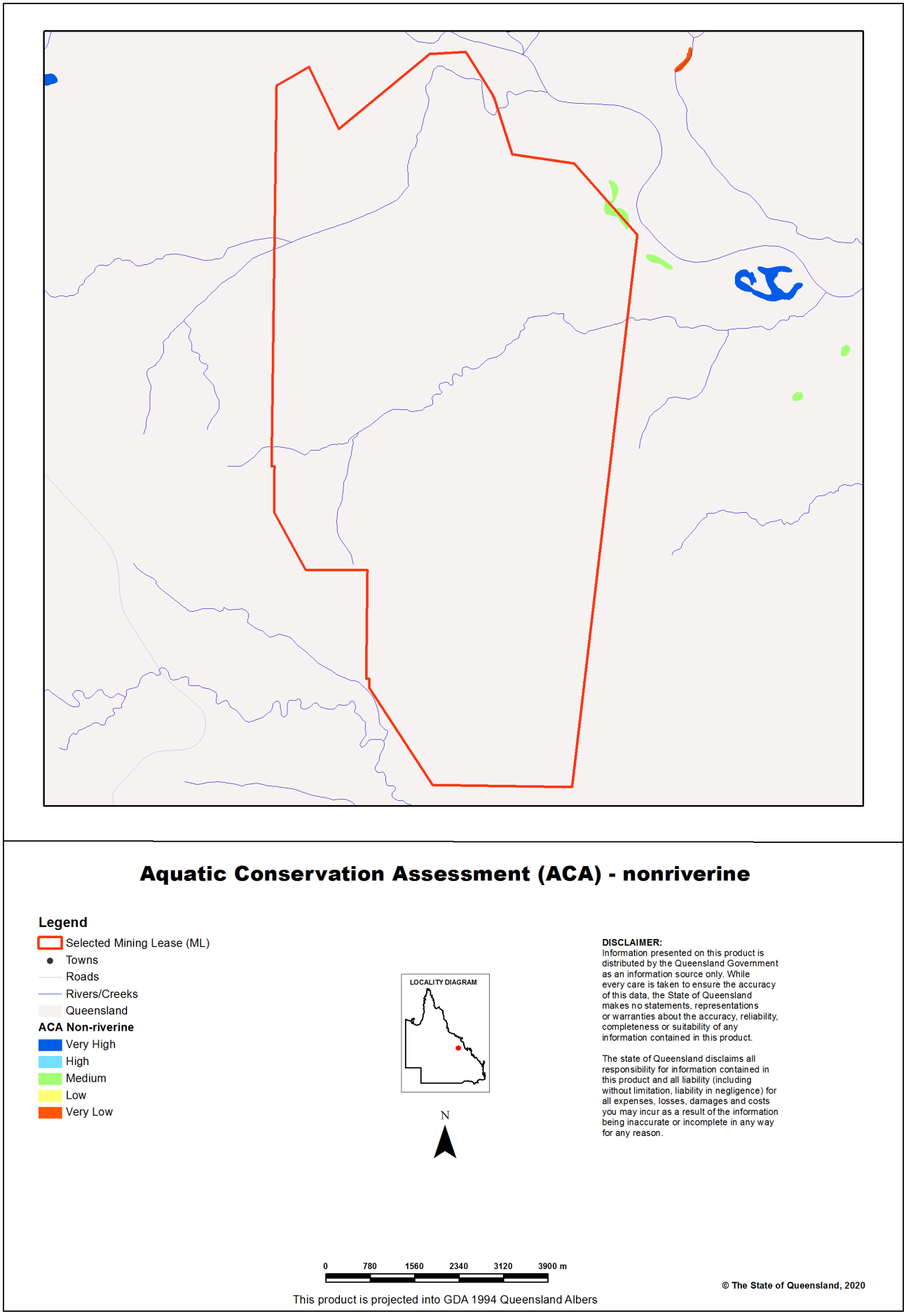
Map 6 - Aquatic Conservation Assessment (ACA) - non-riverine



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Clayton, P.D., Fielder, D.F., Howell, S. and Hill, C.J. (2006) *Aquatic biodiversity assessment and mapping method (AquaBAMM): a conservation values assessment tool for wetlands with trial application in the Burnett River catchment.* Published by the Environmental Protection Agency, Brisbane. ISBN 1-90928-07-3. Available at

http://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca/

Environmental Protection Agency (2002) *Biodiversity Assessment and Mapping Methodology. Version 2.1, July 2002.* (Environmental Protection Agency, Brisbane).

Morton, S. R., Short, J. and Barker, R. D. with an Appendix by G.F. Griffin and G. Pearce (1995). *Refugia for Biological Diversity in Arid and Semi-arid Australia. Biodiversity Series* , Paper No. 4, Biodiversity Unit, Environment Australia.

Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.

Appendices

Appendix 1 - Source Data

Theme	Datasets
Aquatic Conservation Assessments Non-riverine*	Combination of the following datasets: Cape York Peninsula Non-riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Non-riverine v1.3 Lake Eyre and Bulloo Basins v1.1 QMDB Non-riverine ACA v1.4 Southeast Queensland ACA v1.1 WBB Non-riverine ACA v1.1 Southern Gulf Catchments Non-riverine ACA v1.1
Aquatic Conservation Assessments Riverine*	Combination of the following datasets: Cape York Peninsula Riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Riverine v1.1 Lake Eyre and Bulloo Basins v1.1 QMDB Riverine ACA v1.4 Southeast Queensland ACA v1.1 WBB Riverine ACA v1.1 Southern Gulf Catchments Riverine ACA v1.1
Biodiversity Planning Assessments*	Combination of the following datasets: Brigalow Belt BPA v2.1 Cape York Peninsula BPA v1.1 Central Queensland Coast BPA v1.3 Channel Country BPA v1.1 Desert Uplands BPA v1.3 Einasleigh Uplands BPA v1.1 Gulf Plains BPA v1.1 Mitchell Grass Downs BPA v1.1 Mulga Lands BPA v1.4 New England Tableland v2.3 Northwest Highlands v1.1 Southeast Queensland v4.1 Wet Tropics v1.1
Statewide BPA Corridors*	Statewide corridors v1.6
Threatened Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.
BPA Priority Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.
ACA Priority Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.

***These datasets are available at:**

http://dds.information.qld.gov.au/DDS

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
ACA	- Aquatic Conservation Assessment
AQUABAMM	- Aquatic Biodiversity Assessment and Mapping Methodology
BAMM	- Biodiversity Assessment and Mapping Methodology
BoT	- Back on Track
BPA	- Biodiversity Planning Assessment
CAMBA	- China-Australia Migratory Bird Agreement
DES	- Department of Environment and Science
EPBC	- *Environment Protection and Biodiversity Conservation Act 1999*
EVNT	- Endangered, Vulnerable, Near Threatened
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
JAMBA	- Japan-Australia Migratory Bird Agreement
NCA	- *Nature Conservation Act 1992*
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
ROKAMBA	- Republic of Korea-Australia Migratory Bird Agreement

Queensland Government

Department of Environment and Science

Environmental Reports

Biodiversity and Conservation Values

Biodiversity Planning Assessments and Aquatic Conservation Assessments

For the selected area of interest
ml: 700065

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or Area of Interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "Central co-ordinates" option, the resulting assessment area encompasses an area extending from 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: biodiversity.planning@des.qld.gov.au

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Table of Contents

Summary Information

Tables 1 to 8 provide an overview of the AOI with respect to selected topographic and environmental values.

Table 1: Area of interest details: ml: 700065

Size (ha)	135.88
Local Government(s)	Isaac Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Northern Bowen Basin
Catchment(s)	Fitzroy

The following table identifies available Biodiversity Planning Assessments (BPAs) and Aquatic Conservation Assessments (ACAs) with respect to the AOI.

Table 2: Available Biodiversity Planning and Aquatic Conservation Assessments

Assessment Type	Assessment Area and Version
Biodiversity Planning Assessment(s)	Brigalow Belt v2.1
Aquatic Conservation Assessment(s) (riverine)	Great Barrier Reef Catchments v1.1
Aquatic Conservation Assessment(s) (non-riverine)	Great Barrier Reef Catchments v1.3

Table 3: Remnant regional ecosystems within the AOI as per the Qld Herbarium's 'biodiversity status'

Biodiversity Status	Area (Ha)	% of AOI
Endangered	5.42	3.99
Of concern	43.22	31.81
No concern at present	47.81	35.19

The following table identifies the extent and proportion of the user specified area of interest (AOI) which is mapped as being of "State", "Regional" or "Local" significance via application of the Queensland Department of Environment and Science's *Biodiversity Assessment and Mapping Methodology* (BAMM).

Table 4: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	0.0	0.0
State	64.94	47.79
Regional	3.33	2.45
Local or Other Values	28.18	20.74

Table 5: Non-riverine wetlands intersecting the AOI

Non-riverine wetland types intersecting the area of interest	#
(No Records)	

NB. The figures presented in the table above are derived from the relevant non-riverine Aquatic Conservation Assessment(s). Later releases of wetland mapping produced via the Queensland Wetland Mapping Program may provide more recent

information in regards to wetland extent.

Table 6: Named waterways intersecting the AOI

(no results)

Refer to **Map 1** for general locality information.

The following two tables identify the extent and proportion of the user specified AOI which is mapped as being of "Very High", "High", "Medium", "Low", or "Very Low" aquatic conservation value for riverine and non-riverine wetlands via application of the Queensland Department of Environment and Science's *Aquatic Biodiversity Assessment and Mapping Method* (AquaBAMM).

Table 7: Summary table, aquatic conservation significance (riverine)

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	135.88	100.0
Low	0.0	0.0
Very Low	0.0	0.0

Table 8: Summary table, aquatic conservation significance (non-riverine)

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
(No Records)		

Biodiversity Planning Assessments

Introduction

The Department of Environment and Science (DES) attributes biodiversity significance on a bioregional scale through a Biodiversity Planning Assessment (BPA). A BPA involves the integration of ecological criteria using the *Biodiversity assessment and Mapping Methodology* (BAMM) and is developed in two stages: 1) **diagnostic criteria**, and 2) **expert panel criteria**. The diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion, while the expert panel criteria allows for the refinement of the mapped information from the diagnostic output by incorporating local knowledge and expert opinion.

The BAMM methodology has application for identifying areas with various levels of significance solely for biodiversity reasons. These include threatened ecosystems or taxa, large tracts of habitat in good condition, ecosystem diversity, landscape context and connection, and buffers to wetlands or other types of habitat important for the maintenance of biodiversity or ecological processes. While natural resource values such as dryland salinity, soil erosion potential or land capability are not dealt with explicitly, they are included to some extent within the biodiversity status of regional ecosystems recognised by the DES.

Biodiversity Planning Assessments (BPAs) assign three levels of overall biodiversity significance.

- **State significance** - areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed by other studies/processes as being significant at national or international scales. In addition, areas flagged as being of State significance due to the presence of endangered, vulnerable and/or near threatened taxa, are identified as "State Habitat for EVNT taxa".
- **Regional significance** - areas assessed as being significant for biodiversity at the subregional scale. These areas have lower significance for biodiversity than areas assessed as being of State significance.
- **Local significance and/or other values** - areas assessed as not being significant for biodiversity at state or regional scales. Local values are of significance at the local government scale.

For further information on released BPAs and a copy of the underlying methodology, go to:

http://www.qld.gov.au/environment/plants-animals/biodiversity/planning/

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

http://qspatial.information.qld.gov.au/geoportal/

The following table identifies the extent and proportion of the user specified AOI which is mapped as being of "State", "Regional" or "Local" significance via application of the BAMM.

Table 9: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	0.0	0.0
State	64.94	47.79
Regional	3.33	2.45
Local or Other Values	28.18	20.74

Refer to **Map 2** for further information.

Diagnostic Criteria

Diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion. These criteria are diagnostic in that they are used to filter the available data and provide a "first-cut" or initial determination of biodiversity significance. This initial assessment is then combined through a second group of other essential criteria.

A description of the individual diagnostic criteria is provided in the following sections.

Criteria A. Habitat for EVNT taxa: Classifies areas according to their significance based on the presence of endangered, vulnerable and/or rare (EVNT) taxa. EVNT taxa are those scheduled under the *Nature Conservation Act 1992* and/or the

Environment Protection and Biodiversity Conservation Act 1999. It excludes highly mobile fauna taxa which are instead considered in Criterion H and brings together information on EVNT taxa using buffering of recorded sites or habitat suitability models (HSM) where available.

Criteria B. Ecosystem value: Classifies on the basis of biodiversity status of regional ecosystems, their extent in protected areas (presence of poorly conserved regional ecosystems), the presence of significant wetlands; and areas of national importance such as the presence of Threatened Ecological Communities, World Heritage areas and Ramsar sites. Ecosystem value is applied at a bioregional (**B1**) and regional (**B2**) scale.

Criteria C. Tract size: Measures the relative size of tracts of vegetation in the landscape. The size of any tract is a major indicator of ecological significance, and is also strongly correlated with the long-term viability of biodiversity values. Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts.

Criteria D. Relative size of regional ecosystems: Classifies the relative size of each regional ecosystem unit within its bioregion (**D1**) and its subregion (**D2**). Remnant units are compared with all other occurrences with the same regional ecosystem. Large examples of a regional ecosystem are more significant than smaller examples of the same regional ecosystem because they are more representative of the biodiversity values particular to the regional ecosystem, are more resilient to the effects of disturbance, and constitute a significant proportion of the total area of the regional ecosystem.

Criteria F. Ecosystem diversity: Is an indicator of the number of regional ecosystems occurring within an area. An area with high ecosystem diversity will have many regional ecosystems and ecotones relative to other areas within the bioregion.

Criteria G. Context and connection: Represents the extent to which a remnant unit incorporates, borders or buffers areas such as significant wetlands, endangered ecosystems; and the degree to which it is connected to other vegetation.

A summary of the biodiversity status based upon the diagnostic criteria is provided in the following table.

Table 10: Summary of biodiversity significance based upon diagnostic criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Nat. Threatened Ecol. Community (B1) & Remnant contains at least one Of Concern RE (B1)	30.03	22.1
State	Remnant contains at least 1 Endangered RE (B1) & Nat. Threatened Ecol. Community (B1)	3.61	2.66
State	Remnant contains at least 1 Vulnerable or Near Threatened species (A) & Nat. Threatened Ecol. Community (B1)	31.29	23.03
Regional	Remnant is part of a Tract that is one of the largest in the bioregion (C) & Remnant has high connectivity or buffers an endangered RE or Significant Wetland (G)	3.33	2.45
Local or Other Values	Refer to diagnostic data for additional information	28.18	20.74

Assessment of diagnostic criteria with respect to the AOI

The following table reflects an assessment of the individual diagnostic criteria noted above in regards to the AOI.

Table 11: Assessment of individual diagnostic criteria with respect to the AOI

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
A: Habitat for EVNT Taxa			32.91	24.2	52.77	38.8	10.78	7.9
B1: Ecosystem Value (Bioregion)	64.94	47.8			31.52	23.2		
B2: Ecosystem Value (Subregion)			3.61	2.7	92.85	68.3		
C: Tract Size	96.45	71.0					0.01	
D1: Relative RE Size (Bioregion)							96.46	71.0
D2: Relative RE Size (Subregion)							96.46	71.0
F: Ecosystem Diversity			71.49	52.6	0.15	0.1	24.82	18.3
G: Context and Connection	43.82	32.2	29.92	22.0	22.72	16.7		

Other Essential Criteria

Other essential criteria (also known as expert panel criteria) are based on non-uniform information sources and which may rely more upon expert opinion than on quantitative data. These criteria are used to provide a "second-cut" determination of biodiversity significance, which is then combined with the diagnostic criteria for an overall assessment of relative biodiversity significance. A summary of the biodiversity status based upon the other essential criteria is provided in the following table.

Table 12: Summary of biodiversity significance based upon other essential criteria with respect to the AOI

(No Records)

A description of each of the other essential criteria and associated assessment in regards to the AOI is provided in the following sections.

Criteria H. Essential and general habitat for priority taxa: Priority taxa are those which are at risk or of management concern, taxa of scientific interest as relictual (ancient or primitive), endemic taxa or locally significant populations (such as a flying fox camp or heronry), highly specialised taxa whose habitat requirements are complex and distributions are not well correlated with any particular regional ecosystem, taxa important for maintaining genetic diversity (such as complex spatial patterns of genetic variation, geographic range limits, highly disjunct populations), taxa critical for management or monitoring of biodiversity (functionally important or ecological indicators), or economic and culturally important taxa.

Criteria I. Special biodiversity values: areas with special biodiversity values are important because they contain multiple taxa in a unique ecological and often highly biodiverse environment. Areas with special biodiversity values can include the following:

- Ia - centres of endemism - areas where concentrations of taxa are endemic to a bioregion or subregion are found.
- Ib - wildlife refugia (Morton *et al*. 1995), for example, islands, mound springs, caves, wetlands, gorges, mountain ranges and topographic isolates, ecological refuges, refuges from exotic animals, and refuges from clearing. The latter may include large areas that are not suitable for clearing because of land suitability/capability.
- Ic - areas with concentrations of disjunct populations.
- Id - areas with concentrations of taxa at the limits of their geographic ranges.
- Ie - areas with high species richness.
- If - areas with concentrations of relictual populations (ancient and primitive taxa).
- Ig - areas containing REs with distinct variation in species composition associated with geomorphology and other environmental variables.
- Ih - an artificial waterbody or managed/manipulated wetland considered by the panel/s to be of ecological significance.
- Ii - areas with a high density of hollow-bearing trees that provide habitat for animals.
- Ij - breeding or roosting sites used by a significant number of individuals.
- Ik - climate change refuge.

The following table identifies the value and extent area of the Other Essential Criteria H and I within the AOI.

Table 13: Relative importance of expert panel criteria (H and I) used to access overall biodiversity significance with respect to the AOI

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
H: Core Habitat Priority Taxa								
Ia: Centres of Endemism								
Ib: Wildlife Refugia								
Ic: Disjunct Populations								
Id: Limits of Geographic Ranges								
Ie: High Species Richness								

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
If: Relictual Populations								
Ig: Variation in Species Composition								
Ih: Artificial Wetland								
Ii: Hollow Bearing Trees								
Ij: Breeding or Roosting Site								
Ik: Climate Refugia								

NB. Whilst biodiversity values associated with Criteria I may be present within the site (refer to tables 12 and 15), for the New England Tableland and Central Queensland Coast BPAs, area and % area figures associated with Criteria Ia through to Ij cannot be listed in the table above (due to slight variations in data formats between BPAs).

Criteria J. Corridors: areas identified under this criterion qualify either because they are existing vegetated corridors important for contiguity, or cleared areas that could serve this purpose if revegetated. Some examples of corridors include riparian habitats, transport corridors and "stepping stones".

Bioregional and subregional conservation corridors have been identified in the more developed bioregions of Queensland through the BPAs, using an intensive process involving expert panels. Map 3 displays the location of corridors as identified under the Statewide Corridor network. The Statewide Corridor network incorporates BPA derived corridors and for bioregions where no BPA has been assessed yet, corridors derived under other planning processes. *Note: as a result of updating and developing a statewide network, the alignment of corridors may differ slightly in some instances when compared to those used in individual BPAs.*

The functions of these corridors are:

- **Terrestrial** Bioregional corridors, in conjunction with large tracts of remnant vegetation, maintain ecological and evolutionary processes at a landscape scale, by:

  • Maintaining long term evolutionary/genetic processes that allow the natural change in distributions of species and connectivity between populations of species over long periods of time;

  • Maintaining landscape/ecosystems processes associated with geological, altitudinal and climatic gradients, to allow for ecological responses to climate change;

  • Maintaining large scale seasonal/migratory species processes and movement of fauna;

  • Maximising connectivity between large tracts/patches of remnant vegetation;

  • Identifying key areas for rehabilitation and offsets; and

- **Riparian** Bioregional Corridors also maintain and encourage connectivity of riparian and associated ecosystems.

The location of the corridors is determined by the following principles:

- Terrestrial

  • Complement riparian landscape corridors (i.e. minimise overlap and maximise connectivity);

  • Follow major watershed/catchment and/or coastal boundaries;

  • Incorporate major altitudinal/geological/climatic gradients;

  • Include and maximise connectivity between large tracts/patches of remnant vegetation;

  • Include and maximise connectivity between remnant vegetation in good condition; and

- Riparian

  • Located on the major river or creek systems within the bioregion in question.

The total extent of remnant vegetation triggered as being of "State", "Regional" or "Local" significance due to the presence of an overlying BPA derived terrestrial or riparian corridor within the AOI, is provided in the following table. For further

information on how remnant vegetation is triggered due to the presence of an overlying BPA derived corridor, refer to the relevant landscape BPA expert panel report(s).

Table 14: Extent of triggered remnant vegetation due to the presence of BPA derived corridors with respect to the AOI

Biodiversity Significance	Area (Ha)	% of AOI
State	0.0	0.0
Regional	0.0	0.0
Local	0.0	0.0

NB: area figures associated with the extent of corridor triggered remnant vegetation are only available for those bioregions where a BPA has been undertaken.

Refer to **Map 3** for further information.

Threatening process/condition (Criteria K) - areas identified by experts under this criterion may be used to amend (upgrade or downgrade) biodiversity significance arising from the "first-cut" analysis. The condition of remnant vegetation is affected by threatening processes such as weeds, ferals, grazing and burning regime, selective timber harvesting/removal, salinity, soil erosion, and climate change.

Assessment of Criteria K with respect to the AOI is not currently included in the "Biodiversity and Conservation Values" report, as it has not been applied to the majority of Queensland due to data/information limitations and availability.

Special Area Decisions

Expert panel derived "Special Area Decisions" are used to assign values to Other Essential Criteria. The specific decisions which relate to the AOI in question are listed in the table below.

Table 15: Expert panel decisions for assigning levels of biodiversity significance with respect to the AOI

(No Records)

Expert panel decision descriptions:

(No Records)

Aquatic Conservation Assessments

Introduction

The Aquatic Biodiversity Assessment and Mapping Method or AquaBAMM (Clayton *et al.* 2006), was developed to assess conservation values of wetlands in queensland, and may also have application in broader geographical contexts. It is a comprehensive method that uses available data, including data resulting from expert opinion, to identify relative wetland conservation/ecological values within a specified study area (usually a catchment). The product of applying this method is an Aquatic Conservation Assessment (ACA) for the study area.

An ACA using AquaBAMM is non-social, non-economic and identifies the conservation/ecological values of wetlands at a user-defined scale. It provides a robust and objective conservation assessment using criteria, indicators and measures that are founded upon a large body of national and international literature. The criteria, each of which may have variable numbers of indicators and measures, are naturalness (aquatic), naturalness (catchment), diversity and richness, threatened species and ecosystems, priority species and ecosystems, special features, connectivity and representativeness. An ACA using AquaBAMM is a powerful decision support tool that is easily updated and simply interrogated through a geographic information system (GIS).

Where they have been conducted, ACAs can provide a source of baseline wetland conservation/ecological information to support natural resource management and planning processes. They are useful as an independent product or as an important foundation upon which a variety of additional environmental and socio-economic elements can be added and considered (i.e. an early input to broader 'triple-bottom-line' decision-making processes). An ACA can have application in:

- determining priorities for protection, regulation or rehabilitation of wetlands and other aquatic ecosystems
- on-ground investment in wetlands and other aquatic ecosystems
- contributing to impact assessment of large-scale development (e.g. dams)
- water resource and strategic regional planning prcesses

For a detailed explanation of the methodology please refer to the summary and expert panel reports relevant to the ACA utilised in this assessment. These reports can be accessed at Wetland *Info*:

http://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

http://qspatial.information.qld.gov.au/geoportal/

Explanation of Criteria

Under the AquaBAMM, eight criteria are assessed to derive an overall conservation value. Similar to the Biodiversity Assessment and Mapping Methodology, the criteria may be primarily diagnostic (quantitative) or primarily expert opinion (qualitative) in nature. The following sections provide a brief description of each of the 8 criteria.

Criteria 1. Naturalness - Aquatic: This attribute reflects the extent to which a wetland's (riverine, non-riverine, estuarine) aquatic state of naturalness is affected through relevant influencing indicators which include: presence of exotic flora and fauna; presence of aquatic communities; degree of habitat modification and degree of hydrological modification.

Criteria 2. Naturalness - Catchment: The naturalness of the terrestrial systems of a catchment can have an influence on many wetland characteristics including: natural ecological processes e.g. nutrient cycling, riparian vegetation, water chemistry, and flow. The indicators utilised to assess this criterion include: presence of exotic flora and/or fauna; riparian, catchment and flow modification.

Criteria 3. Naturalness - Diversity and Richness: This criterion is common to many ecological assessment methods and can include both physical and biological features. It includes such indicators as species richness, riparian ecosystem richness and geomorphological diversity.

Criteria 4. Threatened Species and Ecosystems: This criterion evaluates ecological rarity characteristics of a wetland. This includes both species rarity and rarity of communities / assemblages. The communities and assemblages are best represented by regional ecosystems. Species rarity is determined by NCA and EPBC status with Endangered, Vulnerable or Near-threatened species being included in the evaluation. Ecosystem rarity is determined by regional ecosystem biodiversity status i.e. Endangered, Of Concern, or Not of Concern.

Criteria 5. Priority Species and Ecosystems: Priority flora and fauna species lists are expert panel derived. These are aquatic, semi-aquatic and riparian species which exhibit at least 1 particular trait in order to be eligible for consideration. For

flora species the traits included:

- It forms significant macrophyte beds (in shallow or deep water).
- It is an important food source.
- It is important/critical habitat.
- It is implicated in spawning or reproduction for other fauna and/or flora species.
- It is at its distributional limit or is a disjunct population.
- It provides stream bank or bed stabilisation or has soil binding properties.
- It is a small population and subject to threatening processes.

Fauna species are included if they meet at least one of the following traits:

- It is endemic to the study area (>75 per cent of its distribution is in the study area/catchment).
- It has experienced, or is suspected of experiencing, a serious population decline.
- It has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area/catchment.
- It is currently a small population and threatened by loss of habitat.
- It is a significant disjunct population.
- It is a migratory species (other than birds).
- A significant proportion of the breeding population (>one per cent for waterbirds, >75 per cent other species) occurs in the waterbody (see Ramsar criterion 6 for waterbirds).
- Limit of species range.

See the individual expert panel reports for the priority species traits specific to an ACA.

Criteria 6. Special Features: Special features are areas identified by flora, fauna and ecology expert panels which exhibit characteristics beyond those identified in other criteria and which the expert panels consider to be of the highest ecological importance. Special feature traits can relate to, but are not solely restricted to geomorphic features, unique ecological processes, presence of unique or distinct habitat, presence of unique or special hydrological regimes e.g. spring-fed streams. Special features are rated on a 1 - 4 scale (4 being the highest).

Criteria 7. Connectivity: This criterion is based on the concept that appropriately connected aquatic ecosystems are healthy and resilient, with maximum potential biodiversity and delivery of ecosystem services.

Criteria 8. Representativeness: This criterion applies primarily to non-riverine assessments, evaluates the rarity and uniqueness of a wetland type in relation to specific geographic areas. Rarity is determined by the degree of wetland protection within "protected Areas" estate or within an area subject to the *Fisheries Act 1994*, *Coastal Protection and Management Act 1995*, or *Marine Parks Act 2004*. Wetland uniqueness evaluates the relative abundance and size of a wetland or wetland management group within geographic areas such as catchment and subcatchment.

Riverine Wetlands

Riverine wetlands are all wetlands and deepwater habitats within a channel. The channels are naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water. AquaBAMM, when applied to riverine wetlands uses a discrete spatial unit termed subsections. A subsection can be considered as an area which encompasses discrete homogeneous stream sections in terms of their natural attributes (i.e. physical, chemical, biological and utilitarian values) and natural resources. Thus in an ACA, an aquatic conservation significance score is calculated for each subsection and applies to all streams within a subsection, rather than individual streams as such.

Please note, the area figures provided in Tables 16 and 17, are derived using the extent of riverine subsections within the AOI. Refer to **Map 5** for further information. A summary of the conservation significance of riverine wetlands within the AOI is provided in the following table.

Table 16: Overall level/s of riverine aquatic conservation significance

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
High	0.0	0.0
Medium	135.88	100.0
Low	0.0	0.0
Very Low	0.0	0.0

The individual aquatic conservation criteria ratings for riverine wetlands within the AOI are listed below.

Table 17: Level/s of riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic					112.54	82.8	23.34	17.2
2. Naturalness catchment	124.24	91.4	11.64	8.6				
3. Diversity and richness			11.64	8.6	124.24	91.4		
4. Threatened species and ecosystems			135.88	100.0				
5. Priority species and ecosystems			11.64	8.6				
6. Special features								
7. Connectivity					124.24	91.4	11.64	8.6
8. Representative-ness								

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to riverine wetlands within the AOI.

Table 18: Expert panel decisions for assigning overall levels of riverine aquatic conservation significance

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
(No Records)				

4 is the highest rating/value

Expert panel decision descriptions:

(No Records)

Non-riverine Wetlands

Non-riverine wetlands include both lacustrine and palustrine wetlands, however, do not currently incorporate estuarine, marine or subterranean wetland types. A summary of the conservation significance of non-riverine wetlands within the AOI is provided in the following table. Refer to **Map 6** for further information.

Table 19: Overall level/s of non-riverine aquatic conservation significance

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
(No Records)		

The following table provides an assessment of non-riverine wetlands within the AOI and associated aquatic conservation criteria values.

Table 20: Level/s of non-riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
(No Records)								

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to non-riverine wetlands within the AOI.

Table 21: Expert panel decisions for assigning overall levels of non-riverine aquatic conservation significance.

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
(No Records)				

4 is the highest rating/value

Expert panel decision descriptions:

(No Records)

Threatened and Priority Species

Introduction

This chapter contains a list of threatened and priority flora and/or fauna species that have been recorded on, or within 4km of the Assessment Area.

The information presented in this chapter with respect to species presence is derived from compiled databases developed primarily for the purpose of BPAs and ACAs. Data is collated from a number of sources and is updated periodically.

It is important to note that the list of species provided in this report, may differ when compared to other reports generated from other sources such as the State government's WildNet, Herbrecs or the federal government's EPBC database for a number of reasons.

Records for threatened and priority species are filtered and checked based on a number of rules including:

- Taxonomic nomenclature - current scientific names and status,
- Location - cross-check co-ordinates with location description,
- Taxon by location - requires good knowledge of the taxon and history of the record,
- Duplicate records - identify and remove,
- Expert panels - check records and provide new records,
- Flora cultivated records excluded,
- Use precise records less than or equal to 2000m,
- Use recent records greater than or equal to 1975 animals, greater than or equal to 1950 plants.

Threatened Species

Threatened species are those species classified as "Endangered" or "Vulnerable" under the *Environment Protection and Biodiversity Conservation Act 1999* or "Endangered", "Vulnerable" or "Near threatened" under the *Nature Conservation Act 1992*.

The following threatened species have been recorded on, or within approximately 4km of the AOI.

Table 22: Threatened species recorded on, or within 4km of the AOI

Species	Common name	NCA status	EPBC status	Back on Track rank	Migratory species*	Wetland species**	Identified flora/fauna
Denisonia maculata	ornamental snake	V	V	Medium			FA
Geophaps scripta scripta	squatter pigeon (southern subspecies)	V	V	Medium			FA
Petauroides volans	greater glider	V	V	Low			FA
Phascolarctos cinereus	koala	V	V	Low			FA
Rostratula australis	Australian painted snipe	E	E	Medium		Y	FA

NB. Please note that the threatened species listed in this section are based upon the most recently compiled DES internal state-wide threatened species dataset. This dataset may contain additional records that were not originally available for inclusion in the relevant individual BPAs and ACAs.

**JAMBA - Japan-Australia Migratory Bird Agreement; CAMBA - China-Australia Migratory Bird Agreement; ROKAMBA - Republic of Korea-Australia Migratory Bird Agreement; CMS - Convention on the Conservation of Migratory Species*.

***Y - wetland indicator species*.

BPA Priority Species

A list of BPA priority species that have been recorded on, or within approximately 4km of the AOI is contained in the following table.

Table 23: Priority species recorded on, or within 4km of the AOI

Species	Common name	Back on Track rank	Identified flora/fauna
Carlia rubigo	Orange-flanked Rainbow Skink	None	FA
Gehyra catenata	None	L	FA
Mogurnda adspersa	Southern Purplespotted Gudgeon	L	FA
Petaurus australis australis	Yellow-bellied Glider (southern subsp.)	H	FA
Porochilus rendahli	Rendahl's Catfish	L	FA

NB. Please note that the list of priority species is based on those species identified in the BPAs, however records for these species may be more recent than the originals used. furthermore, the BPA priority species databases are updated from time to time. At each update, the taxonomic details for all species are amended as necessary to reflect current taxonomic name and/or status changes.

ACA Priority Species

A list of ACA priority species used in riverine and non-riverine ACAs that have been recorded on, or within approximately 4km of the AOI are contained in the following tables.

Table 24: Priority species recorded on, or within 4 km of the AOI - riverine

(no results)

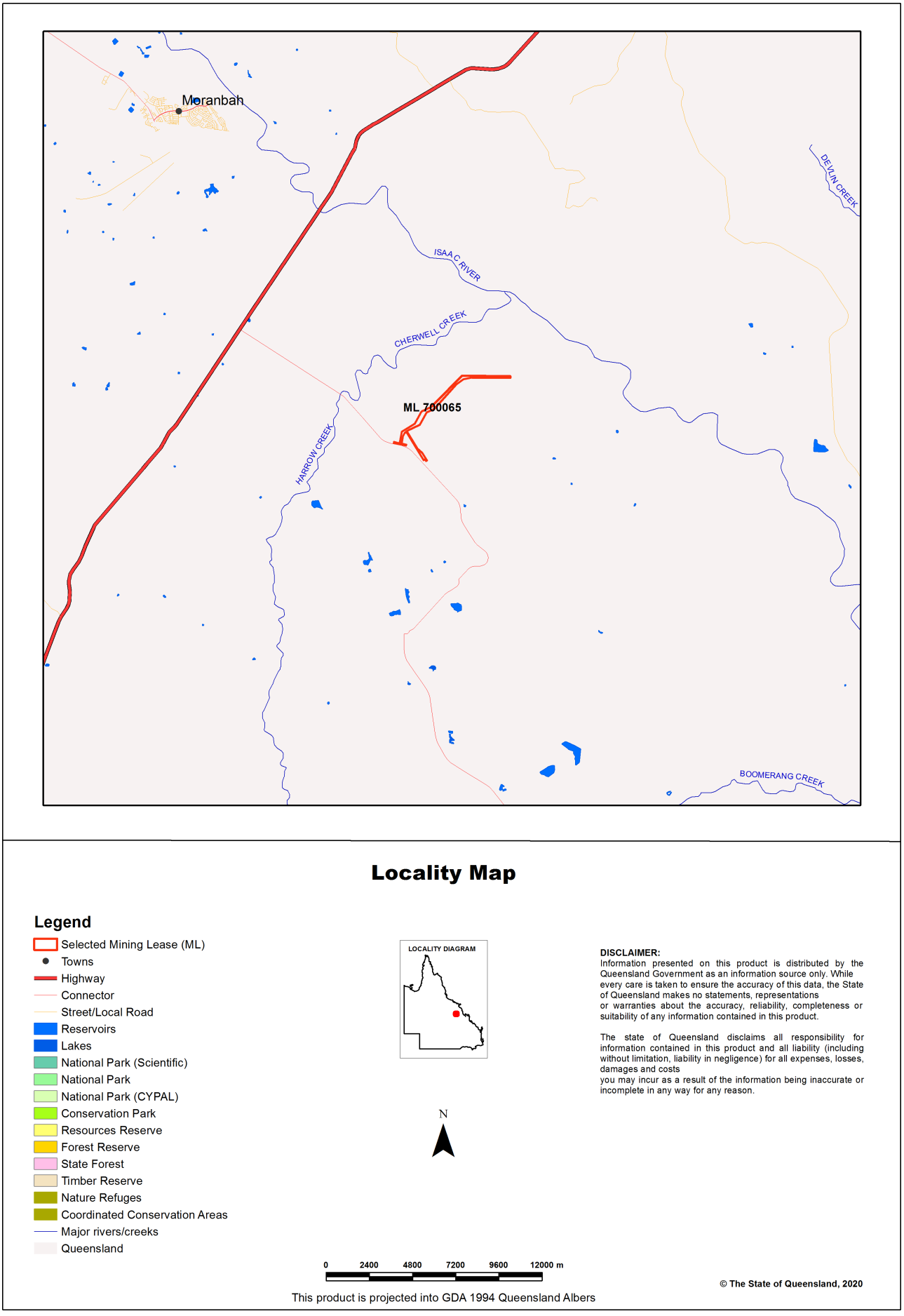
Table 25: Priority species recorded on, or within 4 km of the AOI - non-riverine

(no results)

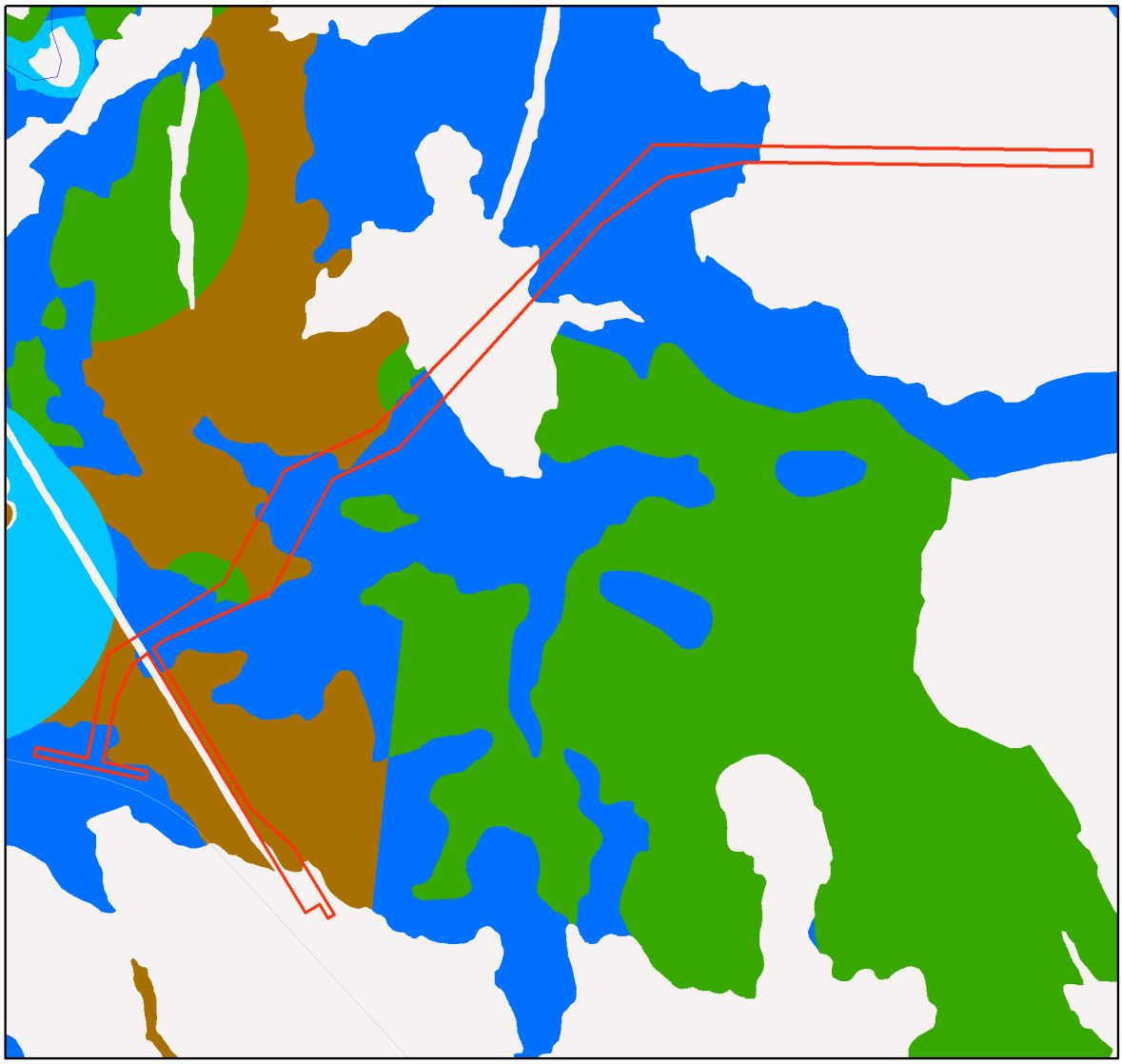
NB. Please note that the priority species records used in the above two tables are comprised of those adopted for the released individual ACAs. The ACA riverine and non-riverine priority species databases are updated from time to time to reflect new release of ACAs. At each update, the taxonomic details for all ACAs records are amended as necessary to reflect current taxonomic name and/or status changes.

Maps

Map 1 - Locality Map



Map 2 - Biodiversity Planning Assessment (BPA)



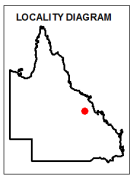
Biodiversity Planning Assessments

Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Major rivers/creeks
- Queensland

Biodiversity Planning Assessment

- State Habitat for EVNT taxa
- State
- Regional
- Local or Other Values
- Non Bioregion Ecosystem



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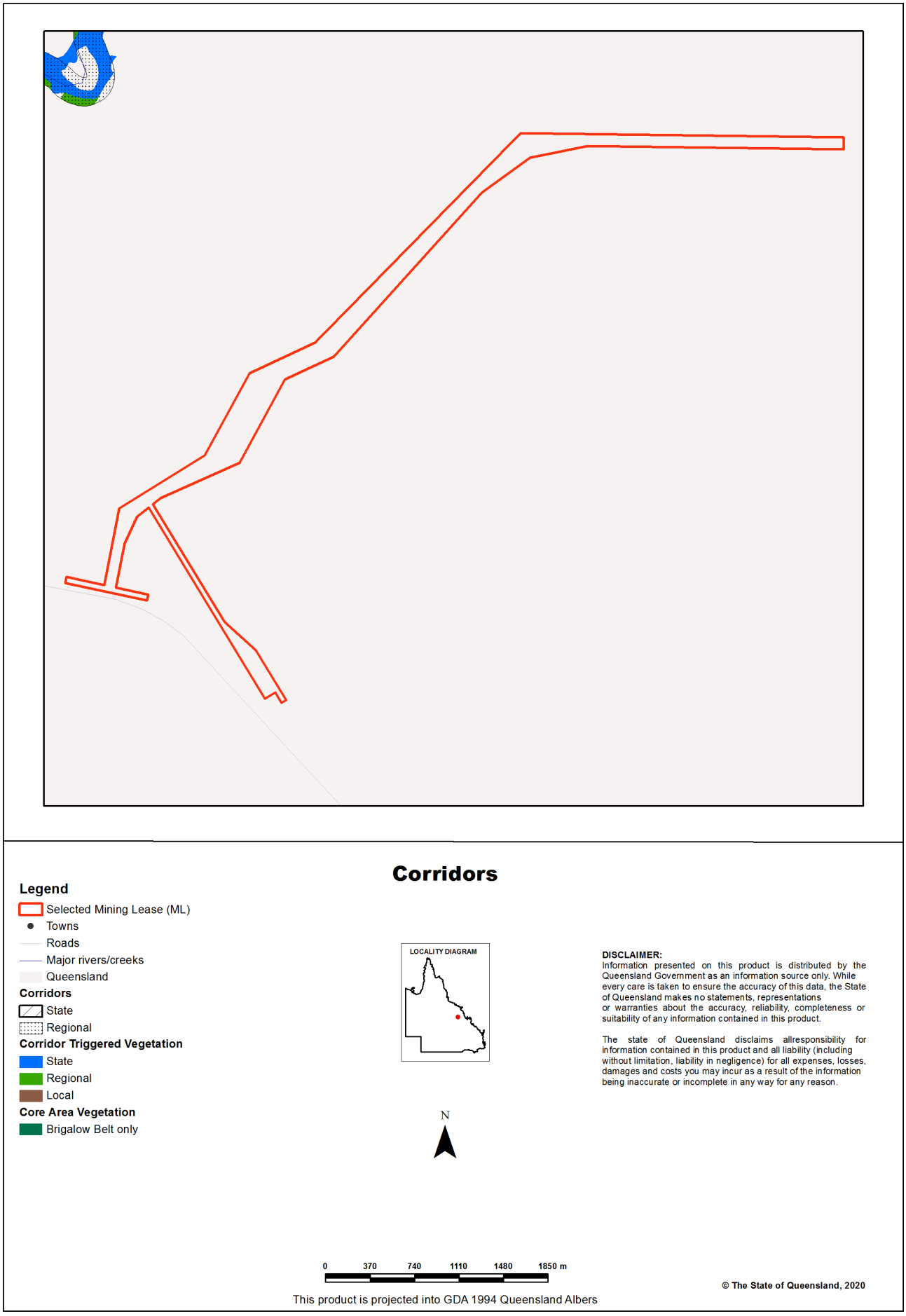
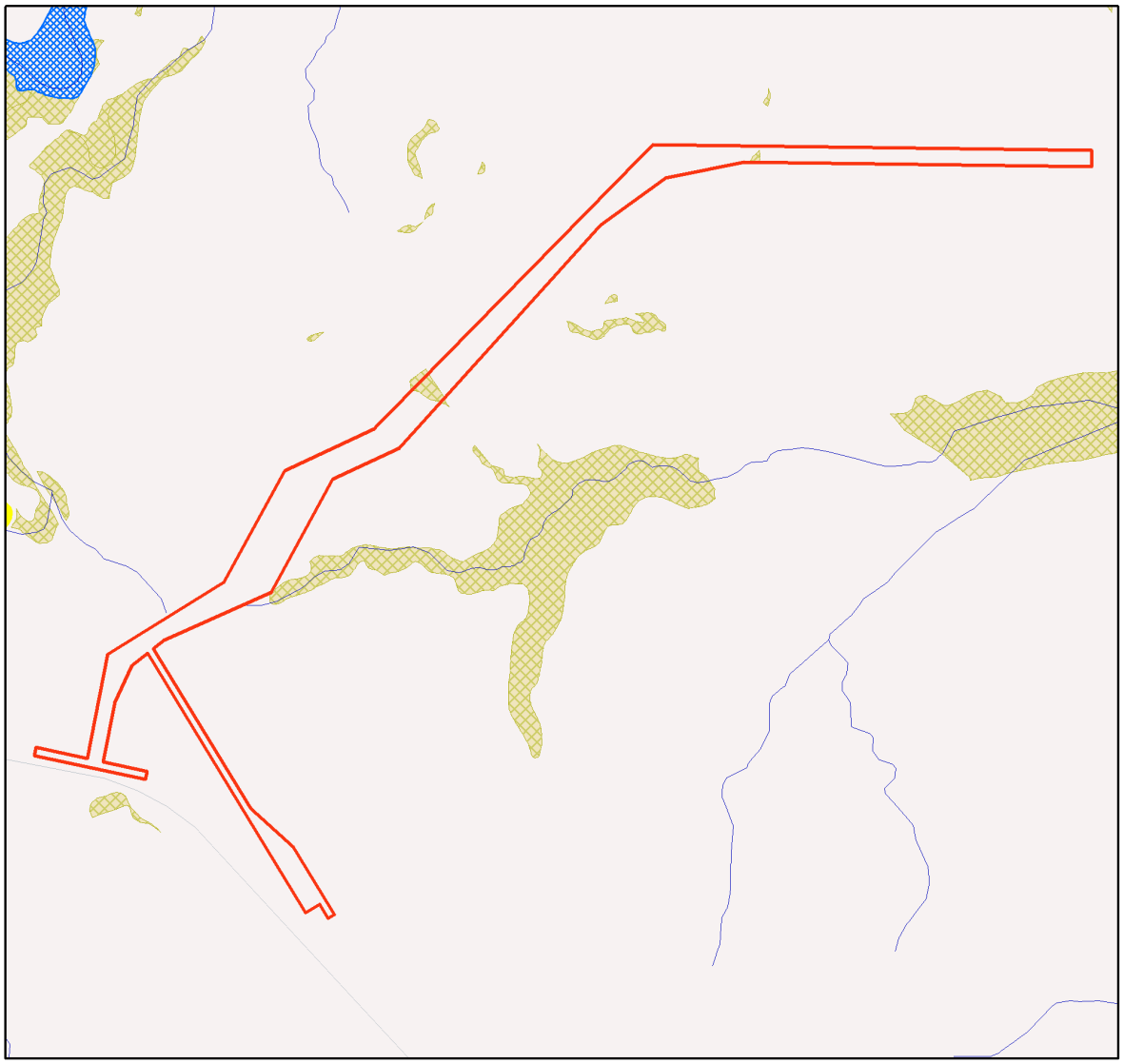
Map 3 - Corridors



Map 4 - Wetlands and waterways



Wetlands and Waterways

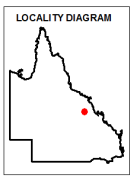
Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Springs
- Rivers/Creeks
- Directory of Important Wetlands
- Ramsar Sites - QLD
- Queensland

Wetland Type

- Marine Waterbodies
- Estuarine Waterbodies
- Riverine Waterbodies
- Lacustrine Waterbodies
- Palustrine Waterbodies
- Marine RE
- Estuarine RE
- Riverine RE
- Lacustrine RE
- Palustrine RE
- RE 51-80% wetland (mosaic units)
- RE 1-50% wetland (mosaic units)

LOCALITY DIAGRAM



N

0 370 740 1110 1480 1850 m

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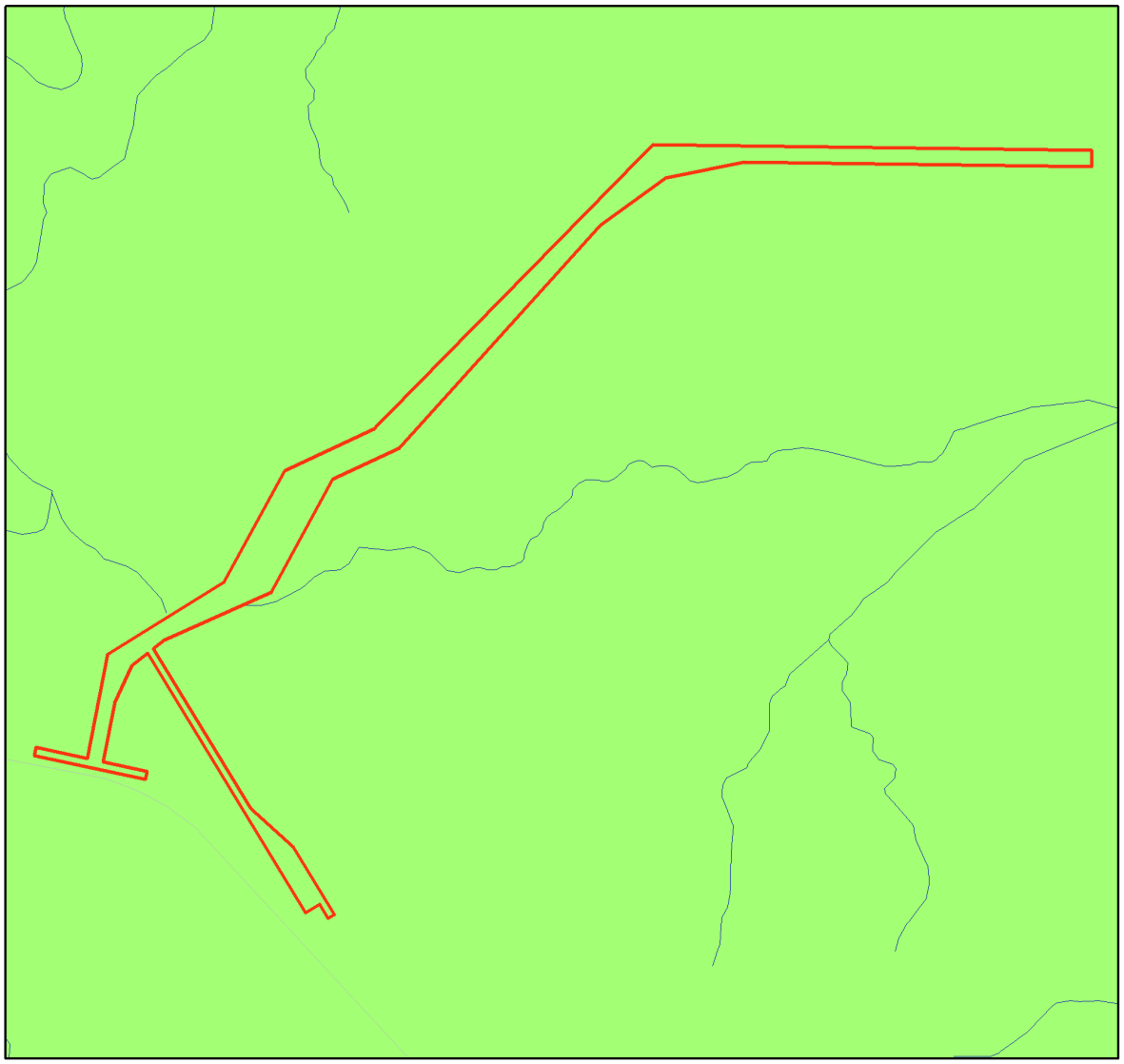
Map 5 - Aquatic Conservation Assessment (ACA) - riverine



Aquatic Conservation Assessment (ACA) - riverine

Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Rivers/Creeks
- Queensland

ACA Riverine - Subcatchment Significance

- Very High
- High
- Medium
- Low
- Very Low

LOCALITY DIAGRAM

N

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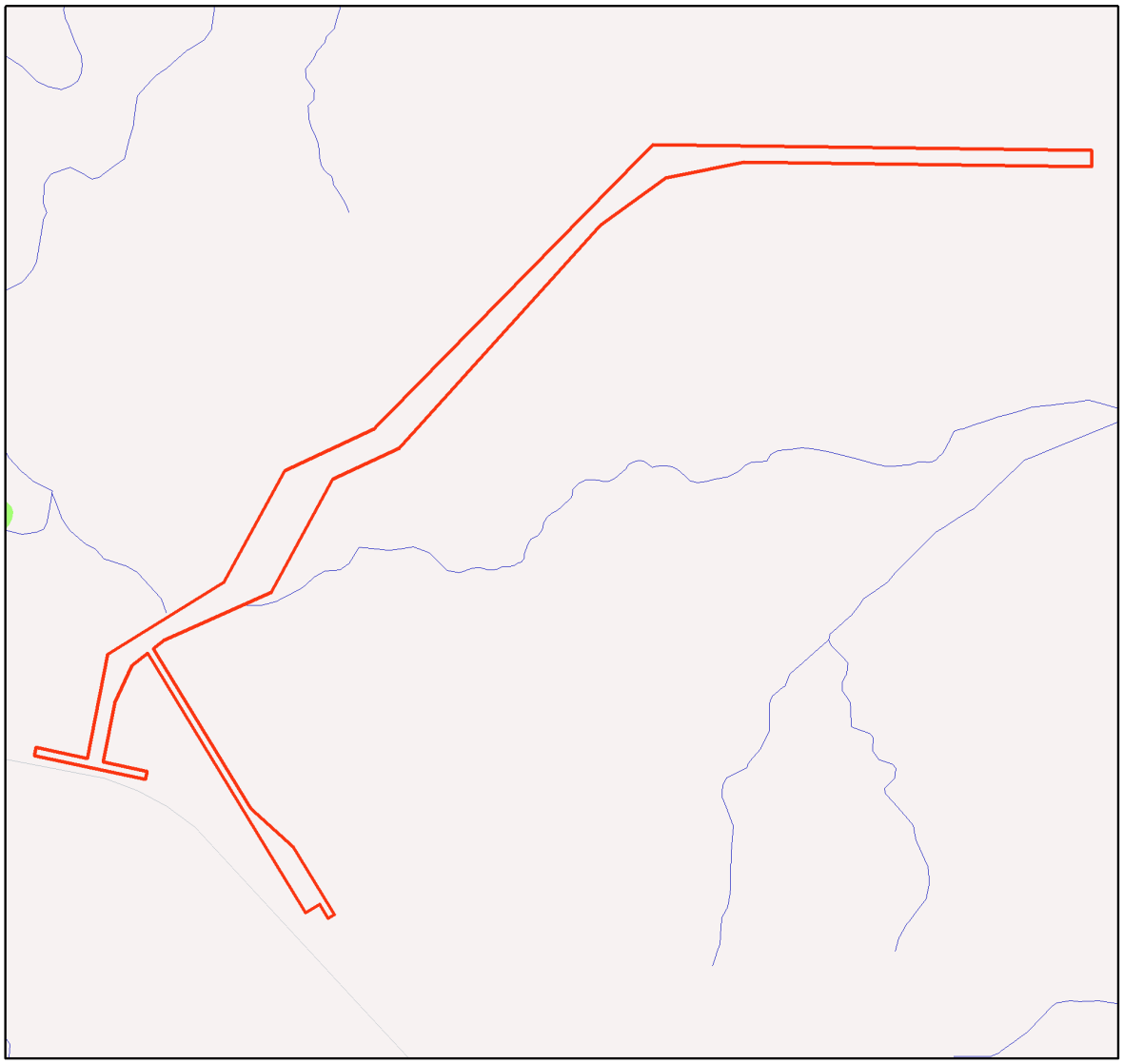
Map 6 - Aquatic Conservation Assessment (ACA) - non-riverine



Aquatic Conservation Assessment (ACA) - nonriverine

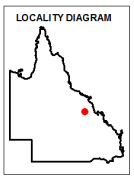
Legend

- Selected Mining Lease (ML)
- Towns
- Roads
- Rivers/Creeks
- Queensland

ACA Non-riverine

- Very High
- High
- Medium
- Low
- Very Low

LOCALITY DIAGRAM



N

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0 370 740 1110 1480 1850 m

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Appendices

Appendix 1 - Source Data

Theme	Datasets
Aquatic Conservation Assessments Non-riverine*	Combination of the following datasets: Cape York Peninsula Non-riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Non-riverine v1.3 Lake Eyre and Bulloo Basins v1.1 QMDB Non-riverine ACA v1.4 Southeast Queensland ACA v1.1 WBB Non-riverine ACA v1.1 Southern Gulf Catchments Non-riverine ACA v1.1
Aquatic Conservation Assessments Riverine*	Combination of the following datasets: Cape York Peninsula Riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Riverine v1.1 Lake Eyre and Bulloo Basins v1.1 QMDB Riverine ACA v1.4 Southeast Queensland ACA v1.1 WBB Riverine ACA v1.1 Southern Gulf Catchments Riverine ACA v1.1
Biodiversity Planning Assessments*	Combination of the following datasets: Brigalow Belt BPA v2.1 Cape York Peninsula BPA v1.1 Central Queensland Coast BPA v1.3 Channel Country BPA v1.1 Desert Uplands BPA v1.3 Einasleigh Uplands BPA v1.1 Gulf Plains BPA v1.1 Mitchell Grass Downs BPA v1.1 Mulga Lands BPA v1.4 New England Tableland v2.3 Northwest Highlands v1.1 Southeast Queensland v4.1 Wet Tropics v1.1
Statewide BPA Corridors*	Statewide corridors v1.6
Threatened Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.
BPA Priority Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.
ACA Priority Species	An internal DES database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.

***These datasets are available at:**

http://dds.information.qld.gov.au/DDS

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
ACA	- Aquatic Conservation Assessment
AQUABAMM	- Aquatic Biodiversity Assessment and Mapping Methodology
BAMM	- Biodiversity Assessment and Mapping Methodology
BoT	- Back on Track
BPA	- Biodiversity Planning Assessment
CAMBA	- China-Australia Migratory Bird Agreement
DES	- Department of Environment and Science
EPBC	- *Environment Protection and Biodiversity Conservation Act 1999*
EVNT	- Endangered, Vulnerable, Near Threatened
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
JAMBA	- Japan-Australia Migratory Bird Agreement
NCA	- *Nature Conservation Act 1992*
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
ROKAMBA	- Republic of Korea-Australia Migratory Bird Agreement

Appendix C Species list

Flora Species List

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]
Acanthaceae	*Brunoniella australis*	blue trumpet	LC	-
	Dipteracanthus australasicus		LC	-
	Pseuderanthemum variabile	pastel flower	LC	-
	Rostellularia adscendens		LC	-
Aizoaceae	*Trianthema portulacastrum*	black pigweed	I	-
	Trianthema triquetra	red spinach	LC	-
Amaranthaceae	*Gomphrena celosioides*		I	-
	Achyranthes aspera		LC	-
	Alternanthera denticulata	lesser joyweed	LC	-
	Alternanthera nana	hairy joyweed	LC	-
	Alternanthera nodiflora	joyweed	LC	-
	Nyssanthes diffusa		LC	-
	Crinum flaccidum	Murray lily	LC	-
Apiaceae	*Eryngium plantagineum*		LC	-
Apocynaceae	*Cryptostegia grandiflora*	rubber vine	I	-
	Alstonia constricta	bitterbark	LC	-
	Carissa ovata	currant bush	LC	-
	Cynanchum viminale		LC	-
	Marsdenia microlepis		LC	-
	Marsdenia viridiflora		LC	-
	Parsonsia lancelolata	northern silkpod	LC	-
Asphodelaceae	*Bulbine bulbosa*	golden lily	LC	-
Asteraceae	*Eclipta prostrata*	white eclipta	I	-
	Parthenium hysterophorus	parthenium weed	I	-
	Tridax procumbens	Tridax daisy	I	-
	Xanthium occidentale	Noogoora burr	I	-
	Apowollastonia spilanthoides		LC	-
	Calotis cuneata		LC	-
	Calotis cuneifolia	burr daisy	LC	-
	Camptacra barbata		LC	-
	Chrysocephalum apiculatum	yellow buttons	LC	-
	Cyanthillium cinereum		LC	-
	Peripleura hispidula		LC	-
	Pterocaulon redolens	pineapple daisy	LC	-
	Pterocaulon serrulatum		LC	-
	Vittadinia sulcata		LC	-

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]
Boraginaceae	*Heliotropium tenuifolium*		LC	-
Byttneriaceae	*Waltheria indica*		LC	-
Cactaceae	*Harrisia martinii*	Harrisia cactus	I	-
	Opuntia stricta	prickly pear	I	-
	Opuntia tomentosa	velvety tree pear	I	-
Caesalpiniaceae	*Senna artemisioides*	silver cassia	LC	-
	Senna occidentalis	coffee senna	I	-
	Cassia brewsteri	Leichhardt bean	LC	-
	Chamaecrista absus		LC	-
	Lysiphyllum carronii	red bauhinia	LC	-
	Lysiphyllum hookeri		LC	-
	Senna barclayana		LC	-
Campanulaceae	*Wahlenbergia queenslandica*		SLC	-
	Wahlenbergia stricta		SLC	-
Capparaceae	*Capparis sp.*	-	-	-
	Apophyllum anomalum	warrior bush	LC	-
	Capparis lasiantha	wait-a-while	LC	-
	Capparis loranthifolia	narrow-leaf bumble	LC	-
	Capparis mitchellii	wild orange	LC	-
Casuarinaceae	*Casuarina cunninghamiana*	river she oak	C	-
	Casuarina cristata	belah	LC	-
Celastraceae	*Denhamia cunninghamii*	-	LC	-
	Denhamia cunninghamiana		LC	-
	Denhamia oleaster		LC	-
Chenopodiaceae	*Atriplex semibaccata*		LC	-
	Einadia polygonoides		LC	-
	Enchylaena tomentosa		LC	-
	Salsola australis		LC	-
	Sclerolaena muricata	black roly-poly	LC	-
	Sclerolaena tetracuspis	brigalow burr	LC	-
Cleomaceae	*Cleome viscosa*	tick-weed	LC	-
Combretaceae	*Terminalia oblongata*		LC	-
Commelinaceae	*Commelina diffusa*	wandering jew	LC	-
	Cyanotis axillaris		LC	-
Convolvulaceae	*Convolvulus graminetinus*		LC	-
	Evolvulus alsinoides		LC	-
	Ipomoea calobra		LC	-

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]
	Ipomoea plebia	bellvine	LC	-
	Polymeria longifolia		LC	-
	Polymeria pusilla		LC	-
Cornaceae	*Albigaardia vaginata*		LC	-
Cucurbitaceae	*Cucumis melo*		LC	-
Cyperaceae	*Cyperus dietrichiae*		LC	-
	Cyperus difformis	rice sedge	LC	-
	Cyperus distans		LC	-
	Cyperus exaltatus	tall flat-sedge	LC	-
	Cyperus fulvus		LC	-
	Cyperus gilesii		LC	-
	Cyperus gracilis		LC	-
	Eleocharis pallens	pale spike-rush	LC	-
	Fimbristylis dichotoma	common fringe-rush	LC	-
Ebenaceae	*Diospyros humilis*	small-leaved ebony	LC	-
Erythroxylaceae	*Erythroxylum australe*	cocaine tree	LC	-
Euphorbiaceae	*Acalypha eremorum*	soft acalypha	LC	-
	Euphorbia drummondii		LC	-
	Euphorbia tannensis		LC	-
Fabaceae	*Glycine sp.*	-	-	-
	Clitoria ternatea	butterfly pea	I	-
	Crotalaria incana		I	-
	Crotalaria juncea	sunhemp	I	-
	Macroptilium atropurpureum	siratro	I	-
	Macroptilium lathyroides	phasey bean	I	-
	Stylosanthes scabra	stylo	I	-
	Aeschynomene indica	budda pea	LC	-
	Crotalaria dissitiflora		LC	-
	Crotalaria medicaginea	trefoil ratlepod	LC	-
	Crotalaria montana		LC	-
	Cullen tenax	emu-foot	LC	-
	Desmodium brachypodum	large ticktrefoil	LC	-
	Galactia tenuiflora		LC	-
	Glycine tomentella		LC	-
	Hovea longipes	brush hovea	LC	-
	Indigofera linifolia		LC	-
	Indigofera linnaei	Birdsville indigo	LC	-

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]
	Lotus australis	Australian trefoil	LC	-
	Rhynchosia minima		LC	-
	Sesbania cannabina		LC	-
	Vigna lanceolata		LC	-
	Zornia muriculata		LC	-
Goodeniaceae	*Goodenia glabra*		LC	-
	Goodenia rotundifolia		LC	-
	Scaevola spinescens	fan bush	LC	-
Hemerocallidaceae	*Dianella caerulea*	blue flax lily	LC	-
	Dianella longifolia		LC	-
Juncaceae	*Juncus usitatus*		LC	-
Lamiaceae	*Ajuga australis*	austral bugle	LC	-
	Basilicum polystachyon		LC	-
	Clerodendrum floribunda	lolly bush	LC	-
	Ocimum tenuiflorum		LC	-
Laxmanniaceae	*Lomandra sp.*	-	-	-
	Eustrephus latifolius	wombat berry	LC	-
	Lomandra longifolia	spiny-headed mat-rush	LC	-
Malvaceae	*Hibiscus sp.*	-	-	-
	Sida sp.	-	-	-
	Sida filiformis		-	-
	Malvastrum americanum		I	-
	Sida cordifolia	flannel weed	I	-
	Sida rhombifolia	Paddy's lucerne	I	-
	Sida spinosa		I	-
	Abutilon halophilum		LC	-
	Abutilon oxycarpum		LC	-
	Abutilon sp.		LC	-
	Gossypium australe		LC	-
	Hibiscus sturtii		LC	-
	Hibiscus verdcourtii		LC	-
	Sida corrugata	corrugated sida	LC	-
	Sida fibulifera	pin sida	LC	-
	Sida hackettiana		LC	-
	Sida rohlenae	shrub sida	LC	-
	Sida trichopoda	hairy sida	LC	-

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]
Marsileaceae	*Marsilea drummondii*	nardoo	LC	-
Meliaceae	*Owenia acidula*	emu apple	LC	-
Mimosaceae	*Vachellia farnesiana*	mimosa bush	I	-
	Acacia excelsa	ironwood	LC	-
	Acacia harpophylla	brigalow	LC	-
	Acacia salicina	sally wattle	LC	-
	Archidendropsis basaltica	dead finish	LC	-
	Neptunia gracilis		LC	-
	Neptunia major		LC	-
Molluginaceae	*Glinus lotoides*	hairy carpet weed	LC	-
Myrtaceae	*Corymbia clarksoniana*	Clarkson's bloodwood	LC	-
	Corymbia dallachiana	Dallachy's gum	LC	-
	Corymbia erythrophloia	red bloodwood	LC	-
	Corymbia tessellaris	Moreton Bay ash	LC	-
	Eucalyptus camaldulensis	river red gum	LC	-
	Eucalyptus cambageana	Dawson gum	LC	-
	Eucalyptus coolabah	coolabah	LC	-
	Eucalyptus melanophloia	silver-leaved ironbark	LC	-
	Eucalyptus orgadophila	mountain coolibah	LC	-
	Eucalyptus populnea	poplar box	LC	-
	Eucalyptus tereticornis	Queensland blue gum	LC	-
	Melaleuca fluviatilis		LC	-
	Melaleuca nervosa		LC	-
Oleaceae	*Jasminum didymum*		LC	-
	Notelaea microcarpa		LC	-
Orchidaceae	*Cymbidium canaliculatum*	black orchid	SLC	-
Oxalidaceae	*Oxalis radicosa*		LC	-
Pentapetaceae	*Melhania oblongifolia*		LC	-
Phyllanthaceae	*Breynia oblongifolia*	coffee bush	LC	-
	Phyllanthus maderaspatensis		LC	-
	Phyllanthus virgatus		LC	-
Picrodendraceae	*Petalostigma pubescens*	quinine tree	LC	-
Pittosporaceae	*Bursaria incana*	prickly pine	LC	-
	Pittosporum spinescens		LC	-
Plantaginaceae	*Scoparia dulcis*		I	-
	Stemodia glabella		LC	-

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]
Poaceae	*Aristida sp.*	-	-	-
	Chloris sp.	-	-	-
	Enneapogon sp.	-	-	-
	Eragrostis sp.	-	-	-
	Leptochloa sp.	-	-	-
	Paspalidium sp.	-	-	-
	Bothriochloa ewartiana	desert bluegrass	LC	-
	Bothriochloa pertusa		I	-
	Cenchrus ciliaris	buffel grass	I	-
	Chloris inflata	purpletop Rhodes grass	I	-
	Cynodon dactylon		I	-
	Dichanthium aristatum	angleton grass	I	-
	Digitaria ciliaris	summer grass	I	-
	Echinochloa colona	awnless barnyard grass	I	-
	Megathyrsus maximus	Guinea grass	I	-
	Melinis repens	red Natal grass	I	-
	Urochloa mosambicensis	sabi grass	I	-
	Alloteropsis semialata	cockatoo grass	LC	-
	Ancistrachne uncinulata	hooky grass	LC	-
	Aristida benthamii		LC	-
	Aristida calycina	white spear grass	LC	-
	Aristida holathera		LC	-
	Aristida latifolia	feathertop wiregrass	LC	-
	Aristida leptopoda	white speargrass	LC	-
	Aristida ramosa	purple wiregrass	LC	-
	Astrebla elymoides	hoop Mitchell grass	LC	-
	Astrebla squarrosa	bull Mitchell grass	LC	-
	Bothriochloa bladhii		LC	-
	Bothriochloa decipiens		LC	-
	Brachyachne convergens	native couch	LC	-
	Chloris divaricata	slender grass	LC	-
	Chrysopogon fallax	golden beard grass	LC	-
	Cymbopogon ambiguus	lemon grass	LC	-
	Cymbopogon refractus	barbed wire grass	LC	-
	Dactyloctenium radulans	button grass	LC	-
	Dichanthium sericeum	Queensland bluegrass	LC	-

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]
	Digitaria brownii		LC	-
	Diplachne fusca		LC	-
	Enneapogon gracilis	slender nineawn	LC	-
	Enneapogon lindleyanus		LC	-
	Enteropogon acicularis	curly windmill grass	LC	-
	Enteropogon ramosus		LC	-
	Eragrostis elongata	clustered lovegrass	LC	-
	Eragrostis lacunaria	purple lovegrass	LC	-
	Eragrostis megalosperma		LC	-
	Eragrostis parviflora	weeping lovegrass	LC	-
	Eragrostis scabridus		LC	-
	Eragrostis sororia	woodland lovegrass	LC	-
	Eriachne mucronata		LC	-
	Eriochloa crebra	spring grass	LC	-
	Eriochloa pseudoacrothricha		LC	-
	Eulalia aurea	silky browntop	LC	-
	Heteropogon contortus	black spear grass	LC	-
	Iseilema vaginiflorum	red Flinders grass	LC	-
	Leptochloa digitata		LC	-
	Ophiuros exaltatus		LC	-
	Panicum decompositum	native millet	LC	-
	Panicum effusum		LC	-
	Panicum larcomianum		LC	-
	Panicum queenslandicum		LC	-
	Paspalidium caespitosum	brigalow grass	LC	-
	Paspalidium distans	shotgrass	LC	-
	Paspalidium globoideum	sago grass	LC	-
	Perotis rara		LC	-
	Sehima nervosum		LC	-
	Setaria surgens		LC	-
	Sporobolus actinocladus	katoora grass	LC	-
	Sporobolus caroli	fairy grass	LC	-
	Sporobolus creber	western rat's tail grass	LC	-
	Sporobolus scabridus		LC	-
	Thellungea advena	coolibah grass	LC	-
	Themeda avenacea	oat grass	LC	-

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]
	Themeda triandra	kangaroo grass	LC	-
	Tragus australianus	small burr grass	LC	-
	Triraphis mollis	purple plume grass	LC	-
Portulacaceae	*Portulaca oleracea*	pigweed	I	-
	Portulaca pilosa		I	-
	Portulaca filifolia		LC	-
Proteaceae	*Grevillea parallela*	silver oak	LC	-
	Grevillea striata	beefwood	LC	-
	Hakea lorea	bootlace hakea	LC	-
Rhamnaceae	*Alphitonia excelsa*	red ash	LC	-
	Ventilago viminalis	supplejack	LC	-
Rubiaceae	*Psydrax odorata*	shiny-leafed canthium	C	-
	Oldenlandia mitrasacmoides		LC	-
	Psydrax oleifolia	myrtle tree	LC	-
	Spermacoce multicaulis		LC	-
Rutaceae	*Citrus glauca*	lime bush	LC	-
	Flindersia dissosperma		LC	-
	Geijera parviflora	wilga	LC	-
	Geijera salicifolia	brush wilga	LC	-
Santalaceae	*Santalum lanceolatum*	sandalwood	SLC	-
Sapindaceae	*Alectryon sp.*	-	-	-
	Alectryon diversifolius	scrub boonaree	LC	-
	Alectryon oleifolius	boonaree	LC	-
	Atalaya hemiglauca	whitewood	LC	-
Scrophulariaceae	*Eremophila debilis*	winter apple	LC	-
	Eremophila mitchellii	false sandalwood	LC	-
	Myoporum acuminatum		LC	-
Solanaceae	*Solanum adenophorum*		E	-
	Datura ferox	thornapple	I	-
	Solanum ellipticum		LC	-
Sparrmanniaceae	*Corchorus trilocularis*		LC	-
	Grewia latifolia		LC	-
	Grewia retuscifolia	dysentery bush	LC	-
Thymelaeaceae	*Pimelea sp.*	-	-	-
	Pimelea haematostachya		LC	-
Verbenaceae	*Verbena gaudichaudii*		LC	-

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]
Violaceae	*Afrohybanthus enneaspermus*		LC	-
Vitaceae	*Clematicissus opaca*	pepper vine	LC	-

[1] EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*; NC Act = *Nature Conservation Act 1992*.

LC = Least Concern, I = Introduced, SLC = Special Least Concern, E = Endangered.

Fauna Species List

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]	Dry season 2018	Wet Season 2019	Dry Season 2019	Wet Season 2020
Amphibians								
Bufonidae	*Rhinella marina*	cane toad	Introduced	-	✓	✓		✓
Hylidae	*Cyclorana alboguttata*	greenstripe frog	LC	-		✓		✓
	Cyclorana novaehollandiae	eastern snapping frog	LC					✓
	Litoria caerulea	common green treefrog	LC	-	✓	✓		✓
	Litoria latopalmata	broad palmed rocketfrog	LC					✓
	Litoria rothii	northern laughing treefrog	LC					✓
	Litoria rubella	ruddy treefrog	LC	-	✓			✓
Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog	LC	-	✓	✓		✓
	Platyplectrum ornatum	ornate burrowing frog	LC	-		✓		✓
Birds								
Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill	LC					✓
	Acanthiza pusilla	brown thornbill	LC					✓
	Gerygone olivacea	white-throated gerygone	LC	-	✓	✓	✓	✓
	Smicrornis brevirostris	weebill	LC	-	✓	✓	✓	
Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk	LC				✓	
	Accipiter fasciatus	brown goshawk	LC	Marine	✓			
	Aquila audax	wedge-tailed eagle	LC	-	✓	✓	✓	✓
	Circus assimilis	spotted harrier	LC	-	✓	✓		
	Elanus axillaris	black-shouldered kite	LC	-		✓		

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]	Dry season 2018	Wet Season 2019	Dry Season 2019	Wet Season 2020
	Haliastur sphenurus	whistling kite	LC	Marine	✓	✓	✓	✓
	Milvus migrans	black kite	LC	-		✓	✓	
Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler	LC					✓
Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar	LC	-	✓	✓		✓
Alaudidae	*Mirafra javanica*	Horsfield's bushlark	LC	-	✓			
Anatidae	*Anas gracilis*	grey teal	LC	-	✓	✓	✓	✓
	Anas superciliosa	Pacific black duck	LC	-	✓	✓		✓
	Aythya australis	hardhead	LC	-	✓		✓	
	Chenonetta jubata	Australian wood duck	LC	-	✓	✓		✓
	Cygnus atratus	black swan	LC					✓
	Dendrocygna eytoni	plumed whistling-duck	LC					✓
	Nettapus coromandelianus	cotton pygmy-goose	LC					✓
Anhingidae	*Anhinga novaehollandiae*	Australasian darter	LC	-	✓	✓	✓	✓
Apodidae	*Apus pacificus*	fork-tailed swift	LC					✓
Ardeidae	*Ardea alba modesta*	eastern great egret	LC	Marine	✓	✓		
	Ardea intermedia	intermediate egret	LC	Marine		✓		✓
	Ardea pacifica	white-necked heron	LC					✓
	Egretta garzetta	little egret	LC	Marine	✓			✓
	Egretta novaehollandiae	white-faced heron	LC	-	✓	✓		✓
	Nycticorax caledonicus	nankeen night-heron	LC	Marine	✓			
Artamidae	*Artamus cinereus*	black-faced woodswallow	LC	-	✓	✓	✓	✓

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]	Dry season 2018	Wet Season 2019	Dry Season 2019	Wet Season 2020
	Artamus personatus	masked woodswallow	LC	-	✓		✓	✓
	Cracticus nigrogularis	pied butcherbird	LC	-	✓	✓	✓	✓
	Cracticus tibicen	Australian magpie	LC	-	✓	✓	✓	✓
	Cracticus torquatus	grey butcherbird	LC	-	✓	✓	✓	
Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo	LC	-	✓	✓	✓	
	Eolophus roseicapilla	galah	LC	-	✓	✓	✓	✓
	Nymphicus hollandicus	cockatiel	LC	-		✓	✓	
Campephagidae	*Coracina maxima*	ground cuckoo-shrike	LC	-		✓		✓
	Coracina novaehollandiae	black-faced cuckoo-shrike	LC	Marine	✓	✓	✓	✓
	Coracina papuensis	white-bellied cuckoo-shrike	LC	Marine	✓			
	Lalage tricolor	white-winged triller	LC	-	✓		✓	
Casuariidae	*Dromaius novaehollandiae*	emu	LC	-		✓	✓	✓
Charadriidae	*Elseyornis melanops*	black-fronted dotterel	LC	-	✓	✓	✓	✓
	Vanellus miles	masked lapwing	LC	-	✓	✓	✓	✓
Columbidae	*Geopelia humeralis*	bar-shouldered dove	LC	-		✓		✓
	Geopelia striata	peaceful dove	LC	-	✓		✓	✓
	Geophaps scripta scripta	squatter pigeon (southern subspecies)	V	V	✓	✓		✓
	Ocyphaps lophotes	crested pigeon	LC	-	✓	✓	✓	✓
Coraciidae	*Eurystomus orientalis*	dollarbird	LC	Marine	✓			✓
Corcoracidae	*Struthidea cinerea*	apostlebird	LC	-	✓	✓	✓	✓
Corvidae	*Corvus coronoides*	Australian raven	LC	-		✓		

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]	Dry season 2018	Wet Season 2019	Dry Season 2019	Wet Season 2020
	Corvus orru	Torresian crow	LC	-	✓	✓	✓	✓
Cuculidae	*Cacomantis pallidus*	pallid cuckoo	LC	Marine	✓	✓		
	Centropus phasianinus	pheasant coucal	LC	-		✓	✓	✓
	Chalcites basalis	Horsfield's bronze-cuckoo	LC	Marine		✓		✓
	Chalcites osculans	black-eared cuckoo	LC	Marine	✓			
	Eudynamys orientalis	eastern koel	LC					✓
	Scythrops novaehollandiae	channel-billed cuckoo	LC	Marine	✓			✓
Dicruridae	*Dicrurus bracteatus*	spangled drongo	LC	Marine	✓			
Estrildidae	*Neochmia modesta*	plum-headed finch	LC	-		✓		
	Taeniopygia bichenovii	double-barred finch	LC	-	✓	✓	✓	
	Taeniopygia guttata	zebra finch	LC	-	✓	✓	✓	
Eurostopodidae	*Eurostopodus mystacalis*	White-throated Nightjar	LC				✓	
Falconidae	*Falco berigora*	brown falcon	LC	-	✓	✓	✓	✓
	Falco cenchroides	nankeen kestrel	LC	Marine	✓	✓	✓	✓
	Falco subniger	black falcon	LC				✓	
Gruidae	*Grus rubicunda*	brolga	LC	-		✓	✓	✓
Halcyonidae	*Dacelo leachii*	blue-winged kookaburra	LC	-	✓		✓	
	Dacelo novaeguineae	laughing kookaburra	LC	-	✓	✓	✓	✓
	Todiramphus macleayii	forest kingfisher	LC	Marine	✓	✓	✓	
	Todiramphus sanctus	sacred kingfisher	LC	Marine	✓		✓	✓
Hirundinidae	*Petrochelidon ariel*	fairy martin	LC	-	✓	✓		✓

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]	Dry season 2018	Wet Season 2019	Dry Season 2019	Wet Season 2020
	Petrochelidon nigricans	tree martin	LC	Marine	✓	✓	✓	✓
Maluridae	*Malurus melanocephalus*	red-backed fairy-wren	LC	-	✓	✓	✓	✓
Megaluridae	*Cincloramphus cruralis*	brown songlark	LC	-		✓		✓
	Cincloramphus mathewsi	rufous songlark	LC	-	✓	✓		✓
Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater	LC	-	✓	✓	✓	
	Gavicalis virescens	singing honeyeater	LC	-	✓	✓	✓	✓
	Manorina flavigula	yellow-throated miner	LC	-	✓	✓	✓	✓
	Manorina melanocephala	noisy miner	LC	-	✓	✓		
	Philemon citreogularis	little friarbird	LC	-	✓	✓	✓	✓
	Philemon corniculatus	noisy friarbird	LC	-	✓	✓	✓	✓
	Plectorhyncha lanceolata	striped honeyeater	LC	-	✓	✓	✓	
Meropidae	*Merops ornatus*	rainbow bee-eater	LC	Marine	✓		✓	
Monarchidae	*Grallina cyanoleuca*	magpie-lark	LC	Marine	✓	✓	✓	✓
	Myiagra cyanoleuca	satin flycatcher	LC	Migratory		✓		
	Myiagra rubecula	leaden flycatcher	LC	-	✓			
Motacillidae	*Anthus novaeseelandiae*	Australasian pipit	LC	Marine	✓	✓	✓	✓
Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird	LC	-	✓		✓	✓
Oriolidae	*Oriolus sagittatus*	olive-backed oriole	LC	-		✓		✓
	Ardeotis australis	Australian bustard	LC	-	✓		✓	✓
Pachycephalidae	*Pachycephala rufiventris*	rufous whistler	LC	-	✓	✓	✓	✓
Pardalotidae	*Acanthiza reguloides*	buff-rumped thornbill	LC				✓	

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]	Dry season 2018	Wet Season 2019	Dry Season 2019	Wet Season 2020
	Pardalotus striatus	striated pardalote	LC	-	✓	✓	✓	
Pelecanidae	*Pelecanus conspicillatus*	Australian pelican	LC	Marine	✓		✓	✓
Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant	LC	-	✓		✓	
	Phalacrocorax varius	pied cormorant	LC	-	✓			
Phasianidae	*Coturnix ypsilophora*	brown quail	LC	-	✓	✓	✓	✓
Podargidae	*Podargus strigoides*	tawny frogmouth	LC	-	✓	✓	✓	✓
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe	LC				✓	
Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler	LC	-	✓	✓	✓	✓
Psittacidae	*Aprosmictus erythropterus*	red-winged parrot	LC	-	✓	✓	✓	✓
	Melopsittacus undulatus	budgerigar	LC	-		✓		
	Platycercus adscitus	pale-headed rosella	LC	-	✓	✓	✓	✓
	Trichoglossus chlorolepidotus	scaly-breasted lorikeet	LC	-		✓		
	Trichoglossus haematodus moluccanus	rainbow lorikeet	LC	-	✓	✓		✓
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt	LC				✓	✓
Rhipiduridae	*Rhipidura albiscapa*	grey fantail	LC	-		✓	✓	
	Rhipidura leucophrys	willie wagtail	LC	-	✓	✓	✓	✓
Strigidae	*Ninox boobook*	southern boobook	LC	-	✓	✓	✓	✓
Sturnidae	*Acridotheres tristis*	common myna	Introduced	-	✓	✓	✓	✓
Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill	LC	-		✓		
	Threskiornis spinicollis	straw-necked ibis	LC	Marine		✓		✓
Tytonidae	*Tyto delicatula*	eastern barn owl	LC	-		✓	✓	✓

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]	Dry season 2018	Wet Season 2019	Dry Season 2019	Wet Season 2020
Mammals								
Canidae	*Canis lupus familiaris*	dog	Introduced	-	✓	✓		✓
Dasyuridae	*Planigale tenuirostris*	narrow-nosed planigale	LC	-	✓	✓		
Emballonuridae	*Saccolaimus flaviventris*	yellow-bellied sheathtail-bat	LC	-	✓	✓		
Felidae	*Felis catus*	cat	Introduced	-	✓	✓		✓
Leporidae	*Lepus europaeus*	European hare	Introduced	-	✓		✓	✓
	Oryctolagus cuniculus	rabbit	Introduced	-	✓	✓	✓	✓
Macropodidae	*Macropus giganteus*	eastern grey kangaroo	LC	-	✓	✓	✓	✓
	Macropus rufus	red kangaroo	LC	-	✓		✓	
Miniopteridae	*Miniopterus orianae*	eastern benty-wing bat	LC	-		✓		
Molossidae	*Austronomus australis*	white-striped freetail bat	LC	-	✓			
	Chaerephon jobensis	northern freetail bat	LC	-	✓	✓		
	Ozimops lumsdenae	northern free-tailed bat	LC	-	✓	✓		
	Ozimops ridei	eastern free-tailed bat	LC	-	✓	✓		
	Setirostris eleryi	bristle-faced free-tailed bat	LC	-	✓	✓		
Muridae	*Hydromys chrysogaster*	water rat	LC	-	✓			
	Melomys sp.	Melomys sp.	LC	-		✓		
	Mus musculus	house mouse	Introduced	-	✓		✓	
	Pseudomys delicatulus	delicate mouse	LC	-	✓			
Petauridae	*Petaurus breviceps*	sugar glider	LC	-		✓	✓	✓
	Petaurus norfolcensis	squirrel glider	LC	-		✓		

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]	Dry season 2018	Wet Season 2019	Dry Season 2019	Wet Season 2020
Phalangeridae	*Trichosurus vulpecula*	common brushtail possum	LC	-	✓	✓		
Phascolarctidae	*Phascolarctos cinereus*	koala	V	V	Evidence of presence (scats and scratches)	Evidence of presence (scats and scratches)		
Potoroidae	*Aepyprymnus rufescens*	rufous bettong	LC	-	✓	✓		
Pseudocheiridae	*Petauroides volans*	greater glider	V	V	✓	✓		
Pteropodidae	*Pteropus scapulatus*	little red flying-fox	LC	-	✓			
Suidae	*Sus scrofa*	pig	Introduced				✓	
Vespertilionidae	*Chalinolobus gouldii*	Gould's wattled bat	LC	-	✓	✓		
	Chalinolobus morio	chocolate wattle bat	LC	-	✓	✓		
	Chalinolobus picatus	little pied bat	LC	-	✓	✓		
	Nyctophilus geoffroyi / N. gouldi	-	LC	-	✓	✓		
	Scotorepens balstoni	inland broad-nosed bat	LC	-	✓	✓		
	Scotorepens greyii/S. sanborni	-	LC	-	✓	✓		
	Vespadelus troughtoni	eastern cave bat	LC	-	✓	✓		
Agamidae	*Pogona barbata*	bearded dragon	LC	-	✓	✓		✓
Reptiles								
Boidae	*Aspidites melanocephalus*	black-headed python	LC					✓
	Morelia spilota	carpet python	LC					✓
Colubridae	*Boiga irregularis*	brown tree snake	LC					✓
	Tropidonophis mairii	keelback snake	LC	-	✓			✓

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]	Dry season 2018	Wet Season 2019	Dry Season 2019	Wet Season 2020
Diplodactylidae	*Diplodactylus vittatus*	stone gecko	LC	-		✓		✓
	Lucasium steindachneri	box-patterened gecko	LC	-	✓			
	Oedura monilis	ocellated velvet gecko	LC	-		✓		
Elapidae	*Cryptophis nigrescens*	carpentaria snake	LC	-		✓	✓	
	Denisonia maculata	ornamental snake	V	V		✓		✓
	Furina diadema	red-naped snake	LC					✓
	Hoplocephalus bitorquatus	pale-headed snake	LC	-		✓		✓
	Pseudonaja textilis	eastern brown snake	LC	-	✓	✓	✓	
Gekkonidae	*Gehyra catenata*	chain-backed dtella	LC	-		✓		
	Gehyra dubia	dubious dtella	LC	-	✓	✓	✓	✓
	Heteronotia binoei	Bynoe's gecko	LC	-	✓	✓	✓	✓
Scincidae	*Carlia munda*	shaded-litter rainbow-skink	LC	-	✓	✓		✓
	Carlia pectoralis	open-litter rainbow skink	LC	-	✓			✓
	Carlia sp.	orange-flanked rainbow-skink	LC	-		✓		
	Cryptoblepharus virgatus	striped snake-eyed skink	LC	-	✓			
	Ctenotus allotropis	brown-blazed wedgesnout ctenotus	LC	-		✓		
	Ctenotus robustus	Eastern stripped skink	LC					✓
	Glaphyromorphus punctulatus	fine-spotted mulch-skink	LC	-	✓			
	Lampropholis delicata	dark-flecked garden sunskink	LC	-	✓			
	Lerista fragilis	eastern mulch slider	LC	-	✓			✓
	Lerista punctatovittata	eastern robust slider	LC	-	✓			

Family	Scientific name	Common name	NC Act status[1]	EPBC Act status[1]	Dry season 2018	Wet Season 2019	Dry Season 2019	Wet Season 2020
	Menetia greyii	common dwarf skink	LC	-	✓			
	Morethia boulengeri	Boulenger's snake-eyed skink	LC	-	✓			✓
	Morethia taeniopleura	fire-tailed skink	LC	-		✓		
	Tiliqua scincoides	eastern blue-tongued lizard	LC					✓

[1] EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*; NC Act = *Nature Conservation Act 1992*

LC = Least Concern, SLC = Special Least Concern, E = Endangered, V = Vulnerable

Appendix D Likelihood of occurrence assessment

Likelihood of Occurrence Assessment

Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
Capparis humistrata	-	E	The species has been recorded between Rockhampton and Port Curtis and one location near Harrybrandt Station near Dingo (Hewson ,1982; Atlas of Living Australia, 2019). The species has been recorded in eucalypt woodland with a shrubby understorey on stony ridges and serpentine soils (Hewson, 1982).	**Unlikely to occur** The species has been recorded within the desktop search extent, approximately 30 km from the Study Area. However, suitable habitat for the species was not recorded within the Study Area.
Cycas ophiolitica Marlborough Blue	E	E	*Cycas ophiolitica* grows on hills and slopes in sparse, grassy open forest, at altitude ranges from 80–400 m above sea level, between Marlborough and Rockhampton in central Queensland. Although this species prefers red clay soils near Marlborough, it is more frequently found on shallow, stony, infertile soils, which are developed on sandstone and serpentinite (DAWE, 2020b). The species occurs within eucalypt woodland and open woodlands containing *Corymbia dallachiana, C. erythrophloia, E. crebra, E. fibrosa* and *C. intermedia* (DAWE, 2020b).	**Unlikely to occur** The species has not been previously recorded in the desktop search extent and suitable habitat for the species was not recorded within the Study Area.
Dichanthium setosum	V	LC	The species is associated with heavy basaltic black soils and stony red-brown hard-setting loam with clay subsoil and is found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture. The extent to which this species tolerates disturbance is unknown (DAWE, 2020b).	**Potential to occur** The species has been previously recorded in natural grasslands on Tay Glen, approximately 27 km south of the Study Area (SKM, 2011). The Study Area was identified to contain suitable habitat in association with natural grasslands and open woodlands. However, despite extensive surveys by E2M in optimal conditions (wet season surveys), the species was not detected, reducing its likelihood of occurring.
Dichanthium queenslandicum King Blue-grass	E	V	The species typically occurs on black cracking clay in tussock grasslands mainly in association with other species of blue grasses (*Dichanthium* spp. and *Bothriochloa* spp.) but also with other grasses restricted to this soil type (DES, 2019b). The species is known to occur as a component of the Natural Grasslands of the Queensland Central Highlands and the Northern Fitzroy Basin Threatened Ecological Community (DAWE, 2020b). Other communities where *Dichanthium queenslandicum* can be found include *Acacia salicina* thickets in grassland and eucalypt woodlands (i.e. *Corymbia dallachiana, C. erythrophloia, E. orgadophila*) (DES, 2019b).	**Potential to occur** The species has been previously recorded within the desktop search extent, approximately 11 km south of the Study Area. Suitable habitat was observed in areas of RE 11.9.3 within the Study Area. However, despite extensive surveys by E2M in optimal conditions (wet season surveys), the species was not detected, reducing its likelihood of occurring.

Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
Eucalyptus raveretiana Black Ironbox	V	-	*E. raveretiana* occurs between Rockhampton and Ayr in Queensland (DES, 2019b). The species occurs on the banks of rivers, creeks and other watercourses, on clayey or loamy soil (DES, 2019b). The species is usually a co-dominant canopy species, associated with *Melaleuca leucadendra*, *M. fluviatilis*, *Eucalyptus tereticornis*, *C. tessellaris*. The species has been recorded within RE 11.3.25a, 11.3.11, 9.3.1 and 8.3.3 (DES, 2019b).	**Unlikely to occur** The Study Area is not in proximity to recorded populations with the closest record greater than 40 km north east of the Study Area.
Kelita uncinella			The species has been recorded in proximity to the Newlands Coal Mine near the township of Glenden. The species grows on Acacia woodlands on slopes and plateaus with shallow, gravelly-loam soils. Associated species include *Acacia shirleyi*, *Erythroxylon australe*, *Croton insularis* and *Grevillea helmsiae*. The ground layer usually comprises *Ancistrachne uncinulata*, *Leptochloa decipiens* and *Paspalidium* sp. (Bean, 2010).	**Unlikely to occur** Although the species has been previously recorded in the desktop search extent (with the closest record approximately 40 km north-west of the Study Area), suitable habitat for the species was limited within the Study Area.
Samadera bidwillii Quassia	V	V	The species commonly occurs in lowland rainforest often with *Araucaria cunninghamii* or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland, it is commonly found in areas adjacent to both temporary and permanent watercourses up to 510 m altitude (DES, 2019b). Commonly associated trees in the open forest and woodlands include *Corymbia citriodora, Eucalyptus propinqua, E. acmenoides, E. tereticornis, C. intermedia, E. siderophloia, E. moluccana, E. cloeziana* and *E. fibrosa* (DES, 2019b).	**Unlikely to occur** The species has not been previously recorded in the desktop search extent and suitable habitat for the species was limited within the Study Area.
Solanum adenophorum	-	E	The species has been recorded from the Nebo-Clermont area as well as west and north-west or Rockhampton. The species has been observed within *Acacia harpophylla* and *A. cambagei* woodlands on deep cracking clays (Bean, 2004).	**Known to occur** The species has been previously recorded in the desktop search extent and three individuals were recorded at one location within the Study Area in association with regrowth *A. harpophylla* shrublands.
Solanum elachophyllum	-	E	The species has been recorded from Middlemount to Theodore. The species has been observed within *Acacia harpophylla, Casuarina cristata, Macropteranthes leichardtii* and *Eucalyptus cambageana* woodlands on fertile, cracking clays (Bean, 2004).	**Potential to occur** The species has been previously recorded within the desktop search extent (approximately 6.5 km from the Study Area) and suitable habitat was observed during field surveys within the Study Area in association with remnant and regrowth *A. harpophylla* communities on clay plains (i.e. RE 11.4.8 and 11.4.9). Despite extensive surveys by E2M in optimal conditions (wet season surveys), the species was not detected, reducing its likelihood of occurring.

Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
Birds				
curlew sandpiper *Calidris ferruginea*	CE; Marine; Migratory (Bonn, CAMBA, JAMBA, ROKAMBA)	E	In Australia, this species usually forages and roosts in intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms (DotE, 2015c).	**Unlikely to occur** The species has not been previously recorded within the desktop search extent. Potential habitat for the species within the Study Area (e.g. farm dams) was considered marginal.
red goshawk *Erythrotriorchis radiatus*	V	E	The species prefers landscapes containing a mosaic of habitats including coastal and sub-coastal tall open forest, woodland and rainforest edges (Marchant & Higgins, 1993; DERM, 2012; TSSC, 2015b). Forests of intermediate density are particularly favoured, as are ecotones between variably dense habitats (i.e. ecotone between rainforest and sclerophyll forest) (DAWE, 2020b). Large bird populations (the primary prey of this species) are also an important determinant of red goshawk habitat utilisation (DAWE, 2020b). It generally avoids open habitats and is only rarely encountered over agricultural land (Marchant and Higgins, 1993). Nesting occurs in tall trees within one kilometre of permanent water, generally in open, biologically rich forest or woodland (Marchant and Higgins, 1993). The species is sparsely dispersed across approximately 15 percent of coastal and sub-coastal Australia. The species occurs at low densities occupying home ranges estimated between 50 – 220 km^2 (DAWE, 2020b).	**Unlikely to occur** The species has not been previously recorded within the desktop search extent. In addition, remnant woodland within the Study Area has undergone historical disturbance from clearing which reduces the habitat value for the species.
squatter pigeon (southern subspecies) *Geophaps scripta scripta*	V	V	The species is locally abundant within the northern part of its range (i.e. Brigalow Belt (North) and Desert Uplands Bioregions) (DAWE, 2020b). It is considered to be common in grazing country north of the Tropic of Capricorn (DAWE, 2020b). The species occurs in a wide range of habitats wherever there is a grassy understorey. It is often found within close proximity of water bodies (DAWE, 2020b).	**Known to occur** The species was recorded within the northern and western portions of the Study Area during field surveys (refer to Section 5.3.4). Suitable breeding and foraging habitat for the species was identified on suitable land zones within the Study Area.
painted honeyeater *Grantiella picta*	V	V	The species forages on mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes (DotE, 2015b).	**Potential to occur** The species has not previously been recorded within the desktop search extent; however, potentially suitable habitat for the species was identified within the Study Area.

Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
star finch (eastern); star finch (southern) *Neochmia ruficauda ruficauda*	E	E	The species occurs mainly in grasslands and grassy woodlands that are located close to bodies of fresh water (DEWHA, 2008b). It also occurs in cleared or suburban areas such as along roadsides and in towns (DAWE, 2020b).	**Unlikely to occur** The species has not previously been recorded within the desktop search extent and the Study Area is outside of the current known distribution for the species.
black-throated finch (southern subspecies) *Poephila cincta cincta*	E	E	Occurs mainly in grassy, open woodlands and forests, typically dominated by *Eucalyptus, Corymbia* and *Melaleuca,* and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water (DAWE, 2020b). Almost all recent records of the finch from south of the tropics have been in riparian habitat (Black-throated Finch Recovery Team, 2004). The subspecies is thought to require a mosaic of different habitats in which it can find seed during the wet season (DAWE, 2020b).	**Unlikely to occur** The species has not been previously recorded within the desktop search extent. In addition, the Study Area is outside the current known distribution of the species (DES, 2019b).
white-throated needletail *Hirundapus caudacutus*	Vulnerable; Marine; Migratory (CAMBA, JAMBA, ROKAMBA)	V	In Australia, this species is almost exclusively aerial (1-1,000 m above ground), yet occurs over a variety of habitats with a preference for wooded areas (DAWE, 2020b).	**Likely occurrence** Fork-tailed swifts are likely to forage within the air space above the Study Area. The species has previously been recorded within the desktop search extent.
Australian painted snipe *Rostratula australis*	E; Marine	E	Generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (DAWE, 2020b). They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains (DAWE, 2020b). The species has been recorded to sometimes utilise areas that are lined with trees, or that have some scattered fallen or washed-up timber (Marchant & Higgins, 1993). Breeding occurs in shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby, typically from or near small islands in freshwater wetlands (DAWE, 2020b).	**Known to occur** The species has been previously recorded along an unnamed drainage line in the northern extent of the Study Area and from nearby locations on the Olive Downs and Saraji East study areas (SKM, 2011; Ecological Survey & Management, 2013; DPM, 2018).
glossy black cockatoo *Calyptorphynuchus lathami*	N/A	V	Mixed *Allocasaurina*, *Casuarina*, cypress *Callitris* and *Acacia harpophylla* woodland assemblages	**Unlikely to occur** Suitable habitat for the species was not recorded within the Study Area. No previous records were detected within the desktop study extent.
red-tailed tropicbird *Phaethon rubicauda*	CAMBA, JAMBA, marine	V	Tropical and subtropical seas, pelagic, often far from land	**Unlikely to occur** Suitable habitat for the species was not recorded within the Study Area. No previous records were detected within the desktop study extent.

Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
Mammals				
northern quoll *Dasyurus hallucatus*	E	LC	The species occupies a diversity of habitats across its range including eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert (TSSC, 2005). The species is also known to occupy non-rocky lowland habitats such as beachscrub communities in central Queensland (DAWE, 2020b). Rocky areas provide prime habitat for northern quolls (Hill and Ward, 2010).	**Unlikely to occur** Suitable habitat for the species was not recorded within the Study Area. The closest known historic record is located over 40 km from the Study Area.
ghost bat *Macroderma gigas*	V	E	The species occurs across a range of habitats, from arid Pilbara to tropical savanna woodlands and rainforests (DAWE, 2020b). During the daytime they roost in caves, rock crevices and old mines (TSSC, 2016b). Roost sites used permanently are generally deep natural caves or disused mines with a relatively stable temperature of 23°– 28°C and a moderate to high relative humidity of 50–100 percent (DAWE, 2020b). The average foraging distance is approximately 2 km from the daytime roost (DAWE, 2020b).	**Unlikely to occur** Suitable habitat for the species was not recorded within the Study Area. No previous records were detected within the desktop study extent.
Corbens long-eared bat *Nyctophilus corbeni*	V	V	Found in a wide range of inland woodland vegetation types (TSSC, 2015c). These include box, ironbark, cypress pine woodlands, bulloak woodlands, brigalow woodland, belah woodland, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee (DAWE, 2020b). The species is more abundant in extensive stands of vegetation in comparison to smaller woodland patches (DAWE, 2020b).	**Unlikely to occur** The species has not previously been recorded within the desktop search extent, and the Study Area is located outside of the species known distribution.
greater glider *Petauroides volans*	V	V	The species is generally restricted to eucalypt forests and woodlands, particularly favouring forest with a diversity of eucalypt species (DAWE, 2020b). During the day the species shelters in tree hollows, with a particular selection for large hollows in large, old trees (DAWE, 2020b). Modelling suggests that they require native forest patches of at least 160 km^2 to maintain viable populations (Eyre, 2002).	**Known to occur** The species was recorded within the Study Area during field surveys. In addition, the species had previously been recorded within 3 km of the Study Area (DPM, 2018). Known records were primarily located within vegetation in close proximity to the Isaac River and its tributaries (refer to Section 5.3.3).

Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
koala *Phascolarctos cinereus*	V	V	Koalas occur in a variety of eucalypt forests and woodland communities (Environmental Protection Agency, 2006). They feed almost entirely on eucalypt foliage with preferences varying regionally (Krockenberger, Gordon, & Dennis, 2012). Diet is thought to be a major determinant of habitat selection, with the species being able to use small remnants of original vegetation where suitable habitat is present (Krockenberger *et al.*, 2012). Koalas are also known to occur in modified or regenerating native vegetation communities, as well as urban and rural landscapes where food trees or shelter trees may be highly scattered (DAWE, 2020b).	**Known to occur** Koala scats were recorded within the Study Area during field surveys. In addition, the koala has been previously recorded immediately adjacent to the Study Area in association with the Olive Downs Project surveys (DPM, 2018a, 2018b). Records of the species were primarily associated with riparian vegetation (refer to Section 5.3.3).
northern hairy-nosed wombat (*Lasiorhinus krefftii*)	E	CE	The current distribution of the species is restricted to a single locality in Epping Forest National Park approximately 165 km from the Winchester South Project	**Unlikely to occur** Suitable habitat for the species was not recorded within the Study Area. No previous records were detected within the desktop study extent.
short-beaked echidna	N/A	SLC	Habitat generalist that utilises coarse woody debris, hollow logs and burrows as refuge habitat with access to foraging opportunities (ants and termites, supplemented with worms, beetles and moth larvae)	**Likely to occur** Given the species is widespread and abundant within the broader region.
Reptiles				
common death adder *Acanthophis antarcticus*	N/A	V	The species is strongly associated with deep leaf litter and therefore, wooded ecosystems. The species is found in a wide variety of habitats including rainforests, wet sclerophyll forests, woodland, grasslands, chenopod dominated shrublands, and coastal heathlands (DES, 2017).	**Likely to occur** The Study Area contains suitable habitat for the species, particularly within woodland areas that contain deep leaf litter. The species has also been recorded within 4 km of the Study Area (DPM Envirosciences, 2018b) however it was not detected during field surveys. If it were to occur within the Study Area, it is only expected to occur in very low numbers
ornamental snake *Denisonia maculata*	V	V	The species is known to prefer woodlands and open forests associated with moist areas, particularly gilgai (melon-hole) mounds and depressions in land zone 4, but also lake margins and wetlands (DAWE, 2020b). Gilgai formations are found where deep-cracking alluvial soils with high clay contents occur (DAWE, 2020b).	**Known to occur** The Study Area is known to contain habitat for Ornamental Snake (refer to Section 4.2.3). The species has previously been recorded from within the Study Area (Ecological Survey & Management, 2013) and by previous surveys near the Study Area (DPM Envirosciences, 2018b; SKM, 2011).

Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
yakka skink *Egernia rugosa*	V	V	The species is known to occur in open dry sclerophyll forest, woodland and scrub (DotE, 2014d), including on land zones 3, 4, 5, 7, 9 and 10 (DAWE, 2020b). Common woodland and open forest types include *Acacia harpophylla, A. aneura, A. catenulata, A. shirleyi, Casuarina cristata, Eucalyptus populnea, Eucalyptus* spp. and *Callitris glaucophylla* (DAWE, 2020b).	**Potential to occur** The species has not previously been recorded within the desktop search extent; however, potentially suitable habitat for the species occurs within the Study Area.
southern snapping turtle *Elseya albagula*	CE	E	Prefers clear, flowing, well-oxygenated waters (DAWE, 2020b). The species does occur in non-flowing waters, but typically at much reduced densities (DAWE, 2020b).	**Unlikely to occur** The species has not previously been recorded within the desktop search extent. Suitable habitat for the species was not recorded within the Study Area.
Dunmall's snake *Furina dunmalli*	V	V	The species has been found in a broad range of habitats, including forests and woodlands on black alluvial cracking clay and clay loams dominated by *Acacia harpophylla* (brigalow), other wattles (*A. burowii, A. deanii, A. leiocalyx*), *Callitris* spp. or *Allocasuarina luehmannii;* and *Corymbia citriodora, Eucalyptus crebra, E. melanophloia, Callitris glaucophylla* and bulloak open forest and woodland associations on sandstone derived soils (DotE, 2014e).	**Potential to occur** The species has not previously been recorded within the desktop search extent; however, potentially suitable habitat for the species occurs within the Study Area.
Allan's lerista / retro slider *Lerista allanae*	E	E	Found in association with *Eucalyptus orgadophila/E. erythrophloia* open woodlands and *Melaleuca bracteata* (DAWE, 2020b). It is currently associated with altered landscapes that have areas with leaf litter and friable surface soils beneath trees and shrubs. These sites were characterised by dark chocolate non-cracking clay-based soils which are mapped as Regional Ecosystem 11.8.5 and 11.8.11 (DAWE, 2020b).	**Unlikely to occur** The species has not previously been recorded within the desktop search extent and the Study Area is outside of the current known distribution for the species.
Fitzroy river turtle *Rheodytes leukops*	V	V	Generally associated with instream habitats providing deep pool and riffle sequences, this species also prefers *Vallisneria* spp. (ribbonweed) beds (DAWE, 2020b). Common riparian trees associated with the species habitat include *Eucalyptus tereticornis, Casuarina cunninghamiana, Callistemon viminalis* and *Melaleuca linariifolia* (DAWE, 2020b).	**Unlikely to occur** The species has not previously been recorded within the desktop search extent. Suitable habitat for the species was not recorded within the Study Area.

[1] EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*; NC Act = *Nature Conservation Act 1992*. E-Endangered, V-Vulnerable, NT-Near Threatened

[2] **Known** to occur: species were recorded during field surveys. **Likely** to occur: suitable habitat to support the species is present within the Study Area and the species has previously been recorded within the desktop search extent. **Potential** to occur: The Study Area is within the species known distribution and suitable habitat to support the species is present; however, the species has not previously been recorded within the desktop search extent; and/or, suitable habitat is degraded or of limited extent, thereby reducing the likelihood of the species occurrence. **Unlikely** to occur: the Study Area does not comprise suitable habitat for the species, or is outside of the species known distribution.

Likelihood of Occurrence for Migratory and Special Least Concern Species

Fauna Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurence[2]
Birds				
common sandpiper *Actitis hypoleucos*	Marine; Migratory (Bonn, CAMBA, JAMBA, ROKAMBA)	SLC	The species has been recorded from a wide range of wetland habitats, of varying levels of salinity (DAWE, 2020b). The species typically forages in shallow water and on bare soft mud at the edges of wetlands (DAWE, 2020b).	**Potential to occur** The species has not been previously recorded within the desktop search extent. Farm dams within the Study Area are considered to provide marginal habitat for the species.
fork-tailed swift *Apus pacificus*	Marine; Migratory (CAMBA, JAMBA, ROKAMBA)	SLC	The species is predominantly aerial and occurs over inland areas and occasionally above the foothills in coastal areas with dry and open habitat (DAWE, 2020b). The species can also occur over low scrub, heathland, saltmarsh and riparian woodlands and are associated with low pressure systems that favour the occurrence of insect prey (DAWE, 2020b).	**Known occurrence** The species has been recorded on a single occasion within the Study Area.
sharp-tailed sandpiper *Calidris acuminata*	Marine; Migratory (Bonn, CAMBA, JAMBA, ROKAMBA)	SLC	The species typically inhabits muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DAWE, 2020b). This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland (DAWE, 2020b). The species may use flooded paddocks, sedgelands and other ephemeral wetlands, but vacate these habitats during dry conditions (DAWE, 2020b). Marine habitats for the species include intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves (DAWE, 2020b). Sometimes sharp-tailed sandpipers occur on rocky shores and rarely on exposed reefs (Higgins & Davies, 1996).	**Potential to occur** The species has not been previously recorded within the desktop search extent. Farm dams within the Study Area are considered to provide marginal habitat for the species.
curlew sandpiper *Calidris ferruginea*	CE; Marine; Migratory (Bonn, CAMBA, JAMBA, ROKAMBA)	CE	In Australia, this species usually forages and roosts in intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms (DAWE, 2020b).	**Unlikely to occur** The species has not been previously recorded within the desktop search extent. Potential habitat for the species within the Study Area (farm dams) was considered marginal.

Fauna Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurence[2]
pectoral sandpiper *Calidris melanotos*	Marine; Migratory (Bonn, JAMBA, ROKAMBA)	SLC	Typical habitat for the species comprises shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (DAWE, 2020b). The species is usually found in coastal or near coastal habitat but occasionally further inland (DAWE, 2020b). Also recorded in swamp overgrown with lignum (DAWE, 2020b).	**Unlikely to occur** The species has not been previously recorded within the desktop search extent. Potential habitat for the species within the Study Area (farm dams) was considered marginal.
oriental cuckoo *Cuculus optatus*	Marine; Migratory (CAMBA, JAMBA, ROKAMBA)	SLC	The species inhabits monsoon forest, rainforest edges, leafy trees in paddocks, river flats, roadsides, mangroves, islands (Pizzey & Knight, 2007). The species is a regular nonbreeding migrant to coastal northern and eastern Australia (Pizzey and Knight, 2007).	**Unlikely to occur** The species has not been previously recorded within the desktop search extent. Potential habitat for the species within the Study Area (farm dams) was considered marginal.
Latham's snipe *Gallinago hardwickii*	Marine; Migratory (Bonn, JAMBA, ROKAMBA)	SLC	In Australia the species typically occurs in permanent and ephemeral wetlands up to 2000 m above sea-level (DAWE, 2020b). They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies) (DAWE, 2020b). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity (DAWE, 2020b). Various other freshwater habitats can be used including bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains (DAWE, 2020b).	**Likely to occur** The species has been previously recorded within the desktop search extent. Farm dams and ephemeral wetland areas within the Study Area are considered to providing potential suitable habitat for the species.
gull-billed tern *Gelochelidon nilotica*	Marine; Migratory (CAMBA)	SLC	The species has been recorded on beaches, mudflats, fresh and brackish wetlands, grasslands, crops and airfields (Pizzey and Knight, 2010).	**Potential to occur** The species has not previously been recorded within the desktop search extent; however, farm dams provide potentially suitable habitat for the species.
Caspian tern *Hydroprogne caspia*	Marine; Migratory (JAMBA)	SLC	Mostly found in sheltered coastal areas (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks. They also use artificial wetlands, including reservoirs, sewage ponds and saltworks (DAWE, 2020b).	**Potential to occur** The species has previously been recorded within the desktop search extent, however suitable habitat for the species is primarily limited small farm dams within the Study Area.

Fauna Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurence[2]
black-faced monarch *Monarcha melanopsis*	Marine; Migratory (Bonn)	SLC	The species mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest (DAWE, 2020b). Also known from gullies in mountain areas or coastal foothills, softwood scrub dominated by *Acacia harpophylla*, coastal scrub dominated by *Banksia integrifolia* and *Eucalyptus botryoides*, occasionally among mangroves, sometimes in suburban parks and gardens, and selectively logged and 20—30 years old regrowth rainforest (DAWE, 2020b).	**Unlikely to occur** While the species has previously been recorded within the desktop search extent, however the Study Area does not contain suitable habitat for the species.
yellow wagtail *Motacilla flava*	Marine; Migratory (CAMBA, JAMBA, ROKAMBA)	SLC	The species typically inhabits short grass and bare ground; swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land and town lawns (Pizzey and Knight, 2007). The species is regularly recorded as a summer migrant to coastal northern Australia (Pizzey and Knight, 2007).	**Unlikely to occur** The species has not previously been recorded within the desktop search extent and the Study Area is outside of the current known distribution for the species.
satin flycatcher *Myiagra cyanoleuca*	Marine; Migratory (Bonn)	SLC	Eucalypt forests, often near wetlands or watercourses and/or with open understory and grass ground cover. During migration the species occurs in coastal forests, woodlands and drier woodlands and open forests.	**Known occurrence** The species has been recorded on a single occasion within the Study Area.
eastern osprey *Pandion cristatus*	Marine; Migratory (Bonn)	SLC	The species inhabits littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands (DAWE, 2020b). The species has been recorded within a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes (DAWE, 2020b).	**Unlikely to occur** Suitable habitat for the species was not present within the Study Area.
glossy ibis *Plegadis falcinellus*	Marine; Migratory (Bonn)	SLC	Preferred habitat for the species includes foraging and breeding are freshwater marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation (DAWE, 2020b). The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons (DAWE, 2020b).	**Likely to occur** The species has been previously recorded within the desktop search extent. Farm dams and ephemeral wetland areas within the Study Area are considered to provide potential suitable habitat for the species.

Fauna Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurence[2]
common greenshank *Tringa nebularia*	Marine; Migratory (Bonn, CAMBA, JAMBA, ROKAMBA)	SLC	The species occurs in all types of wetlands (Higgins & Davies, 1996). Typical habitat for this species a wide variety of inland wetlands and sheltered coastal habitats of varying salinity (DAWE, 2020b), including sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass, both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and salt-flats (DAWE, 2020b).	**Potential to occur** The species has been previously recorded within the desktop search extent. Farm dams within the Study Area are considered to provide marginal habitat for the species.
marsh greenshank *Tringa stagnatilis*	Marine; Migratory (Bonn, CAMBA, JAMBA, ROKAMBA)	SLC	The species inhabits permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks (DAWE, 2020b). They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes (DAWE, 2020b).	**Potential to occur** The species has been previously recorded within the desktop search extent. Farm dams within the Study Area are considered to provide marginal habitat for the species.
oriental plover *Cuculus optatus*	Marine; Migratory (Bonn, CAMBA, JAMBA, ROKAMBA)	SLC	Usually inhabit flat, open, semi-arid or arid grasslands, where the grass is short and sparse, and interspersed with hard, bare ground, such as claypans, dry paddocks, playing fields, lawns and cattle camps (DAWE, 2020b)	**Potential to occur** The species has been previously recorded within the desktop search extent, however the Study Area occurs outside of the species primary distribution and the species would only occur extremely infrequently as a vagrant.

[1] EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*; NC Act = *Nature Conservation Act 1992*. E-Endangered, V-Vulnerable, NT-Near Threatened

[2] **Known** to occur: species were recorded during field surveys. **Likely** to occur: suitable habitat to support the species is present within the Study Area and the species has previously been recorded within the desktop search extent. **Potential** to occur: The Study Area is within the species known distribution and suitable habitat to support the species is present; however, the species has not previously been recorded within the desktop search extent; and/or, suitable habitat is degraded or of limited extent, thereby reducing the likelihood of the species occurrence. **Unlikely** to occur: the Study Area does not comprise suitable habitat for the species, or is outside of the species known distribution.

Appendix E Regional ecosystem summaries

RE 11.3.1

Habitat Quality Sites:
HQ21, HQ27, HQ28, HQ30, HQ39 and HQ40

Recorders: Brad Dreis and Peter Wagner

Landform: alluvial channel

Geology/Soils: Qa/ alluvial sands

Land zone: 3

Description: *Acacia harpophylla* woodlands to 17 m on alluvial flats with associated *Casuarina cristata* and *Eucalyptus coolabah*. A sparse shrublayer was usually present.

Structural formation: Woodland	**Ecologically Dominant Layer (EDL):** T1
Comment: -	**VM Act status/BD:** Endangered/Endangered

T1

Height interval: 12-19 m	**Median Height:** 16 m	**Estimated Cover Density:** Sparse (S)

Species: *Acacia harpophylla (d), Eucalyptus coolabah (a), Eucalyptus populnea (a), Atalaya hemiglauca (a) and Acacia salicina (a).*

T2

Height interval: 7-11 m	**Median Height:** 9 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Acacia harpophylla, Acacia salicina, Lysiphyllum carronii, Eucalyptus populnea, Eucalyptus coolabah, Terminalia oblongata.*

S1

Height interval:1-6 m	**Median Height:** 2.5 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Lysiphyllum hookeri, Acacia harpophylla, Carissa ovata, Geijera parviflora, Alectryon diversifolius, Capparis lasiantha, Capparis mitchellii* and *Atalaya hemiglauca.*

Groundcover

Estimated Cover Density: 41-75%

Species: *Chloris divaricata, Cenchrus ciliaris**, *Enteropogon ramosa*, Parthenium hysterophorus*, *Bothriochloa pertusa**, *Sporobolus caroli, Malvastrum americanum**and *Paspalidium caespitosum.*

RE 11.3.2

Habitat Quality Sites:
B2, B5, B6 and B7

Recorders: Brad Dreis and Peter Wagner

Landform: alluvial floodplain

Geology/Soils: Qr/ sands

Land zone: 3

Description: *Eucalyptus populnea* woodlands to 22 m on alluvial flats. Associated tree canopy species included *E. coolabah*, *Corymbia tessellaris* and *C. dallachiana*. A sparse shrub layer containing *Cassia brewsteri*, *Acacia salicina* was also present.

Structural formation: Woodland	**Ecologically Dominant Layer (EDL):** T1
Comment: -	**VM Act status/BD:** Of concern/Of concern

T1

Height interval: 11-22 m	**Median Height:** 15 m	**Estimated Cover Density:** Sparse (S)

Species: *Eucalyptus populnea* (d), *Eucalyptus coolabah* (a), *Acacia harpophylla* (a) and *Corymbia tessellaris*.

T2

Height interval: 7-11 m	**Median Height:** 9 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Eucalyptus populnea* (d), *Acacia harpophylla* (a), *Eucalyptus coolabah* (a).

S1

Height interval:1-6 m	**Median Height:** 2 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Terminalia oblongata, Cassia brewsteri, Acacia harpophylla, Carissa ovata and Eucalyptus populnea.*

Groundcover

Estimated Cover Density: 71-75%

Species: *Chrysopogon fallax, Cenchrus ciliaris*, Chrysocephalum apiculatum, Perotis rara, Eragrostis elongata* and *Melinis repens**.

RE 11.3.3c

Habitat Quality Sites:
HQ9 and HQ15

Recorders: Brad Dreis and Peter Wagner

Landform: floodplain wetland

Geology/Soils: Qr/ black clay-loam

Land zone: 3

Description: *Eucalyptus coolabah* woodland, occasionally with *A. harpophylla* sub-dominant/co-dominant to 19m on alluvial flats. Other associated tree species included *E. populnea*, *Casuarina cristata* and *Acacia salicina*. A very sparse to sparse shrublayer was usually present containing *Cassia brewsteri*, *Alectryon diversifolius* and juvenile canopy species.

Structural formation: Woodland	**Ecologically Dominant Layer (EDL):** T1
Comment: -	**VM Act status/BD:** Of concern/Of concern

T1

Height interval: 12-19 m	**Median Height:** 16 m	**Estimated Cover Density:** Sparse (S)

Species: *Eucalyptus coolabah* (d), *Eucalyptus populnea* (a), *Acacia harpophylla* (a).

T2

Height interval: 7-11 m	**Median Height:** 9 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Eucalyptus coolabah* (d), *Acacia harpophylla* (a), *Casuarina cristata* (a).

S1

Height interval:1-6 m	**Median Height:** 2 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Terminalia oblongata*, *Cassia brewsteri*, *Casuarina cristata*

Groundcover

Estimated Cover Density: 66-70%

Species: *Eleocharis pallens*, *Parthenium hysterophorus**, *Echinochloa Colona**, *Cenchrus ciliaris**, *Leptochloa digitata*, *Sesbania cannabina*, *Aeschynomene indica*, *Alternanthera nodiflora* and *Cyperus gracilis*.

RE 11.3.4

Habitat Quality Sites: B3, HQ10 and HQ12

Recorders: Brad Dreis and Peter Wagner

Landform: alluvial sand ridge

Geology/Soils: TQa and Qr/ alluvial sands

Land zone: 3

Description: *Eucalyptus tereticornis* and *Corymbia clarksoniana* open woodland (to 23 m) on Quaternary alluvials. Other associated tree species included *C. tessellaris*. A sparse shrublayer was present consisting of *Petalostigma pubescens*, *Acacia salicina*, *Melaleuca nervosa*.

Structural formation: Open woodland	**Ecologically Dominant Layer (EDL):** T1
Comment: -	**VM Act status/BD:** Of concern/Of concern

T1

Height interval: 14-23 m	**Median Height:** 19 m	**Estimated Cover Density:** Very sparse (V)

Species: *Eucalyptus tereticornis* (d), *Corymbia clarksoniana* (a), *Corymbia tessellaris* (a).

T2

Height interval: 7-13 m	**Median Height:** 9 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Corymbia clarksoniana, Corymbia tessellaris.*

S1

Height interval:1-6 m	**Median Height:** 2.5 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Melaleuca nervosa, Petalostigma pubescens, Acacia salicina,*

Groundcover

Estimated Cover Density: 61-65%

Species: *Chrysopogon fallax, Cenchrus ciliaris*, Aristida benthamii, Chrysocephalum apiculatum Perotis rara, Chamaecrista absus, Vittadinia sulcata, Wahlenbergia queenslandica, Stylosanthes scabra*, Cyperus difformis, Waltheria indica and Setaria surgens.*

RE 11.3.25

Habitat Quality Sites:
HQ14 and HQ37

Recorders: Brad Dreis and Peter Wagner

Landform: alluvial channels

Geology/Soils: Qa

Land zone: 3

Description: Mixed eucalypt fringing riparian woodland (to 23 m) comprising *E. camaldulensis*, *E. coolabah* and *Acacia harpophylla*. A sparse shrublayer was present containing *Terminalia oblongata*, *Santalum lanceolatum* and *A. salicina*.

Structural formation: Woodland	**Ecologically Dominant Layer (EDL):** T1
Comment: -	**VM Act status/BD:** Least concern/Of concern

T1

Height interval: 14-23 m	**Median Height:** 19 m	**Estimated Cover Density:** Very sparse (V)

Species: *Eucalyptus tereticornis* (d), *Eucalyptus camaldulensis* (s), *Eucalyptus coolabah (a)*, *Corymbia tessellaris* (a), *Eucalyptus populnea* (a), *Melaleuca fluviatilis* (a) and *Casuarina cunninghamiana* (a).

T2

Height interval: 6-13 m	**Median Height:** 9 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Lysiphyllum hookeri, Melaleuca fluviatilis, Acacia salicina, Casuarina cunninghamii and Corymbia tessellaris.*

S1

Height interval:1-5 m	**Median Height:** 2 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Acacia salicina, Clerodendrum floribundum, Santalum lanceolatum and Sida cordifolia*.*

Groundcover

Estimated Cover Density: 71-85%

Species: *Megathyrsus maximus*, Cenchrus ciliaris*, Parthenium hysterophorus*, Urochloa mosambicensis*, Sida spinosa*, Bothriochloa bladhii, Leptochloa digitata, Alternanthera denticulata, Juncus usitatus, Cynodon dactylon*, Trianthema portulacastrum and Polymeria pusilla.*

RE 11.4.4

Habitat Quality Sites:
HQ16 and HQ29

Recorders: Brad Dreis and Peter Wagner

Landform: gently undulating plains

Geology/Soils: Qr/Czs black loam

Land zone: 4

Description: *Dichanthium* spp., *Astrebla* spp. grassland on Cainozoic clay plains.

Structural formation: grassland

Ecologically Dominant Layer (EDL): G

Comment: The community also contains suitable habitat for threatened fauna and flora.

VM Act status/BD: Least concern/Of concern

Emergent

Height interval: 1-5 m

Median Height: 2 m

Estimated Cover Density: Very sparse (V)

Species: *Cassia brewsteri, Atalaya hemiglauca* and *Vachellia farnesiana**.

Groundcover

Estimated Cover Density: 75-85%

Species: *Dichanthium sericeum* (d), *Aristida latifolia, Thellungia advena, Eriochloa crebra, Heteropogon contortus, Bothriochloa pertusa**, *Iseilema vaginiflorum, Dichanthium aristatum**, *Panicum decompositum, Brachyachne convergens, Aristida leptopoda, Neptunia gracilis, Polymeria pusilla, Pimelea haematostachya, Glycine tomentella, Phyllanthus maderaspatensis, Galactia tenuiflora, Parthenium hysterophorus** and *Cenchrus ciliaris**.

RE 11.4.8

Habitat Quality Sites:
B9, HQ3, HQ5, HQ18 and HQ37 (regrowth HQ1, HQ2, HQ7 and HQ19)

Recorders: Brad Dreis and Peter Wagner

Landform: gently undulating clay plains

Geology/Soils: Qr/Czs

Land zone: 4

Description: *Eucalyptus cambageana* and *Acacia harpophylla* woodlands (to 18 m) on gently undulating clay plains. The shrublayer comprised *Geijera parviflora*, *Carissa ovata*, *Capparis lasiantha*, *Archidendropsis basaltica* and *Alectryon diversifolius*.

Structural formation: Woodland	**Ecologically Dominant Layer (EDL):** T1
Comment: An area of this RE contained Brigalow TEC. The community also contains suitable habitat for threatened fauna and flora.	**VM Act status/BD:** Endangered/Endangered

T1

Height interval: 11-18 m	**Median Height:** 14 m	**Estimated Cover Density:** Sparse (S)

Species: *Eucalyptus cambageana* (d/c), *Acacia harpophylla* (c/s), *Eucalyptus crebra* (a) and *Corymbia clarksoniana* (a).

T2

Height interval: 6-10 m	**Median Height:** 7 m	**Estimated Cover Density:** Very Sparse (V)

Species: Acacia harpophylla, *Lysiphyllum carronii*, *Owenia acidula*, *Acacia salicina*, *Eucalyptus cambageana* and *Santalum lanceolatum*.

S1

Height interval:1-5 m	**Median Height:** 2.5 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Acacia harpophylla*, *Carissa ovata*, *Geijera parviflora*, *Alectryon diversifolius*, *Terminalia oblongata*, *Cassia brewsteri and Citrus glauca*.

Groundcover

Estimated Cover Density: 36-50%

Species: *Chloris divaricata*, *Cenchrus ciliaris**, *Parthenium hysterophorus**, *Paspalidium caespitosum*, *Bothriochloa pertusa**, *Einadia polygonoides*, *Enchylaena tomentosa*, *Sporobolus caroli*, *Parsonsia lanceolata*, *Ancistrachne uncinulata*, *Enteropogon ramosus* and *Salsola australis*.

RE 11.4.9

Habitat Quality Sites: HQ8 (regrowth HQ1, HQ2, HQ7 and HQ19)

Recorders: Brad Dreis and Peter Wagner

Landform: Undulating clay plains

Geology/Soils: Qr/Czs

Land zone: 4

Description: *Acacia harpophylla* dominated woodlands and low woodlands on undulating clay plains. Associated canopy tree species included *Eucalyptus coolabah* and *Casuarina cristata*. The shrublayer contained *Atalaya hemiglauca*, *Citrus glauca*, *Lysiphyllum carronii*, *Carissa ovata* and juvenile *A. harpophylla*.

Structural formation: Woodland	**Ecologically Dominant Layer (EDL):** T1
Comment: The community also contains suitable habitat for threatened fauna and flora.	**VM Act status/BD:** Endangered/Endangered

T1

Height interval: 8-13 m	**Median Height:** 11 m	**Estimated Cover Density:** Very sparse (V)

Species: *Acacia harpophylla* (c), *Casuarina cristata* (c), *Eucalyptus populnea* (a), *Eucalyptus coolabah* and *Lysiphyllum carronii*.

S1

Height interval:1-6 m	**Median Height:** 3 m	**Estimated Cover Density:** Very Sparse (V)

Species: *Acacia harpophylla, Lysiphyllum carronii, Geijera parviflora, Apophyllum anomalum, Eremophila mitchellii, Alectryon diversifolius* and *Citrus glauca*.

Groundcover

Estimated Cover Density: 61-65%

Species: *Cenchrus ciliaris*, Aristida ramosa, Enteropogon ramosus, Bothriochloa pertusa*, Paspalidium caespitosum, Harrisia martinii*, Chloris divaricata, Enchylaena tomentosa, Sporobolus creber, Rhynchosia minima, Parthenium hysterophorus** and *Astrebla squarrosa*.

RE 11.5.3

Habitat Quality Sites:
B4, HQ11, HQ13, HQ17 and HQ20

Recorders: Brad Dreis and Peter Wagner

Landform: flat, sandy plains

Geology/Soils: TQa/ Colluvial sands

Land zone: 5

Description: *Eucalyptus populnea* woodlands and open woodlands (to 21 m) on deep sandy plains. Associated species within the tree canopy included *Corymbia clarksoniana* and *C. tessellaris*. The sparse to moderate shrub layer contained *Cassia brewsteri*, *Archidendropsis basaltica*, *Alectryon diversifolius*, *Eremophila mitchelli* and *Carissa ovata*.

Structural formation: Woodland

Ecologically Dominant Layer (EDL): T1

Comment: -

VM Act status/BD: Least concern/No concern at present

T1

Height interval: 11-21 m

Median Height: 15 m

Estimated Cover Density: Sparse (S)

Species: *Eucalyptus populnea* (d), *Corymbia tessellaris* (a), *Corymbia clarksoniana* (a), *Owenia acidula* (a), *Brachychiton populneus*, *Acacia harpophylla* (a), *Acacia salicina* (a) and *Eucalyptus crebra* (a).

T2

Height interval: 5-10 m

Median Height: 8 m

Estimated Cover Density: 10%

Species: *Eucalyptus populnea* (d), *Corymbia tessellaris* (a), *Lysiphyllum carronii* (a), *Corymbia clarksoniana* (a), *Acacia excelsa* (a), *Acacia harpophylla* (a), *Acacia salicina* (a).

S1

Height interval:1-5 m

Median Height: 2.5 m

Estimated Cover Density: 11-15%

Species: *Cassia brewsteri*, *Archidendropsis basaltica*, *Erythroxylon australe*, *Alectryon diversifolius*, *Eucalyptus populnea*, *Carissa ovata*, *Petalostigma pubescens*, *Erythroxylon australe*, *Geijera parviflora*, *Myoporum acuminatum*, *Acacia harpophylla* and *Eremophila mitchellii*.

Groundcover

Estimated Cover Density: 65-80%

Species: *Cenchrus ciliaris**, *Enteropogon ramosa*, *Aristida ramosa*, *Aristida holathera*, *Aristida calycina*, *Chrysopogon fallax*, *Fimbristylis dichotoma*, *Themeda triandra*, *Melinis repens**, *Enneapogon lindleyanus*, *Digitaria brownii*, *Phyllanthus virgatus*, *Desmodium brachypodum*, *Evolvulus alsinoides*, *Melhania oblongifolia*, *Crotalaria* spp. and *Boerhavia dominii*.

RE 11.5.9

Habitat Quality Sites:
HQ4 and HQ6

Recorders: Brad Dreis and Peter Wagner

Landform: flat, sandy plains

Geology/Soils: TQa/ colluvial sands

Land zone: 5

Description: *Eucalyptus crebra* open woodland (to 16m) with associated *Corymbia clarksoniana* on remnant surfaces. The sparse shrub layer comprised *Psydrax oleifolius*, *Capparis lasiantha* and *Acacia harpophylla*.

Structural formation: Open woodland	**Ecologically Dominant Layer (EDL):** T1
Comment: -	**VM Act status/BD:** Least concern/No concern at present

T1

Height interval: 8-16 m	**Median Height:** 12 m	**Estimated Cover Density:** Sparse (S)

Species: *Eucalyptus crebra* (d), *Corymbia clarksoniana* (a), *Eucalyptus melanophloia* (a) and *Petalostigma pubescens* (a).

S1

Height interval:1-6 m	**Median Height:** 2 m	**Estimated Cover Density:** 6-10%

Species: *Cassia brewsteri*, *Psydrax odorata*, *Psydrax oleifolia*, *Grewia retusifolia*, *Capparis lasiantha*, *Denhamia cunninghamii*, *Carissa ovata* and *Grewia latifolia*.

Groundcover

Estimated Cover Density: 51-55%

Species: *Cenchrus ciliaris**, *Digitaria brownii*, *Aristida ramosa*, *Enteropogon ramosus*, *Chrysopogon fallax*, *Panicum effusum*, *Enneapogon gracilis*, *Enneapogon lindleyanus*, *Eulalia aurea*, *Rostellularia adscendens*, *Evolvulus alsinoides*, *Abutilon oxycarpum*, *Sida rohlenae*, *Phyllanthus maderaspatensis*, *Alternanthera nana*, *Melinis repens**, *Bothriochloa pertusa** and *Gomphrena celosioides**.

RE 11.9.2

Habitat Quality Sites:
B1, B8, HQ22, HQ31, HQ33, HQ38, HQ42 and HQ43

Recorders: Brad Dreis and Peter Wagner

Landform: gently undulating plains

Geology/Soils: Czb/Puw/Pwj

Land zone: 9

Description: *Eucalyptus melanophloia* and *E. orgadophila* open woodlands (to 15 m) over underlying fine-grained sedimentary rock. Other associated tree species include *C. dallachiana* and *C. erythrophloia*. A very sparse shrub layer was usually present containing juvenile *Eucalyptus* and *Corymbia* spp.

Structural formation: Open woodland

Ecologically Dominant Layer (EDL): T1

Comment: The community also contains suitable habitat for threatened fauna and flora.

VM Act status/BD: Least concern/No concern at present

T1

Height interval: 8-17 m

Median Height: 13 m

Estimated Cover Density: Very sparse (V)

Species: *Eucalyptus orgadophila* (d)/*Eucalyptus melanophloia* (d), *Corymbia dallachiana* (a), *Eucalyptus populnea* (a) and *Corymbia erythrophloia* (a).

S1

Height interval:1-6 m

Median Height: 2.5 m

Estimated Cover Density: 6-10%

Species: *Cassia brewsteri, Acacia salicina, Carissa ovata, Archidendropsis basaltica, Capparis lasiantha* and *Atalaya hemiglauca.*

Groundcover

Estimated Cover Density: 71-85%

Species: *Heteropogon contortus, Chrysopogon fallax, Aristida latifolia, Thellungia advena, Eriochloa pseudoacrotricha, Dichanthium queenslandicum, Bothriochloa pertusa*, Iseilema vaginiflorum, Cyperus* spp., *Sehima nervosum, Dichanthium aristatum*, Panicum decompositum, Brachyachne convergens, Aristida leptopoda, Apowollastonia spilanthoides, Afrohybanthus enneaspermus, Pimelea haematostachya, Sida rohlenae*, Malvastrum americanum*, *Phyllanthus virgatus, Wahlenbergia queenslandica, Parthenium hysterophorus** and *Cenchrus ciliaris**.

RE 11.9.3

Habitat Quality Sites:
HQ23, HQ25, HQ26, HQ32, HQ34, HQ35 and HQ36

Recorders: Brad Dreis and Peter Wagner

Landform: gently undulating plains

Geology/Soils: Czb/Puw/Pwj

Land zone: 9

Description: *Dichanthium sericeum* dominated grasslands on plains over underlying sedimentary rocks.

Structural formation: grassland

Ecologically Dominant Layer (EDL): G

Comment: The community also contains suitable habitat for threatened fauna and flora.

VM Act status/BD: Least concern/No concern at present

Emergent

Height interval: 2-12 m

Median Height: 5 m

Estimated Cover Density: Very sparse (V)

Species: *Cassia brewsteri, Acacia salicina, Lysiphyllum carronii, Eucalyptus orgadophila* and *Vachellia farnesiana**.

Groundcover

Estimated Cover Density: 75-85%

Species: *Dichanthium sericeum* (d), *Aristida latifolia, Thellungia advena, Eriochloa pseudoacrotricha, Heteropogon contortus, Bothriochloa pertusa**, *Iseilema vaginiflorum, Cyperus* spp., *Sehima nervosum, Dichanthium aristatum**, *Panicum decompositum, Brachyachne convergens, Aristida leptopoda, Apowollastonia spilanthoides, Crotalaria spp., Polymeria longifolia, Ocimum tenuiflorum, Pimelea haematostachya, Glycine tomentella,* Malvastrum americanum*, *Phyllanthus virgatus, Galactia tenuiflora, Parthenium hysterophorus** and *Cenchrus ciliaris**.

RE 11.9.5

Habitat Quality Sites:
HQ24, HQ41 and HQ45

Recorders: Brad Dreis and Peter Wagner

Landform: gently undulating plains

Geology/Soils: Czb/Puw/Pwj

Land zone: 9

Description: *Acacia harpophylla* and *Casuarina cristata* woodlands and open forests on underlying fine-grained sedimentary rock. The shrub layer included *Citrus glauca*, *Lysiphyllum carronii*, *Alectryon diversifolius*, *Terminalia oblongata* and *Carissa ovata*.

Structural formation: Woodland	**Ecologically Dominant Layer (EDL):** T1
Comment: -	**VM Act status/BD:** Endangered/ Endangered

T1

Height interval: 10-16 m	**Median Height:** 12 m	**Estimated Cover Density:** Sparse (S)

Species: *Acacia harpophylla* (d), *Eucalyptus orgadophila* (a), *Eucalyptus populnea* (a), *Lysiphyllum carronii* (a), *Ventilago viminalis* (a), *Atalaya hemiglauca* (a) and *Alectryon oleifolius* (a).

T2

Height interval: 7-9 m	**Median Height:** 8 m	**Estimated Cover Density:** 6-10%

Species: *Acacia harpophylla*, *Lysiphyllum carronii*, *Terminalia oblongata*, *Owenia acidula* and *Atalaya hemiglauca*.

S1

Height interval:1-5 m	**Median Height:** 2.5 m	**Estimated Cover Density:** 11-15%

Species: *Acacia harpophylla*, *Alectryon diversifolius*, *Geijera parviflora*, *Terminalia oblongata*, *Carissa ovata*, *Apophyllum anomalum*, *Capparis lasiantha*, *Capparis loranthifolia*, *Citrus glauca* and *Lysiphyllum carronii*.

Groundcover

Estimated Cover Density: 6-75%

Species: *Cenchrus ciliaris**, *Bothriochloa pertusa**, *Rhynchosia minima*, *Enchylaena tomentosa*, *Parsonsia lanceolata*, *Parthenium hysterophorus**, *Harissa martinii**, *Malvastrum americanum**, *Neptunia gracilis*, *Dipteracanthus australasicus*, *Rostellularia adscendens*, *Sporobolus caroli*, *Sporobolus creber*, *Astrebla elymoides*, *Enteropogon ramosus* and *Panicum queenslandicum*.

Appendix F Anabat Analysis Results

Microbat Call Identification Report

Prepared for ("Client"):	E2M Pty Ltd
Survey location/project name:	Winchester, Qld
Survey dates:	1-9 May 2019
Client project reference:	
Job no.:	E2M-1903
Report date:	10 June 2019

Methods

Data received

Balance! Environmental received almost 13,000 full-spectrum audio files (WAV files) recorded by three Anabat Swift detectors (Titley Scientific, Brisbane) deployed over eight consecutive nights (1-8 May 2019). A review of GPS data in the nightly metadata log files from each detector indicates that 12 sites were surveyed, each for two consecutive nights (see **Table 1**).

Table 1 Deployment schedule for three Anabat Swifts in the Winchester study area, 1-8 May 2019.

Site code *	Detector / Serial No.	Date	Latitude	Longitude
Win-01	Anabat 1 SN497997	1-2 May	-22.1981	148.3415
Win-02	Anabat 2 SN497961	1-2 May	-22.2223	148.3195
Win-03	Anabat 3 SN498036	1-2 May	-22.1961	148.3023
Win-04	Anabat 1 SN497997	3-4 May	-22.2188	148.2527
Win-05	Anabat 2 SN497961	3-4 May	-22.2284	148.3192
Win-06	Anabat 3 SN498036	3-4 May	-22.1817	148.2440
Win-07	Anabat 1 SN497997	5-6 May	-22.1322	148.2468
Win-08	Anabat 2 SN497961	5-6 May	-22.1280	148.2462
Win-09	Anabat 3 SN498036	5-6 May	-22.1249	148.2709
Win-10	Anabat 1 SN497997	7-8 May	-22.2426	148.2418
Win-11	Anabat 2 SN497961	7-8 May	-22.1657	148.2672
Win-12	Anabat 3 SN498036	7-8 May	-22.1783	148.2343

***** Note the Site codes given here were assigned by Balance! Environmental, not provided by the client.

Bat-call analysis

Call analyses were performed using *Anabat Insight* (Version 1.8.6; Titley Scientific, Brisbane). All files were passed first through a generic noise filter to exclude from analysis those files that did not contain bat calls. Files that passed the filter were then processed with a Decision Tree Analysis to group similar calls, based largely on frequency characteristics, and assign tentative species labels. All groups were then reviewed manually to confirm and/or reassign correct species identities.

Species identification

Final call identifications were achieved by comparing call spectrograms and derived metrics with those of reference calls from northern and central Queensland and/or with published call descriptions (e.g. Reinhold et al. 2001). Consideration was also given to the probability of species' occurrence based on published distribution information (e.g. Churchill 2008; van Dyck *et al.* 2013) and on-line database records (e.g. http://www.ala.org.au).

Species identification was based largely on sequences of more than four search-phase pulses; however, where good-quality foraging sequences were available (*i.e.* a call sequence with contiguous search-phase, attack-phase and feeding-buzz components), those calls were used to provide additional evidence of some species' presence. The feeding buzzes of free-tailed bats (Family Molossidae) and bent-winged bats (Family Miniopteridae) are quite distinctive, compared with those of the evening or vesper bats (Family Vespertilionidae) with which they often share search-phase characteristics (Corben 2010).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at http://www.ausbats.org.au/.

Species nomenclature follows Jackson & Groves (2015).

Results & Discussion

The *Anabat Insight* noise-filtering process extracted 5076 files containing recognisable bat calls, within which 5200 calls were identified.

At least 13 and up to 15 species were recorded during the Winchester surveys (see **Table 2**). Eleven call types were reliably attributed to individual species, with two other call types allocated to undifferentiated species pairs: *Nyctophilus geoffroyi* / *N. gouldi*; and *Scotorepens greyii* / *S. sanborni*.

More than half (2770) of the calls were reliably identified, while the remainder were "unresolved" and allocated only to mixed-species groups based on shared call-characteristics. All the unresolved groups represented species that were positively identified from other, more typical calls. Where unresolved calls were identified, all group members are shown as "possible" for the relevant site in **Table 2**, unless more typical calls of one or more species were also recorded and positively identified.

References

Churchill, S. (2008). *Australian Bats.* Jacana Books, Allen & Unwin; Sydney.

Corben, C. (2010). Feeding Buzzes. *Australasian Bat Society Newsletter* **35**, 40-44.

Jackson, S. and Groves, C. (2015). *Taxonomy of Australian Mammals*. CSIRO Publishing, Melbourne.

Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**, 41-43.

Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.

van Dyck, S., Gynther, I. and Baker, A. (ed.) (2013). *Field Companion to the Mammals of Australia*. New Holland; Sydney.

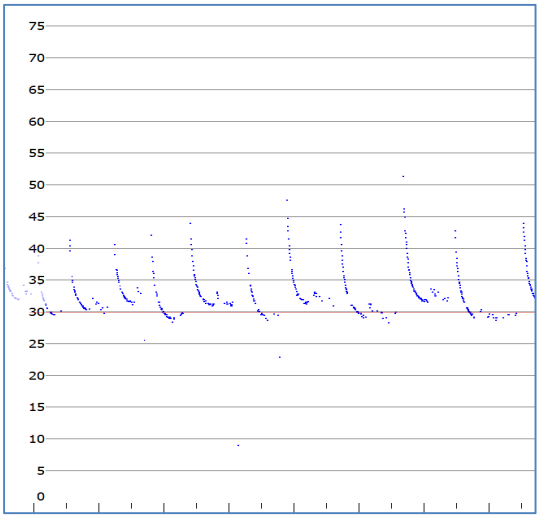
Table 2 Microbat species recorded during the Winchester surveys, 1-8 May 2019.

♦ = 'definite' - at least one call was attributed unequivocally to the species at the site
□ = 'possible' - calls like those of the species were recorded, but were not reliably identified

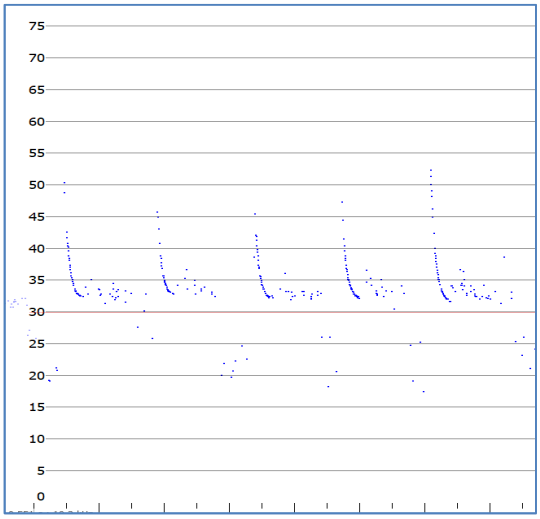
Site *:	Win-01	Win-02	Win-03	Win-04	Win-05	Win-06	Win-07	Win-08	Win-09	Win-10	Win-11	Win-12
Unit:	Anabat 1	Anabat 2	Anabat 3	Anabat 1	Anabat 2	Anabat 3	Anabat 1	Anabat 2	Anabat 3	Anabat 1	Anabat 2	Anabat 3
Dates:	1-2 May	1-2 May	1-2 May	3-4 May	3-4 May	3-4 May	5-6 May	5-6 May	5-6 May	7-8 May	7-8 May	7-8 May
Chalinolobus gouldii	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Chalinolobus morio		□		□					♦	♦	♦	□
Chalinolobus picatus	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Nyctophilus geoffroyi / N. gouldi		♦				♦		♦		♦	♦	
Scotorepens balstoni			♦	♦	♦	♦		♦	♦	♦	♦	♦
Scotorepens greyii/S. sanborni	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Vespadelus troughtoni		□		♦				♦	♦		♦	♦
Miniopterus orianae	□	♦		♦	♦			♦	♦	♦	♦	□
Chaerephon jobensis	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Ozimops lumsdenae	♦	♦	♦	♦	♦	♦	♦	♦		♦	♦	♦
Ozimops ridei	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Setirostris eleryi	□	♦	□		□			□				□
Saccolaimus flaviventris	♦	♦	♦	♦	♦	♦	♦	♦		♦	♦	♦

* Refer to **Table 1** (p. 2) for site locations. Site codes provided here were assigned by Balance Environmental, not provided by the client.

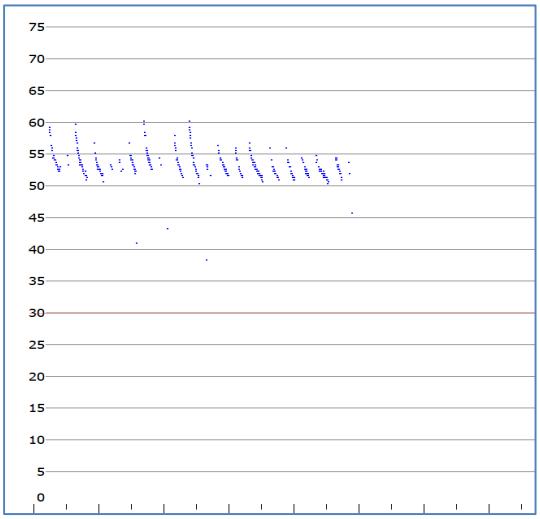
Appendix 1 Representative call sequences from the Winchester surveys, 1-8 May 2019.
x-axis = 10 ms per tick-mark; time between pulses removed ("compressed")



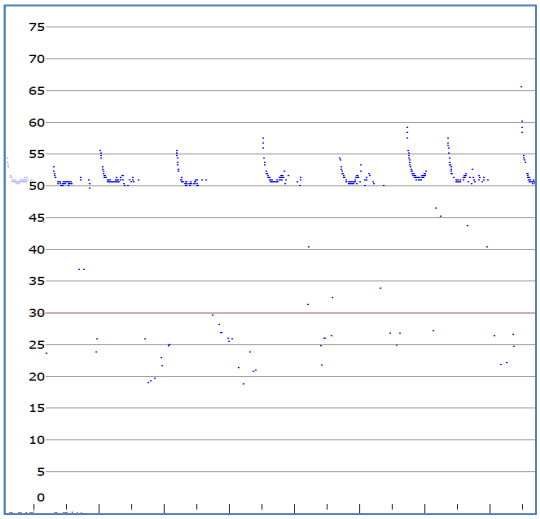
Chalinolobus gouldii



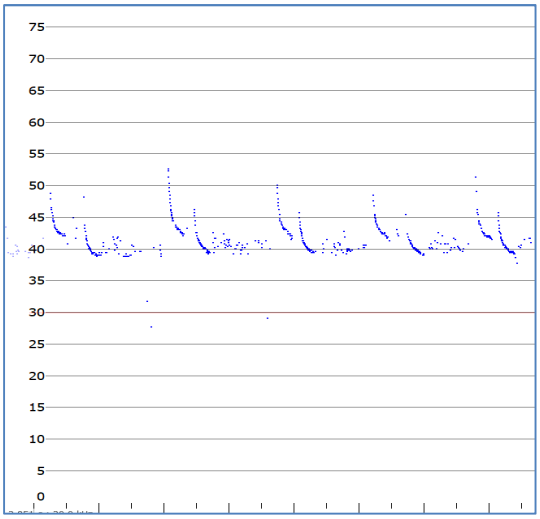
Scotorepens balstoni



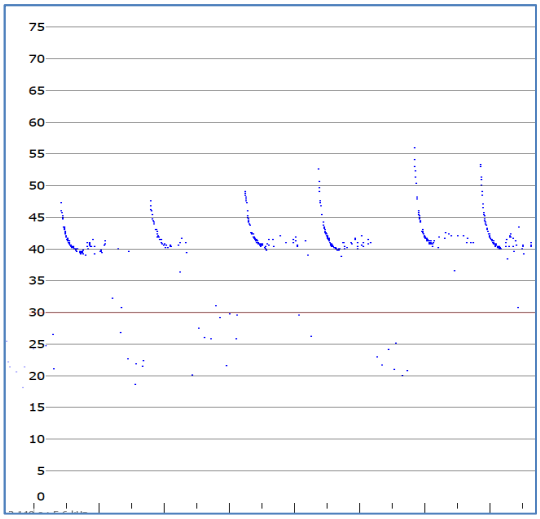
Chalinolobus morio



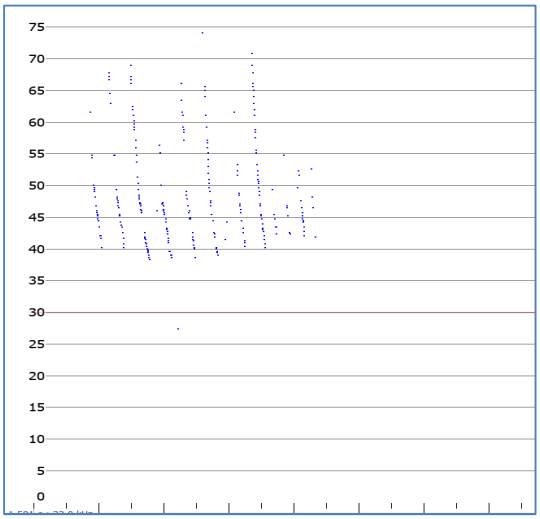
Vespadelus troughtoni



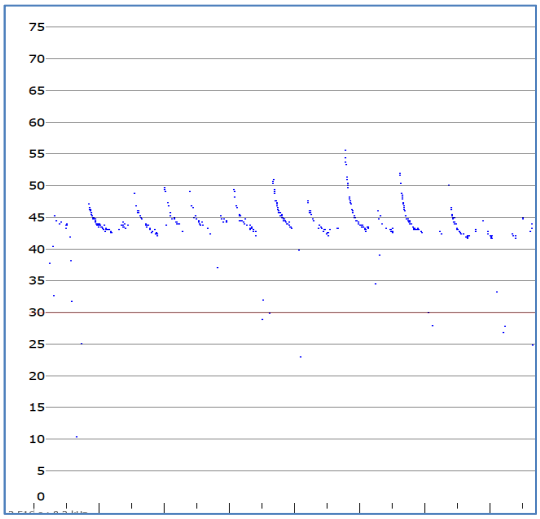
Chalinolobus picatus



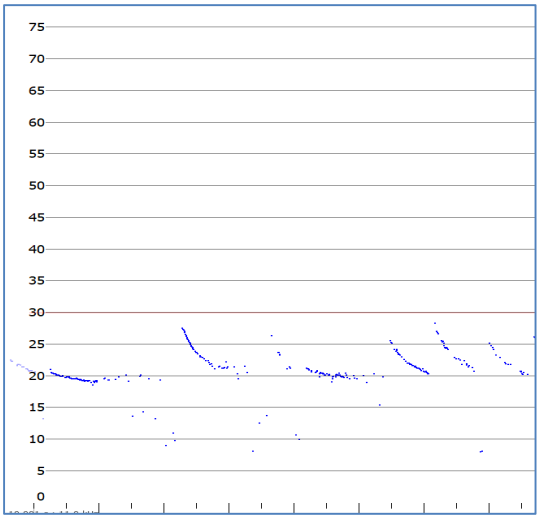
Scotorepens greyii/S. sanborni



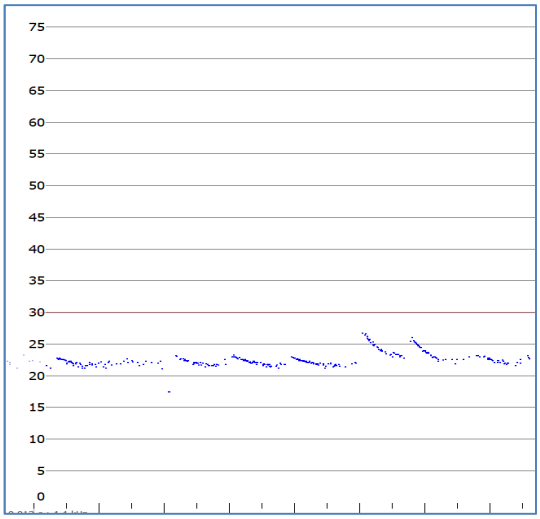
Nyctophilus sp.



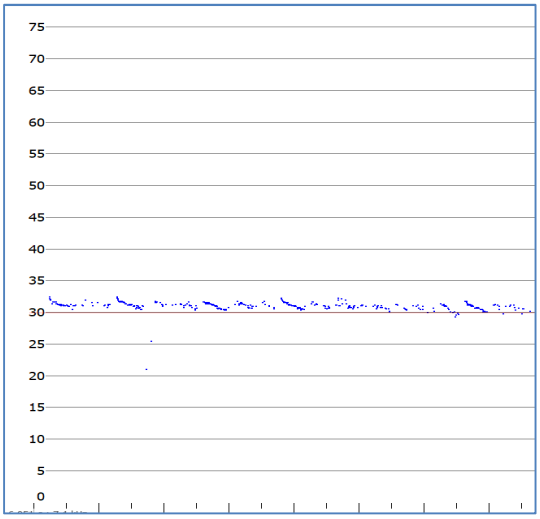
Miniopterus orianae



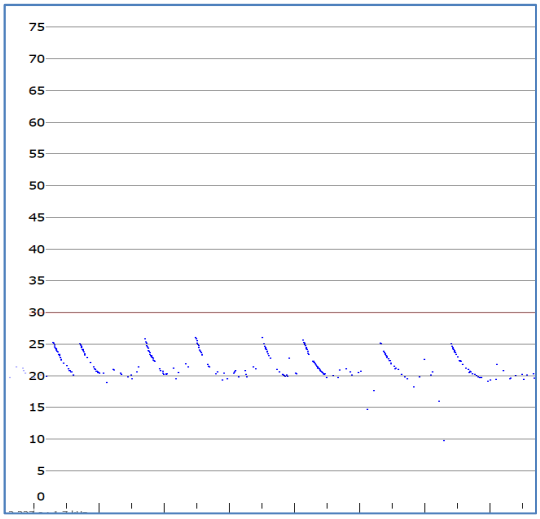
Chaerephon jobensis



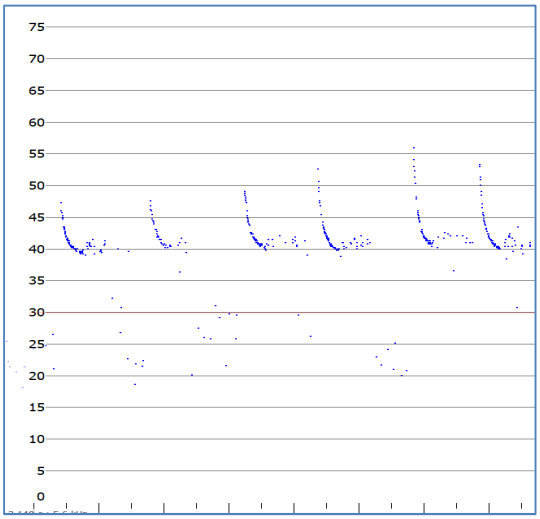
Ozimops lumsdenae



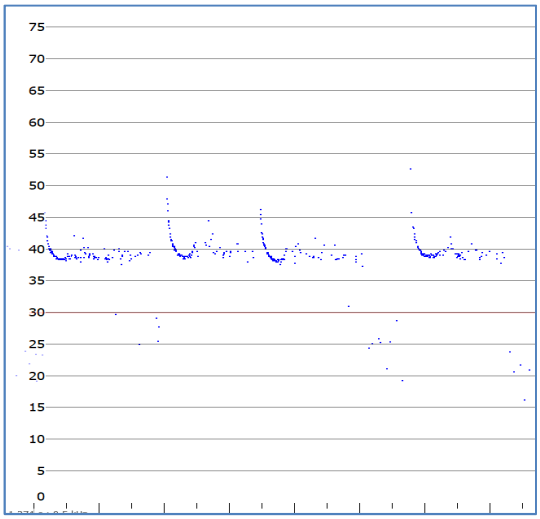
Ozimops ridei



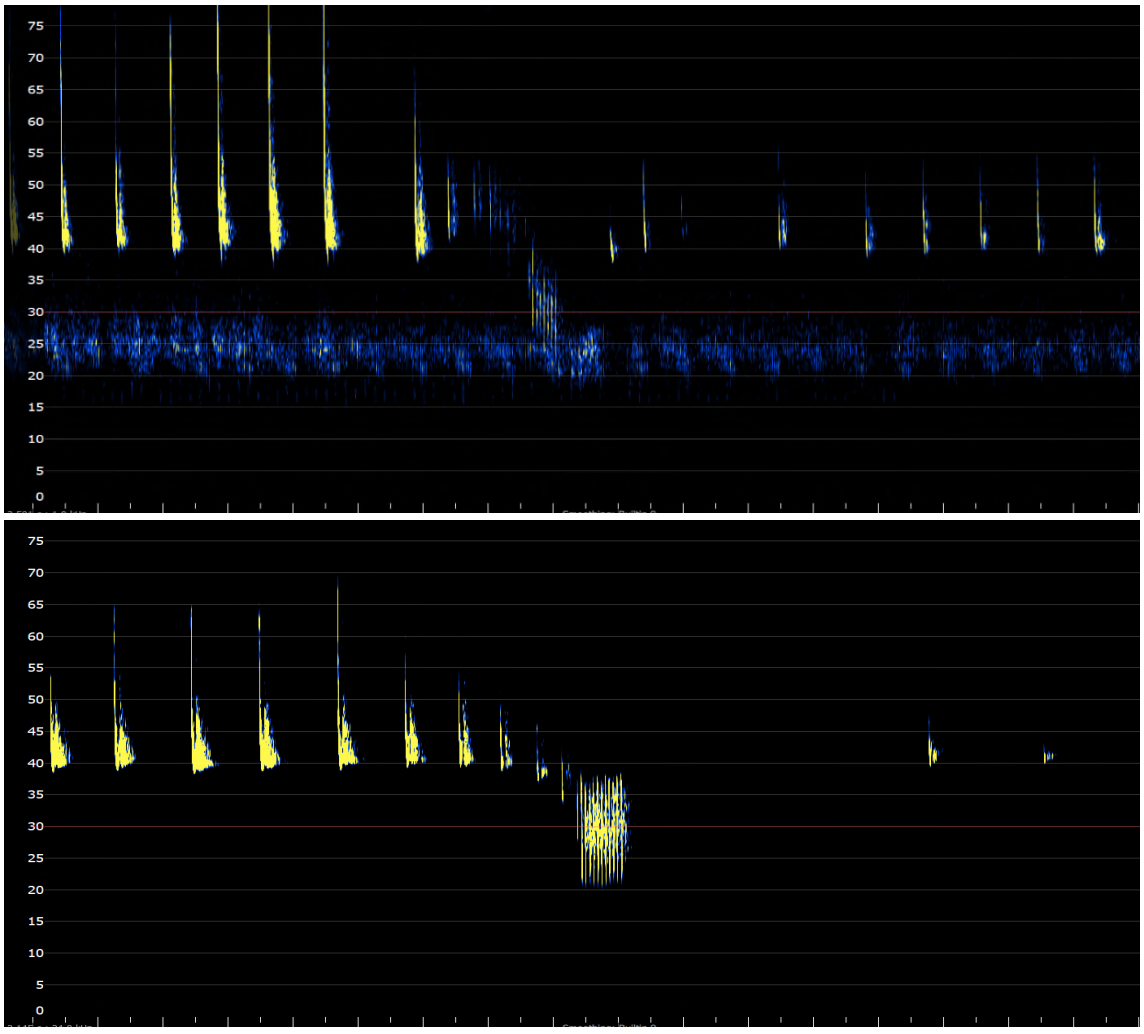
Saccolaimus flaviventris



Scotorepens greyii/S. sanborni



Setirostris eleryi



Differences in feeding buzz structure of *Scotorepens* sp. (top) and *Setirostris eleryi* (bottom)
Note time scale (50 ms per tick) differs from other images and call is displayed in true-time (not compressed)

Microbat Call Identification Report

Prepared for ("Client"):	E2M Pty Ltd
Survey location/project name:	Winchester, Qld
Survey dates:	10-16 September 2019
Client project reference:	
Job no.:	E2M-1904
Report date:	1 November 2019

Methods

Data received

Balance! Environmental received 2978 full-spectrum audio files (WAV files) recorded by two Anabat Swift detectors (Titley Scientific, Brisbane) deployed over eight consecutive nights (10-17 September 2019).

Bat-call analysis

Call analyses were performed using *Anabat Insight* (Version 1.9.0; Titley Scientific, Brisbane). All files were passed first through a generic noise filter to exclude from analysis those files that did not contain bat calls. Files that passed the filter were then processed with a Decision Tree Analysis to group similar calls, based largely on frequency characteristics, and assign tentative species labels. All groups were then reviewed manually to confirm and/or reassign correct species identities.

Species identification

Final call identifications were achieved by comparing call spectrograms and derived metrics with those of reference calls from northern and central Queensland and/or with published call descriptions (e.g. Reinhold et al. 2001). Consideration was also given to the probability of species' occurrence based on published distribution information (e.g. Churchill 2008; van Dyck *et al.* 2013) and on-line database records (e.g. http://www.ala.org.au).

Species identification was based largely on sequences of more than four search-phase pulses; however, where good-quality foraging sequences were available (*i.e.* a call sequence with contiguous search-phase, attack-phase and feeding-buzz components), those calls were used to provide additional evidence of some species' presence. The feeding buzzes of free-tailed bats (Family Molossidae) and bent-winged bats (Family Miniopteridae) are quite distinctive, compared with those of the evening or vesper bats (Family Vespertilionidae) with which they often share search-phase characteristics (Corben 2010).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at http://www.ausbats.org.au/.

Species nomenclature follows Jackson & Groves (2015).

Results & Discussion

The *Anabat Insight* noise-filtering process excluded 291 WAV files from further analysis. A total of 2843 bat calls were identified in the other 2687 WAV files.

At least 9 and up to 12 species were recorded during the Winchester September surveys (see **Table 1**). Eight call types were reliably attributed to individual species, with one other call type allocated to the undifferentiated species pair of *Scotorepens greyii / S. sanborni*.

Over 60% (1749) of the calls were reliably identified, while the remainder were "unresolved" and allocated only to mixed-species groups based on shared call-characteristics. Most of the unresolved groups represented species that were positively identified from other, more typical calls; however, two call types potentially represented additional species (*Vespadelus baverstocki* and *Scotorepens balstoni*). The likelihood of *V. baverstocki* being present in the study area is uncertain, as it is generally associated with more arid habitats further inland; however, several (potentially

unsubstantiated) records for the species do exist for the northern Bowen Basin region. The other unresolved species (*S. balstoni*) as highly likely present in the study area.

Where unresolved calls were identified, all group members are shown as "possible" for the relevant detector-night in **Table 1**, unless more typical calls of one or more species were also recorded and positively identified.

References

Churchill, S. (2008). *Australian Bats.* Jacana Books, Allen & Unwin; Sydney.

Corben, C. (2010). Feeding Buzzes. *Australasian Bat Society Newsletter* **35**, 40-44.

Jackson, S. and Groves, C. (2015). *Taxonomy of Australian Mammals*. CSIRO Publishing, Melbourne.

Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**, 41-43.

Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.

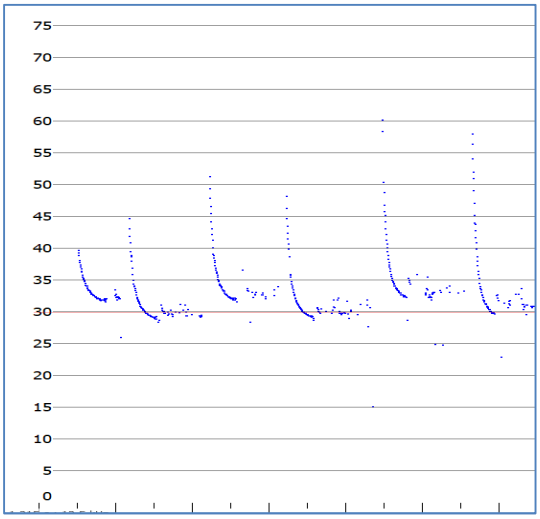
van Dyck, S., Gynther, I. and Baker, A. (ed.) (2013). *Field Companion to the Mammals of Australia*. New Holland; Sydney.

Table 1 Microbat species recorded during the Winchester surveys, 10-17 September 2019.

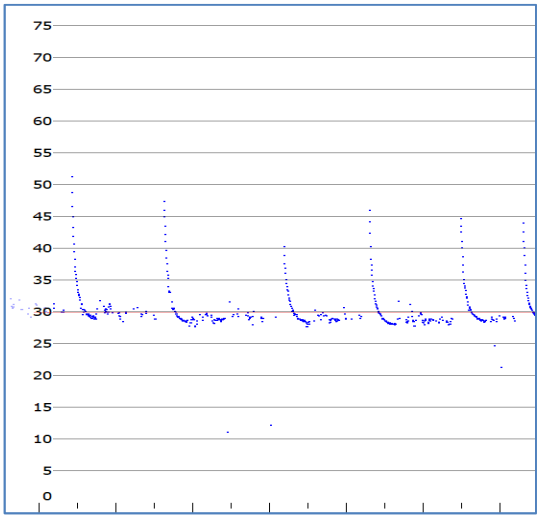
♦ = 'definite' - at least one call was attributed unequivocally to the species at the site
□ = 'possible' - calls like those of the species were recorded, but were not reliably identified

Detector:	SN474552							SN514063						
Night of:	10-Sep	11-Sep	12-Sep	13-Sep	14-Sep	15-Sep	16-Sep	10-Sep	11-Sep	12-Sep	13-Sep	14-Sep	15-Sep	16-Sep
Chalinolobus gouldii	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Chalinolobus morio				□	♦	♦	♦		♦	♦	♦	♦	♦	♦
Chalinolobus picatus		♦	♦		♦			♦	♦	♦	♦	♦	♦	♦
Scotorepens balstoni											□	□	□	□
Scotorepens greyii/S. sanborni	♦		♦	♦	♦			♦	♦	♦	♦	♦	♦	♦
Vespadelus baverstocki							□	□	□	□				
Vespadelus troughtoni				♦	♦	□	♦		♦	♦	♦	♦	♦	♦
Chaerephon jobensis		♦	♦	♦	♦	♦	♦			♦		♦	♦	♦
Ozimops lumsdenae				♦	♦	♦					♦		♦	
Ozimops ridei	♦	□	♦	♦	♦	♦	♦	♦	♦	□	♦	□	♦	♦
Saccolaimus flaviventris	♦				♦	♦					♦		♦	♦

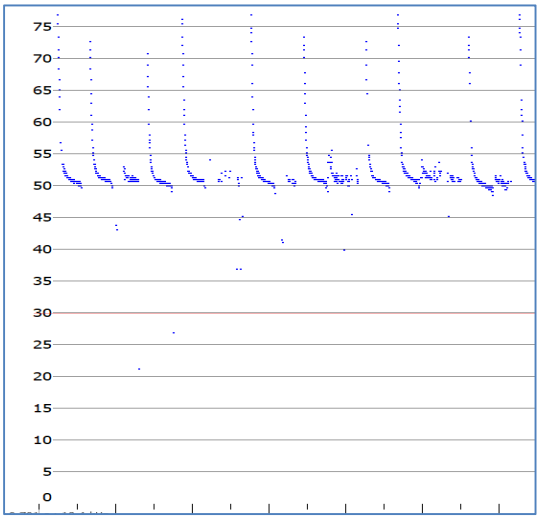
Appendix 1 Representative call sequences from the Winchester surveys, September 2019.
x-axis = 10 ms per tick-mark; time between pulses removed ("compressed")



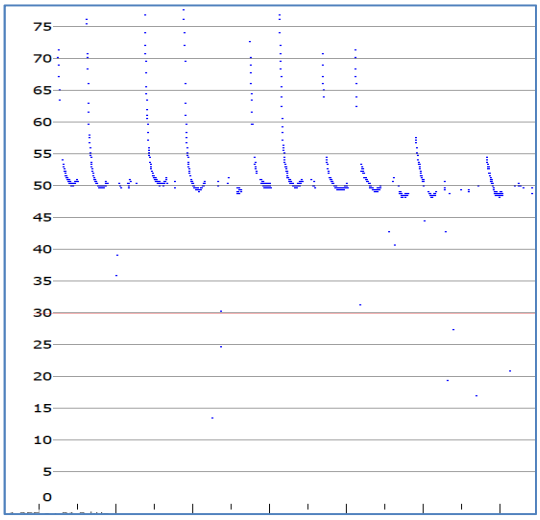
Chalinolobus gouldii



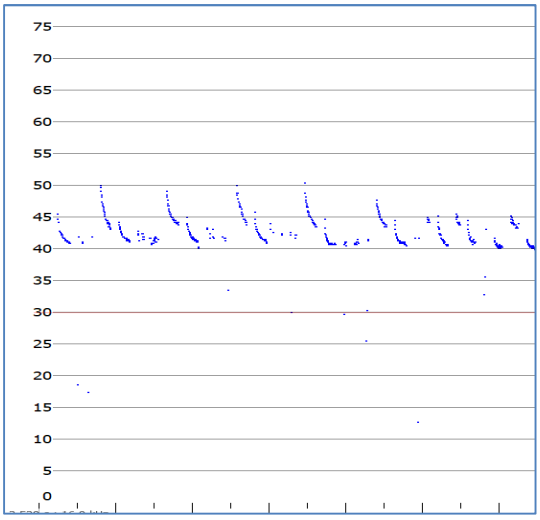
C. gouldii or *Scotorepens balstoni*



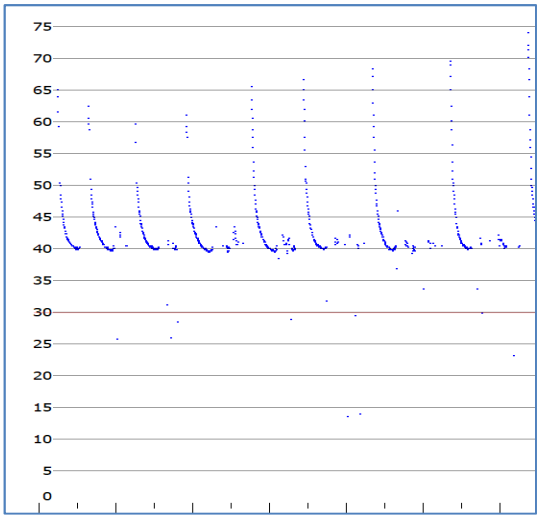
Chalinolobus morio



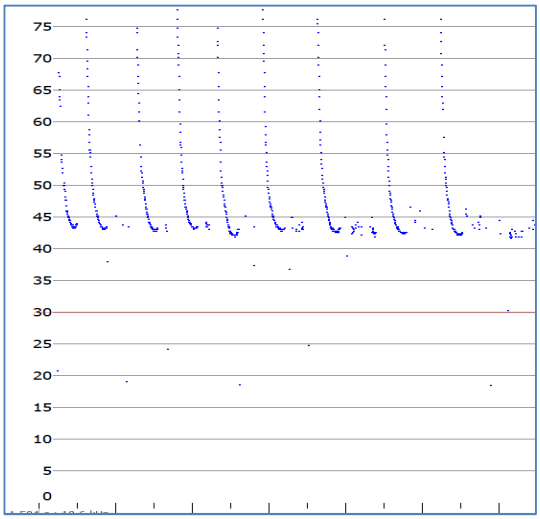
Vespadelus troughtoni



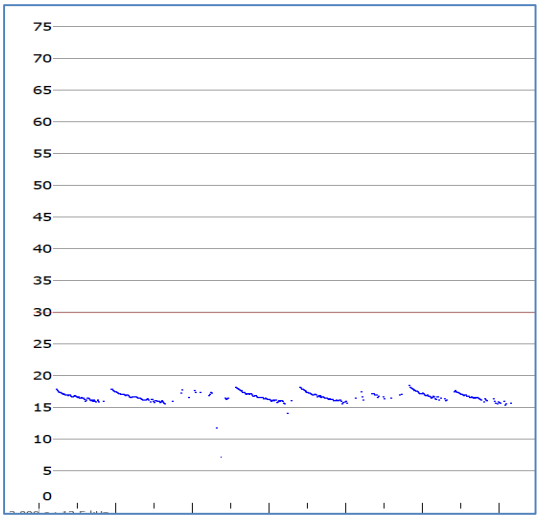
Chalinolobus picatus



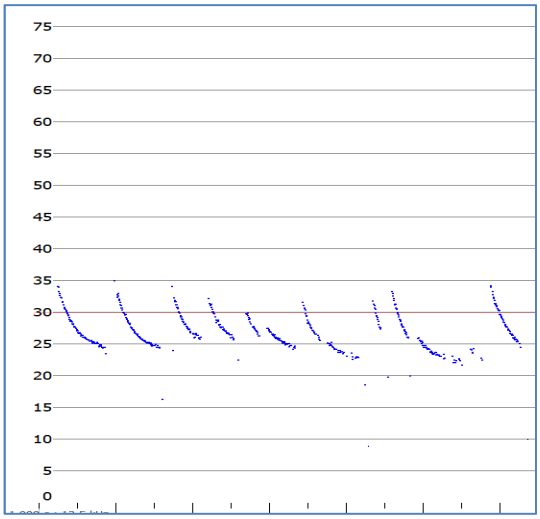
Scotorepens greyii/S. sanborni



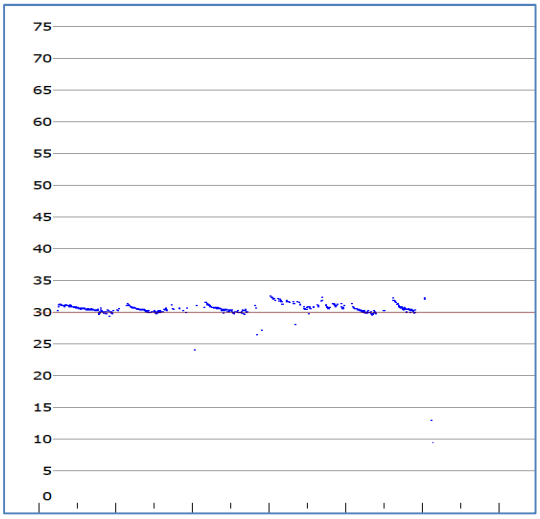
Scotorepens sp. or *Vespadelus baverstocki*



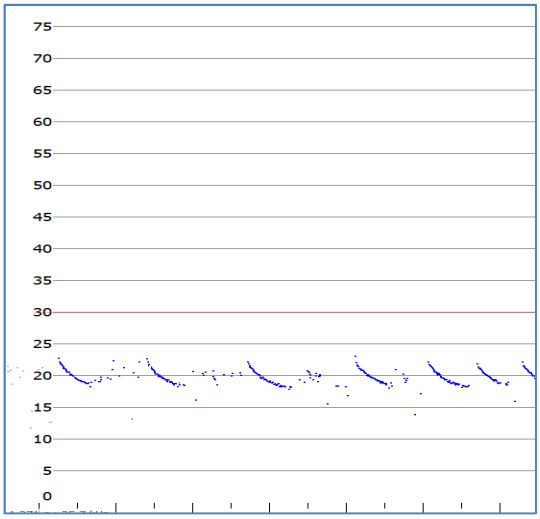
Chaerephon jobensis



Ozimops lumsdenae



Ozimops ridei



Saccolaimus flaviventris

Microbat Call Identification Report

Prepared for ("Client"):	E2M Pty Ltd
Survey location/project name:	Winchester (Moranbah)
Survey dates:	12-20 February 2020
Client project reference:	
Job no.:	E2M-2001
Report date:	15 April 2020

Methods

Data received

Balance! Environmental received 14,753 full-spectrum audio files (WAV files) recorded by two Anabat Swift detectors (Titley Scientific, Brisbane) deployed over eight consecutive nights (12-19 February 2020). Data were sorted according to deployment location (nine separate sites) as advised by the client (see **Table 1**).

Bat-call analysis

Call analyses were performed using *Anabat Insight* (Version 1.9.0; Titley Scientific, Brisbane). All files were passed first through a generic noise filter to exclude from analysis those files that did not contain bat calls. Files that passed the filter were then processed with a Decision Tree Analysis to group similar calls, based largely on frequency characteristics, and assign tentative species labels. All groups were then reviewed manually to confirm and/or reassign correct species identities.

Species identification

Final call identifications were achieved by comparing call spectrograms and derived metrics with those of reference calls from northern and central Queensland and/or with published call descriptions (e.g. Reinhold et al. 2001). Consideration was also given to the probability of species' occurrence based on published distribution information (e.g. Churchill 2008; van Dyck *et al.* 2013) and on-line database records (e.g. http://www.ala.org.au).

Species identification was based largely on sequences of more than four search-phase pulses; however, where good-quality foraging sequences were available (*i.e.* a call sequence with contiguous search-phase, attack-phase and feeding-buzz components), those calls were used to provide additional evidence of some species' presence. The feeding buzzes of free-tailed bats (Family Molossidae) and bent-winged bats (Family Miniopteridae) are quite distinctive, compared with those of the evening or vesper bats (Family Vespertilionidae) with which they often share search-phase characteristics (Corben 2010).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at http://www.ausbats.org.au/.

Species nomenclature follows Jackson & Groves (2015).

Table 1 Bat detector deployment schedule for the Winchester survey, 12-20 February 2020.

Site	12/02	13/02	14/02	15/02	16/02	17/02	18/02	19/02
Full 10	Anabat 1	Anabat 1						
Full 11	Anabat 3	Anabat 3						
SUPP 89			Anabat 1					
SUPP 90			Anabat 3					
SUPP 101				Anabat 1				
SUPP 102				Anabat 3	Anabat 3	Anabat 3		
SUPP 107					Anabat 1	Anabat 1		
SUPP 111							Anabat 3	Anabat 3
SUPP 113							Anabat 1	Anabat 1

Results & Discussion

The *Anabat Insight* noise-filtering process excluded 3037 WAV files from further analysis. A total of 14,769 bat calls were identified in the other 11,716 WAV files.

At least 14 and up to 17 species were recorded during the survey. Some 30% (4455) of the calls were reliably identified, with 13 call types positively identified to 11 individual species and two undifferentiated species pairs, including:

- *Chalinolobus gouldii*
- *Chalinolobus morio*
- *Chalinolobus picatus*
- *Nyctophilus geoffroyi / N. gouldi*
- *Scotorepens balstoni*
- *Scotorepens greyii / S. sanborni*
- *Vespadelus baverstocki*
- *Vespadelus troughtoni*
- *Austronomus australis*
- *Chaerephon jobensis*
- *Ozimops lumsdenae*
- *Ozimops ridei*
- *Saccolaimus flaviventris*

The other 10,314 calls were allocated to one of nine mixed-species groups based on shared call-characteristics. Most of these "unresolved" calls represented species that were positively identified from more typical calls; however, two unresolved species groups potentially represented additional species – *Vespadelus vulturnus* and/or *Miniopterus orianae oceanensis* – that were not otherwise identified. The unresolved call groups used in this analysis included:

- *C. gouldii / O. ridei*
- *C. gouldii / S. balstoni*
- *C. morio / V. troughtoni*
- *C. picatus / S. greyii*
- *C. picatus / V. baverstocki*
- *S. sanborni / V. baverstocki*
- *V. baverstocki / V. vulturnus*
- *Vespadelus* sp. */ Miniopterus orianae oceanensis*
- *S. flaviventris / C. jobensis / O. lumsdenae*

Table 2 provides a summary of species recorded per site. Where unresolved calls were identified, all group members are shown as "possible" for the relevant site, unless more typical calls of one or more species were also recorded and positively identified.

Table 2 Microbat species recorded during the Winchester survey, 12-20 February 2020.

♦ = 'definite' - at least one call was attributed unequivocally to the species at the site
□ = 'possible' - calls like those of the species were recorded, but were not reliably identified

Site:	Full 10	Full 11	Supp 101	Supp 102	Supp 107	Supp 111	Supp 113	Supp 89	Supp 90
Chalinolobus gouldii	♦	♦	♦	♦	♦	♦	♦	♦	♦
Chalinolobus morio							♦	♦	
Chalinolobus picatus	♦		♦	□	□	♦	♦	□	□
Nyctophilus geoffroyi / N. gouldi						♦			
Scotorepens balstoni	□	□	□	□	♦	♦	♦	□	♦
Scotorepens greyii / S. sanborni	♦	♦	♦	♦	♦	♦	♦	♦	♦
Vespadelus baverstocki	♦	♦	♦	♦	♦	♦	♦	♦	♦
Vespadelus troughtoni	♦						♦	♦	
Vespadelus vulturnus							□	□	
Miniopterus orianae oceanensis					□			□	
Austronomus australis		♦							
Chaerephon jobensis	♦	♦	♦	♦	♦	♦	♦	♦	♦
Ozimops lumsdenae	♦	♦	♦	♦	♦	♦	♦	♦	♦
Ozimops ridei	□	♦	♦	♦	♦	♦	♦	♦	♦
Saccolaimus flaviventris	♦	♦	♦	♦	♦	♦	♦	♦	♦

References

Churchill, S. (2008). *Australian Bats.* Jacana Books, Allen & Unwin; Sydney.

Corben, C. (2010). Feeding Buzzes. *Australasian Bat Society Newsletter* **35**, 40-44.

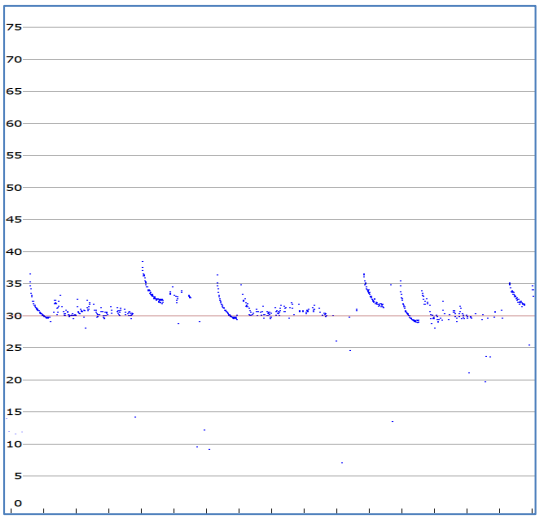
Jackson, S. and Groves, C. (2015). *Taxonomy of Australian Mammals*. CSIRO Publishing, Melbourne.

Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**, 41-43.

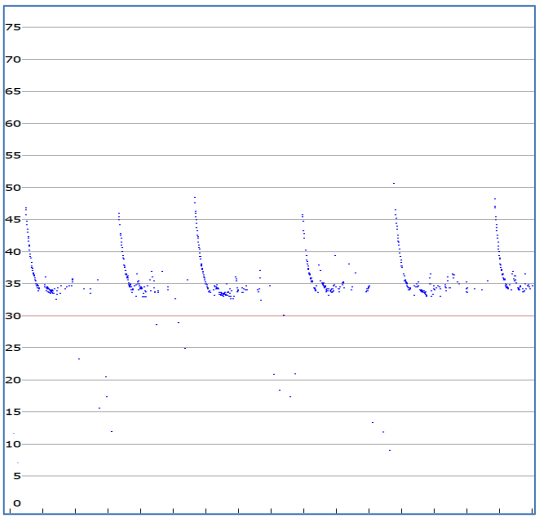
Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.

van Dyck, S., Gynther, I. and Baker, A. (ed.) (2013). *Field Companion to the Mammals of Australia*. New Holland; Sydney.

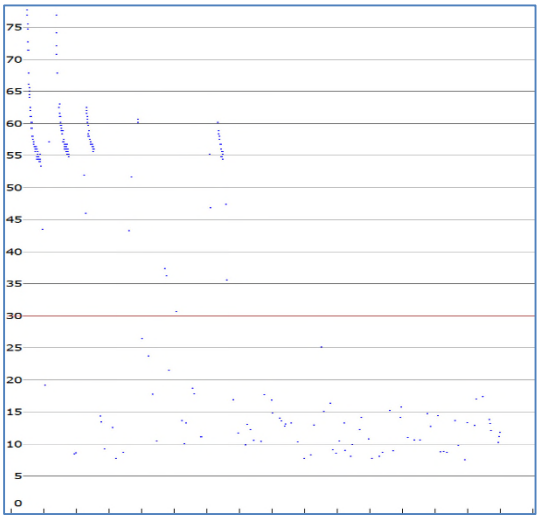
Appendix 1 Representative call sequences from the Winchester survey, 12-20 February 2020.
x-axis = 10 ms per tick-mark; time between pulses removed ("compressed")



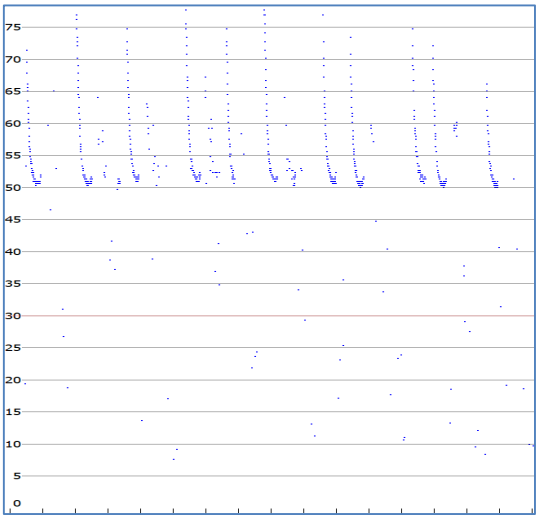
Chalinolobus gouldii



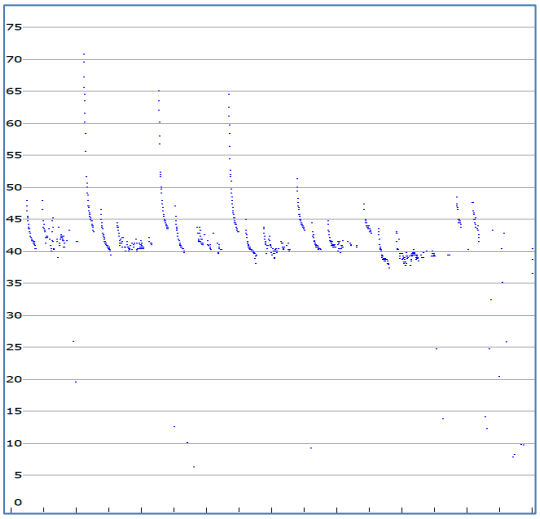
Scotorepens balstoni



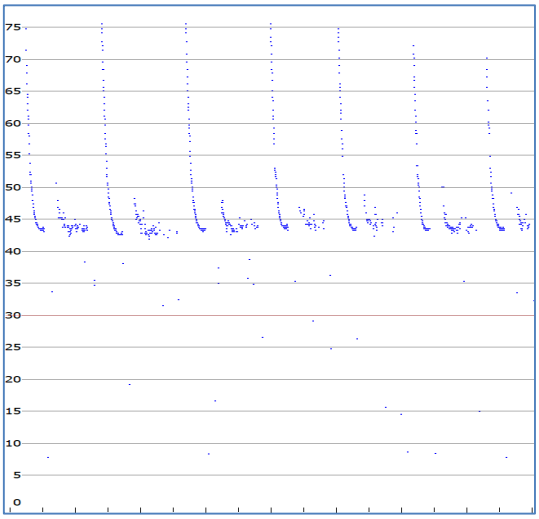
Chalinolobus morio



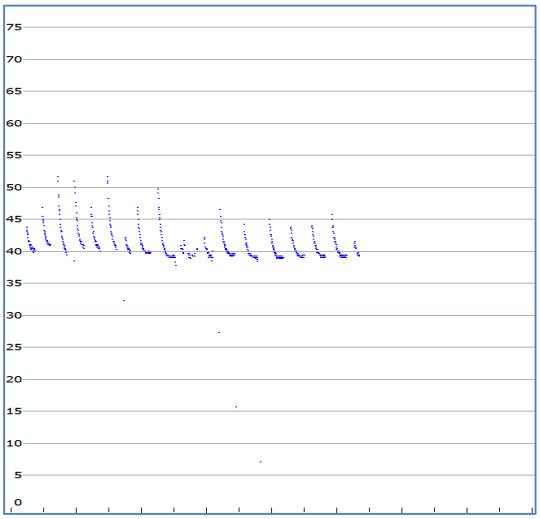
Vespadelus troughtoni



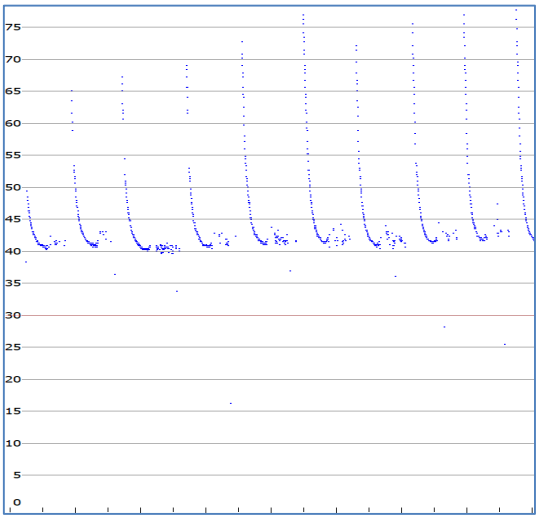
Chalinolobus picatus



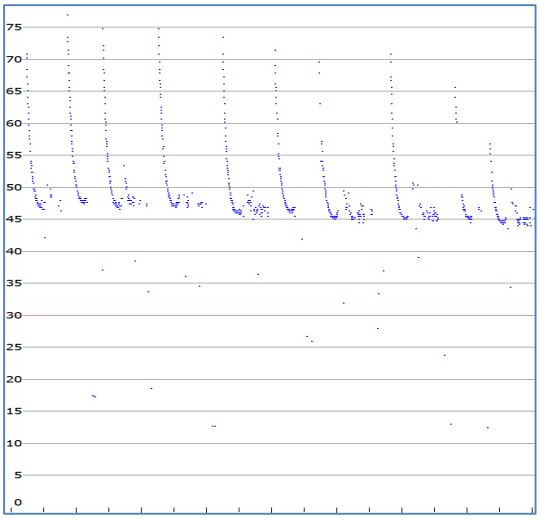
Vespadelus baverstocki



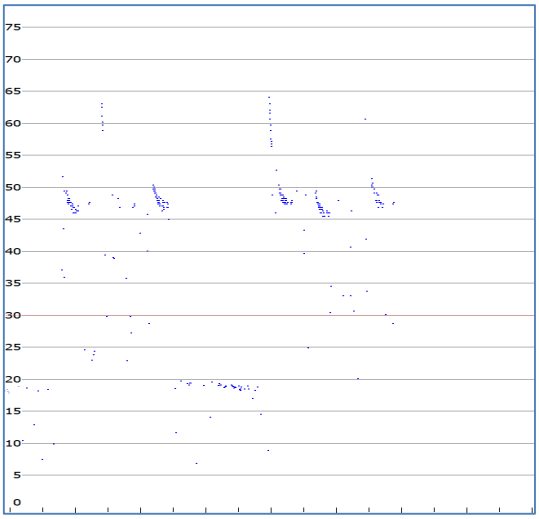
Scotorepens greyii or *S. sanborni*



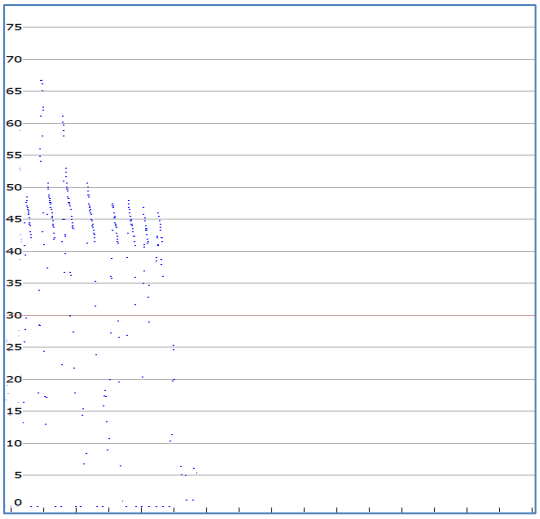
Scotorepens greyii or ***S. sanborni***



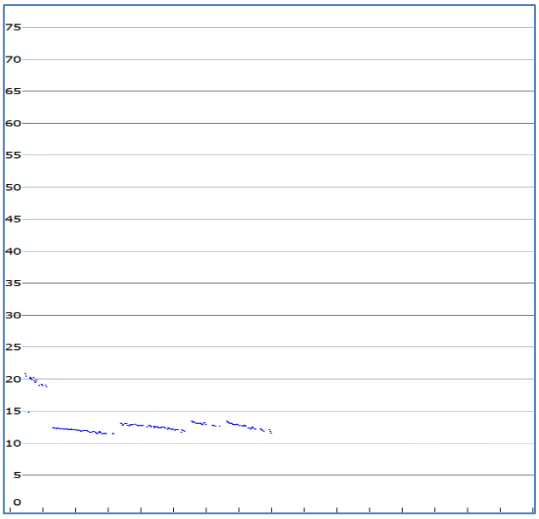
V. baverstocki or *V. vulturnus*



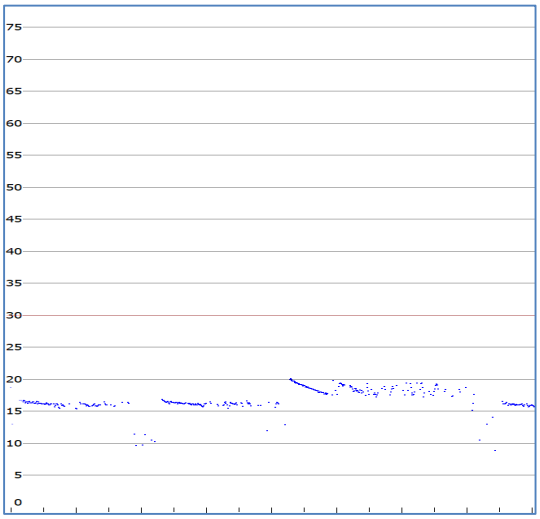
Vespadelus sp. or *Miniopterus orianae oceanensis*



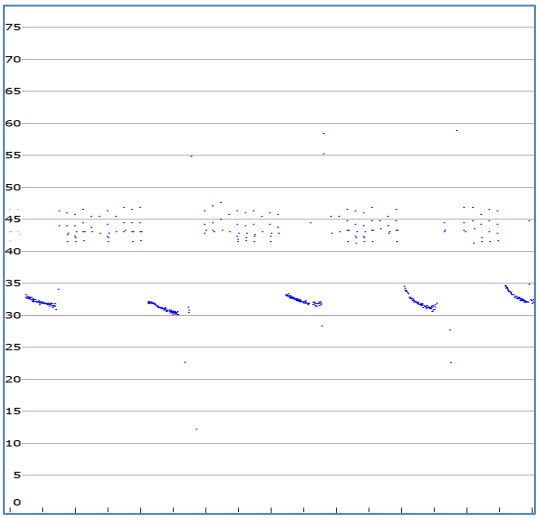
Nyctophilus sp.



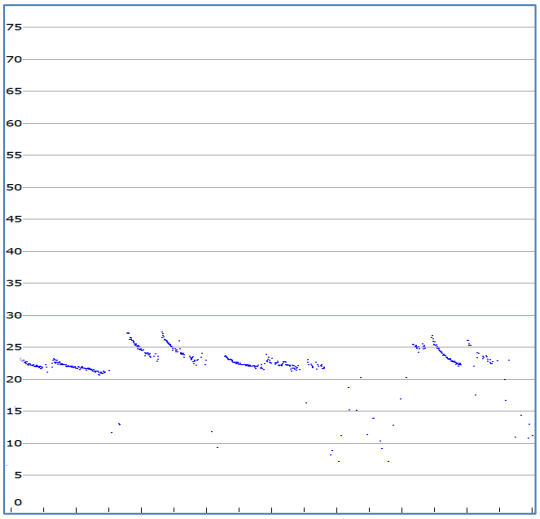
Austronomus australis



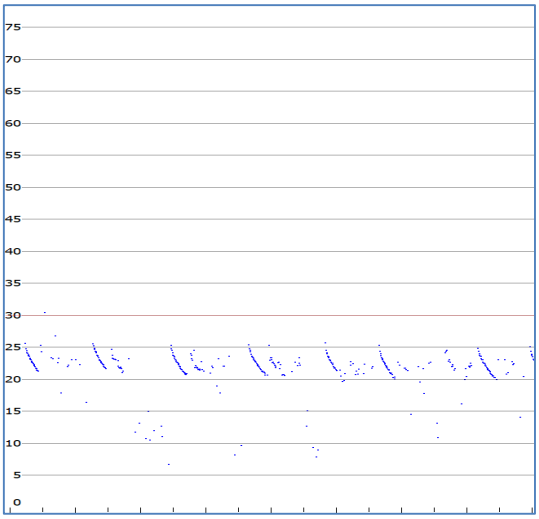
Chaerephon jobensis



Ozimops ridei



Ozimops lumsdenae



Saccolaimus flaviventris

Appendix G MNES Significant Residual Impact Assessment

Definitions and terminology

Term	Definition under the *EPBC Act Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (Department of the Environment, 2013b)
Important population	*a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:* • *key source populations either for breeding or dispersal* • *populations that are necessary for maintaining genetic diversity, and/or* • *populations that are near the limit of the species range.*
Habitat critical to the survival of the species	*areas that are necessary:* • *for activities such as foraging, breeding, roosting, or dispersal* • *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)* • *to maintain genetic diversity and long-term evolutionary development, or* • *for the reintroduction of populations or recovery of the species or ecological community.* *Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.*
Invasive species	*an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation.*

MNES assessment for EPBC Act listed endangered ecological communities

To determine if the Project is likely to have a significant residual impact to endangered communities, the *EPBC Act Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (DotE, 2013b) requires an assessment against significant impact criteria.

Assessments identified that the Project is likely to have a significant impact on two endangered ecological communities listed under the EPBC Act, namely:

- Natural Grasslands TEC; and
- Poplar Box TEC.

However, the Project would avoid impacts on the Brigalow TEC as no Brigalow TEC would be cleared.

These assessments are contained within the tables below.

MNES significant impact assessment for Brigalow TEC

Assessment criteria	Response
Reduce the extent of an ecological community	The Project would avoid clearance of Brigalow TEC and therefore would not reduce the extent of the Brigalow TEC (Figure 8A-E).
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The Project would avoid clearance of Brigalow TEC and therefore would not fragment or increase fragmentation on the Brigalow TEC.
Adversely affect habitat critical to the survival of an ecological community	The Project would avoid clearance of Brigalow TEC.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Approximately 28.9 ha of Brigalow TEC occurs outside of the Project area (Figure 8A-E). To avoid impacts to TEC outside the Project area, mitigation measures would be applied to control any substantial alterations in surface water drainage patterns and erosion and sediment control (refer to Section 10.4.7).
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The Project would avoid clearance of Brigalow TEC. To avoid the impacts of indirect to TEC outside the Project area, mitigation and management measures to demarcate the area and control pest and weed species would be implemented (refer to Section 10).
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • assisting invasive species, that are harmful to the listed ecological community, to become established, or • causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	The Project would avoid clearance of Brigalow TEC. To reduce the impacts of indirect to TEC outside the Project area, mitigation and management measures to control weed species would be implemented (refer to Section 10).
Interfere with the recovery of an ecological community	The primary threat to the Brigalow TEC throughout it's range is clearing for cropping and pasture (TSSC, 2001a). The Project would avoid clearance of Brigalow TEC and therefore the Project would not adversely interfere with the recovery of the Brigalow TEC.
Conclusion	**The Project would not significantly impact Brigalow TEC as its occurrence in the MLAs would be avoided (Figure 8A-E).**

MNES significant impact assessment for Natural Grasslands TEC

Assessment criteria	Response
Reduce the extent of an ecological community	The Project would require the clearance of approximately 80.9 ha of Natural Grasslands TEC within four patches (Figure 8A-D). At the time of the TEC listing, the extent of Natural Grasslands TEC in Queensland was estimated to be 229,895 ha (Accad *et al.*, 2019). The Project would not significantly reduce the occurrence of the Natural Grasslands TEC, as the Project impact on potential TEC within the State would be <1% based on Accad *et al.* (2019). The Project is not near the edge of the known distribution of this ecological community and therefore the Project would not reduce the overall extent of occurrence of this community.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Three of the seven patches of Natural Grasslands TEC in the Study Area would be completely removed for the Project (Figure 8A-D). The fourth patch of Natural Grasslands TEC would be partly cleared (fragmented) due to the infrastructure corridor.
Adversely affect habitat critical to the survival of an ecological community	The patches of Natural Grasslands TEC in the Project area are unlikely to be critical to the survival of the ecological community. The patches are fragmented and do not meet the definition of 'best quality' Natural Grasslands TEC as described in the listing advice (TSSC, 2009).
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	As described above, the fourth patch of Natural Grasslands TEC would be partly cleared due to the infrastructure corridor. The Project is unlikely to destroy or modify abiotic factors of retained TEC areas, as the TEC is unlikely to be impacted by indirect impacts, including weed invasion, given the mitigation measures proposed in this assessment are implemented (refer to Section 10).
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	As described above, the fourth patch of Natural Grasslands TEC would be partly cleared due to the infrastructure corridor. There is a potential for edge effects on this patch, however, given the mitigation measures proposed in this assessment are implemented it is considered unlikely to Project would substantially change the species composition of retained areas of the TEC.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • assisting invasive species, that are harmful to the listed ecological community, to become established, or • causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	As described above, the fourth patch of Natural Grasslands TEC would be partly cleared due to the infrastructure corridor. There is a potential for edge effects on this patch, however, given the mitigation measures proposed in this assessment are implemented (refer Section 10) it is considered unlikely to Project would substantially change the species composition of retained areas of the TEC (refer Section 10).
Interfere with the recovery of an ecological community	The Project would require clearing of Natural Grasslands TEC and therefore would interfere with the recovery of the ecological community.
Conclusion	**The Project would clear 80.9 ha of 'good quality' Natural Grasslands TEC (Figure 8A-D), comprising 74.4 ha in the mine site (EPBC 2019/8460) and 6.5 ha along the infrastructure corridor (EPBC 2019/8458) (Table 20). This is considered a significant impact as it would interfere with the recovery of the community.** **This significant impact conclusion is made in relation to the mine site (EPBC 2019/8460) and infrastructure corridor (EPBC 2019/8458) actions both invidivually and cumulatively as one would not be undertaken without the other.**

MNES significant impact assessment for Poplar Box TEC

Assessment criteria	Response
Reduce the extent of an ecological community	The Project would require the clearing of a single patch of Poplar Box TEC that is approximately 9.6 ha in size. The current extent of potential Poplar Box TEC in Queensland is estimated to be 566,700 ha based on (Accad *et al.*, 2019). The Project would not significantly reduce the extent of the Poplar Box TEC as the Project impact on potential TEC within the State would be <1%. The Project is not near the edge of the known distribution of this ecological community and therefore the Project would not reduce the overall extent of occurrence of this community.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The Project would require the clearing of 9.6 ha of the Poplar Box TEC. However, this clearing would remove entire patches and therefore would not fragment retained areas.
Adversely affect habitat critical to the survival of an ecological community	The Poplar Box TEC Conservation Advice (DEE, 2019a) describes that the areas most critical to the survival of the ecological community are the "Best Quality" (Class A), most intact patches of the ecological community. While the areas of Poplar Box TEC within the Project area are only "Good Quality" (Class B) they still may be important in a regional and local context.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	As described in Section 4.8, the woodland dominated by RE 11.3.2 (some of which would meet the definition of Polar Box Woodland TEC) on the floodplains on the Isaac River and Cherwell Creek has a moderate potential to meet the definition of a terrestrial GDE, and any dependency on groundwater is likely to be facultative, during dry times. There would be no impacts to vegetation on the Isaac River and Ripstone Creek floodplains (outside of wetlands) that may access water from the Quaternary alluvium, as there would be negligible drawdown to the Quaternary alluvium (SLR Consulting, 2020). Where the vegetation on the Isaac River and Ripstone Creek floodplains (outside of wetlands) occurs outside of the mapped extent of the Quaternary alluvium, negligible drawdown to the underlying water table is predicted.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The Project is unlikely to destroy of modify abiotic factors of retained Poplar Box TEC areas, as the TEC is unlikely to be impacted by indirect impacts, including weed invasion and groundwater drawdown, given the mitigation measures proposed in this assessment are implemented (refer to Section 10).
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • assisting invasive species, that are harmful to the listed ecological community, to become established, or • causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	The clearing of areas of Poplar Box TEC would lead to an increase in potential edge effects which has the potential to impact species composition. However, given the mitigation measures proposed in this assessment are implemented it is considered unlikely the Project would substantially change the species composition of retained areas of the TEC (refer to Section 10).
Interfere with the recovery of an ecological community	The Project would require clearing of Poplar Box TEC and therefore would interfere with the recovery of the ecological community.
Conclusion	**The Project, specifically the mine site (EPBC 2019/8460) action, is likely to result in a significant impact on Poplar Box TEC through the removal of approximately 9.6 ha of the community in "Good Quality" habitat within the mine site (EPBC 2019/8460). No Poplar Box TEC is present in the infrastructure corridor (EPBC 2019/8548).** **The residual significant impacts on this ecological community would be offset (Section 11).**

MNES assessment for EPBC Act listed endangered species

To determine if the Project is likely to have a significant impact to the Australian painted snipe, the *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (DotE, 2013b) require an assessment against the significant impact criteria for listed endangered species. The assessment is contained within the table below.

MNES significant impact assessment for Australian Painted Snipe

Assessment criteria	Response
Lead to a long-term decrease in the size of a population	The Australian painted snipe is a widespread species in Australia and is not considered to have a limited geographic distribution, having been recorded at wetlands in all States and territories (DSEWPaC, 2013a). The Project would require the clearing of approximately 1,859.3 ha of potential intermittent foraging habitat (after significant rainfall) (Figure 17). The removal of the intermittent foraging habitat (after significant rainfall) is unlikely to lead to a long-term decrease in the size of a population as this habitat is widely available in the greater area.
Reduce the area of occupancy of the species	The proposed clearing comprises a minimal proportion of the overall area of occupancy of the species and would not impact connectivity of suitable habitat given the mobility of this species.
Fragment an existing population into two or more populations	The Project is unlikely to impact the movement of Australian painted snipe individuals among habitat areas within and surrounding Project area.
Adversely affect habitat critical to the survival of a species	Breeding habitat is critical to the survival of the Australian painted snipe (Threatened Species Scientific Committee, 2013) is very specific and includes shallow wetlands with areas of bare wet mud with adjacent canopy cover with nests usually created on an island. No breeding habitat was identified during the surveys and the species was not recorded. Therefore the intermittent foraging habitat that will be lost is not considered to be critical to the survival of the species considering that similar (and better) breeding habitat for this species is widespread in Australia.
Disrupt the breeding cycle of a population	No breeding habitat was identified during the surveys and therefore the Project is unlikely to disrupt the breeding individuals of this species. The Project would not impact the breeding cycle of the entire population given that similar (and better) breeding habitat for this species is widespread in Australia.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Given the abundance of suitable intermittent foraging in the surrounding region, the Project is unlikely to result in the species population declining.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Predation by feral animals (cats and foxes) are listed as potential threatening processes to the species (Threatened Species Scientific Committee, 2013). The Project is unlikely to increase the abundance of these invasive species above their current levels or result in the introduction of new invasive species.
Introduce disease that may cause the species to decline	Disease is not listed as a potential threat to the species (Threatened Species Scientific Committee, 2013). The Project is unlikely to introduce a disease that may cause the species to decline.
Interfere with the recovery of the species	It is considered unlikely that the Project has the potential to introduce a disease to the local area that is not already present, given the minimal handling of the species that is required and the proposed mitigation measures (refer to Section 10). The change in cumulative impact on this species as a result of the habitat to be cleared for the Project (considering impacts from other surrounding developments [Section 7.13]) is considered to be minimal because the regional ecosystems to be cleared (i.e. the potential habitat) are all more widely occurring within the subregion (Section 7.1).
Conclusion	**The Project is unlikely to result in a significant impact on Australian painted snipe as the intermittent foraging habitat that will be lost is not considered to be critical to the survival of the species and is widespread in the region and across Australia.**

MNES assessment for EPBC Act listed vulnerable species (excluding koala)

To determine if the Project is likely to have a significant impact to vulnerable species, the *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (DotE, 2013b) require an assessment of whether an 'important population' of vulnerable species occurs within the Action area and an assessment against the significant impact criteria for listed vulnerable species.

Assessments identified that the Project is likely to have a significant impact on the following three vulnerable species:

- squatter pigeon (southern subspecies);
- greater gilder; and
- ornamental snake.

Detailed assessments are contained within the assessment tables below.

Important population assessment for listed vulnerable species

Assessment criteria	Response
Key source populations either for breeding or dispersal, and/or	• **Greater glider**: While key populations of greater glider have not been formally identified (TSSC, 2016a; DAWE, 2020b), the species occurs over a wide distribution and the population within the region is not considered of particular importance as a key source population. The population is not identified in any management plan or conservation advice as being of significance. • **Squatter pigeon (southern subspecies)**: The population of the squatter pigeon (southern subspecies) within the region is not considered to be an important population. Important populations of squatter pigeon (southern subspecies) occur south of the Carnarvon Ranges in Central Queensland (TSSC, 2015a). • **Ornamental snake**: The ornamental snake is known only from within the drainage system of the Fitzroy and Dawson Rivers in Queensland (DotE, 2014a). An occurrence of important habitat for ornamental snake is a surrogate for an important population for the species (DSEWPaC, 2011c). Important habitat for ornamental snake includes areas with gilgai depressions and mounds (DSEWPaC, 2011c). Due to presence of important habitat within the Study Area, populations within the region are considered important populations (DotE, 2014a). • **White-throated needletail**: As the species' total population is unknown, the population of this migratory species in Australia is considered an important population.
Populations that are necessary for maintaining genetic diversity, and/or	• **Greater glider**: While key populations of greater glider have not been formally identified (TSSC 2016s; DAWE 2020b), the species occurs over a wide distribution and the population within the region is not considered of particular importance for the genetic diversity of the species. • **Squatter pigeon (southern subspecies)**: Important populations of squatter pigeon (southern subspecies) occur south of the Carnarvon Ranges in Central Queensland (TSSC, 2015a). • **Ornamental snake**: The ornamental snake is known only from within the drainage system of the Fitzroy and Dawson Rivers in Queensland (DotE, 2014a). Important habitat for ornamental snake includes areas with gilgai depressions and mounds. Due to presence of important habitat within the Study Area, populations within the region are considered important populations (DotE, 2014a). • **White-throated needletail**: As the species' total population is unknown, the population of this migratory species in Australia is considered an important population.

Assessment criteria	Response
Populations that are near the limit of the species range.	• **Greater glider**: The Project area does not occur near the limit of the species range (ALA, 2020). • **Squatter pigeon (southern subspecies)**: The Project area does not occur near the limit of the species range (ALA, 2020). • **Ornamental snake**: The Project area does not occur near the limit of the species range (ALA, 2020) • **White-throated needletail**: The Project area does not occur near the limit of the species range (ALA, 2020).

MNES significant impact assessment for squatter pigeon (southern subspecies)

MNES Significant Impact Guideline criteria for vulnerable species	Response
Lead to a long-term decrease in the size of an important population of a species	The population of squatter pigeon (southern subspecies) that uses habitat within the protected areas and surrounds is not considered to be an important population. As such, it is considered that the Project would not lead to a long-term decrease in the size of an important population of the species.
Reduce the area of occupancy of an important population	The population of squatter pigeon (southern subspecies) that uses habitat within the Project area and surrounds is not considered to be an important population. As such, the Project would not reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations	The population of squatter pigeon (southern subspecies) that uses habitat within the Project area and surrounds is not considered to be an important population. Therefore, the removal of suitable breeding/foraging habitat would not fragment an important population of the species.
Adversely affect habitat critical to the survival of a species	The Project would require the clearing of approximately 261.2 ha of habitat, comprising of 140.5 ha of breeding/foraging habitat, and 120.7 ha of foraging habitat. However, the habitat to be removed is not considered to be critical to the survival of the species considering that similar (and better) habitat for this species is widespread within the species range. No habitat critical to the survival of the species has been identified in the conservation advice (TSSS, 2015a). The potential breeding habitat to be removed may not be actually used by the species for breeding (since the species has not been detected breeding in the Project area).
Disrupt the breeding cycle of an important population	The population within the Study Area is not considered to be an important population. The removal of potential breeding/foraging habitat would not disrupt the breeding cycle of an important population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project would require the clearing of approximately 261.2 ha of squatter pigeon (southern subspecies) habitat, comprising of 140.5 ha of breeding/foraging habitat, and 120.7 ha of foraging habitat, which is unlikely to lead to a long-term decline in the species population given the wider extent of habitat for this species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Predation by feral animals (cats and foxes) are potential threatening processes to the species (TSSC, 2015a). The Project is unlikely to increase the abundance of these invasive species above their current levels or result in the introduction of new invasive species.
Introduce disease that may cause the species to decline	It is considered unlikely that the Project has the potential to introduce a disease to the local area, given the minimal handling of the species that is required.
Interfere substantially with the recovery of the species	The Project would clear habitat for this species, and therefore may interfere with the recovery of the species.

MNES Significant Impact Guideline criteria for vulnerable species	Response
Conclusion	**The Project would result in a significant impact on the squatter pigeon (southern subspecies) through the removal of approximately 261.2 ha of suitable breeding/foraging and foraging habitat, comprising 140.5 ha of breeding/foraging habitat and 120.7 ha of foraging habitat within the mine site (EPBC 2019/8460) (Table 20). The residual significant impacts on this species would be offset (Section 11).** **This significant impact conclusion is made in relation to the mine site (EPBC 2019/8460) and infrastructure corridor (EPBC 2019/8458) actions both invidivually and cumulatively as one would not be undertaken without the other.**

MNES significant impact assessment for greater glider

MNES Significant Impact Guideline criteria for vulnerable species	Response
Lead to a long-term decrease in the size of an important population of a species	The population of greater glider that uses habitat within the Project area and surrounds is not considered to be an important population.
Reduce the area of occupancy of an important population	The population of greater glider that uses habitat within the Project area and surrounds is not considered to be an important population.
Fragment an existing important population into two or more populations	The Project would result in the removal of 167.1 ha of greater glider habitat. However, clearing would not result in the fragmentation of any retained habitat.
Adversely affect habitat critical to the survival of a species	The Project would require the clearing of approximately 167.1 ha of greater glider habitat. As such, the Project is likely to adversely affect habitat that meets the definition of habitat critical to the survival of the species within the local landscape. The habitat to be cleared contains hollow-bearing trees and therefore is potential breeding habitat, however, the Project avoids clearance along the main watercourses in the locality (Isaac River). The habitat to be removed is not considered to be critical to the species survival compared to habitat that occurs along those main watercourses.
Disrupt the breeding cycle of an important population	The population within the Study Area is not considered to be an important population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project would require the clearing of approximately 167.1 ha of greater glider habitat, which is unlikely to lead to a long-term decline in the species population.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Project is unlikely to increase the abundance of these invasive species above their current levels or result in the introduction of new invasive species.
Introduce disease that may cause the species to decline	It is considered unlikely that the Project has the potential to introduce a disease to the local area that is not already present, given the minimal handling of the species that is required.
Interfere substantially with the recovery of the species	One of the key conservation actions for the species is the protection and retention of hollow-bearing trees, suitable habitat and connectivity. Therefore, given the Project would require the removal of 167.1 ha of habitat that meets the definition of habitat critical to the survival of the species, the Project is also likely to substantially interfere with the recovery of the species. The change in cumulative impact on this species as a result of the habitat to be cleared for the Project (considering impacts from other surrounding developments [Section 7.13]) is considered to be minimal because the Project would avoid clearance along the main watercourses in the locality (Isaac River) the regional ecosystems to be cleared (i.e. the potential habitat) are all more widely occurring within the subregion (Section 7.1).
Conclusion	**The Project, specifically the mine site (EPBC 2019/8460) action, is likely to result in a significant impact on the greater glider through the removal of approximately 167.01 ha of suitable habitat in the mine site (EPBC 2019/8460).** **The residual significant impacts on this species would be offset (Section 11).**

MNES significant impact assessment for ornamental snake

MNES Significant Impact Guideline criteria for vulnerable species	Response
Lead to a long-term decrease in the size of an important population of a species	The Project would result in the removal of approximately 1,834.2 ha of habitat for the ornamental snake including areas known to be occupied by the species. The removal of a large area of suitable habitat could result in a decrease in the size of the population.
Reduce the area of occupancy of an important population	The removal of a large area of suitable habitat would reduce the area of occupancy of the population at a local scale.
Fragment an existing important population into two or more populations	The Project would result in the removal of approximately 1,834.2 ha of suitable habitat for the species including areas known to be occupied by the species. However, the Project is unlikely to fragment the population that occurs in the locality into two or more populations given the extent of surrounding habitat and mobility of the species.
Adversely affect habitat critical to the survival of a species	Important habitat for ornamental snake includes areas with gilgai depressions and mounds. Due to presence of important habitat, populations within the region are considered important populations (DotE, 2014a). The Project would result in the removal of approximately 1,834.2 ha of suitable habitat within the Project area, which is considered to meet the definition of habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	Impacts of the Project are expected to be confined to direct habitat loss. Impacts on the breeding cycle of individuals located outside of the direct disturbance footprint is likely to be minimal given proposed mitigation measures (refer Section 10).
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project would result in the removal of approximately 1,834.2 ha of suitable habitat for the species including areas known to be occupied by the species. The removal of 1,834.2 ha of suitable habitat is likely to reduce the availability of habitat to an extent that may lead to a decline in the population at a local scale.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Project is unlikely to increase the abundance of invasive species above their current levels or result in the introduction of new invasive species.
Introduce disease that may cause the species to decline	It is considered unlikely that the Project has the potential to introduce a disease to the local area, given the minimal handling of the species that is required.
Interfere substantially with the recovery of the species	There is likely to be a cumulative impact on this species as a result of the habitat to be cleared for the Project and other surrounding developments. For example, the Olive Downs Project is approved to clear 7,746 ha of habitat for the ornamental snake. However, the Project and other surrounding developments (such as Olive Downs Project) are required to offset the clearance impacts.
Conclusion	**The Project would result in a significant impact on the ornamental snake through the removal of approximately 1,834.2 ha of potential habitat, comprising 1,821.9 ha in the mine site (EPBC 2019/8460) and 12.3 ha along the infrastructure corridor (EPBC 2019/8458) (Table 20).** **This significant impact conclusion is made in relation to the mine site (EPBC 2019/8460) and infrastructure corridor (EPBC 2019/8458) actions both invidivually and cumulatively as one would not be undertaken without the other.** **The residual significant impacts on this species would be offset (Section 11).**

MNES significant impact assessment for white-throated needletail

MNES Significant Impact Guideline criteria for endangered species	Response
Lead to a long-term decrease in the size of an important population of a species	In Australia, the white-throated needletail is almost exclusively aerial. Therefore, the Project is unlikely to lead to a long-term decrease in population size.
Reduce the area of occupancy of an important population	In Australia, the white-throated needletail is almost exclusively aerial. Therefore, the Project is unlikely to reduce the area of occupancy of the species.
Fragment an existing important population into two or more populations	In Australia, the white-throated needletail is almost exclusively aerial. Therefore, the Project is unlikely to lead to fragmentation of populations.
Adversely affect habitat critical to the survival of a species	In Australia, the white-throated needletail is almost exclusively aerial. Therefore, the Project is unlikely to affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	This species does not breed in Australia. Therefore, it is unlikely the Project would disrupt the breeding cycle of populations of white-throated needletail.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	In Australia, the white-throated needletail is almost exclusively aerial. Therefore, the Project is unlikely to affect habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	In Australia, the white-throated needletail is almost exclusively aerial. Therefore, invasive species do not pose a threat to this species.
Introduce disease that may cause the species to decline	In Australia, the white-throated needletail is almost exclusively aerial. Therefore, the Project is unlikely to introduce a disease that may cause species decline.
Interfere with the recovery of the species	The proposed works are unlikely to interfere with the recovery of the species due to the minimal impact on the white-throated needletail.
Conclusion	**The Project is unlikely to result in a significant impact on the white-throated needletail as the species is almost exclusively aerial within Australia.**

MNES assessment for EPBC Act listed vulnerable koala (combined populations in Queensland, New South Wales and the Australian Capital Territory)

The EPBC Act referral guidelines for the vulnerable koala (DotE,2014c) are a species-specific extension of the Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DotE, 2013b). The guidelines provide an assessment framework:

1. Determine geographic context of the Project (inland or coastal)

The greatest density of koalas in the State occurs in south-east Queensland, and lower densities occur through central and eastern areas (TSSC, 2012). For the purposes of determining significant impacts under the EPBC Act, the koala's distribution has been split into coastal and inland regions based on annual rainfall. Coastal areas receive ≥800 mm annual rainfall and inland areas receive <800 mm annual rainfall. As the Study Area receives less than 800 mm/year (614.2 mm), the geographic context of the Project/Action is 'inland'.

2. Identify if the Project impact area contains koala habitat

The potential koala habitat in the Study Area is shown on Figure 14. The potential koala habitat is comprised of remnant and regrowth eucalypt woodland with food trees. The majority of the Project area (approximately 96%, 6,815.5 ha) is not included as suitable koala habitat due to the low abundance of koala shelter trees and low canopy cover.

In total, 1,344 ha of suitable koala habitat was identified within the Study Area and approximately 314.5 ha was identified within the Project area. The koala has not been recorded using the potential habitat within the Project area, but has been recorded in adjacent habitat (Figure 14).

3. Determine if on-ground surveys are required in addition to desktop analysis

On-ground surveys were undertaken as part of this assessment and identified koalas in multiple locations within the Study Area, outside of the Project area.

4. Determine if the Project/Action impact area contains habitat critical to the survival

The main identified threats to koala are loss and fragmentation of habitat, vehicle strike, disease, and predation by dogs (DSEWPaC, 2012c). Critical habitat (for inland habitat) is defined as an impact area that scores **five or more** using the habitat assessment tool. Assessment of koala habitat within the Study Area against the koala habitat assessment tool, determined that koala habitat within the Study Area is critical to the species survival according to the Department of the Environment (2014c) (**Score of 6 to 10**).

However, the koala has not been recorded using the potential habitat within the Project area, and the habitat that occurs outside of the Project area (along the Isaac River) is much more likely to be important habitat for the species in the local area.

Koala habitat assessment tool

Attribute	Scoring values	Rationale	Proposed Project area Score
Koala occurrence	Evidence of one or more koalas within the last 5 years (+2).	Evidence of koalas was recorded in adjacent habitat	+2
	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 10 years (+1).		
	None of the above (0).		
Vegetation composition	Has forest, woodland or shrubland with emerging trees with two or more known koala food tree species, OR One food tree species that alone accounts for >50% of the vegetation in the relevant strata. (+2).	Vegetation composition within koala habitat in the Study Area contains multiple koala food tree species	+2
	Has forest, woodland or shrubland with emerging trees with only one species of known koala food tree present (+1).		
	None of the above (0).		
Habitat connectivity	Area is part of a contiguous landscape ≥ 1,000 ha (+2).	Part of the potential koala habitat within the Project area is contiguous with large areas >1,000 ha of remnant vegetation associated with the Isaac River and its tributaries.	0 to +2
	Area is part of a contiguous landscape <1,000 ha, but ≥ 500 ha (+1).		
	None of the above (0).		

Attribute	Scoring values	Rationale	Proposed Project area Score
Key existing threats	Little or no evidence of koala mortality from vehicle strike or dog attack are present in areas that score 1 or 2 for koala occurrence, OR Areas which score 0 for koala occurrence and have no dog or vehicle threat present (+2).	While wild dogs were recorded within the Study Area, no evidence of mortality was observed during field surveys.	+2
	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence, OR Areas which score 0 for koala occurrence and are likely to have some degree dog or vehicle threat present (+1).		
	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the Study Area at present, OR Areas which score 0 for koala occurrence and have a significant dog or vehicle threat present (0).		
Recovery value (Interim recovery objectives): 1. Protect and conserve the quality and extent of habitat refuges for the persistence of the species during droughts and periods of extreme heat, especially in riparian environments and other areas with reliable soil moisture and fertility[1] 2. Maintain the quality, extent and connectivity of large areas of koala habitat surrounding habitat refuges)	Habitat is likely to be important for achieving the interim recovery objectives (+2).	Achieves both interim recovery objectives.	0 to +2
	Uncertain whether the habitat is important for achieving the interim recovery objectives (+1).		
	Habitat is unlikely to be important for achieving the interim recovery objectives (0).		
Total			**6 to10**

[1] This may include habitat which occurs on a permanent aquifer, in a riparian zone, on upper or mid-slopes, on a fertile alluvial plain or where soil moisture/rainfall is reliable.

The Project would avoid clearing of riparian vegetation associated with the Isaac River, avoid creek crossings for the infrastructure corridor and avoid clearing palustrine wetlands to the north of the Project. Approximately 314.5 ha of potential koala habitat (in approximately seven patches) would be removed by the Project (Figure 14).

Outcome of significant impact assessment: The Project would result in a significant impact on the koala through the removal of approximately 314.5 ha of known habitat, comprising 278.6 ha in the mine site (EPBC 2019/8460) and 35.9 ha along the infrastructure corridor (EPBC 2019/8458).

This significant impact conclusion is made in relation to the mine site (EPBC 2019/8460) and infrastructure corridor (EPBC 2019/8458) actions both invidivually and cumulatively as one would not be undertaken without the other.

Appendix H MSES Significant Residual Impact Assessment

MSES Significant Residual Impact Guidelines

To determine if the Project is likely to have a significant residual impact on MSES values, MSES values considered known or likely to occur within the Study Area were assessed against the *Queensland Environmental Offsets Policy Significant Residual Impact Guideline* (DEHP, 2014).

Under section 15(1) of the EO Act:

'*An administering agency may impose an offset condition on an authority only if –*

(a) the same, or substantially the same, impact has not been assessed under a relevant Commonwealth Act; and

(b) the same, or substantially the same, prescribed environmental matter has not been assessed under a relevant Commonwealth Act.'

The above provision '*applies whether or not the assessment resulted in the imposition of an offset condition*'. As such, any MSES that was assessed under the *EPBC Act Significant Impact Guidelines 1.1 Matters of National Environmental Significance*, were not assessed under the *Queensland Environmental Offsets Policy Significant Residual Impact Guideline*. These include:

- ornamental snake
- koala
- greater glider
- squatter pigeon (southern subspecies); and
- Australian painted snipe.

Regulated Vegetation

Structural category	RE	Assessment criteria	Response
Endangered REs			
Mid-dense	11.3.1	Clearing does not exceed 0.5 ha	Yes, the Project would result in the removal of 64.5 ha of this community.
	11.9.5		Yes, the Project would result in the removal of 17.7 ha of this community.
Sparse	11.4.8	Clearing does not exceed 2 ha	Yes, the Project would result in the removal of 2.4 ha of this community.
	11.4.9		Yes, the Project would result in the removal of 23.1 ha of this community.
Of Concern REs			
Sparse	11.3.2	Clearing does not exceed 2 ha	Yes, the Project would result in the removal of 9.6 ha of this community.
	11.3.3c		Yes, the Project would result in the removal of 6.9 ha of this community.
	11.3.4		Yes, the Project would result in the removal of 39.8 ha of this community.
Regional Ecosystems within the defined distance of a Mapped Vegetation Management Wetlands			
Sparse	11.3.3c	• Clearing does not exceed 2 ha • Clearing does not occur within 50 m of the defining bank	The occurrence of RE 11.3.3c in the Project area is not within a mapped Vegetation Management Wetland.
Regional Ecosystems within the defined distance of a Vegetation Management Watercourse			
Mid-dense	11.3.1	• Clearing does not exceed 0.5 ha • Clearing does not occur within 5 m of the defining bank	Yes, the Project would result in the removal of 1.3 ha of this community including vegetation within 5 m of the defining bank.
Grassland	11.4.4	• Clearing does not exceed 5 ha • Clearing does not occur within 5 m of the defining bank	No, although the Project would result in the removal of 0.1 ha of this vegetation community within 5 m of the defining bank, the clearing threshold of 5 ha would not be exceeded.
	11.9.3		No, **although** the Project would result in the removal of 3.1 ha of this vegetation community within 5 m of the defining bank, the clearing threshold of 5 ha would not be exceeded.
Essential Habitat			
Essential habitat mapping for the ornamental snake, as defined under the VM Act is shown on Figure 13. Essential habitat is defined under the VM Act as a category A, B or C area that has at least three essential habitat factors (a component of the wildlife's habitat that is necessary or desirable for the wildlife at any stage of its lifecycle), that are stated as mandatory for the protected wildlife in the essential habitat database, or in which the wildlife, at any stage of its lifecycle is located. Ornamental snake habitat in the Study Area is mapped as known important habitat because the species was recorded in these areas and they contain suitable microhabitat features of which the species relies on (Section 5.3.1). Assessment of whether impacts on essential habitat for the species are significant has been considered in the assessment of impacts on protected wildlife habitat for the ornamental snake, in accordance with the *Queensland Environmental Offsets Policy Significant Residual Impact Guideline* (DEHP, 2014). Refer to assessment of impacts for Protected Wildlife Habitat.			

MSES significant impact assessment for endangered and vulnerable wildlife habitat (including essential habitat)

Assessment criteria	Responses	
	Solanum adenophorum	Common death adder
Lead to a long-term decrease in the size of a local population	The Project would result in the removal of the known local population of *Solanum adenophorum* (represented by five individuals within approximately 0.2 ha of known habitat). In other words, the Project would lead to a long-term decrease in the size of a local population.	The common death adder has previously been recorded approximately 6.5 km to the east of the Project. The existing record was reported to be a large specimen found dead (presumably by cane toad poisoning) on the Iffley property during fauna surveys by 3d Environmental / Ecosmart for the Arrow Bowen Gas Project in 2011, in a patch of brigalow (*Acacia harpophylla*) with gilgai (pers. comm. Mark Sanders 16 February 2018 in DPM Enviroscienses, 2018). The next closest database record of this species is located approximately 65 km south, south-east of the Project area (ALA, 2020). The Project would result in the removal of approximately 230.3 ha of potential habitat for this species. It is unlikely that the Project would lead to a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	The extent of occurrence of a species is the overall distribution of a species (ALA, 2020). The Project is not near the edge of the known distribution of this species and therefore the Project would not reduce the extent of occurrence of this species.	The extent of occurrence of a species is the overall distribution of a species (ALA, 2020). The Project is not near the edge of the known distribution of this species and therefore the clearance of potential habitat for this species (if occupied by the common death adder) would not reduce the extent of occurrence of this species.
Fragment an existing population	The Project would not fragment a population of *Solanum adenophorum* but rather result in the removal of a known population.	While the Project would result in the removal of approximately 230.3 ha of potential habitat there is a lack of records either side of the Project, there is a single local record of this species (approximately 6.5 km to the east of the Project) and the next closest database record of this species is located approximately 65 km south, south-east of the Project area (ALA, 2020). Given the mobility of this species, the Project is not likely to fragment an existing population of this species.
Result in genetically distinct populations forming as a result of habitat isolation	The Project would not fragment/isolate a population of *Solanum adenophorum* but rather result in the removal of a known population.	As described above, given the mobility of this species, the Project is not likely to fragment/isolate an existing population of this species. The Project would not result in distinct populations forming.

Assessment criteria	Responses	
	Solanum adenophorum	Common death adder
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	The Project is unlikely to result in weeds becoming established in surrounding potential habitat for *Solanum adenophorum*.	The Project is unlikely to result in an increase in the abundance of invasive species that are harmful to this species above their current levels or result in the introduction of new invasive species in surrounding potential habitat.
Introduce disease that may cause the population to decline	It is considered unlikely that the Project has the potential to introduce a disease to the local area, given there are no known diseases that impact *Solanum adenophorum*.	It is considered unlikely that the Project has the potential to introduce a disease to the local area, given there are no known diseases that lethal to the common death adder.
Interfere with the recovery of the species	The Project would result in the removal of the known local population of *Solanum adenophorum* (represented by five individuals within approximately 0.2 ha of known habitat). The loss of a population may interfere with the recovery of the species. The next closest record of this species is located approximately 36 km north of the Project area (ALA, 2020).	The removal of potential habitat for the common death adder is considered unlikely to interfere significantly with the recovery of the species because it is unlikely to lead to a long-term decrease in the size of a population, reduce the extent of occurrence of the species, fragment a population or result in a harmful invasive species or disease. This species has a very broad habitat range and similar potential habitat is abundant in the surrounding locality.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	The Project would result in the removal of local population of *Solanum adenophorum*.	Impacts of the Project are expected to be confined to clearance of potential habitat. The Project is unlikely to cause disruption to surrounding potential habitat (potentially used for breeding, feeding, refuge).
Conclusion	**The removal of the local population of *Solanum adenophorum* is considered likely to result in a significant residual impact on the species.**	**The removal of 230.3 ha of potential habitat for the common death adder may result in the loss of individuals, however the Project is unlikely to result in a significant residual impact on the common death adder because it is unlikely to lead to a long-term decrease in the size of a population, reduce the extent of occurrence of the species, fragment a population or result in a harmful invasive species or disease.**

MSES significant impact assessment for echidna (Special Least Concern - non-migratory)

Assessment criteria	Mitigation measures
Lead to a long-term decrease in the size of a local population	While the Project would result in the removal of approximately 2,470.68 ha of potential habitat, given the species occurs widely throughout the region it is considered unlikely that the Project would lead to a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	The extent of occurance of a species is the overall distribution of a species (ALA, 2020). The Project is not near the edge of the known distribution of this species and therefore the clearance of potential habitat for the species would not reduce the extent of occurance of this species.
Fragment an existing population	While the Project would result in the removal of approximately 2,470.68 ha of potential habitat, the lack of linear disturbance associated with the Project indicates it is unlikely that any populations would be fragmented.
Result in genetically distinct populations forming as a result of habitat isolation	While the Project would result in the removal of approximately 2,470.68 ha of potential habitat, the lack of fragmentation limits the likelihood of distinct populations forming.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	Impacts of the Project are expected to be confined to direct habitat loss. Impacts on the breeding cycle of individuals located outside of the direct disturbance footprint is likely to be minimal provided appropriate mitigation measures are implemented to control indirect impacts such as erosion/sedimentation, dispersal impedance, alteration in hydrology and weed introduction (refer to Section 10).
Conclusion	**The Project is unlikely to result in a significant residual impact on the echidna.**

Connectivity

The Landscape Fragmentation and Connectivity Tool was used to assess the significance of impact on connectivity areas as defined in the *Environmental Offsets Regulation 2014*. The assessment determined that the Project is likely to result in a significant residual impact on Connectivity.

Landscape Fragmentation and Connectivity Tool output

Output	Value
Significance test one	
Regional total area	230,553.89 ha
Regional extent of core remnant	78,164.87 ha (33.90 %)
Area of core at the local scale (pre impact)	13,046.91 ha
Area of core at the local scale (post impact)	12,450.54 ha
Percent change of core at the local scale (post impact)	4.57 %
Significance test two	
The number of core remnant areas occurring on the site	8
The number of core remnant areas remaining on the site post impact	6
Result	
Result: 20:59:26 - This analysis has determined a significant impact on connectivity areas.	

Appendix I Habitat Quality Data

Assessment Unit	**10b**			**6**			**12**			**6**		
Site	HQ1			HQ10			HQ11			HQ12		
Regional ecosystem	11.4.8 / 11.4.9			11.3.4			11.5.3			11.3.4		
Broad condition state	Regrowth			Remnant			Remnant			Remnant		
Biocondition attribute	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**
Recruitment of woody perennial species (%)		100	5		50	3		100	5		100	5
Native plant species richness - trees (No.)	3	0	0	4	3	2.5	6	2	2.5	4	6	5
Native plant species richness - shrubs (No.)	10	3	2.5	2	1	2.5	6	7	5	2	1	2.5
Native plant species richness - grasses (No.)	9	5	2.5	7	3	2.5	6	5	2.5	7	9	5
Native plant species richness - forbs (No.)	7	9	5	10	11	5	10	12	5	10	8	2.5
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	17	3	0	22	19	5	16	16	5	22	18	5
Tree sub-canopy height (m)	9	-		12	-		7	-		12	-	
Tree height - average			0			5			5			5
Tree emergent cover (%)	na	-		na	-		na	-		na	-	
Tree canopy cover (%)	40	15.9	2	17	13.2	5	20	32.2	5	17	25.9	5
Tree sub-canopy cover (%)	3	-		5	0	0	3	3.6	5	5	4.2	5
Tree cover - average			2			2.5			5			5
Native shrub canopy cover (%)	5	15.9	3	1	2.3	3	3	2.9	5	1	3.3	3
Native perennial grass cover (%)	20	1.4	0	43	0	0	19	0	0	43	0	0
Organic litter (%)	37	25.6	5	20	12.4	5	20	58	3	20	21	5
Large trees/ha - Total	42	0	0	35	6	5	10	0	0	35	6	5
Coarse woody debris (m/ha)	813	34	0	384	757	5	314	1306	2	384	402	5
Non-native plant cover (%)	0	75	0	0	65	0	0	70	0	0	45	3

Assessment Unit	12			7			5			8		
Site	HQ13			HQ14			HQ15			HQ16		
Regional ecosystem	11.5.3			11.3.25			11.3.3c			11.4.4		
Broad condition state	Remnant			Remnant			Remnant			Remnant		
Biocondition attribute	Benchmark	Value	Score	Benchmark	Value	Score	Benchmark	Value	Score	Benchmark	Value	Score
Recruitment of woody perennial species (%)		100	5		25	3		100	5		0	0
Native plant species richness - trees (No.)	6	5	2.5	4	9	5	3	2	2.5	na	1	
Native plant species richness - shrubs (No.)	6	6	5	2	3	5	5	1	0	na	0	
Native plant species richness - grasses (No.)	6	9	5	8	6	2.5	12	3	2.5	7	9	5
Native plant species richness - forbs (No.)	10	11	5	12	7	2.5	15	5	2.5	12	12	5
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	16	18	5	23	22	5	18	18.5	5	na	0	
Tree sub-canopy height (m)	7	-		na	-		10	-		na	-	
Tree height - average			5			5			5			
Tree emergent cover (%)	na	-		na	-		na	-		na	0	
Tree canopy cover (%)	20	24.8	5	22	66.8	3	28	46.7	5	na	-	
Tree sub-canopy cover (%)	3	8.1	3	na	13.5		5	0	0	na	-	
Tree cover - average			4			3			2.5			
Native shrub canopy cover (%)	3	9.5	3	1	4	3	4	0	0	na	0.6	
Native perennial grass cover (%)	19	2.6	1	12	0	0	45	0	0	50	4	0
Organic litter (%)	20	42.2	3	15	12	5	30	75.2	3	21	18	5
Large trees/ha - Total	10	12	15	21	12	10	10	14	15	na	0	0
Coarse woody debris (m/ha)	314	802	2	375	26	0	285	211	5	na	17	
Non-native plant cover (%)	0	65	0	0	55	0	0	1	10	0	65	0

Assessment Unit	12			9			10b			10b		
Site	HQ17			HQ18			HQ19			HQ2		
Regional ecosystem	11.5.3			11.4.8			11.4.8 / 11.4.9			11.4.8 / 11.4.9		
Broad condition state	Remnant			Remnant			Regrowth			Regrowth		
Biocondition attribute	Benchmark	Value	Score	Benchmark	Value	Score	Benchmark	Value	Score	Benchmark	Value	Score
Recruitment of woody perennial species (%)		100	5		67	3		100	5		100	5
Native plant species richness - trees (No.)	6	6	5	3	7	5	3	2	2.5	3	0	0
Native plant species richness - shrubs (No.)	6	6	5	10	10	5	10	2	0	10	5	2.5
Native plant species richness - grasses (No.)	6	15	5	9	7	2.5	9	9	5	9	4	2.5
Native plant species richness - forbs (No.)	10	8	2.5	7	18	5	7	12	5	7	9	5
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	16	17.5	5	17	12.5	5	17	1.5	0	17	3	0
Tree sub-canopy height (m)	7	-		9	-		9	-		9	-	
Tree height - average			5			5			0			0
Tree emergent cover (%)	na	-		na	-		na	-		na	-	
Tree canopy cover (%)	20	31.5	5	40	53.4	5	40	30.7	5	40	26.1	5
Tree sub-canopy cover (%)	3	8.2	3	3	0	0	3	-		3	-	
Tree cover - average			4			2.5			5			5
Native shrub canopy cover (%)	3	3.7	5	5	24.4	3	5	30.7	3	5	26.1	3
Native perennial grass cover (%)	19	9.2	1	20	4.2	1	20	15.2	3	20	3	1
Organic litter (%)	20	28	5	37	44.6	5	37	15	3	37	13	3
Large trees/ha - Total	10	6	10	42	4	5	42	0	0	42	0	0
Coarse woody debris (m/ha)	314	367	5	813	1086	5	813	74	0	813	18	0
Non-native plant cover (%)	0	25	3	0	30	3	0	40	3	0	40	3

Assessment Unit	12			1			15			17		
Site	HQ20			HQ21			HQ22			HQ23		
Regional ecosystem	11.5.3			11.3.1			11.9.2			11.9.3		
Broad condition state	Remnant			Remnant			Remnant			Remnant		
Biocondition attribute	Benchmark	Value	Score	Benchmark	Value	Score	Benchmark	Value	Score	Benchmark	Value	Score
Recruitment of woody perennial species (%)		100	5		100	5		100	5		0	0
Native plant species richness - trees (No.)	6	3	2.5	3	3	5	3	2	2.5	na	0	
Native plant species richness - shrubs (No.)	6	10	5	5	3	2.5	5	1	0	na	0	
Native plant species richness - grasses (No.)	6	3	2.5	4	10	5	9	8	2.5	7	1	0
Native plant species richness - forbs (No.)	10	14	5	8	11	5	19	12	2.5	12	6	2.5
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	16	14	5	14	7	3	15	11	5	na	0	
Tree sub-canopy height (m)	7	-		4	-		na	-		na	-	
Tree height - average			5			3			5			
Tree emergent cover (%)	na	-		na	-		na	-		na	-	
Tree canopy cover (%)	20	17.5	5	29	17.8	5	20	12.2	5	na	-	
Tree sub-canopy cover (%)	3	0	0	9	0	0	na	0		na	-	
Tree cover - average			2.5			2.5			5			
Native shrub canopy cover (%)	3	16.6	3	8	2.7	3	2	0	0	na	-	
Native perennial grass cover (%)	19	0	0	8	21.6	5	57	13.8	1	50	3.8	0
Organic litter (%)	20	60.8	3	34	25	5	10	55.8	3	21	14.4	5
Large trees/ha - Total	10	4	5	170	0	0	10	0	0	na	0	0
Coarse woody debris (m/ha)	314	21	0	1752	514	2	212	193	5	na	0	
Non-native plant cover (%)	0	35	3	0	50	3	0	15	5	0	60	0

Assessment Unit	18			17			17			2		
Site	HQ24			HQ25			HQ26			HQ27		
Regional ecosystem	11.9.5			11.9.3			11.9.3			11.3.1		
Broad condition state	Remnant			Remnant			Remnant			Mature Regrowth		
Biocondition attribute	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**
Recruitment of woody perennial species (%)		100	5		0	0		0	0		50	3
Native plant species richness - trees (No.)	4	4	5	na	0		na	0		3	5	5
Native plant species richness - shrubs (No.)	5	6	5	na	5		na	1		5	7	5
Native plant species richness - grasses (No.)	5	6	5	7	12	5	7	12	5	4	6	5
Native plant species richness - forbs (No.)	10	11	5	12	11	5	12	10	2.5	8	10	5
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	15	9	3	na	0		na	0		14	8	3
Tree sub-canopy height (m)	8	-		na	-		na	-		4	-	
Tree height - average			3									3
Tree emergent cover (%)	na	-		na	0		na	0		na	5.9	
Tree canopy cover (%)	32	18.9	5	na	-		na	-		29	32.3	5
Tree sub-canopy cover (%)	30	0	0	na	0		na	0		9	0	0
Tree cover - average			2.5									2.5
Native shrub canopy cover (%)	19	30.4	5	na	16.6		na	8.4		8	10.2	5
Native perennial grass cover (%)	30	3.6	1	50	33	3	50	36	3	8	0	0
Organic litter (%)	49	39.6	5	21	13.8	5	21	21.6	5	34	25.6	5
Large trees/ha - Total	10	0	0	na	0	0	na	0	0	170	0	0
Coarse woody debris (m/ha)	688	1533	2	na	0		na	0		1752	947	5
Non-native plant cover (%)	0	40	3	0	12	5	0	20	5	0	70	0

Assessment Unit	2			8			9			1		
Site	HQ28			HQ29			HQ3			HQ30		
Regional ecosystem	11.3.1			11.4.4			11.4.8			11.3.1		
Broad condition state	Mature Regrowth			Remnant			Remnant			Remnant		
Biocondition attribute	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**
Recruitment of woody perennial species (%)		50	3		0	0		0	0		50	3
Native plant species richness - trees (No.)	3	4	5	na	0		3	3	5	3	5	5
Native plant species richness - shrubs (No.)	5	5	5	na	1		10	2	0	5	3	2.5
Native plant species richness - grasses (No.)	4	6	5	7	4	2.5	9	5	2.5	4	7	5
Native plant species richness - forbs (No.)	8	10	5	12	18	5	7	12	5	8	12	5
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	14	14.5	5	na	0		17	11.5	3	14	12	5
Tree sub-canopy height (m)	4	-		na	-		9	-		4	-	
Tree height - average			5						3			5
Tree emergent cover (%)	na	3.5		na	0		na	4.6		na	-	
Tree canopy cover (%)	29	19.8	5	na	-		40	30.9	5	29	30.4	5
Tree sub-canopy cover (%)	9	0	0	na	0		3	0	0	9	0	0
Tree cover - average			2.5						2.5			2.5
Native shrub canopy cover (%)	8	10.4	5	na	2.2		5	6.3	5	8	11.2	5
Native perennial grass cover (%)	8	5	3	50	9.6	1	20	1.2	0	8	1	1
Organic litter (%)	34	39.6	5	21	24.2	5	37	22.8	5	34	31.2	5
Large trees/ha - Total	170	4	5	na	0	0	42	2	5	170	2	5
Coarse woody debris (m/ha)	1752	508	2	na	0		813	495	5	1752	1576	5
Non-native plant cover (%)	0	60	0	0	45	3	0	22	5	0	40	3

Assessment Unit	**15**			**17**			**15**			**17**		
Site	HQ31			HQ32			HQ33			HQ34		
Regional ecosystem	11.9.2			11.9.3			11.9.2			11.9.3		
Broad condition state	Remnant			Remnant			Remnant			Remnant		
Biocondition attribute	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**
Recruitment of woody perennial species (%)		67	3		0	0		75	5		100	5
Native plant species richness - trees (No.)	3	3	5	na	0		3	4	5	na	1	
Native plant species richness - shrubs (No.)	5	2	2.5	na	1		5	2	2.5	na	0	
Native plant species richness - grasses (No.)	9	7	2.5	7	9	5	9	8	2.5	7	7	5
Native plant species richness - forbs (No.)	19	14	2.5	12	10	2.5	19	12	2.5	12	8	2.5
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	15	13	5	na	0		15	12	5	na	5	
Tree sub-canopy height (m)	na	-		na	-		na	-		na	-	
Tree height - average			5						5			
Tree emergent cover (%)	na	-		na	0		na	-		na	0	
Tree canopy cover (%)	20	13.1	5	na	-		20	13.2	5	na	-	
Tree sub-canopy cover (%)	na	0		na	-		na	0		na	0	
Tree cover - average			5						5			
Native shrub canopy cover (%)	2	4.1	3	na	0.7		2	2.1	5	na	0	
Native perennial grass cover (%)	57	18.6	1	50	56.6	5	57	38.8	3	50	24	1
Organic litter (%)	10	33.6	3	21	14.6	5	10	25.6	3	21	9	3
Large trees/ha - Total	10	2	5	na	0	0	10	0	0	na	0	0
Coarse woody debris (m/ha)	212	185	5	na	145		212	83	2	na	0	
Non-native plant cover (%)	0	18	5	0	15	5	0	10	5	0	55	0

Assessment Unit	17			17			7			15		
Site	HQ35			HQ36			HQ37			HQ38		
Regional ecosystem	11.9.3			11.9.3			11.3.25			11.9.2		
Broad condition state	Remnant			Remnant			Remnant			Remnant		
Biocondition attribute	Benchmark	Value	Score	Benchmark	Value	Score	Benchmark	Value	Score	Benchmark	Value	Score
Recruitment of woody perennial species (%)		0	0		0	0		50	3		100	5
Native plant species richness - trees (No.)	na	0		na	0		4	8	5	3	3	5
Native plant species richness - shrubs (No.)	na	0		na	0		2	10	5	5	1	0
Native plant species richness - grasses (No.)	7	7	5	7	10	5	8	4	2.5	9	5	2.5
Native plant species richness - forbs (No.)	12	9	2.5	12	8	2.5	12	3	2.5	19	7	2.5
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	na	0		na	0		23	17	5	15	13	5
Tree sub-canopy height (m)	na	-		na	-		na	-		na	-	
Tree height - average									5			5
Tree emergent cover (%)	na	0		na	0		na	-		na	-	
Tree canopy cover (%)	na	-		na	-		22	40	5	20	22	5
Tree sub-canopy cover (%)	na	0		na	0		na	-		na	0	
Tree cover - average									5			5
Native shrub canopy cover (%)	na	0		na	0		1	0	0	2	0.7	3
Native perennial grass cover (%)	50	6	1	50	25	3	12	3	1	57	16	1
Organic litter (%)	21	8.2	3	21	24	5	15	29	5	10	19	5
Large trees/ha - Total	na	0	0	na	0	0	21	12	10	10	0	0
Coarse woody debris (m/ha)	na	0		na	0		375	370	5	212	80	2
Non-native plant cover (%)	0	15	5	0	20	5	0	15	5	0	55	0

Assessment Unit	**1**			**14**			**1**			**19**		
Site	HQ39			HQ4			HQ40			HQ41		
Regional ecosystem	11.3.1			11.5.9			11.3.1			11.9.5		
Broad condition state	Remnant			Remnant			Remnant			Mature Regrowth		
Biocondition attribute	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**
Recruitment of woody perennial species (%)		100	5		50	3		100	5		100	5
Native plant species richness - trees (No.)	3	6	5	3	3	5	3	6	5	4	4	5
Native plant species richness - shrubs (No.)	5	9	5	6	3	2.5	5	7	5	5	10	5
Native plant species richness - grasses (No.)	4	4	5	9	14	5	4	4	5	5	3	2.5
Native plant species richness - forbs (No.)	8	1	0	11	8	2.5	8	1	0	10	0	0
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	14	12	5	17	15	5	14	8	3	15	6	3
Tree sub-canopy height (m)	4	-		8	-		4	-		8	-	
Tree height - average			5			5			3			3
Tree emergent cover (%)	na	-		na	-		na	-		na	-	
Tree canopy cover (%)	29	36	5	25	22.3	5	29	14	2	32	11	2
Tree sub-canopy cover (%)	9	0	0	5	0	0	9	0	0	30	0	0
Tree cover - average			2.5			2.5			1			1
Native shrub canopy cover (%)	8	1	3	10	1.4	3	8	4.8	5	19	10.6	5
Native perennial grass cover (%)	8	8	5	26	24	5	8	3	1	30	0	0
Organic litter (%)	34	43	5	30	15	5	34	49	5	49	15	3
Large trees/ha - Total	170	2	5	20	0	0	170	2	5	10	0	0
Coarse woody debris (m/ha)	1752	270	2	342	522	5	1752	130	0	688	120	2
Non-native plant cover (%)	0	20	5	0	25	3	0	60	0	0	65	0

Assessment Unit	**15**			**15**			**9**			**18**		
Site	HQ42			HQ43			HQ44			HQ45		
Regional ecosystem	11.9.2			11.9.2			11.4.8			11.9.5		
Broad condition state	Remnant			Remnant			Remnant			Remnant		
Biocondition attribute	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**
Recruitment of woody perennial species (%)		50	3		100	5		50	3		100	5
Native plant species richness - trees (No.)	3	5	5	3	4	5	3	3	5	4	6	5
Native plant species richness - shrubs (No.)	5	3	2.5	5	3	2.5	10	5	2.5	5	8	5
Native plant species richness - grasses (No.)	9	3	2.5	9	4	2.5	9	3	2.5	5	5	5
Native plant species richness - forbs (No.)	19	0	0	19	0	0	7	1	0	10	1	0
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	15	14	5	15	15	5	17	8	3	15	8	3
Tree sub-canopy height (m)	na	-		na	-		9	-		8	-	
Tree height - average			5			5			3			3
Tree emergent cover (%)	na	-		na	-		na	-		na	-	
Tree canopy cover (%)	20	19.2	5	20	11	5	40	47.3	5	32	21.5	5
Tree sub-canopy cover (%)	na	0		na	0		3	0	0	30	0	0
Tree cover - average			5			5			2.5			2.5
Native shrub canopy cover (%)	2	0	0	2	0	0	5	0	0	19	21	5
Native perennial grass cover (%)	57	34	3	57	25	1	20	14	3	30	7	1
Organic litter (%)	10	23	3	10	26	3	37	30	5	49	18	3
Large trees/ha - Total	10	2	5	10	6	10	42	0	0	10	0	0
Coarse woody debris (m/ha)	212	130	5	212	190	5	813	440	5	688	490	5
Non-native plant cover (%)	0	20	5	0	40	3	0	60	0	0	65	0

Assessment Unit	**15**			**3**			**6**			**13**		
Site	HQ46 (B1)			HQ47 (B2)			HQ48 (B3)			HQ49 (B4)		
Regional ecosystem	11.9.2			11.3.2			11.3.4			11.5.3		
Broad condition state	Remnant			Remnant			Remnant			Mature Regrowth		
Biocondition attribute	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**
Recruitment of woody perennial species (%)		60	3		100	5		50	3		50	3
Native plant species richness - trees (No.)	3	5	5	2	2	5	4	4	5	6	2	2.5
Native plant species richness - shrubs (No.)	5	6	5	2	7	5	2	1	2.5	6	8	5
Native plant species richness - grasses (No.)	9	4	2.5	9	7	2.5	7	1	0	6	6	5
Native plant species richness - forbs (No.)	19	10	2.5	17	6	2.5	10	7	2.5	10	9	5
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	15	14	5	18	12.8	5	22	15.8	5	16	8.2	3
Tree sub-canopy height (m)	na	-		na	-		12	-		7	-	
Tree height - average			5			5			5			3
Tree emergent cover (%)	na	0		na	0		na	0		na	0	
Tree canopy cover (%)	20	16.5	5	40	34.9	5	17	23.4	5	20	2.8	2
Tree sub-canopy cover (%)	na	5.5		na	0		5	0	0	3	0	0
Tree cover - average			5			5			2.5			1
Native shrub canopy cover (%)	2	11	3	2	5.6	3	1	1	5	3	5.5	5
Native perennial grass cover (%)	57	10	1	35	29	3	43	1	0	19	10	3
Organic litter (%)	10	12	5	30	26	5	20	11	5	20	3	3
Large trees/ha - Total	10	2	5	22	14	10	35	4	5	10	0	0
Coarse woody debris (m/ha)	212	135	5	307	490	5	384	222	5	314	192	5
Non-native plant cover (%)	0	35	3	0	25	3	0	70	0	0	55	0

Assessment Unit	**9**			**3**			**4**			**4**		
Site	HQ5			HQ50 (B5)			HQ51 (B6)			HQ52 (B7)		
Regional ecosystem	11.4.8			11.3.2			11.3.2			11.3.2		
Broad condition state	Remnant			Remnant			Mature Regrowth			Mature Regrowth		
Biocondition attribute	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**
Recruitment of woody perennial species (%)		50	3		66	3		100	5		50	3
Native plant species richness - trees (No.)	3	3	5	2	3	5	2	2	5	2	2	5
Native plant species richness - shrubs (No.)	10	8	2.5	2	6	5	2	3	5	2	6	5
Native plant species richness - grasses (No.)	9	4	2.5	9	7	2.5	9	4	2.5	9	2	0
Native plant species richness - forbs (No.)	7	16	5	17	12	2.5	17	10	2.5	17	11	2.5
Tree emergent height (m)	na	-		na	-		na	-		na	-	
Tree canopy height (m)	17	16	5	18	14.8	5	18	11.8	3	18	8.6	3
Tree sub-canopy height (m)	9	-		na	-		na	-		na	-	
Tree height - average			5			5			3			3
Tree emergent cover (%)	na	-		na	9		na	0		na	0	
Tree canopy cover (%)	40	13.8	2	40	33.3	5	40	4.7	2	40	3.2	0
Tree sub-canopy cover (%)	3	0	0	na	0		na	0		na	0	
Tree cover - average			1			5			2			0
Native shrub canopy cover (%)	5	7.8	5	2	5.5	3	2	1.2	5	2	4.2	3
Native perennial grass cover (%)	20	3.6	1	35	24	3	35	20	3	35	2	0
Organic litter (%)	37	9.8	3	30	24	5	30	9	3	30	8.6	3
Large trees/ha - Total	42	4	5	22	8	5	22	2	5	22	4	5
Coarse woody debris (m/ha)	813	343	2	307	185	5	307	98	2	307	12	0
Non-native plant cover (%)	0	40	3	0	40	3	0	50	3	0	55	0

Assessment Unit	16			10a			14		
Site	HQ53 (B8)			HQ54 (B9)			HQ6		
Regional ecosystem	11.9.2			11.4.8			11.5.9		
Broad condition state	Mature Regrowth			Mature Regrowth			Remnant		
Biocondition attribute	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**
Recruitment of woody perennial species (%)		33	3		100	5		100	5
Native plant species richness - trees (No.)	3	3	5	3	2	2.5	3	4	5
Native plant species richness - shrubs (No.)	5	7	5	10	6	2.5	6	4	2.5
Native plant species richness - grasses (No.)	9	3	2.5	9	1	0	9	11	5
Native plant species richness - forbs (No.)	19	16	2.5	7	5	2.5	11	9	2.5
Tree emergent height (m)	na	-		na	-		na	-	
Tree canopy height (m)	15	7.6	3	17	9	3	17	13.5	5
Tree sub-canopy height (m)	na	-		9	-		8	-	
Tree height - average			3			3			5
Tree emergent cover (%)	na	0		na	-		na	-	
Tree canopy cover (%)	20	2.1	2	40	36.5	5	25	22.6	5
Tree sub-canopy cover (%)	na	0		3	-		5	0	0
Tree cover - average			2			5			2.5
Native shrub canopy cover (%)	2	0.2	3	5	6	5	10	2.6	3
Native perennial grass cover (%)	57	0	0	20	0	0	26	2	0
Organic litter (%)	10	17	5	37	20	5	30	11.2	3
Large trees/ha - Total	10	0	0	42	0	0	20	0	0
Coarse woody debris (m/ha)	212	269	5	813	65	0	342	73	2
Non-native plant cover (%)	0	55	0	0	55	0	0	50	3