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Fauna Inventory
Assessment Report –
Offset Revegetation
Areas

London Creek
Environmental Reserve

Report Prepared for: Sunshine Coast Council

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Signed on behalf of

Date: 4/03/2021

Future-Plus Environmental



Paul Wood

Director

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LIST OF ABBREVIATIONS

BAR	Bio Acoustic Recorder
DES	Queensland Department of Environment and Science
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
EVNT	Endangered, Vulnerable and Near Threatened species under relevant QLD and Commonwealth legislation
FPE	Future-Plus Environmental
HS	Habitat Stack
LCER	London Creek Environmental Reserve
NC Act	Queensland <i>Nature Conservation Act 1992</i>
RE	Regional Ecosystem
SCC	Sunshine Coast Council

EXECUTIVE SUMMARY

This report presents the results of a biodiversity assessment conducted over two seasonal surveys in 2020 at London Creek Environmental Reserve (LCER) using comparable techniques to the baseline biodiversity data captured at this site in 2012/2013 (with the exception of monitoring cameras which were not utilised previously). Valid comment can be made on biodiversity changes as a result of intensive revegetation work in vicinity of Site 1. Site 1 has a significant history of disturbance including periods of exotic *Pinus* plantation and horse pasturage. The 2020 assessments were conducted over similar seasonal conditions, as surveys aimed to replicate the pre-wet season survey in early December 2012 and a post-wet season survey spread over two events in early April and early June 2013.

Significant change in terms of vegetation structure and diversity is evident within the offset area and these survey results demonstrate an increase in vertebrate species diversity. We report the detection of at least fifteen (15) species that were not previously detected in the formerly cleared paddocks within this section of the reserve in 2012/2013 (using comparable techniques), and nine (9) of which were in addition to the baseline surveys completed by FPE and Edward Meyer. Species that are dependent on complex structure and some form of canopy (e.g. *Melomys cervinipes* and *Antechinus* spp.) have already moved into the revegetation planting area, as well as a number of arboreal mammals (Two species each of *Petaurus* and *Trichosurus*) reliant on flowering native trees with connecting canopy.

Targeted survey effort at four habitat stacks (piled logs and stumps) located within the revegetation areas showed activity from a range of species, with the Long-nosed Bandicoot (*Perameles nasuta*), Echidna (*Tachyglossus aculeatus*), Lace Monitor (*Varanus varius*) and macropods, captured on cameras positioned around the stacks. Fawn-footed melomys (*Melomys cervinipes*) and Grassland Melomys (*Melomys burtoni*) were trapped in Elliotts/wire cage traps that were strategically placed around and within stacks. This confirms the value of habitat stacks in creating habitat within areas that are recovering from disturbance and/or a cleared state, previously containing nil to minimal coarse woody debris, and therefore lacking essential foraging and shelter habitat.

In addition to the techniques we employed in 2013, we collected a series of dawn bird chorus recordings with a passive acoustic array. This acoustic data can be stored electronically and in hard copy (hard drive / USB). It will allow assessment of changes in avian diversity over the period of recovery of this natural area. We suggest future resampling using the same equipment and method at a frequency of three to five years.

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

Future-Plus Environmental (FPE) was commissioned by Sunshine Coast Council (SCC) to undertake a follow-up inventory assessment of terrestrial fauna within the revegetated sections (approximately 9 ha) of London Creek Environmental Reserve (LCER). The survey included two seasonal surveys (autumn and early summer) at two sampling locations undertaken over 4 days and 5 nights, plus additional trapping at four constructed habitat stacks. Monitoring cameras were placed *in situ* for a 14-day instalment and Song Meter SM3BAT acoustic recorders were programmed to record for five nights at each site. An array of passive acoustic recorders (Frontier Labs BAR units) was deployed for a period of 5 days for the collection of dawn chorus recordings.

The purpose of the ecological assessments was to:

- Develop inventory data on species occurrence and relative abundance within the revegetated sections of the environmental reserve in order to make comparisons to previous surveys completed in 2012/2013; and
- Prepare an ecological report including:
 - Outline of the survey areas, survey methods and results;
 - Provide an inventory species list incorporating all field fauna survey data;
 - Discussion of findings, survey limitations, comparisons to previous survey results and success of revegetation; and
 - Recommendations for the ongoing management of the reserve.

1.2 SITE OVERVIEW

London Creek Environmental Reserve (LCER) incorporates Lot 17 on SP251354 and Lot 15 on SP168935 and is located on the northern side of MacDonalds Road in Peachester QLD 4519 (refer to **Figure 1**). The entire reserve covers a total area of 142.79 ha and is owned and managed by SCC. During the preliminary fauna assessments completed by FPE in 2013/2013, a large portion of Lot 17 was cleared and heavily grassed, with a previous history of disturbance that included periods of exotic *Pinus* plantation and horse pasturage (refer to **Figure 2**). Any regrowth vegetation in the southern portion of Lot 17 was heavily dominated by a single native species (Black Wattle – *Acacia melanoxylon*) and *Pinus* wildlings. Since this 2012/2013 biodiversity assessment, SCC has implemented an intensive revegetation program over a large portion of the area formerly impacted by pasture (refer to **Figure 1** for revegetation area locations and **Figure 3** and **Figure 4** of photographs demonstrating vegetation changes overtime). Planting areas have been revegetated to align with pre-clearing regional ecosystems (RE), predominantly RE 12.9-10.14 – *Eucalyptus*

pilularis tall open forest on sedimentary rocks, and to a lesser extent RE 12.3.2 *Eucalyptus grandis* tall open forest on alluvial plains. The study area includes two dams on gullies draining into an unnamed tributary of London Creek. These areas of open water are now surrounded by revegetation plantings and assisted natural regeneration areas (north of Eastern Dam). LCER is largely surrounded by large tracts of regrowth and remnant bushland and rural freehold properties.

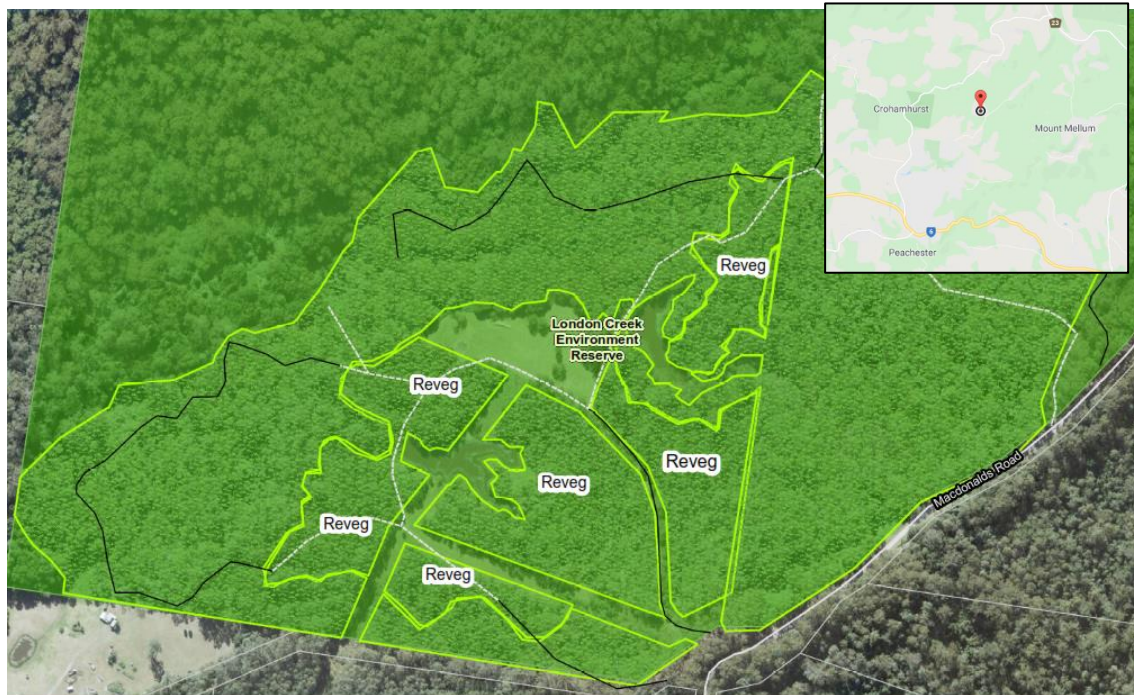


Figure 1. Site Locality Plan



Figure 2. Historical Aerial Imagery (Dated 16 Sept 2011) of Site Prior to Revegetation



Figure 3. Photos of Western Dam & Easement 2012/2013



Figure 4. Photos of Western Dam & Easement in 2020

1.3 SURVEY OVERVIEW

The survey conducted within LCER aimed to maximise survey capture across the revegetation areas by including two full trapping survey sites (one site in the same location at the previous 2012/2013 surveys (Site 1) and an additional site), 4-5 additional small mammal traps at each of the four habitat stacks, a large spread of camera monitoring stations (Reconyx HC550 Hyperfire & HC600 Covert) and two acoustic song meter monitoring sites (utilising previous survey locations). As additional value to Council, FPE installed and recorded an acoustic data set utilising four passive acoustic recorders (Frontier Labs BAR). The recorder array targeted bird chorus activity that can be analysed to provide a detailed species list of bird diversity on site. This data is provided as recordings and has not been analysed by FPE.

The fauna survey was conducted in Autumn and early Summer in 2020 and included:

- A targeted amphibian survey on 22 April 2020;
- An autumn fauna survey from 11 – 16 May 2020 with cameras collected on 26 May 2020; and
- An early summer survey from 7 – 13 December 2020 with cameras collected on 6 January 2021.

Survey site locations are presented in **Appendix A**.

1.4 SURVEY RESULTS SUMMARY

A total of 52 different species of Mammalia, Reptilia and Amphibians (including invasive fauna) were recorded during the autumn and early summer surveys from within revegetation areas, seven of which were only detected in autumn and 14 species were only detected during the early summer event. A summary of fauna survey results is provided in **Table 1** below and includes all species that were detected within mapped revegetation areas shown in **Figure 1** above. Survey results are discussed in Section 3.2 and a complete list of fauna detected is provided in **Appendix B**.

Table 1. Summary of Fauna Recorded

Group	Total Number of Species Recorded
Microbats (Microchiroptera) ¹	Minimum 14, up to 18
Arboreal Mammalia	5
Macropods	2
Ground Dwelling Mammalia	9
Reptilia	9

Group	Total Number of Species Recorded
Amphibia	8
Invasive Fauna ²	5
NC Act or EPBC Act Significant Fauna ³	2

¹ Microbats species numbers have the potential to include up to 3 species of *Nyctophilus* sp. (*N. bifax*, *N. geoffroyi* or *N. gouldii*) and two other unresolved calls which may indicate the presence of *Scotorepens orion* and either *Chalinolobus nigrogriseus* or *Scotorepens greyii*. For the purposes of species totals, the minimum number of 14 has been included.

² Includes Mammalian and Amphibian invasive species

³ Number is inclusive of one of the total species for Arboreal Mammalia. Does not include incidental EVNT species (i.e. Aves, invertebrate)

2.0 METHODOLOGY

2.1 DESKTOP & LITERATURE REVIEW

FPE conducted an updated desktop assessment for LCER. Reporting outputs of the following databases/mapping tools (completed on 18 June 2020) were reviewed and supplied:

- DES Wildnet Database – 1km search radius of lot boundary;
- EPBC Act Protected Matters Report (EBPC PMR) – 1 km search radius from central coordinate;
- DNRME Regulated Vegetation Management Report and Supporting Maps;
- Queensland Herbarium Regional Ecosystem Mapping; and
- DES MSES Environmental Report.

In addition to the above, the following consultant report documents were provided to FPE:

- *Frog Habitat Assessment and Survey Results for London Creek Environmental Reserve* (Ed Meyer 2013).

The output from the most recent desktop searches completed by FPE is included as **Appendix C**.

2.2 SURVEY PERMITS

All survey work has been conducted under the following permits:

- Scientific User Registration No. 1606;
- AEC Reference Number CA 2020/03/1364;
- Scientific purposes permit WA0003026; and
- Rehabilitation Permit WA0015961.

2.3 SURVEY SITE DETAILS

Table 2 identifies survey site location and description details. Refer to the survey site location map provided in **Appendix A** and survey site photos provided in **Appendix D**.

Table 2. Survey Site Locations & Descriptions Overview

Survey Site	Trap Type	Location Description	Central Site Coordinates ¹ (Easting / Northing)	Bearing (Approximate)
1	Pitfall / funnel drift fence line	Site located in same area as previous surveys in 2012/2013. Traplines traverse habitats associated with the dam, revegetation areas and the grassy	490161 / 7034148	83° E
	Elliott and wire cage trapline		490142 / 7034136	43° NE 132° E

Survey Site	Trap Type	Location Description	Central Site Coordinates ¹ (Easting / Northing)	Bearing (Approximate)
	Camera 12 Camera 15	easement. Song meter and Harp Trap located on vehicle track crossing the dam.	490078 / 7034123 490131 / 7034165	N/A
	Song Meter 1		490142 / 7034173	N/A
	Harp Trap 1		490162 / 7034217	N/A
2	Pitfall / funnel drift fence line	Site located within revegetation area adjacent main access track. The trapline was extended over the access road. Vegetation had a slight ecotone between open areas with very little understorey development and areas with a grassy understorey (particularly Blady Grass).	490354 / 7034149	312°N-NW
	Elliott and wire cage trapline		490355 / 7034138	56° NE 315°N-NW
	Camera 5 Camera 6		490418 / 7034182 490328 / 7034152	N/A
Habitat Stack 1	2x Elliot & 3x Wire Cage Traps	Located in vicinity of Site 1.	490160 / 7034131	N/A
	Camera 3 Camera 14		490163 / 7034130 490158 / 7034132	
Habitat Stack 2	3x Wire Cage Traps	Located approx. 50m north-east of HS1 adjacent dam.	490207 / 7034145	N/A
	Camera 1		490210 / 7034148	
Habitat Stack 3	1x Elliot 3x Wire Cage Traps	Located adjacent (to the right) the main access track.	490292 / 7034259	N/A
	Camera 18		490298 / 7034256	
Habitat Stack 4	2x Elliot & 3x Wire Cage Traps	Located 25m south-west of HS3, adjacent to powerline easement.	490269 / 7034238	N/A
	Camera 7 Camera 10		490266 / 7034235 490269 / 7034241	
Extra Song Meter	Song Meter 2	Site located in same area as previous surveys in 2012/2013.	490374 / 7034307	N/A
Extra Cameras	Camera 13	Located in revegetation area on northern side of Western Dam (east of Harp Trap 1 & BAR 4).	490193 / 7034206	N/A
	Camera 9	Located in revegetation area approx. 100m east of Site 1.	490256 / 7034089	
	Camera 4	Located in revegetation area approx. 150m south-east of Site 1, adjacent an access track.	490256 / 7034037	

Survey Site	Trap Type	Location Description	Central Site Coordinates ¹ (Easting / Northing)	Bearing (Approximate)
	Camera 8 (Dec 2020 only)	Located in the northern portion of the revegetation area to the north of the eastern dam	490519 / 7034408	N/A
	Cam 20 (Dec 2020 only)	Located at the top of the bank adjacent the eastern Dam	490446 / 7034295	N/A
BARs	BAR 1 BAR 2 BAR 3 BAR 4	BARs installed in array at 100m centres.	490271 / 7034272 490278 / 7034165 490181 / 7034140 490173 / 7034243	N/A

Notes: ¹Coordinates in UTM Datum

2.4 SURVEY SCHEDULE

2.4.1 Survey Event 1

A targeted amphibian survey was conducted on 22 April 2020 prior to the onset of cooler weather during the autumn survey event. The survey utilised previous monitoring points established by Ed Meyer during surveys in 2012/2013.

Small mammal traps (Elliot & wire cage), funnel/pitfall/drift line combinations, motion sensing cameras, Song Meter SM3BAT acoustic recorders, harp traps and BARs were installed and functional from the evening of 11 May 2020.

Removal of most trapping infrastructure (including BARs) from site occurred on the morning of 16 May 2020, with camera traps demobilised following the 14-day instalment period. Diurnal active searches and trap monitoring occurred each day, 6:00am to 11:00am and again from 4:00pm. Spotlight surveys were carried out on all evenings between 6:00pm to 10:00pm. Song Meter SM3BAT recordings occurred each night between sunset and sunrise for a five (5) night period at both sites.

Weather conditions during the autumn survey were considered average for the time of year with mild evenings ranging between 8.2 and 13.5°C and daytime temperatures to a maximum of 24.7 °C (data obtained from Beerburum station number 040284). The survey included some showers on Tuesday and Wednesday morning. Insulative coverings were applied to Elliot traps on Tuesday (12 May) morning when showers were forecasted.

2.4.2 Survey Event 2

Small mammal traps (Elliot & wire cage), funnel/pitfall/drift line combinations, motion sensing cameras, Song Meter SM3BAT acoustic recorders, harp traps and BARs were installed and functional from the evening of 7 December 2020.

Removal of most trapping infrastructure (including BARs) from site occurred on the morning of 13 December 2020, with camera traps demobilised in early 2021 following the minimum 14-day instalment period. Diurnal active searches and trap monitoring occurred each day, 6:00am to 11:00am and again from 4:00pm. Spotlight surveys were carried out on all evenings between 6:00pm to 10:00pm. Song Meter SM3BAT recordings occurred each night between sunset and sunrise for a five (5) night period at both sites.

Conditions during this survey events included a storm on the afternoon of the trapping installation day (7 Dec 2020), with the reserve receiving 30.5mm of rainfall (data obtained from Peachester station number 040169), and further rainfall (>30mm) received on 12 and 13 December. As this wet weather followed prolonged dry weather, we regard this rain event as promoting favourable conditions for fauna activity.

2.5 SURVEY METHODS

Survey methodology included the following techniques:

- Targeted amphibian survey;
- Opportunistic sightings and active search;
- Nocturnal eye-shine spotlighting;
- Small mammal trapping using folding solid-sided traps (Elliott / Sherman) and wire cage traps;
- Funnel trap and pitfall combination along drift fences;
- Camera trap monitoring;
- Harp trapping along potential bat flyways;
- Acoustic monitoring for microbat species; and
- BAR monitoring.

Each survey technique was conducted in accordance with the relevant guidelines and have been further detailed in the sections below.

2.5.1 Targeted Amphibian Survey

A targeted nocturnal amphibian survey was undertaken by Jono Hooper on 22 April 2020 within revegetated areas at London Creek Environmental Reserve, specifically within the vicinity of the large lake nearby habitat stacks in the south of the reserve. Three aural monitoring points (AMPs) were surveyed for calling frogs for a period of five minutes each, with survey location (AU13, AU14 and AU15) and technique mirroring the frog habitat assessment undertaken by Dr Ed Meyer in 2012-13. Additionally, a meander transect was surveyed between both AMPs, encompassing the western extent of the lake. Visual detection of frogs was aided by a headtorch (~280 lumens) mounted above the observer's eyes, assisting with eyeshine detection. AMPs are shown in **Appendix A**. Ambient weather data was recorded using a Kestrel weather meter at the start and end of monitoring. In early summer, site conditions were suitable for detection of amphibians, and ecologists completed aural surveys and spotlighting throughout this survey period.

2.5.2 Opportunistic Sightings and Active Search

Active search was undertaken for signs (scats, tracks and other traces) of difficult-to-find species (e.g. Koala, bandicoot, echidna, glider and more), as well as introduced species such as fox, wild dog etc. Targeted searches around habitat stacks for reptiles was completed. Active search also involved physical techniques such as litter raking, rock and log rolling etc. Material displaced during this search was carefully replaced to the original position.

2.5.3 Nocturnal Spotlighting

Binoculars & LED high output (3 & 5 watt) head-torches were utilised for detection of nocturnal species with reflective eye-shine. Animals were located by eye-shine and direct observation for taxa not readily detectable by eye-shine. Identification was confirmed by examination with 10x binoculars where necessary. During the course of the nocturnal spotlighting, search effort was also directed to those species difficult to locate by eye-shine (e.g. snakes). Megabat (Flying fox, Tube-nosed & Blossom bats) were sought by direct observation (spotlight with binocular confirmation) at fruiting or flowering trees located during daytime survey activity.

2.5.4 Small Mammal Trapping Using Folding Solid-Sided Traps (Elliott/Sherman) and Wire Cage Traps

Two trap lines using a combination of 20 folding solid-sided traps (Elliott / Sherman) and 4 wire cage traps were deployed at Site 1 and Site 2. Traps were placed singly and at 5 metre intervals and were laid in a “T” configuration in order to maximise catch rates. Where possible, traps were positioned close to landscape features that may enhance trap success (e.g. fruiting tree or shrub, alongside logs or fallen timber, near burrows, ecotones). Traps all feature foot-plate activation and were baited with peanut butter/rolled oats. Wire cage traps in close proximity to the dam were additionally baited with chicken necks during Survey Event 2 to target water rat. Catch was examined and released at the site daily during am and pm trap checks.

2.5.5 Funnel and Pitfall Trap Combinations along Drift Fences

Each site was surveyed for terrestrial & fossorial vertebrates with a single (10-15 metre) drift fence fitted with eight funnel traps (installed as 4 pairs) and two 20 litre pitfall buckets installed for five days. Buckets were provided with bottom shelter and floats and were left open during the duration of the survey. During Survey 2, buckets had to be regularly bailed of rainwater. Funnels were shaded using leaf litter when necessary. Funnels and buckets were inspected morning and evening. Catch was examined and released at the site.

2.5.6 Camera Trap Monitoring

A total of 13 monitoring cameras (Reconyx HC550 Hyperfire and Reconyx HC600 black flash covert cameras) were installed across the revegetation areas, with an additional two cameras installed during Survey 2. Seven monitoring cameras were installed in the vicinity of the two defined survey sites, six cameras were installed at habitat stacks, and the two additional cameras deployed in Survey 2 were placed in the revegetation area north of the eastern dam (refer to **Appendix A**). These were baited with a PVC tube bait station filled with peanut butter and rolled oats in order to attract a range of mammals. Cameras were deployed to target habitat ecotones, flowering vegetation, areas close to tracks and animal access routes and tracks. Cameras were installed and operational by dusk on the day they were set and continued taking

images for the following fourteen (14) days minimum. Bait stations were baited at installation and then rebaited midway during the survey period. It is noted that camera monitoring was not utilised during original baseline surveys in 2012/2013.

2.5.7 Harp Trapping Along Potential Microbat Flyways (Microchiroptera)

One harp trap location was placed in a position that could potentially funnel bat traffic during the survey near Site 1. Harp traps were repeatedly checked during nocturnal spotlight active search activity and during early morning trap check activity. Any bats captured during nightly checks were released immediately. Bats present during the morning trap check are typically in a torpid state. They were provided with additional shelter (bark and palm fronds) and left in the canvas trap bag if the trap was in a shaded location. If the trap was in a position likely to experience direct sun during the day, the bats were removed and held in clean cloth bags. Release occurred in the vicinity of the capture site immediately after dark the following evening.

2.5.8 Acoustic Monitoring for Microbat Species (Microchiroptera)

Two SM3BAT acoustic song meter recorders (Wildlife Acoustics Pty Ltd) were deployed near the same locations as previous surveys in 2012/2013 for five consecutive recording nights each. The recorders were positioned approximately 2m above the ground on tree trunks with suitable aspect (facing open space / bat flyways) to maximise call detection. Song Meters were programmed to record from sunset until sunrise each day. All WAV files were processed using *Anabat Insight* (Version 1.9.3; Tittle Scientific, Brisbane) and attributed to species with reference to published bat identification guides (Reinhold et al. (2001) and Pennay et al. (2004)). Bat call data was analysed and reported by Greg Ford. The format and content of the acoustic report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003). The taxonomy and nomenclature used in the report follow Jackson & Groves (2015).

2.5.9 BAR Monitoring

Four Frontier Labs BAR units were deployed in a diamond formation 100 metres apart within the reserve (refer to **Appendix A**). These recorders were deployed on star pickets for a 5-day period and set to capture the dawn chorus. The recorders were positioned on steel posts (star pickets) with the Frontier Labs omnidirectional microphone mounted below the recorder unit and positioned 1.2 metres above the ground. The recorders were programmed to record at a sampling rate of 48kHz and 60db microphone gain. Recordings were stored as a series of 10 minute .WAV files. 10 minutes files are sufficiently small to enable processing by any computer running music-editing software with spectrogram-analysis and view capacity.

3.0 RESULTS

3.1 DESKTOP RESULTS

Results of online database searches results are provided in **Appendix D**. Available online resources identify a number of conservation significant species as potentially occurring in the study area.

It is noted that birds and invertebrates were not included in the scope of this assessment.

The desktop results of EVNT species potentially occurring at the site are summarised in **Table 3** below.

Table 3. EVNT Mammal, Reptile & Amphibian Fauna Species with history of occurrence indicating potential within Reserve

Species Name	Source	NC Act Status	EPBC Act Status	Comments
<i>Adelotus brevis</i> , Tusked Frog	Wildnet, Essential Habitat, MSES	Vulnerable	Not listed	Confirmed in the Reserve. Not detected during 2020 surveys.
<i>Chalinolobus dwyeri</i> , Large-eared Pied Bat	EPBC Act PMR (Likely to occur)	Vulnerable	Vulnerable	Not detected using song meters – Overall site contains some vegetation elements suitable for the species including wet eucalypt forest and rainforest fringes however it appears that the species prefers areas associated with areas of sandstone cliffs and rock overhangs for roosting.
<i>Dasyurus hallucatus</i> , Northern Quoll	EPBC Act PMR (Likely to occur)	Not listed	Endangered	Not detected – The species occupies a range of habitat including eucalypt forest/woodlands and rainforests; however habitat generally encompasses some form of rocky area for denning purposes (DEE 2020). Populations of this species are highly fragmented in Queensland and have been

Species Name	Source	NC Act Status	EPBC Act Status	Comments
				affected by presence of cane toads, loss of habitat, predation following fire, roadkill etc. Southern Queensland populations not likely to be extant.
<i>Dasyurus maculatus maculatus</i> , Spotted-tail Quoll	EPBC Act PMR (Likely to occur)	Vulnerable	Endangered	Not detected –The site contains habitat characteristics considered to be favoured by the species. History of disturbance/clearing and other causes such as road kill, killing by humans protecting livestock, presence of cane toads and use of indiscriminant poison baiting (Dr Scott Burnett pers.comm) may have impacted local populations. Local extinction possible.
<i>Delma torquata</i> , Adorned or Collared Delma	EPBC Act PMR (May occur)	Vulnerable	Vulnerable	Not detected – None were detected despite active search in areas with suitable substrates (loose/buried rock).
<i>Furina dunmalli</i> , Dunmall's Snake	EPBC Act PMR (May occur)	Vulnerable	Vulnerable	Not likely to occur in LCER – Extant SEQ populations associated with Brigalow communities.
<i>Petauroides Volans</i> , Greater Glider	EPBC PMR (Likely to occur)	Vulnerable	Vulnerable	Confirmed within reserve – Species confirmed in remnant forest at the eastern end of the reserve in 2012/2013 fauna surveys by FPE.

Species Name	Source	NC Act Status	EPBC Act Status	Comments
<i>Phascolarctos cinereus</i> , Koala	Wildnet, Essential Habitat, EBPC PMR (Known to occur)	Vulnerable	Vulnerable	Presence confirmed within revegetation area during autumn 2020 survey event.
<i>Potorous tridactylus</i> , Long-nosed Potoroo (SE Mainland)	EPBC PMR (Likely to occur)	Vulnerable	Vulnerable	Not Detected – Moderate to high probability of occurrence within some areas within LCER (suitable vegetation structure) due to proximity of extant population and connectivity.
<i>Pteropus poliocephalus</i> , Grey-headed Flying-fox	EPBC PMR (Known to occur)	Least Concern	Vulnerable	Previously recorded in LCER (feeding), detected during early summer 2020 survey event, foraging on flowering <i>E. pilularis</i>
<i>Mixophyes fleayi</i> , Fleay's Frog	EBPC PMR (Likely to occur)	Endangered	Endangered	Unlikely – Not identified during 2012/2013 targeted frog habitat surveys conducted by Ed Meyer.
<i>Mixophyes iteratus</i>	Wildnet, EPBC PMR (Likely to occur)	Endangered	Endangered	Confirmed in the Reserve – Observed during spotlighting on 14/05/2020 located on banks of creek near footbridge. Not observed within revegetation area.
<i>Saiphos (Coeranoscincus) reticulatus</i> , Three-toed Snake-tooth Skink	EBPC PMR (Likely to occur)	Least Concern	Vulnerable	Possibility of occurrence due to proximity of extant populations and areas of potentially suitable habitat (Rainforest and Wet Sclerophyll) along portions of London Creek.

3.2 SURVEY RESULTS

A full list of species recorded during this project is provided in **Appendix B**, which includes trap success rates and camera trap data. Only those species that were observed or reliably detected are included.

A summary of targeted fauna recorded is provided in **Table 1** (Refer Section 1.4 above), with incidental findings supplied within species lists.

3.2.1 EVNT Species

Two species listed as conservation significant under the relevant Queensland and Commonwealth guidelines were confirmed within the revegetation area during the surveys, including:

- Koala (*Phascolarctos cinereus*) – Vulnerable under EPBC Act & NC Act; and
- Grey-headed Flying Fox (*Pteropus poliocephalus*)- Vulnerable under the EPBC Act.

The Special Least Concern (under the NC Act) Short-beaked Echidna appeared relatively abundant across the revegetation areas and were detected at various locations by direct observation and cameras.

Numerous Giant Barred Frog were observed during spotlighting on 14 May 2020 on the banks of the creek near the footbridge and further upstream. These sightings were outside of the revegetation area. We typically find this species within a short distance of permanent water along streams. It may possibly extend into areas adjacent to the two dams within the revegetation areas once conditions of closed canopy occur.

Incidental EVNT species also recorded include Glossy Black Cockatoo (*Calyptorhynchus lathami*) which were heard calling whilst flying over the reserve. Glossy Black Cockatoo were not seen roosting or feeding onsite.

Locations of EVNT species sightings has been included in **Table 4** below.

Table 4. EVNT Species Occurrences (Revegetation Area)

Name	Date	Location (Latitude, Longitude)	Count	Notes/Observations
Koala (<i>Phascolarctos cinereus</i>)	16/05/2020	-26.81381955, 152.9035783	1	1 individual on Camera 5 near Site 2.
Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)	09 & 10/12/2020	-26.81286, 152.90275	2+ on 09/12/2020, 1 on 10/12/2020	Feeding on flowering <i>Eucalyptus pilularis</i>

3.2.2 Flying Foxes and Bats

No flying-fox activity was recorded during on-ground surveys in Survey 1. There was very little native vegetation flowering at the time of the autumn survey and sufficient food resource may not have been available. Multiple Grey-headed Flying fox were observed over two nights during Survey 2 feeding on flowering *Eucalyptus pilularis*. Eastern Forest Bat (*Vespadelus pumilus*) were trapped in microbat harp traps on two occasions during surveys, one female in autumn and two males in summer.

At least 14 and up to 18 species of Microchiroptera were detected during the survey (see **Table 5**). Thirteen call types were reliably attributed to 12 unique species plus the *Nyctophilus* genus, of which three species potentially occur in the study area (*N. bifax*, *N. geoffroyi* & *N. gouldi*). Another two “unresolved” call types potentially indicated the presence of two additional species (*Scotorepens orion* and either *Chalinolobus nigrogriseus* or *Scotorepens greyii*). More than 60% (1232) of the recorded calls during the autumn event were from *Myotis macropus*, which was active at both dams but much more so at Site 2 (average of 173 calls per detector-night cf. <2 calls/d-n at Site 1) (see **Table 5**). If the *M. macropus* calls are excluded from the Site totals, the average activity level of all other bats, quantified as mean number of calls recorded per detector night, was twice as high at Site 2 as at Site 1.

When comparing positively identified calls between the early summer survey (Survey 2) to the autumn event, four species had a significant increase in activity including *Chalinolobus gouldii*, *Vespadelus pumilus*, *Micronomus norfolkensis* and *Ozimops ridei*. Although showing less activity than the autumn survey event, *Myotis macropus* was still one of the dominant species calling in December. Approximately five times the number of calls were recorded at SM1 (Site 1, adjacent Western Dam) between the surveys, whilst SM2 remained comparable.

Further detail on species richness, call counts and other analysis can be found in Microbat Call Identification Report (Ford 2020 & Ford 2021) included in **Appendix E**.

Table 5. Microchiropteran Acoustic Data Summary (5-Nights)

Survey Date	May-20			Dec-20		
Site Name	SM1	SM2	Species Total	SM1	SM2	Species Total
Positively identified calls						
<i>Rhinolophus megaphyllus</i>	21	20	41	9	1	10
<i>Chalinolobus gouldii</i>	0	11	11	48	87	135
<i>Chalinolobus morio</i>	0	2	2	0	7	7
<i>Myotis macropus</i>	20	878	898	13	125	138
<i>Nyctophilus</i> sp.	7	2	9	5	0	5
<i>Scoteanax rueppellii</i>	1	6	7	-	-	0
<i>Vespadelus pumilus</i>	8	75	83	183	299	482
<i>Miniopterus australis</i>	14	24	38	4	1	5
<i>Miniopterus orianae</i>	0	1	1	-	-	0
<i>Austronomus australis</i>	14	35	49	53	9	62
<i>Micronomus norfolkensis</i>	3	21	24	34	98	132
<i>Ozimops lumsdenae</i>	0	8	8	14	24	38
<i>Ozimops ridei</i>	6	17	23	43	112	155
Unresolved calls						
<i>Chalinolobus nigrogriseus</i> / <i>Scotorepens</i> sp.	1	0	1	0	4	4
<i>S. rueppellii</i> / <i>Scotorepens orion</i>	0	6	6	8	65	73
<i>V. pumilus</i> / <i>M. australis</i>	0	0	0	19	11	30
<i>O. ridei</i> / <i>M. norfolkensis</i>	2	15	17	26	167	193
<i>O. ridei</i> / <i>C. gouldii</i>	7	18	25	58	98	156
<i>V. pumilus</i> / <i>C. morio</i>	-	-	0	3	0	3
TOTALS	104	1139	1243	520	1108	1628

3.2.3 Arboreal Mammals

Given the survey area is 7-year old revegetation, there is no over-mature hollow bearing trees available for hollow dependant arboreal mammals. Despite this, Squirrel Glider (*Petaurus norfolkensis*) and Sugar Glider (*Petaurus breviceps*) were observed foraging in revegetation vegetation near the Western Dam (some *Acacia melanoxylon* flowering) and along the main access track near site 2 (where *Banksia oblongifolia* were flowering). No brushtail (*Trichosurus* sp.) or ringtail (*Pseudocheirus peregrinus*) possums were observed within the revegetation planting areas during Survey 1, however both species were observed during Survey 2 by direct observation and on cameras (refer to **Photo Plate 24 & Photo Plate 25, Appendix D**).

A Koala was captured at camera station 5 (refer to **Photo Plate 26, Appendix D**) during Survey 1.

3.2.4 Macropods and Other Ground Dwelling Mammals

Two species of macropod were confirmed during the surveys. Swamp Wallabies (*Wallabia bicolor*) and Red-necked Wallaby (*Macropus rufogriseus*) were detected by direct observation during active searches as well as regularly on cameras (refer to **Photo Plate 27 & Photo Plate 28, Appendix D**). Red-necked Wallaby were regularly seen grazing in remaining open areas of pasture. They also appear to be abundant on surrounding rural residential property. Swamp Wallaby were detected at three sites around the Western Dam, including Habitat Stack 2, Habitat Stack 4 and Cam 6 (near Site 2) during Survey 1, and regularly on various other cameras during Survey 2.

Short-beaked Echidna (*Tachyglossus aculeatus*) were detected with various methods including direct observation during spotlighting in Survey 1 (north of Eastern Dam in supplementary planting vegetation), during active diurnal searching in Survey 2 (two separate individuals in plantings around Western Dam) and captured on cameras located at Habitat Stack 2 (seen digging on logs, see **Photo Plate 29, Appendix D**) and Habitat Stack 4 and several across located across the revegetation areas (see camera trap data in **Appendix B**). Evidence of their distinctive diggings were abundant throughout the reserve, providing a valuable bioturbation role within the reserve.

Long-nosed Bandicoot (*Perameles nasuta*) were detected via camera across multiple sites and their distinctive diggings were widespread across the revegetation areas and around habitat stacks (refer to **Photo Plate 30, Appendix D**). There were no definitive photo captures for Northern Brown Bandicoot (*Isodon macrourus*) in Survey 1, however the species was positively identified on Camera 5 (Site 2) following Survey 2 (refer to **Photo Plate 31, Appendix D**).

Trap activity/success across the survey sites was relatively high. Two species of Antechinus, Yellow-footed Antechinus (*Antechinus flavipes*) and Buff-footed Antechinus (*Antechinus mysticus*) and two species of Melomys, Fawn-footed melomys (*Melomys cervinipes*) and Grassland Melomys (*Melomys burtoni*), were trapped at both Site 1 and 2. Similar to 2013/2013 Swamp Rat (*Rattus lutreolus*) was trapped at Site 1. Noticeably no Bush Rats (*Rattus fuscipes*) were positively identified at either sites or habitat stacks. One juvenile rat caught at Site 1 compared favourably during Survey, however no adults were trapped to confirm identification.

3.2.5 Reptiles

Three species of reptiles were identified at the site during Survey 1 including Friendly Sunskink (*Lampropholis amicala*) around the Western Dam, a Green Tree Snake (*Dendrelaphis punctulata*) located in regrowth vegetation adjacent planting areas (north-west of Western Dam), and Lace Monitor (*Varanus varius*) captured on camera at Habitat Stack 3 (refer to **Photo Plate 32, Appendix D**).

The warmer weather and more favourable conditions during Survey 2 in early December increased reptile activity significantly across the revegetation areas. There was identification of six additional species when compared to Survey 1, including Elf Skink (*Erotoscincus graciloides*) (which were common around Site 1 during 2012/2013 surveys), an arboreal skink that compared favourably (unable to be caught for definitive identification) to Elegant Snake-eyed Skink (*Cryptoblepharus pulcher*) sunning on top of HS4, three species of snake observed around the margins of the dams (*Tropidonophis mairii*, *Morelia spilota mcdowelli* and CF. *Hemiaspis signata*) and Eastern Water Dragon (*Intellagama lesueurii lesueurii*) at the Eastern Dam. Terrestrial skink activity was higher in the ground and it is highly likely that Garden Skink (*Lampropholis delicata*), that were common around Site 1 during the 2012/2013 surveys are also present in abundance but were not captured during active search or in pitfalls.

3.2.6 Amphibians

Weather conditions were not particularly conducive to frog activity and the detection of frogs present during the targeted amphibian survey completed on 22 April 2020. Ambient temperature ranged from 22.9°C at the beginning of the survey to 16.6°C at the end. Relative humidity ranged from 76% to 100% R.H. Only 0.4mm of rain was recorded during the previous 7-day period to 9am on the day of monitoring. Calling frog activity was limited to one species at each AMP, with six Striped Marshfrogs (*Limnodynastes peronii*) heard at AU13, seven Striped Marshfrogs heard at AU14 and ~10 Striped Marshfrogs heard at AU15. During the meander transect, a Striped Rocketfrog (*Litoria nasuta*), Great Barred Frog (*Mixophyes fasciolatus*), Striped Marshfrog and Broad-palmed Rocketfrog (*Litoria latopalmata*) were observed, as were seven Cane Toads.

Weather conditions were highly favourable for frog activity during the early summer survey event in December, with significant rain events received over the course of the on-ground survey period (>50mm, BOM 2021). Species detected during this survey included three species not detected during the April 2020 event. Eastern Sedgefrogs (*Litoria fallax*) were abundant around both dam margins, whilst Scarlet-sided Pobblebonk (*Limnodynastes terraereginae*) and Graceful Treefrog (*Litoria gracilentia*) were detected in the vicinity of the dam under tree cover. All other species previously observed during the Survey 1 targeted survey were again detected during Survey 2 via aural/direct observation survey technique or were incidentally trapped in funnels/pitfalls.

3.2.7 Exotic Mammals

No exotic rats were detected (*Rattus rattus/tanezumi*, *Rattus norvegicus*) at trapping sites or in camera imagery. This can be taken as a positive indication that the habitat stacks are not favouring the persistence of these human-commensal exotic rodents.

Red Fox were detected on multiple cameras across the revegetation area and at habitat stacks (refer to **Photo Plate 33, Appendix D**). On-going monitoring should consider the possibility of the habitat stacks being utilised by Red Fox as denning sites.

Unleashed domestic dogs were additionally seen on cameras.

4.0 DISCUSSION

To allow valid comparison, Site 1 (in 2020) was located within the same area as previously surveyed (2012/2013) by FPE. During the 2012/2013 surveys the site was described as open paddock, however the 2020 survey trapline traversed ecotones associated with the dam riparian vegetation, revegetation planting areas and the grassy easement. Several species that were not trapped in the vicinity of Site 1 during 2012/2013 surveys were recorded at Site 1 during the Autumn survey in 2020. These include Yellow-footed Antechinus (*Antechinus flavipes*), Buff-footed Antechinus (*Antechinus mysticus*), Fawn-footed Melomys (*Melomys cervinipes*) and Grassland Melomys (*Melomys burtoni*). These species were also captured at Site 2. This demonstrates that species dependent on complex vegetation structure and some form of canopy (e.g. *Melomys cervinipes* and *Antechinus* spp.) are already finding the revegetation areas to their liking. Terrestrial and arboreal mammalian species that were detected around revegetation areas on cameras (and not previously detected here) included Koala (*Phascolarctos cinereus*), Echidna (*Tachyglossus aculeatus*), Swamp Wallaby (*Wallabia bicolor*), two species of Brushtail possum (*Trichosurus caninus* and *Trichosurus vulpecula*), and two species of Bandicoot (*Perameles nasuta* and *Isodon macrourus*). Swamp Wallaby were notably absent from previous surveys, despite targeted survey and their known presence on nearby private property.

Song meters were placed at the same sites as 2012/2013 surveys. In 2020, at least 14 and up to 18 species of Microchiroptera were detected during the survey. In Autumn, Site 1 (Western Dam) detected significantly lower numbers of calls than the site near the Eastern Dam (104 compared to 1139, see **Table 5** in Section 3.2.2 above), however calls on this recorder in December were increased by a multiple of 5 (520 calls). Chocolate Wattled Bat (*Chalinolobus morio*) is a new detection within the reserve (detected during both survey events in 2020), while the calls of *Saccolaimus flaviventris* (Yellow-bellied Sheath-tailed bat) and *Vespadelus troughtoni* (Eastern Cave Bat) were not identified during 2020 despite detection in the early summer survey of 2012/2013. No Megachiroptera were detected during the autumn survey event, attributed to absence of blossom of suitable tree species at the time, while Grey-headed Flying-fox were observed over two nights foraging on flowering *Eucalyptus pilularis* in December. Other megachiropteran species can be expected to utilise the increased food resource offered by trees within the revegetation areas as they approach maturity.

Habitat stacks (four in total) showed activity from a range of species, including Long-nosed Bandicoot (*Perameles nasuta*), Echidna (*Tachyglossus aculeatus*), Lace Monitor (*Varanus varius*), Swamp Wallaby (*Wallabia bicolor*) and Red-necked Wallaby (*Macropus rufogriseus*) as captured on cameras, as well as Fawn-footed Melomys (*Melomys cervinipes*) and Grassland Melomys (*Melomys burtoni*) trapped in Elliotts/wire cage traps that were strategically placed around and within stacks. These species, with the exception of Lace Monitor and Red-necked Wallaby which were widespread across the reserve, were not

previously detected within this portion of LCER (former pasture areas around Site 1). It should be noted that habitat stacks were not installed during the baseline surveys in 2012/2013 and thus findings are observational only and cannot be directly compared. Lace Monitor activity was detected at all habitat stack locations during the December survey, appearing on and around the stacks. Additionally, an arboreal skink was seen sunning on top of HS4. The introduction of the habitat stacks within the offset area is extremely important both as a structural component in a forest environment and for driving biodiversity. Course/large woody debris provide substrate for saproxylic (organisms dependant on dead or decaying wood) and epixylic (organisms that live on wood surfaces) species, and potentially providing a food resource for fauna. An obvious example being the connection between timber, termites and Echidna. Introduction of more large woody debris within revegetation areas (single large pieces or smaller stacks) will further assist with landscape recovery, providing more habitat opportunities (nesting or denning sites), protection against harsh environments and food resources (Grove & Meggs 2003). No exotic rats were detected (*Rattus rattus/tanezumi*, *Rattus norvegicus*) at trapping sites or in camera imagery around habitat stacks. This can be taken as a positive indication that the habitat stacks are not favouring the persistence of these human-commensal exotic rodents. Foxes were active around habitat stacks (as seen on cameras at Habitat Stacks 1, 2 and 3 in May and HS4 in December). Fox denning should be monitored around stacks by SCC.

Despite the lack of over-mature eucalypts with hollows in proximity to revegetation areas, Squirrel Glider (*Petaurus norfolcensis*) and Sugar Gliders (*Petaurus breviceps*) were observed foraging in the revegetation area near the Western Dam (some *Acacia melanoxylon* flowering) and along the main access track near Site 2 (where *Banksia oblongifolia* were flowering) during Survey 1. Both species were again observed during Survey 2, with *P. norfolcensis* feeding on flowering *E. pilularis* south of Site 1 and near the Eastern Dam and *P. breviceps* again observed along the main access track. Two species of Brushtail Possum (*Trichosurus caninus* and *T. vulpecula*) were also detected from within revegetation plantings area in December. *T. caninus* was observed by direct observation in vegetation adjacent the Western Dam crossing, and both were detected by monitoring cameras (Camera 9). Ringtail possums (*Pseudocheirus peregrinus*) were not detected. Arboreal mammals are actively foraging within revegetation areas. These areas are clearly providing food resource as well as corridor to adjacent older growth forest where suitable hollows are available. Installation of nest boxes is likely to increase abundance of arboreal mammals and Microchiroptera within revegetation areas by supplying a critical habitat feature within the revegetation areas.

There is potential that Pademelons (*Thylogale* sp.) and Long-nosed Potoroo (*Potorous tridactylus*) may re-establish populations within some areas within LCER (where there is suitable vegetation structure) due to proximity of extant populations and connectivity. The potential presence of feral dogs/Dingoes may influence the abundance, behaviour and detectability of these small macropod species. In areas where these small macropods occur, Pademelon and Potoroo are very difficult to detect when canid

activity/presence is high. Investigation of the potential occurrence of Pademelon and Potoroo within LCER can require extended periods of camera deployment (4 weeks minimum). It may be beneficial to conduct a more targeted survey at suitable areas in LCER in the near future to assess this potential presence.

The targeted amphibian survey completed in April 2020 was undertaken late in the breeding season under relatively dry conditions, and thus the survey results were unlikely to accurately represent frog diversity or abundance utilising breeding habitat at the dam or the surrounding foraging habitat. Weather conditions were highly conducive to frog activity during the early summer survey event in December 2020, with heavy rainfall received over the course of the on-ground survey period. Eastern Sedgefrog (*Litoria fallax*) were seen and heard in large numbers around both dam margins during the December 2020 event, aligning with observations from baseline frog habitat assessments completed in late 2012 and early 2013 (Meyer 2013). Consistent with the baseline surveys conducted by Dr Meyer, Striped Rocketfrog (*Litoria nasuta*), Striped Marshfrog (*Limnodynastes peronii*), Great Barred Frog (*Mixophyes fasciolatus*) and Graceful Treefrog (*Litoria gracilenta*) were detected in and around the dams. Three additional species were recorded during 2020 surveys when compared to the 2012/2013 baseline, including Scarlett-sided Pobblebonk (*Limnodynastes terraereginae*), Broad-palmed Rocketfrog (*Litoria latopalmata*) and Green Treefrog (*Litoria caerulea*). Another species, the Stony Creek Frog (*Litoria wilcoxii*), were noticeably absent from the dam margins/perimeter, which were recorded in moderate numbers during the baseline survey. The dam margins and surrounding vegetation has changed markedly since 2012/2013, as a result of revegetation of the dam perimeter. Patches of open areas favoured by Stony Creek Frogs along the dam margin have consequently become densely vegetated (refer **Figure 3** and **Figure 4** above), and breeding habitat at the dam for Stony Creek Frog may now be considered marginal, with the species likely to continue using habitat along the creeks, as was observed during the baseline surveys. The threatened Tusked Frog (*Adelotus brevis*) remained undetected at the dam; however, the species and breeding habitat is assumed to be extant.

Cane Toads (*Rhinella marina*) were abundant on tracks and clearings and around the dams, and were also seen utilising the habitat stacks. The revegetated banks of the dam and improved vegetation along the dam margins may deter Cane Toads from breeding at previously bare dam margins identified during the baseline survey. Overhanging tree canopy along dam margins can be expected to lower shallow water temperature during the day, further deterring cane toads from breeding. Trapping of toad tadpoles using the toad baits manufactured by the Cane Toad Challenge may provide an indication of the extent of breeding within the dam, whilst also serving to remove bulk quantities of their tadpoles.

5.0 MANAGEMENT RECOMMENDATIONS

Based on the observations made, data collected and review of the available information, it is recommended that the following measures be considered:

- Installation of nest/habitat boxes suitable for a range of species could be considered to supplement the lack of nesting/roosting habitat available for hollow-dependant species within the revegetation areas. Boxes should be installed at appropriate height and aspect to increase probability of usage. We strongly suggest that the box positions be accurately mapped during installation to allow efficient inspections at later dates. Nest boxes are of limited long-term benefit unless budget allowances consider inspection and repair/replacement at a three-five year frequency.
- The installation of large wood debris into degraded/disturbed landscapes assists in the restoration of ecosystem function, as indicated by the recent 2020 surveys. It is recommended that all future offset/habitat restoration projects include provisions to install a combination of habitat stacks and single large logs during works. It may be beneficial to include several more pieces of large woody debris in the southern section of LCER to further assist with habitat recovery and provide food resources across the revegetation area. Sourcing of large woody debris from development sites (where material is otherwise chipped and used as mulch) turns an inconvenient material (chipped onsite) into a high value resource.
- SCC staff visiting the revegetation area should visually inspect the habitat stacks for evidence of fox denning on a regular basis. Signs of digging in/around the habitat stacks or the presence of the remains of prey (skeletal material, feathers etc.) around the habitat stacks should be taken as evidence of a high level of fox presence. It should be noted that fox control in localised areas is of very limited benefit. This is due to the high mobility of Red Fox which results in gaps/voids in spatial distribution being rapidly filled.
- Trapping of toad tadpoles using the toad baits manufactured by the Cane Toad Challenge may offer an effective means of determining the extent that the dam is used for breeding, whilst also serving to remove bulk quantities of their tadpoles.
- Conduct a more intensive camera deployment (suggested a minimum of 4 weeks) in areas of suitable habitat within LCER for Pademelons (*Thylogale sp.*) and Long-nosed Potoroo (*Potorous tridactylus tridactylus*).
- We suggest repeat collection of passive acoustic data (BAR) on a 3 year cycle over the course of the offset project. This will allow investigation of subtle changes in the avian community through the recovery of forest structure in revegetated areas. Analysis of the recordings are best performed by an experienced "earbinder" (suitable, local experts e.g. Rob Kernot) with reference to a call reference library. We also suggest use of basic music editing software and upload of good samples

into Xeno-Canto.org by the person conducting analysis. This will raise the profile of LCER in the birding and ornithological community. An increase in visitation by members of this community will enhance the rate of detection (and recording into online resources such as Ebird) of significant species in LCER. This strategy could be used at any intended offset/recovery projects, with an initial data collection event before commencement of reparation works.

6.0 CONCLUSION

FPE conducted a follow-up survey of the southern section of LCER in May and December 2020, where previously cleared paddock areas have been revegetated and managed since baseline surveys were conducted in 2012/2013 by FPE utilising comparable survey techniques. To allow valid comparison to results, Site 1 was installed within the same location as the previous surveys, and a new location (Site 2) was established to increase the sampling rate within the revegetation area.

Four (4) species that were not trapped in the vicinity of Site 1 during 2012/2013 surveys were recorded at Site 1 and Site 2 during the Autumn survey in 2020, including Yellow-footed Antechinus (*Antechinus flavipes*), Buff-footed Antechinus (*Antechinus mysticus*), Fawn-footed Melomys (*Melomys cervinipes*) and Grassland Melomys (*Melomys burtoni*). This demonstrates that these species, which are dependent on complex vegetation structure and some form of canopy, are already finding the revegetation areas to their liking. Mammalian species that were detected around revegetation areas by direct observation and on cameras (and not previously detected here) included Koala (*Phascolarctos cinereus*), Echidna (*Tachyglossus aculeatus*), Swamp Wallaby (*Wallabia bicolor*), Grey-headed Flying Fox (*Pteropus poliocephalus*), two species of Brushtail possum (*Trichosurus caninus* and *Trichosurus vulpecula*), and two species of Bandicoot (*Perameles nasuta* and *Isodon macrourus*). Song meters were additionally placed at the same sites at 2012/2013 surveys. Results in 2020 were a subset of previous results, however Chocolate Wattle Bat (*Chalinolobus morio*) was a new detection within the reserve, while the calls of *Saccolaimus flaviventris* (Yellow-bellied Sheath-tailed bat) and *Vespadelus troughtoni* (Eastern Cave Bat) were not identified during Autumn 2020 despite detection in the early summer survey of 2012/2013. Three (3) additional amphibian species were recorded during 2020 surveys when compared to the 2012/2013 baseline (completed by Edward Meyer), including Scarlett-sided Pobblebonk (*Limnodynastes terraereginae*), Broad-palmed Rocketfrog (*Litoria latopalmata*) and Green Treefrog (*Litoria caerulea*). Nine (9) species of reptilia were detected during the 2020 surveys around dam margins and adjacent revegetation open forest, as well as on and around habitat stacks.

Habitat stack sites showed activity from a number of species and are a positive addition to the southern section of the reserve, providing valuable habitat/shelter for ground dwelling species, as well as creating much needed foraging opportunities. In conclusion, survey results demonstrated that the revegetation works have been hugely beneficial for species richness and diversity, with the detection of at least fifteen (15) new species that were not previously detected in the formerly cleared paddocks within this section of the reserve in 2012/2013.

7.0 REFERENCES

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Appendix A.
Survey Site Location Map



Appendix B.

Fauna Species Inventory List, Trap Success & Camera Results

Scientific name	Common name	Status (EPBC & NCA)	Detection Type	May 2020 Notes	Dec 2020 Notes
MAMMALIA -					
Prototheria (Monotremes)					
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	Special Least Concern (NCA)	ST diggings (distinctive), Camera, DO (Spotlight), DO (Active Search)	1x Echidna seen adjacent track between Eastern Dam and footbridge, on camera at HS2, HS4 & Site 1	Diggings widespread. 2x younger individuals seen during active search during daylight, one near HS2 and another near Site 2.
Marsupialia					
<i>Antechinus flavipes</i>	Antechinus, Yellow-footed		Elliot trap	Site 1 and 2	Site 1 only
<i>Antechinus mysticus</i>	Antechinus, Buff-footed		Elliot trap	Site 1 and 2	Nil trapped in Dec
<i>Isodon macrourus</i>	Northern Brown Bandicoot		Camera	No confirmed sightings	Camera 5 (Site 2)
<i>Macropus rufogriseus</i>	Red-necked Wallaby		DO, Camera		
<i>Parameles nasuta</i>	Bandicoot Long-nosed		Camera, ST	Distinctive diggings widespread, occurred on multiple cameras and near habitat stacks	Distinctive diggings widespread
<i>Phascogale cinereus</i>	Koala	Vulnerable (EPBC & NCA)	Camera	Camera Site 5	Nil detected in Dec
<i>Petaurus brevipes</i>	Sugar Glider		DO (spotlight)	Gliders feeding on <i>B. oblongifolia</i> likely <i>P. brevipes</i>	1x <i>P. brevipes</i> on <i>A. melanoxylon</i> on access track
<i>Petaurus norfolcensis</i>	Squirrel Glider		DO (spotlight)	In vegetation around Site 1	1x near Cam 4 foraging on flowering <i>E. pilularis</i> , 1x near SM2 (Eastern Dam) foraging on flowering <i>E. pilularis</i>
<i>Trichosurus caninus</i>	Short-eared Brushtail Possum		DO (spotlight)	Not observed in revegetation areas in May, several observed past Eastern Dam on tracks near foot bridge	1x adult male between Harp Trap and SM1 Western Dam in reveg
<i>Trichosurus vulpecula</i>	Common Brushtail Possum		Camera	NIL	Camera 9
<i>Wallabia bicolor</i>	Swamp Wallaby		Camera		
Eutheria (placentals)					
<i>Rattus cf. fuscipes</i>	Bush Rat		Elliot trap	Juvenile rat in trap compared favourably, no adults trapped	NIL confirmed in December. Several young <i>Rattus</i> trapped, but compared more favourably to <i>R. rattus</i>
<i>Rattus lutreolus</i>	Swamp Rat		Wire cage trap	Site 1 only	Site 1 only
<i>Melomys cervinipes</i>	Fawn-footed Melomys		Elliot trap, Camera	Site 1 and 2	Site 1 and 2 - Appear abundant
<i>Melomys burtoni</i>	Grassland Melomys		Elliot and wire cage trap	Site 1 and 2	Site 1 and 2 - Appear abundant
<i>Pteropus poliocephalus</i>	Grey-headed Flying Fox	Vulnerable (EPBC)	DO (Spotlight)	N/A - Not detected in May	Seen over two nights feeding on flowering <i>E. pilularis</i> near SM2
<i>Austromys australis</i>	White-striped Free-tailed Bat		SM3 Songmeter		
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat		SM3 Songmeter		
<i>Chalinolobus morio</i>	Chocolate Wattled Bat		SM3 Songmeter	Was not detected in 2012/2013 surveys	
<i>Miniopterus australis</i>	Little Bent-winged Bat		SM3 Songmeter		
<i>Miniopterus orianae</i>	Eastern Bent-winged Bat		SM3 Songmeter		NIL
<i>Micronomus norfolkensis</i>	East-coast Free-tailed Bat		SM3 Songmeter	Rarely detected on the eastern Sunshine Coast area	
<i>Myotis macropus</i>	Southern Myotis		SM3 Songmeter		
<i>Ozimops (formerly Mormopterus) lumsdenae</i>	Northern Free-tailed Bat		SM3 Songmeter		
<i>Ozimops (formerly Mormopterus) ridei</i>	Ride's Free-tailed Bat		SM3 Songmeter		
<i>Nyctophilus sp. (N. bifax or N. gouldii)</i>	Large-eared Bat Species		SM3 Songmeter		
<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe Bat		SM3 Songmeter		
<i>Scoteanax rueppellii</i>	Ruppell's Broad-Nosed Bat		SM3 Songmeter		NIL
<i>Vespadelus pumilus</i>	Eastern Forest Bat		SM3 Songmeter, Harp Trap		
<i>Chalinolobus nigrogriseus/Scotorepens sp.</i>	Hoary Wattled Bat / Scotorepens sp.		SM3 Songmeter	Unresolved call	
<i>Scotorepens rueppellii/Scotorepens orion</i>	Greater Broad-nosed Bat / Eastern Broad-nosed Bat		SM3 Songmeter	Unresolved call	
Other Placental Mammals					
<i>Canis lupus familiaris</i>	Domestic Dog	Invasive	Camera	Unleashed / uncollared domestic dogs on cameras near habitat stacks	
<i>Vulpes vulpes</i>	Red Fox	Invasive	Camera	Detected of a number of cameras in revegetation areas and near habitat stacks	
<i>Mus musculus</i>	House Mouse	Invasive	Elliot trap	Site 2 and Habitat Stack 2	Trapped at Site 1 in elliot
<i>Rattus rattus</i>	Black Rat	Invasive	Elliot trap	NIL	2x juvenile <i>Rattus</i> sp. Trapped, compared favourably with <i>R. rattus</i> , no adults trapped
REPTILIA -					
Gekkonidae/Dilodactylidae/Pygopodidae					
Scincidae					
<i>Lampropholis amicala</i>	Friendly Sunskink		DO (Active search), Pitfall Trap	Appears abundant around Western Dam near Site 1	In pitfall traps at both Site 1 & 2, regularly seen when walking
<i>Erolia graciloides</i>	Elf Skink		Pitfall Trap	N/A - Not detected in May	
CF. <i>Cryptoblepharus pulcher</i>	Elegant Snake-eyed Skink		DO (Active Search)	N/A - Not detected in May	Skink resembling <i>C. pulcher</i> by eye was seen sunning on top of HS4, unable to be caught to confirm ID
Varanidae					
<i>Varanus varius</i>	Lace Monitor		Camera	Near Habitat Stack	2x different individuals seen on track past Eastern Dam, 1x younger animal in wire cage trap @ HS2
Agamidae					
CF. <i>Intellagama lesueurii lesueurii</i>	Eastern Water Dragon		DO (Spotlight)	N/A - Not detected in May	On branch overhanging Eastern Dam
Colubridae					
<i>Dendrelaphis punctulata</i>	Green Tree Snake		DO (Active search)	In dam overflow area near Site 1	N/A - Not detected in December
<i>Tropidonophis mairii</i>	Keelback / Freshwater Snake		Funnel Trap, DO (Active Search)	N/A - Not detected in May	Trapped in funnel in PM @ Site 1, 1x seen in AM swimming in Western Dam, 1x seen in PM on Western Dam access track
Pythonidae					
<i>Morelia spilota mcdowelli</i>	Carpet Python		DO (Spotlight)	N/A - Not detected in May	On branch overhanging Eastern Dam adjacent access track
Elapidae					
CF. <i>Hemiaspis signata</i> (Unconfirmed)	CF. Marsh Snake		DO (Active Search)	N/A - Not detected in May	1x Elapidae seen on rocks at Eastern Dam CF. <i>Hemiaspis signata</i> . Unable to capture for ID confirmation
AMPHIBIA -					
<i>Limnodynastes peronii</i>	Striped Marshfrog		Heard, funnel trap, DO (Spotlight)	Abundant onsite around dams	Seen regularly
<i>Limnodynastes terraereginae</i>	Scarlett-sided Pobblebonk / Northern Banjo			N/A - Not detected in May	1x Scarlett-sided Pobblebonk in pitfall trap at Site 2
<i>Litoria caerulea</i>	Green Tree Frog			N/A - Not detected in May	DO (Spotlight)
<i>Litoria fallax</i>	Eastern Sedgefrog		DO (Spotlight), Heard	N/A - Not detected in May	Calling and seen in abundance particularly around dams
<i>Litoria gracielina</i>	Graceful Treefrog		DO (Spotlight), Heard	N/A - Not detected in May	Seen at Site 2, calling irregularly
<i>Litoria latopalmata</i>	Broad-palmed Rocketfrog		Active search, DO (Spotlight)	Around Western Dam	Likely calling around Western Dam
<i>Litoria nasuta</i>	Striped Rocket-frog		DO (Spotlight)	Recorded during targeted frog survey	Direct observations around Western Dam
<i>Mixophyes fasciolatus</i>	Great Barred Frog		DO (Spotlight)	Not in revegetation area (in creek near foot bridge)	Calling in large numbers from nearby watercourses/creeks. 1x observed on track past eastern dam
<i>Rhinella marina</i>	Cane Toad	Invasive	Funnel & pitfall traps, DO		Large numbers throughout reveg areas

Scientific name	Common name	Status (EPBC & NCA)	Detection Type	May 2020 Notes	Dec 2020 Notes
AVES (INCIDENTAL)		Not requested			
<i>Alectura lathamii</i>	Australian Brush Turkey		Camera		
<i>Aviceda subcristata</i>	Pacific Baza		DO	N/A - Not Detected in May	Observed during trap check at Site 1
<i>Calyptorhynchus funereus</i>	Yellow-tail Black Cockatoo		DO active search	Actively foraging and roosting around vicinity of cleared grassed area	
<i>Calyptorhynchus lathamii</i>	Glossy Black Cockatoo	Vulnerable (NCA)	DO active search	Pair heard calling in flight over the reserve	N/A - Not detected in December
<i>Colluricincla harmonica</i>	Grey Shrike Thrush		Camera		
<i>Cracticus tibicen</i>	Australian Magpie		Camera / DO		Captured on camera on HS3
<i>Eopsaltria australis</i>	Eastern Yellow Robin		Camera		
<i>Neochmia temporalis</i>	Red-browed Finch		DO	N/A - Not Detected in May	Flock foraging in easement around Site 1
<i>Ninox boobook</i>	Southern Boobook		Heard	N/A - Not Detected in May	Heard calling in surrounding areas
<i>Pachycephala rufiventris</i>	Rufous Whistler		DO	N/A - Not Detected in May	Calling around reveg area, DO at campsite
<i>Ptilonorhynchus violaceus</i>	Satin Bowerbird		Camera, DO Spotlight		
<i>Tyto sp.</i>	Barn Owl or Masked Owl		DO Spotlight	Seen in flight, more likely Masked Owl	N/A - Not detected in December
Invertebrata (INCIDENTAL)		Not requested			
No significant finds					
Abbreviations		DO= Direct observation, ST= Scat/Trace, CF = Compares favourably			

Study Site	Trap Type	11/05/2020	12/05/2020	13/05/2020	14/05/2020	15/05/2020	16/05/2020
1	Elliott traps (x20)		<i>Melomys cervinipes</i> (1)	<i>Antechinus mysticus</i> (1); <i>M. cervinipes</i> (2)	<i>Rattus sp. (juvenile)</i> (1); <i>Antechinus flavipes</i> (1); <i>M. cervinipes</i> (1); <i>Melomys burtoni</i> (1)	<i>M. cervinipes</i> (3); <i>M. burtoni</i> (1); <i>A. flavipes</i> (1)	<i>M. burtoni</i> (1); <i>A. flavipes</i> (1)
	Wire cage traps (4)	Install	<i>Rattus lutreolus</i> (1)	NIL	NIL	NIL	<i>R. lutreolus</i> (1)
	Drift fence funnels (8)		NIL	<i>R. marina</i> (1)	NIL	<i>R. marina</i> (1)	NIL
	Drift fence pitfall buckets (2)		NIL	NIL	NIL	NIL	NIL
	Harp Trap adj. Site 1		NIL	NIL	<i>Vespadilus pumulis</i> (1)	NIL	NIL
2	Elliott traps (x20)		<i>M. cervinipes</i> (1)	<i>M. cervinipes</i> (1)	<i>A. flavipes</i> (2); <i>M. cervinipes</i> (1); <i>Mus musculus</i> (1)	<i>M. cervinipes</i> (3); <i>A. cf mysticus</i> (1); <i>Anthechinus sp.</i> (got away)	<i>M. cervinipes</i> (4); <i>A. flavipes</i> (1)
	Wire Cage Traps (4)	Install	NIL	NIL	<i>M. cervinipes</i> (1)	<i>M. Burtoni</i> (1)	NIL
	Drift fence funnels (8)		<i>Rhinella marina</i> (1)	NIL	<i>R. marina</i> (1)	NIL	<i>Limnodynastes peronii</i> (1); <i>R. marina</i> (1)
	Drift fence pitfall buckets (2)		NIL	NIL	NIL	NIL	<i>R. marina</i> (1)
HS1			NIL	NIL	NIL	NIL	
HS2			NIL	NIL	NIL	NIL	
HS3	4 Wire cage & Elliot traps on each stack	Install	NIL	<i>M. cervinipes</i> (1)	NIL	<i>M. musculus</i> (1)	
HS4			<i>Melomys cf cervinipes</i> (1)	NIL	NIL	<i>M. cervinipes</i> (1); <i>M. burtoni</i> (1)	<i>M. burtoni</i> (2)

Spotlight & Active search findings (DO= direct obs, ST= scat/trace)							
	Macropod activity heard near Site 1 & 2 - No direct observations	<i>Lampropholis amicala</i> (DO), <i>Litoria latopalmata</i> (DO) - Side of dam near Site 1	<i>Dendrelaphis punctulata</i> (DO)	3x <i>Macropus rufogriseus</i> (DO)	<i>Macropus rufogriseus</i> (DO) - In reveg area near Site 2		Demob
	Bandicoot digging site with fresh scat (ST), individual heard nearby	<i>Tyto sp.</i> DO near Site 1 in flight, likely <i>Tyto novaehollandiae</i>	<i>Tachyglossus aculeatus</i> (DO) - Adjacent access track just north past Eastern Dam	<i>Mixophyes fasciolatus</i> , <i>Micophes iteratus</i> & <i>M. cervinipes</i> (DO) - Not in reveg area	1x <i>P. norfolcensis</i> (DO) - near Site 1		Demob
		1x <i>Petaurus norfolcensis</i> (DO) - At Western Dam crossover	3x <i>Trichosurus caninus</i> (DO) - Not in revegetation areas				Demob
		<i>Petaurus cf. breviceps</i> feeding on <i>B. oblongifolia</i> near Site 2, other Gliders in <i>E. grandis</i> near Eastern Dam access					Demob

Study Site	Trap Type	11/05/2020	12/05/2020	13/05/2020	14/05/2020	15/05/2020	16/05/2020
Study Site	Trap Type	7/12/2020	8/12/2020	9/12/2020	10/12/2020	11/12/2020	12/12/2020
1	Elliott traps (x20)		<i>M. cervinipes</i> (1); <i>A. flavipes</i> (1)	<i>Rattus cf. rattus</i> (Juvenile)(1); <i>M. burtoni</i> (1); <i>M. cervinipes</i> (2); <i>A. flavipes</i> (1)	<i>M. burtoni</i> (2) - AM; <i>M. burtoni</i> (1)	<i>Mus musculus</i> (1)	<i>M. cervinipes</i> (1); <i>M. burtoni</i> (1); <i>Mus musculus</i> (1)
	Wire cage traps (4)	Install	<i>R. lutreolus</i> (1)	NIL	<i>M. cervinipes</i> (1)		
	Drift fence funnels (8)		<i>L. peronii</i> (1); <i>R. marina</i> (8)	<i>R. marina</i> (1)	<i>Tropidonophis mairii</i> (1) - PM	<i>R. marina</i> (2)	
	Drift fence pitfall buckets (2)		NIL	<i>Erotosciscinus graciloides</i> (1)		<i>Lampropholis amiculata</i> (1) - PM	
	Harp Trap adj. Site 1		NIL	NIL	NIL	<i>Vespadilus pumulis</i> (2)	NIL
2	Elliott traps (x20)	Install	<i>M. cervinipes</i> (1); <i>Rattus cf. rattus</i> (Juvenile) (1), <i>R. marina</i> (2)	<i>M. cervinipes</i> (3); <i>M. burtoni</i> (4)	<i>M. cervinipes</i> (3); <i>M. burtoni</i> (1)	<i>M. burtoni</i> (1); <i>M. cervinipes</i> (3); <i>Melomys sp.</i> (Juvenile) (1)	<i>M. cervinipes</i> (2); <i>M. burtoni</i> (1); <i>Melomys sp.</i> (Juvenile) (1)
	Wire Cage Traps (4)		NIL	NIL	<i>M. cervinipes</i> (1)	NIL	<i>M. cervinipes</i> (2)
	Drift fence funnels (8)		<i>R. marina</i> (1)	<i>R. marina</i> (3)	NIL	<i>R. marina</i> (1)	<i>R. marina</i> (1)
	Drift fence pitfall buckets (2)		NIL	NIL	<i>Limnodynastes terraereginae</i> (1)	<i>L. amiculata</i> (1) - PM	<i>E. graciloides</i> (1)
HS1			NIL	<i>M. cervinipes</i> (1)	NIL		
HS2	4 Wire cage & Elliot traps on each stack	Install	NIL	NIL	<i>Varanus varius</i> (1) - PM		
HS3			NIL	NIL	NIL		
HS4			NIL	<i>M. cervinipes</i> (1)	<i>M. cervinipes</i> (1)		

Spotlight & Active search findings (DO= direct obs, ST= scat/trace)							
	<i>Litoria gracilinta</i> (DO & Calling irregularly)	1x <i>P. norfolcensis</i> (DO) near Cam 4, feeding on flowering <i>E. pilularis</i>	<i>Varanus varius</i> - Large monitor on track north of Eastern Dam	<i>T. aculeatus</i> near Site 2, adjacent dam. Appeared to be a separate individual to one seen on 8/12/20	<i>T. mairii</i> (1) - Seen at Western Dam in AM	Demob	
	<i>Litoria fallax</i> (Calling in abundance),	1x <i>T. caninus</i> (DO), between Harp Trap and SM1 Western Dam	<i>Rattus lutreolus</i> - Found in Harp Trap tube	<i>Morelia spilota</i> (1) - At Eastern Dam in PM	<i>T. mairii</i> (1) - Seen on Western Dam track in PM	Demob	
	<i>L. nasuta</i> (DO) - Seen at Site 1 near pitfall/funnel line	1x <i>M. cervinipes</i> (DO) on reveg access track	<i>Pteropus poliocephalus</i> - 2+ feeding on flowering <i>E. pilularis</i> adjacent Eastern Dam	<i>Pteropus poliocephalus</i> - Feeding on flowering <i>E. pilularis</i> adjacent Eastern Dam	Eastern Water Dragon (1) - Eastern Dam	Demob	
		<i>Tachyglossus aculeatus</i> - Foraging near HS2	<i>Mixophes fasciolatus</i> & <i>Litoria caerulea</i> (DO) - On access track near northern-most reveg area. Calling in numbers towards creek	<i>Ninox boobook</i> heard calling regularly in surrounding vegetation	<i>P. norfolcensis</i> (1) - Foraging in flowering <i>E. pilularis</i> , same one as <i>P. poliocephalus</i> previously	Demob	
		1x Elapidae seen on rocks at Eastern Dam CF. <i>Hemiaspis signata</i> , Unable to capture for ID confirmation			<i>P. breviceps</i> (1) seen in A. melanoxylon on reveg area access	Demob	

London Creek Environmental Reserve - Revegetation Areas & Habitat Stacks - Autumn Seasonal Survey				
Site	Camera Number	Common Name	Scientific Name	Comments
Site 1	12	Antechinus	<i>Antechinus sp.</i>	
		Melomys	<i>Melomys sp.</i>	
		Potential Rat	<i>Rattus sp.</i>	Not enough detail to ID
		Echidna	<i>Tachyglossus aculeatus</i>	
		Bandicoot sp.	<i>Perameles sp.</i>	
Site 1	15	Red-necked Wallaby	<i>Macropus rufogriseus</i>	
Site 2	5	Long-nosed Bandicoot	<i>Perameles nasuta</i>	
		Koala	<i>Phascolarctos cinereus</i>	
		Melomys	<i>Melomys sp.</i>	
		Red-necked Wallaby	<i>Macropus rufogriseus</i>	
		Antechinus sp.	<i>Antechinus sp.</i>	
Site 2	6	Wallaby sp.	-	
		Long-nosed Bandicoot	<i>Perameles nasuta</i>	
		Swamp Wallaby	<i>Wallabia bicolor</i>	
		Bandicoot sp.	<i>Perameles sp.</i>	
		Satin Bowerbird	<i>Ptilonorhynchus violaceus</i>	
		Wallaby sp.	-	
		Australian Brush Turkey	<i>Alectura lathami</i>	
		Red-necked Wallaby	<i>Macropus rufogriseus</i>	
		Fox	<i>Vulpes vulpes</i>	
HS 1	3	Fox	<i>Vulpes vulpes</i>	
		Red-necked Wallaby	<i>Macropus rufogriseus</i>	2 in 97
HS1	14	NIL	NIL	
HS 2	1	Bandicoot	<i>Perameles nasuta</i> or <i>Isodon macrourus</i>	Definitive ID unable to be determined
		Swamp Wallaby	<i>Wallabia bicolor</i>	
		Fox	<i>Vulpes vulpes</i>	
		Echidna	<i>Tachyglossus aculeatus</i>	
HS 3	18	Melomys	<i>Melomys sp.</i>	
		Eastern Yellow Robin	<i>Eopsaltria australis</i>	
		Lace monitor	<i>Varanus varius</i>	
		Unleashed Dog	<i>Canis lupus familiaris</i>	
		Grey Shrike Thrush	<i>Colluricincla harmonica</i>	
HS 4	7	Long-nosed Bandicoot	<i>Perameles nasuta</i>	
		Melomys sp.	<i>Melomys sp.</i>	
		Fox	<i>Vulpes vulpes</i>	
		Swamp Wallaby	<i>Wallabia bicolor</i>	
		Echidna	<i>Tachyglossus aculeatus</i>	
HS 4	10	Long-nosed Bandicoot	<i>Perameles nasuta</i>	
		Red-necked Wallaby	<i>Macropus rufogriseus</i>	
		Grey Shrike Thrush	<i>Colluricincla harmonica</i>	
		Melomys sp.	<i>Melomys sp.</i>	
		Long-nosed Bandicoot	<i>Perameles nasuta</i>	
		Echidna	<i>Tachyglossus aculeatus</i>	
		Water Rat (?)	<i>Hydromys chrysogaster</i> (?)	Potential to be water rat tail (white tipped) but unable to confirm
Extra Camera	4	Fox	<i>Vulpes vulpes</i>	
		Australian Brush Turkey	<i>Alectura lathami</i>	
Extra Camera	9	Rodent sp.	-	
		Long-nosed Bandicoot	<i>Perameles nasuta</i>	
Extra Camera	13	Red-necked Wallaby	<i>Macropus rufogriseus</i>	
		Unleashed Dog	<i>Canis lupus familiaris</i>	

London Creek Environmental Reserve - Revegetation Areas & Habitat Stacks - Early Summer Seasonal Survey				
Site	Camera Number	Common Name	Scientific Name	Comments
Site 1	12	Swamp Wallaby	<i>Wallabia bicolor</i>	2x in one photo
Site 1	15	Lace monitor	<i>Varanus varius</i>	
		Swamp Wallaby	<i>Wallabia bicolor</i>	
Site 2	5	CF Long-nosed Bandicoot	<i>Perameles nasuta</i>	
		Northern Brown Bandicoot	<i>Isodon macrourus</i>	
		Red-necked Wallaby	<i>Macropus rufogriseus</i>	
Site 2	6	Long-nosed Bandicoot	<i>Perameles nasuta</i>	2x different individuals (one had scar on back)
		Macropod sp.	-	
		Echidna	<i>Tachyglossus aculeatus</i>	
HS 1	3	Lace monitor	<i>Varanus varius</i>	
HS1	14	Lace monitor	<i>Varanus varius</i>	
		Lace monitor	<i>Varanus varius</i>	
HS 2	1	Long-nosed Bandicoot	<i>Perameles nasuta</i>	
		Echidna	<i>Tachyglossus aculeatus</i>	
		Short-eared Brushtail Possum	<i>Trichosurus caninus</i>	
HS 3	18	Lace monitor	<i>Varanus varius</i>	Monitor appear to be coming out of the stack several times
		Australian Magpie	<i>Cracticus tibicen</i>	
		Lace monitor	<i>Varanus varius</i>	
HS 4	7	Swamp Wallaby	<i>Wallabia bicolor</i>	
		Echidna	<i>Tachyglossus aculeatus</i>	Foraging around stack of two separate days
		Red Fox	<i>Vulpes vulpes</i>	
		Red-necked Wallaby	<i>Macropus rufogriseus</i>	
HS 4	10	Red-necked Wallaby	<i>Macropus rufogriseus</i>	
		Lace monitor	<i>Varanus varius</i>	Coming from stack?
Extra Camera	4	Red-necked Wallaby	<i>Macropus rufogriseus</i>	Several of various ages
		Red Fox	<i>Vulpes vulpes</i>	2, maybe 3 individuals
		Australian Brush Turkey	<i>Alecturur lathamii</i>	
Extra Camera	8	Macropod sp.	-	
		Swamp Wallaby	<i>Wallabia bicolor</i>	
		Australian Brush Turkey	<i>Alecturur lathamii</i>	
		Red-necked Wallaby	<i>Macropus rufogriseus</i>	
		Echidna	<i>Tachyglossus aculeatus</i>	
		Long-nosed Bandicoot	<i>Perameles nasuta</i>	
		Lace monitor	<i>Varanus varius</i>	
		Common Brushtail Possum	<i>Trichosurus vulpecula</i>	
		Short-eared Brushtail Possum	<i>Trichosurus caninus</i>	
		Swamp Wallaby	<i>Wallabia bicolor</i>	
Extra Camera	13	Red-necked Wallaby	<i>Macropus rufogriseus</i>	
		Long-nosed Bandicoot	<i>Perameles nasuta</i>	
		Echidna	<i>Tachyglossus aculeatus</i>	
Extra Camera	20	Macropod Sp.	-	Only ears on camera

Appendix C.
Desktop Assessment Results

WildNet Records

Conservation Significant Species List

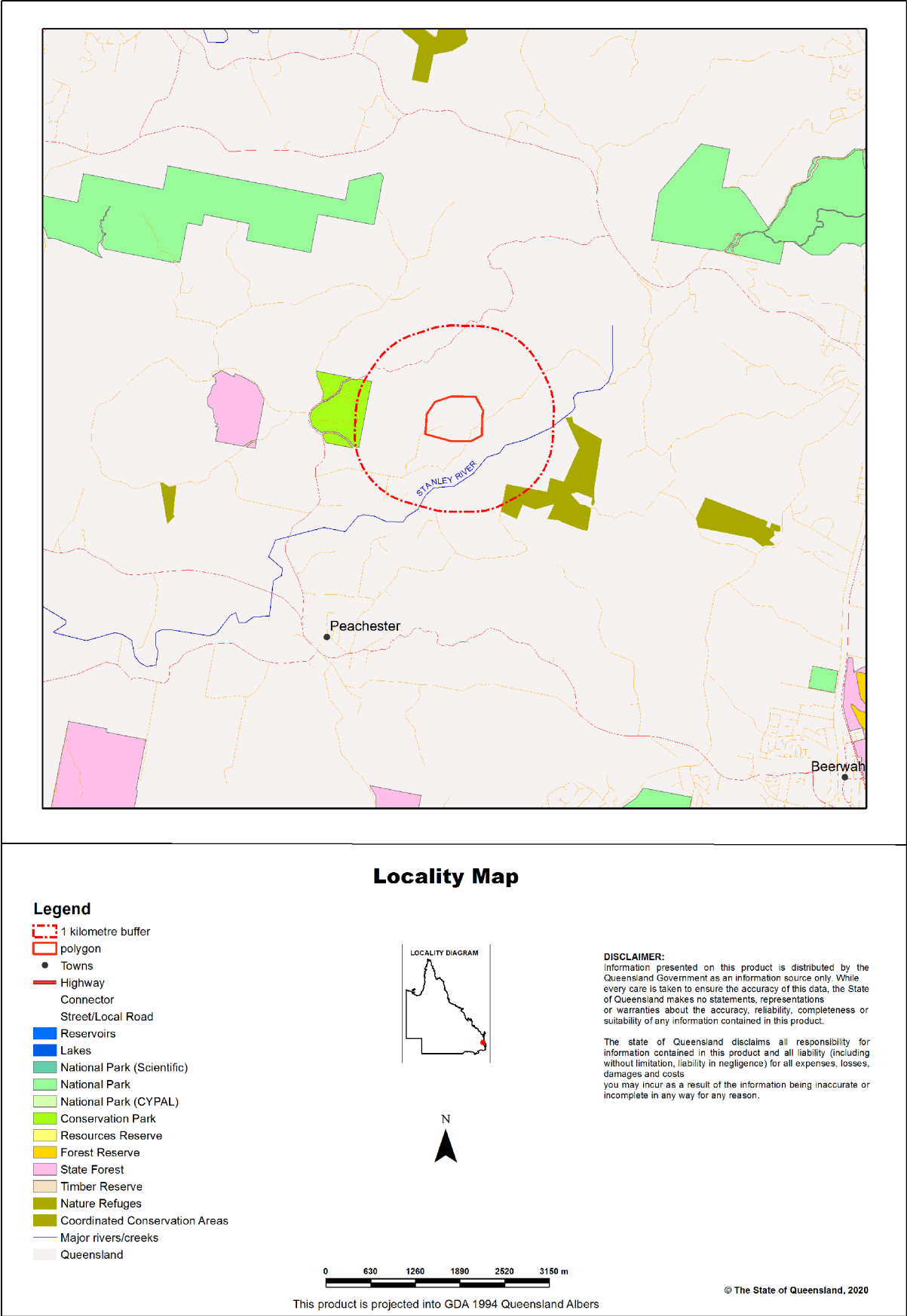


For the selected area of interest 43.86ha

Current as at 18/06/2020

WildNet

Map 1. Locality Map



Summary Information

The following table provides an overview of the area of interest .

Table 1. Area of interest details

Size (ha)	43.86
Local Government(s)	Sunshine Coast Regional
Bioregion(s)	Southeast Queensland
Subregion(s)	Sunshine Coast - Gold Coast Lowlands
Catchment(s)	Brisbane

Protected Area(s)

No estates or reserves are located within the area of interest.

World Heritage Area(s)

No World Heritage Areas are located within the area of interest.

Ramsar Area(s)

No Ramsar Areas are located within the area of interest.

Conservation Significant Species List

Introduction

This Conservation Significant Species List report is derived only from records from the WildNet database managed by the Department of Environment and Science. Other data sources may provide additional information on species occurrence.

Conservation significant species are species listed:

- as [threatened](#) or near threatened under the Nature Conservation Act 1992;
- as threatened under the [Environment Protection and Biodiversity Conservation Act 1999](#) or
- [migratory species](#) protected under the following international agreements:
 - o Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)
 - o China-Australia Migratory Bird Agreement
 - o Japan-Australia Migratory Bird Agreement
 - o Republic of Korea-Australia Migratory Bird Agreement

The WildNet dataset is constantly being enhanced and the taxonomic and status information revised. If a species does not occur in the report, it does not mean it doesn't occur there and listed species may also no longer inhabit the area.

Table 2 lists the species recorded within the area of interest and its one kilometre buffer.

Table 2. Conservation significant species recorded within the area of interest and its one kilometre buffer

Taxon Id	Kingdom	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
706	Animalia	Amphibia	Limnodynastidae	<i>Adelotus brevis</i>	tusked frog	V	None	0	3	28/03/2013
676	Animalia	Amphibia	Myobatrachidae	<i>Mixophyes iteratus</i>	giant barred frog	E	E	0	5	28/03/2013
1728	Animalia	Aves	Accipitridae	<i>Erythrotriorchis radiatus</i>	red goshawk	E	V	0	1	30/06/1972
1971	Animalia	Aves	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail	V	V	0	2	04/01/2000
1597	Animalia	Aves	Monarchidae	<i>Symposiachrus trivirgatus</i>	spectacled monarch	SL	None	0	3	28/03/2013

Taxon Id	Kingdom	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
1952	Animalia	Aves	Podargidae	<i>Podargus ocellatus plumiferus</i>	plumed frogmouth	V	None	0	1	28/03/2013
1578	Animalia	Aves	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail	SL	None	0	5	28/03/2013
19177	Animalia	Insecta	Nymphalidae	<i>Danaus plexippus</i>	monarch	None	None	0	1	23/11/1993
860	Animalia	Mammalia	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala	V	V	0	4	30/07/2014
12377	Plantae	Equisetopsida	Laxmanniaceae	<i>Romnaldia strobilacea</i>	None	V	V	4	4	03/09/2004
13499	Plantae	Equisetopsida	Myrtaceae	<i>Syzygium hodgkinsoniae</i>	red lilly pilly	V	V	0	1	30/05/1993
14491	Plantae	Equisetopsida	Proteaceae	<i>Helicia ferruginea</i>	rusty oak	V	None	0	1	30/05/1993
16747	Plantae	Equisetopsida	Proteaceae	<i>Macadamia ternifolia</i>	bopple nut	V	V	1	1	22/07/2001

Taxon Id: Unique identifier of the taxon from the WildNet database.

NCA: Queensland conservation status of the taxon under the *Nature Conservation Act 1992* (Endangered (E), Extinct in the Wild (PE), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern(C)).

EPBC: Australian conservation status of the taxon under the *Environment Protection and Biodiversity Conservation Act 1999* (Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V)).

Specimens: The number of specimen-backed records of the taxon.

Records: The total number of records of the taxon.

Last record: Date of latest record of the taxon.

Links and Support

Other sites that deliver species information from the WildNet database include:

- [Species profile search](#) - access species information approved for publication including species names, statuses, notes, images, distribution maps and records
- [Species lists](#) - generate species lists for Queensland protected areas, forestry areas, local governments and areas defined using coordinates
- [Biomaps](#) - view biodiversity information, including species information approved for publication, and generate reports
- [Qld wildlife data API](#) - access species information approved for publication such as notes, images and records etc.
- [Wetland Maps](#) - view species records, survey locations etc. approved for publication
- [Wetland Summary](#) - view wildlife statistics, species lists for a range of area types, and access species profiles
- [Generalised distribution and densities of Queensland wildlife](#) - Queensland species distributions and densities generalised to a 10 km grid resolution
- [Conservation status of Queensland wildlife](#) - access current lists of priority species for Queensland including nomenclature and status information
- [Queensland Confidential Species](#) - the list of species flagged as confidential in the WildNet database.

Please direct queries about this report to the [WildNet Team](#).

Other useful sites for accessing biodiversity data include:

- [Queensland Government Data](#)
- [Atlas of Living Australia](#)
- [OZCAM - Online Zoological Collections of Australian Museums](#)
- [AVH - Australia's Virtual Herbarium](#)
- [Protected Matters Search Tool](#)

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government, to the maximum extent permitted by law, 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.





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: 19/06/20 11:24:33

[Summary](#)

[Details](#)

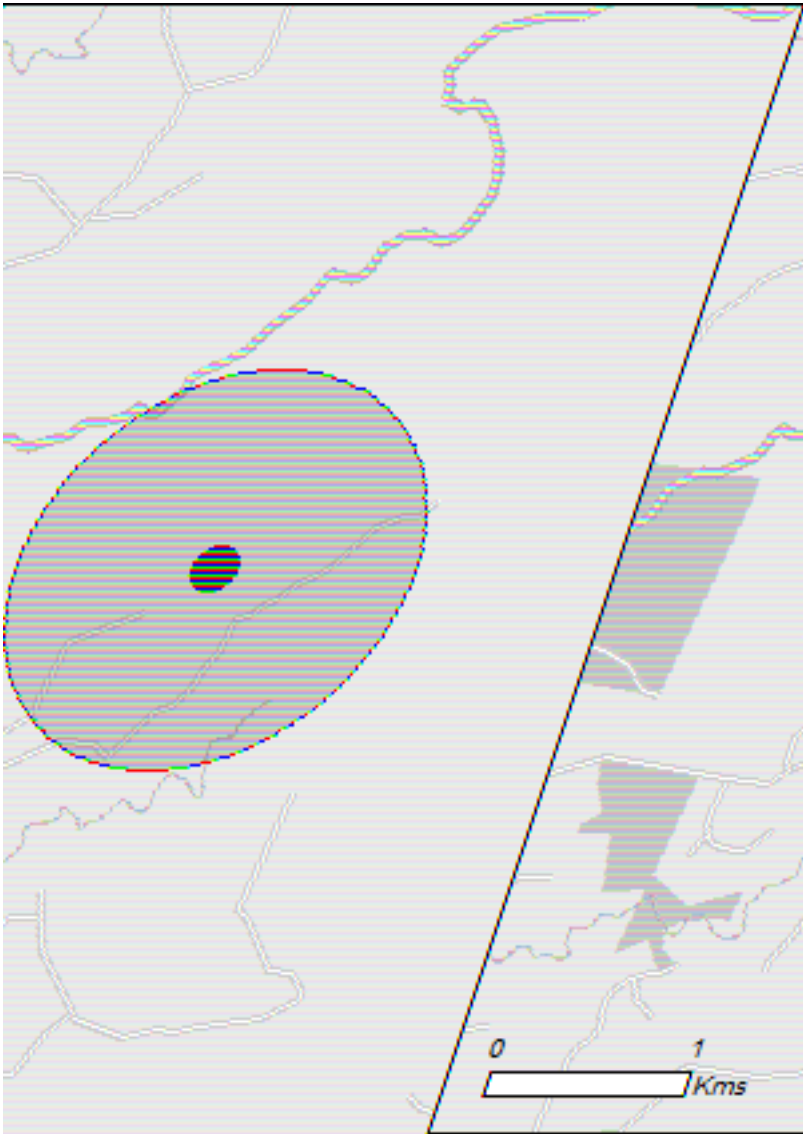
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

[Buffer: 1.0Km](#)



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:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	42
Listed Migratory Species:	14

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:	21
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:	31
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name	Proximity	
Moreton bay	10 - 20km upstream	

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
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Cyclopsitta diophthalma_coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Thinornis rubricollis_rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Mixophyes fleayi Fleay's Frog [25960]	Endangered	Species or species habitat likely to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat likely to occur within area
Insects		
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
Phyllodes imperialis smithersi Pink Underwing Moth [86084]	Endangered	Breeding may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely 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
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Diploglottis campbellii Small-leaved Tamarind [21484]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Floydia praealta Ball Nut, Possum Nut, Big Nut, Beefwood [15762]	Vulnerable	Species or species habitat known to occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
Macadamia ternifolia Small-fruited Queensland Nut, Gympie Nut [7214]	Vulnerable	Species or species habitat known to occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat may occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Plectranthus nitidus Nightcap Plectranthus, Silver Plectranthus [55742]	Endangered	Species or species habitat may occur within area
Romnalda strobilacea [5948]	Vulnerable	Species or species habitat likely to occur within area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat may occur within area
Sophora fraseri [8836]	Vulnerable	Species or species habitat may occur within area
Syzygium hodgkinsoniae Smooth-bark Rose Apple, Red Lilly Pilly [3539]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Triunia robusta Glossy Spice Bush [14747]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Saiphos reticulatus Three-toed Snake-tooth Skink [88328]	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		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		

Name	Threatened	Type of Presence
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to 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 may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species	[<u>Resource Information</u>]	
* 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

Name	Threatened	Type of Presence
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
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 likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely 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
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Thinornis rubricollis rubricollis		
Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat may occur within area

Extra Information

Invasive Species	[Resource Information]
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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		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
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
Sturnus vulgaris Common Starling [389]		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		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		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
Rattus rattus Black Rat, Ship Rat [84]		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		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		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
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and		Species or species

Name	Status	Type of Presence
Sterile Pussy Willow [68497]		habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis		
Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Reptiles		
Ramphotyphlops braminus		
Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat may 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

-26.81373 152.90233

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.



Vegetation management report

For Lot: 17 Plan: SP251354

Current as at 18/06/2020

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Recent changes

Updated mapping

Updated vegetation mapping was released on 6 April 2020 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, wetland, high-value regrowth and essential habitat mapping.

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:

- *Vegetation management framework* - an explanation of the application of the framework.
- *Property details* - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s), catchment(s), coastal or non coastal status, and any applicable area management plans associated with your property.
- *Vegetation management details for the specified Lot on Plan* - specific information about your property including vegetation categories, regional ecosystems, watercourses, wetlands, essential habitat, protected plants, and koala habitat.
- *Contact information*.
- *Maps* - a series of colour maps to assist in identifying regulated vegetation on your property.
- *Other legislation contact information*.

This information will assist you to determine your options for managing vegetation under the vegetation management framework, which may include:

- exempt clearing work
- accepted development vegetation clearing code
- an area management plan
- a development approval.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as Queensland's Protected Plants framework or the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 6 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

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1. Vegetation management framework

The *Vegetation Management Act 1999* (VMA), the Vegetation Management Regulation 2012, the *Planning Act 2016* and the Planning Regulation 2017, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem prescribed under Schedule 5 of the Vegetation Management Regulation 2012; and
- a mangrove.

1.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify DNRME or obtain an approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 5.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval under the vegetation management framework. For all other land tenures, contact DNRME before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at

<https://www.qld.gov.au/environment/land/vegetation/exemptions/>.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Exempt clearing work may require approval under other Commonwealth, State or Local Government laws, or local government planning schemes. Contact DNRME prior to clearing in any of these areas.

1.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at

<https://www.qld.gov.au/environment/land/vegetation/codes/>

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify DNRME before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at

<https://apps.dnrm.qld.gov.au/vegetation/>

1.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

On 8 March 2020, AMPs ended for fodder harvesting, managing thickened vegetation and managing encroachment. New notifications cannot be made for these AMPs. You will need to consider options for fodder harvesting, managing thickened vegetation or encroachment under a relevant accepted development vegetation clearing code or apply for a development approval.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an area management plan applies to your property for which you can make a new notification, it will be listed in Section 2.2 of this report. Before clearing under one of these AMPs, you must first notify the DNRME and then follow the conditions and requirements listed in the AMP.

<https://www.qld.gov.au/environment/land/vegetation/area-plans/>

1.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval. Information on how to apply for a development approval is available at

<https://www.qld.gov.au/environment/land/management/vegetation/development>

2. Property details

2.1 Tenure

All of the lot, plan and tenure information associated with property Lot: 17 Plan: SP251354, including links to relevant Smart Maps, are listed in Table 1. The tenure of the property (whether it is freehold, leasehold, or other) may be viewed by clicking on the Smart Map link(s) provided.

Table 1: Lot, plan and tenure information for the property

Lot	Plan	Tenure	Link to property on SmartMap
17	SP251354	Freehold	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=17\SP251354

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

2.2 Property location

Table 2 provides a summary of the locations for property Lot: 17 Plan: SP251354, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)
Sunshine Coast Regional

Bioregion(s)	Subregion(s)
Southeast Queensland	Sunshine Coast - Gold Coast Lowlands

Catchment(s)
Brisbane

2.2.1 Area Management Plan(s)

Nil

2.2.2 For the purposes of the accepted development vegetation clearing codes and the State Development Assessment Provisions (SDAP), this property is regarded as*

Coastal

*See also Map 5.4

2.2.3 The following can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code:

Does this lot contain land that is mapped as Agricultural Land Class A or B in the State Planning Interactive Mapping System?

Class A: 1.47ha

Class B: 40.0ha

Note - This confirms Agricultural Land Classes as per the State Planning Interactive Mapping System only. This response does not include Agricultural Land Classes identified under local government planning schemes. For further information, check the Planning Scheme for your local government area.

See section 5 to identify the location and extent of Class A and/or Class B Agricultural land on Lot: 17 Plan: SP251354.

3. Vegetation management details for Lot: 17 Plan: SP251354

3.1 Vegetation categories

Vegetation categories are shown on the regulated vegetation management map in section 5.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property. Total area: 106.93ha

Vegetation category	Area (ha)
Category B	64.3
Category C	7.4
Category X	35.2

Table 4

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact DNRME to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact DNRME to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

This report does not confirm if a Property Map of Assessable Vegetation (PMAV) exists on a lot. To confirm whether or not a PMAV exists on a lot, please check the PMAV layer on the Queensland Globe2, or contact DNRME on 135VEG (135 834).

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 5.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/>

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
12.3.2	Of concern	B	5.73	Eucalyptus grandis tall open forest on alluvial plains	Mid-dense
12.3.2	Of concern	C	1.79	Eucalyptus grandis tall open forest on alluvial plains	Mid-dense
12.9-10.14	Least concern	B	42.34	Eucalyptus pilularis tall open forest on sedimentary rocks	Mid-dense
12.9-10.14	Least concern	C	5.61	Eucalyptus pilularis tall open forest on sedimentary rocks	Mid-dense
12.9-10.16	Of concern	B	16.24	Araucarian microphyll to notophyll vine forest on Cainozoic and Mesozoic sediments	Dense
non-rem	None	X	35.23	None	None

Please note:

1. All area and area derived figures included in this table 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.
2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work
- accepted development vegetation clearing codes
- performance outcomes in State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 5.2.

3.4 Wetlands

There are no vegetation management wetlands present on this property.

3.5 Essential habitat

Protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA), and includes endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 5.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map as assessable vegetation -

- 1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or
- 2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
16747	Macadamia ternifolia	bopple nut	V	Araucarian microphyll vine forest; Araucarian simple to complex notophyll vine forest; Araucarian complex mesophyll vine forest with Archontophoenix cunninghamii;	0 to 700 m	red to brown loam soil	bank or alluvial terrace of watercourse or hill slope or rocky scree slope
860	Phascolarctos cinereus	koala	V	SEQ: Open eucalypt forest and woodland that has: a) multiple strata layers containing Eucalyptus, Corymbia, Angophora, Lophostemon or Melaleuca trees that-at 1.3 metres above the ground-have a diameter both greater and less than 30 centimetres; and b) at least 1 of the following species: Eucalyptus tereticornis, E. fibrosa, E. propinqua; E. umbra, E. grandis, E. microcorys, E. tindaliae, E. resinifera, E. populnea, E. robusta, E. nigra, E. racemosa, E. crebra, E. exserta, E. seeana, Lophostemon confertus, L. suaveolens, Melaleuca quinquenervia. Outside SEQ: Open eucalypt forest and woodland that contains Eucalyptus &/or Corymbia spp. Tree species used for food varies across State and can include Eucalyptus tereticornis, E. camaldulensis, E. coolabah; E. drepanophylla, E. platyphylla, E. orgadophilla, E. thozetiana, E. melanophloia, E. populnea, E. melliodora, E. dealbata, E. microtheca, E. crebra, E. exserta, E. blakelyi, E. papuana, Corymbia tessellaris, C. citriodora, Melaleuca quinquenervia, M. leucadendra.	Sea level to 1000m.	None	Riparian areas, plains and hill/escarpment slopes.
706	Adelotus brevis	tusked frog	V	In cavities, under debris (logs, stones) in subtropical vine forest, tall open moist forest, heaths, Melaleuca swamp and pasturelands near puddles and streams.	Sea level to 1000m.	None	None
12377	Romnaldia strobilacea	None	V	complex notophyll vine forest; Araucarian notophyll vine forest	100 to 600 m	None	steep slope or rarely on alluvial terrace

Label	Regional Ecosystem (mandatory unless otherwise specified)
16747	12.3.1, 12.3.16, 12.8.3, 12.8.13, 12.9-10.16, 12.11.1, 12.11.2, 12.11.3, 12.11.9, 12.11.10, 12.11.16, 12.12.1, 12.12.15, 12.12.16, 12.12.23

Label	Regional Ecosystem (mandatory unless otherwise specified)
860	SEQ: 11.3.2, 11.3.4, 11.3.25, 11.3.26, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.9.9, 12.2.5, 12.2.6, 12.2.7, 12.2.8, 12.2.10, 12.3.2, 12.3.3, 12.3.4, 12.3.5, 12.3.6, 12.3.7, 12.3.9, 12.3.10, 12.3.11, 12.3.14, 12.3.18, 12.3.19, 12.3.20, 12.5.1, 12.5.2, 12.5.3, 12.5.4, 12.5.6, 12.5.7, 12.5.10, 12.5.12, 12.8.1, 12.8.8, 12.8.9, 12.8.11, 12.8.12, 12.8.14, 12.8.16, 12.8.17, 12.8.20, 12.8.24, 12.8.25, 12.9-10.1, 12.9-10.2, 12.9-10.3, 12.9-10.4, 12.9-10.5, 12.9-10.7, 12.9-10.8, 12.9-10.11, 12.9-10.12, 12.9-10.14, 12.9-10.17, 12.9-10.18, 12.9-10.19, 12.9-10.21, 12.9-10.25, 12.9-10.26, 12.9-10.27, 12.9-10.28, 12.9-10.29, 12.11.2, 12.11.3, 12.11.5, 12.11.6, 12.11.7, 12.11.8, 12.11.9, 12.11.14, 12.11.15, 12.11.16, 12.11.17, 12.11.18, 12.11.22, 12.11.23, 12.11.24, 12.11.25, 12.11.26, 12.11.27, 12.11.28, 12.12.2, 12.12.3, 12.12.5, 12.12.6, 12.12.7, 12.12.8, 12.12.9, 12.12.11, 12.12.12, 12.12.14, 12.12.15, 12.12.23, 12.12.24, 12.12.25, 12.12.28, Outside SEQ: 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.8, 4.3.10, 4.3.11, 4.4.1, 4.5.3, 4.5.5, 4.5.6, 4.5.8, 4.5.9, 4.7.1, 4.7.7, 4.7.8, 4.9.6, 4.9.10, 4.9.12, 4.9.17, 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.7, 6.3.8, 6.3.9, 6.3.11, 6.3.12, 6.3.17, 6.3.18, 6.3.22, 6.3.24, 6.3.25, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.5.1, 6.5.2, 6.5.3, 6.5.5, 6.5.6, 6.5.7, 6.5.8, 6.5.9, 6.5.10, 6.5.11, 6.5.13, 6.5.14, 6.5.15, 6.5.16, 6.5.17, 6.5.18, 6.5.19, 6.6.2, 6.7.1, 6.7.2, 6.7.5, 6.7.6, 6.7.7, 6.7.9, 6.7.11, 6.7.12, 6.7.13, 6.7.14, 6.7.17, 6.9.3, 7.2.3, 7.2.4, 7.2.7, 7.2.11, 7.3.7, 7.3.8, 7.3.9, 7.3.12, 7.3.13, 7.3.14, 7.3.16, 7.3.19, 7.3.20, 7.3.21, 7.3.25, 7.3.26, 7.3.39, 7.3.40, 7.3.42, 7.3.43, 7.3.44, 7.3.45, 7.3.47, 7.3.48, 7.3.50, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.8.7, 7.8.8, 7.8.10, 7.8.15, 7.8.16, 7.8.17, 7.8.18, 7.8.19, 7.11.5, 7.11.6, 7.11.13, 7.11.14, 7.11.16, 7.11.18, 7.11.19, 7.11.20, 7.11.21, 7.11.31, 7.11.32, 7.11.33, 7.11.34, 7.11.35, 7.11.37, 7.11.41, 7.11.42, 7.11.43, 7.11.44, 7.11.45, 7.11.46, 7.11.47, 7.11.48, 7.11.49, 7.11.50, 7.11.51, 7.12.4, 7.12.5, 7.12.17, 7.12.21, 7.12.22, 7.12.23, 7.12.24, 7.12.25, 7.12.26, 7.12.27, 7.12.28, 7.12.29, 7.12.30, 7.12.33, 7.12.34, 7.12.35, 7.12.51, 7.12.52, 7.12.53, 7.12.54, 7.12.55, 7.12.56, 7.12.57, 7.12.58, 7.12.59, 7.12.60, 7.12.61, 7.12.62, 7.12.63, 7.12.65, 7.12.66, 7.12.69, 8.1.5, 8.2.3, 8.2.6, 8.2.7, 8.2.8, 8.2.11, 8.2.12, 8.2.13, 8.2.14, 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.8, 8.3.10, 8.3.11, 8.3.13, 8.5.1, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.5.7, 8.9.1, 8.10.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 8.11.10, 8.11.12, 8.12.4, 8.12.5, 8.12.6, 8.12.7, 8.12.8, 8.12.9, 8.12.12, 8.12.14, 8.12.20, 8.12.22, 8.12.23, 8.12.25, 8.12.26, 8.12.27, 8.12.29, 8.12.31, 8.12.32, 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.10, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.27, 9.4.1, 9.4.2, 9.4.3, 9.5.1, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.5.15, 9.5.16, 9.5.17, 9.7.1, 9.7.2, 9.7.3, 9.7.4, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.3, 9.8.4, 9.8.5, 9.8.9, 9.8.10, 9.8.11, 9.8.13, 9.10.1, 9.10.3, 9.10.4, 9.10.5, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.12, 9.11.13, 9.11.14, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.21, 9.11.22, 9.11.23, 9.11.24, 9.11.25, 9.11.26, 9.11.28, 9.11.29, 9.11.30, 9.11.31, 9.11.32, 9.12.1, 9.12.2, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.14, 9.12.15, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.25, 9.12.26, 9.12.27, 9.12.28, 9.12.29, 9.12.30, 9.12.31, 9.12.32, 9.12.33, 9.12.35, 9.12.36, 9.12.37, 9.12.38, 9.12.39, 9.12.44, 10.3.2, 10.3.3, 10.3.5, 10.3.6, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.15, 10.3.17, 10.3.20, 10.3.27, 10.3.28, 10.4.3, 10.4.9, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.8, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.1, 10.7.2, 10.7.3, 10.7.4, 10.7.5, 10.7.9, 10.7.10, 10.7.11, 10.7.12, 10.9.2, 10.9.3, 10.9.5, 10.10.1, 10.10.3, 10.10.4, 10.10.5, 10.10.7, 11.2.1, 11.2.5, 11.3.1, 11.3.2,

3.6 Protected plants (administered by the Department of Environment and Science (DES))

In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992* (NCA), with clearing of protected plants in the wild regulated by the [Nature Conservation \(Wildlife Management\) Regulation 2006](#). These requirements apply irrespective of the classification of the vegetation under the *Vegetation Management Act 1999*.

Prior to clearing, if the plants proposed to be cleared are in the wild (see [Operational policy: When a protected plant in Queensland is considered to be 'in the wild'](#)) and the exemptions under the [Nature Conservation \(Wildlife Management\) Regulation 2006](#) are not applicable to the proposed clearing, you must check the flora survey trigger map to determine if any part of the area to be cleared is within a high risk area. The trigger map for this property is provided in section 5.6. The exemptions relate to:

- imminent risk of death or serious injury (refer s261A)
- imminent risk of serious damage to a building or other structure on land, or to personal property (refer s261B)
- *Fire and Emergency Service Act 1990* (refer 261C)
- previously cleared areas (refer s261ZB)
- maintenance activities (refer s261ZC)
- firebreak or fire management line (refer s261ZD)
- accepted development vegetation clearing code (refer s261ZE)
- conservation purposes (refer s261ZG)
- authorised in particular circumstances (refer s385).

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) from the *Vegetation Management Act 1999* (i.e. listed in the Planning Regulations 2017) while some are different.

If the proposed area to be cleared is shown as high risk on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken in accordance with the flora survey guidelines. The main objective of a flora survey is to locate any endangered, vulnerable or near threatened plants (EVNT plants) that may be present in the clearing impact area.

If a flora survey identifies that EVNT plants are not present within the clearing impact area or clearing within 100m of EVNT plants can be avoided, the clearing activity is exempt from a permit. An [exempt clearing notification form](#) must be submitted to the Department of Environment and Science, with a copy of the flora survey report, at least one week prior to clearing. The clearing must be conducted within two years after the flora survey report was submitted.

If a flora survey identifies that EVNT plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the [application form clearing permit](#).

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that EVNT plants are present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

Further information on protected plants is available at

<http://www.ehp.qld.gov.au/licences-permits/plants-animals/protected-plants/>

For assistance on the protected plants flora survey trigger map for this property, please contact the Department of Environment and Science at palm@des.qld.gov.au.

3.7 Koala priority area and koala habitat area (administered by the Department of Environment and Science (DES))

The koala (*Phascolarctos cinereus*) is listed in Queensland as vulnerable by the Queensland Government under the *Nature Conservation Act 1992* and by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Nature Conservation (Koala) Conservation Plan 2017 allows koala habitat areas and koala priority areas to be determined and requires that these are shown on the Koala Conservation Plan Map. Koala habitat areas are areas that contain koala habitat which is essential for the conservation of a viable koala population in the wild. Please note that these areas only apply to lots in the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

Koala habitat areas include koala habitat areas (core) and koala habitat areas (locally refined). Following input from each local government, koala habitat areas (locally refined) were developed. Koala habitat areas (locally refined) will be afforded the same protection during a two year transitional period as if they were koala habitat areas (core) identified by the State.

Koala priority areas are areas where long-term management (e.g. habitat protection, habitat restoration and threat mitigation) and monitoring will be strategically focused as the areas have the highest likelihood of achieving conservation outcomes for koalas.

Clearing koala habitat areas in a koala priority area is prohibited, except for in certain circumstances (see Schedule 10, 16A of the Planning Regulation 2017). Clearing cannot occur (other than for exempt activities) and a development application cannot be lodged for prohibited activities.

Development located inside a koala priority area on lots that contain koala habitat area, but do not involve clearing of koala habitat, will be assessed by local government, except for in certain circumstances (see Schedule 11, Parts 1 and 2 of the Planning Regulation 2017). This is to manage and minimise impacts on koala habitat, such as edge effects.

Outside of koala priority areas, clearing of koala habitat areas must be avoided, mitigated or offset. Development that is proposing to clear koala habitat area will be assessed by the Queensland Government, except for in certain circumstances (see Schedule 10, 16B of the Planning Regulation 2017).

For more information on development requirements see

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy>.

Landholders (or a person acting on landholder's behalf) can request to have a koala habitat area determination for an area made, amended or revoked if they believe there is an error. For more information, see

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy>.

The koala conservation plan maps will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

In order to ensure that the most recent map for an area of interest can be accessed, prior to the annual update, a register of changes made to koala habitat areas as a result of the map amendment process will be available at:

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/>. The register will include lot on plan for the change, the date the decision was made and the map issued to the landholder which shows areas determined to be koala habitat areas.

For further information on the regulatory framework for koala conservation, including koala priority areas and koala habitat areas, please see the Queensland Government website at

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy> or contact Koala Assessment and Compliance, Department Environment and Science, at koala.assessment@des.qld.gov.au.

3.8 Emissions Reduction Fund (ERF)

The ERF is an Australian Government scheme which offers incentives for businesses and communities across the economy to reduce emissions.

Under the ERF, landholders can earn money from activities such as planting (and keeping) trees, managing regrowth vegetation and adopting more sustainable agricultural practices.

The purpose of a project is to remove greenhouse gases from the atmosphere. Each project will provide new economic opportunities for farmers, forest growers and land managers.

Further information on ERF is available at <https://www.qld.gov.au/environment/land/state/use/carbon-rights/>.

4. Contact information for DNRME

For further information on vegetation management:

Phone 135VEG (135 834)

Email vegetation@dnrme.qld.gov.au

Visit <https://www.dnrme.qld.gov.au/?contact=vegetation> to submit an online enquiry.

For contact details for other State and Commonwealth agencies, please see Section 6.

5. Maps

Maps included in this report may also be requested individually at:

- <https://www.dnrme.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form>
- <http://www.ehp.qld.gov.au/licences-permits/plants-animals/protected-plants/map-request.php>

Regulated vegetation management map

The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new [property maps of assessable vegetation \(PMAV\)](#).

Vegetation management supporting map

The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

Pre-clear map

The vegetation management pre-clear regional ecosystem mapping shows the regional ecosystem, location and extent which is likely to have occurred at that location prior to clearing. This map can be used for identifying exchange areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code. It may also be used for identifying offsets under the vegetation management framework.

Coastal/non coastal map

The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and the State Development Assessment Provisions (SDAP).

Agricultural Land Class A or B

The Agricultural Land Class map confirms the location and extent of land mapped as Agricultural Land Classes A or B as identified on the State Planning Interactive Mapping System. Please note that this map does not include areas identified as Agricultural Land Class A or B in local government planning schemes. This map can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code.

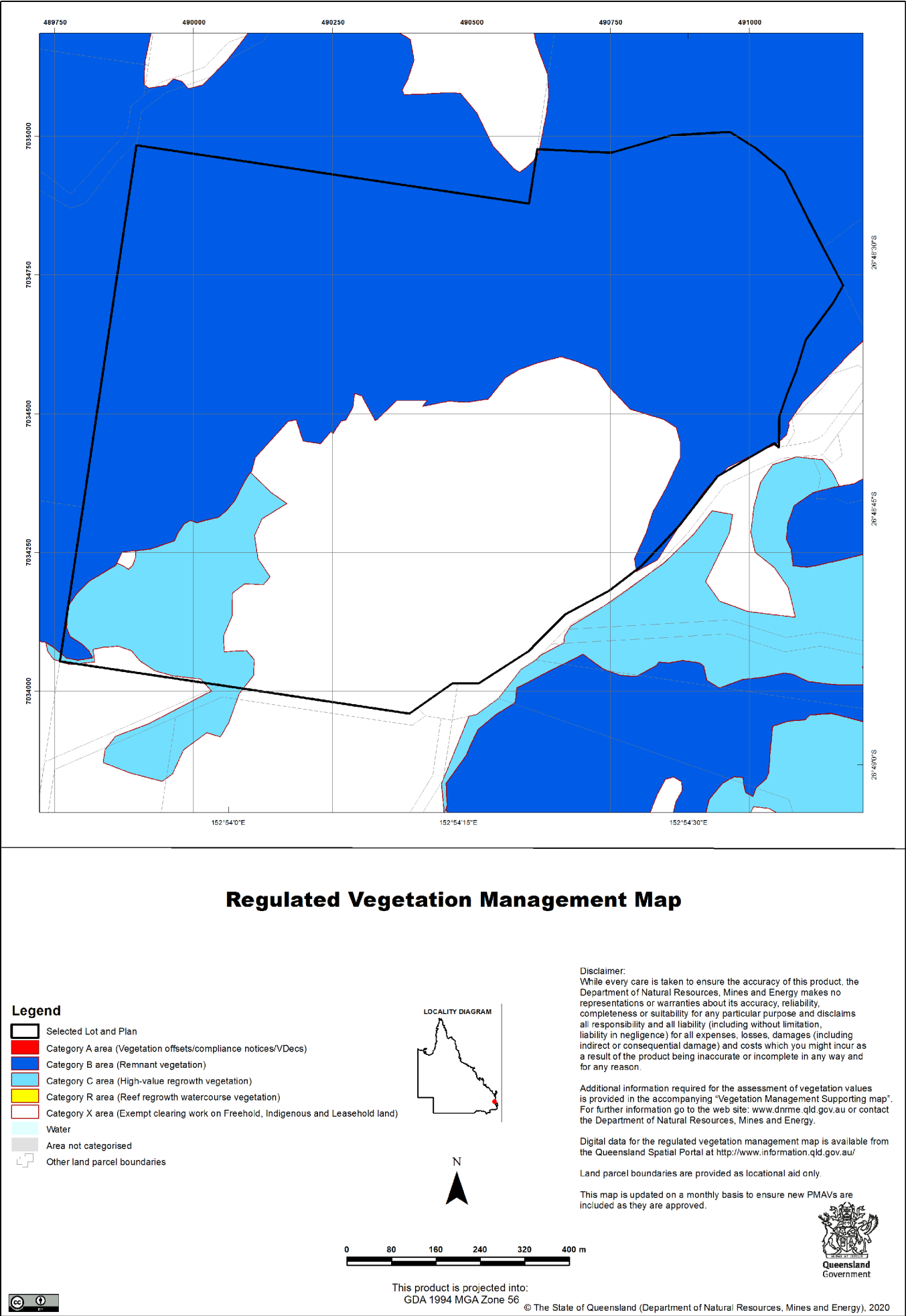
Protected plants map

The protected plants map shows areas where particular provisions of the *Nature Conservation Act 1992* apply to the clearing of protected plants.

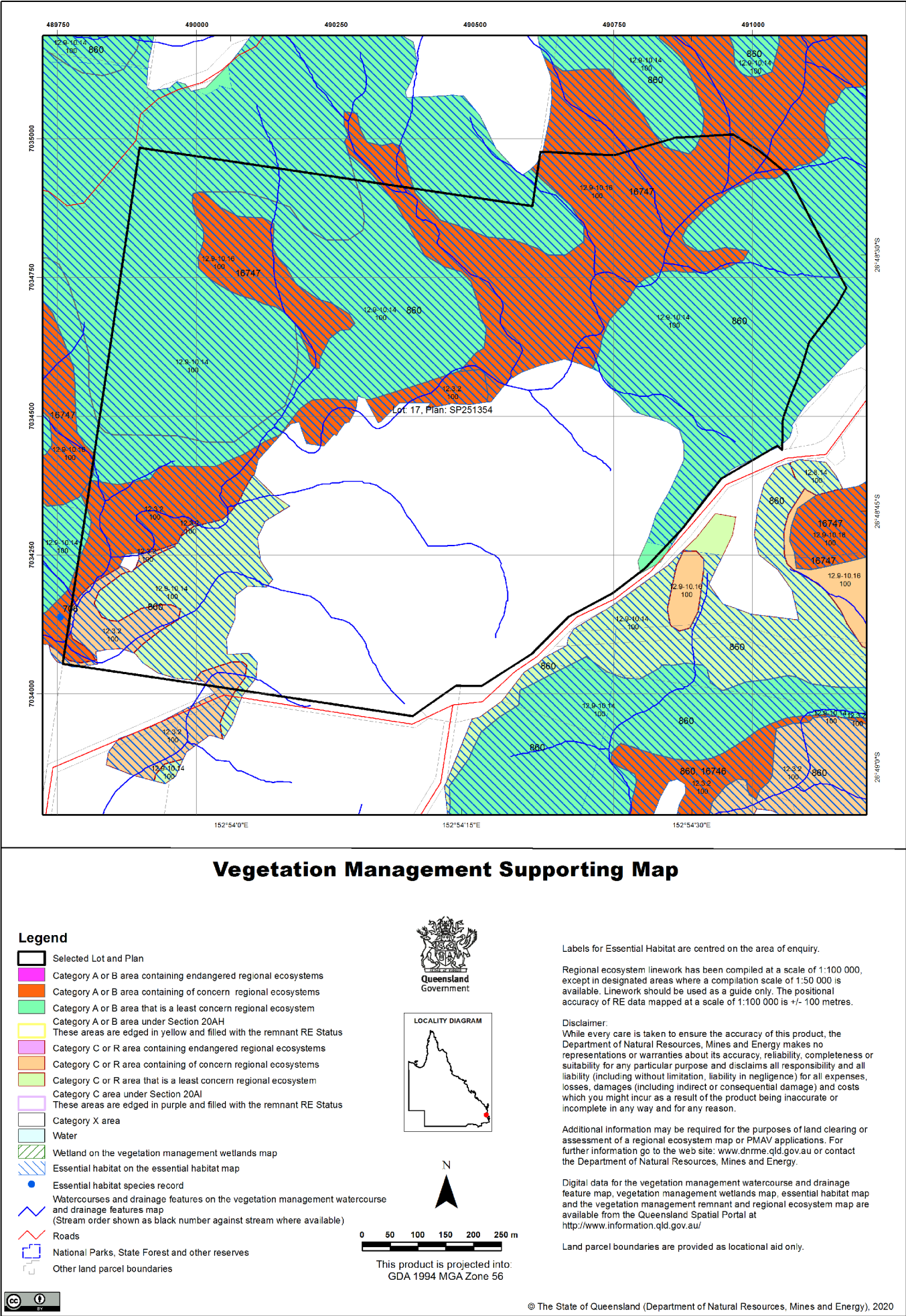
Koala priority area and koala habitat area map

The koala map shows area of koala priority area and koala habitat under the Nature Conservation (Koala) Conservation Plan 2017. Clearing of habitat in these areas is regulated under the Planning Regulation 2017. Please note that these areas only apply to lots in the South East Queensland "Shaping SEQ" Regional Plan area.

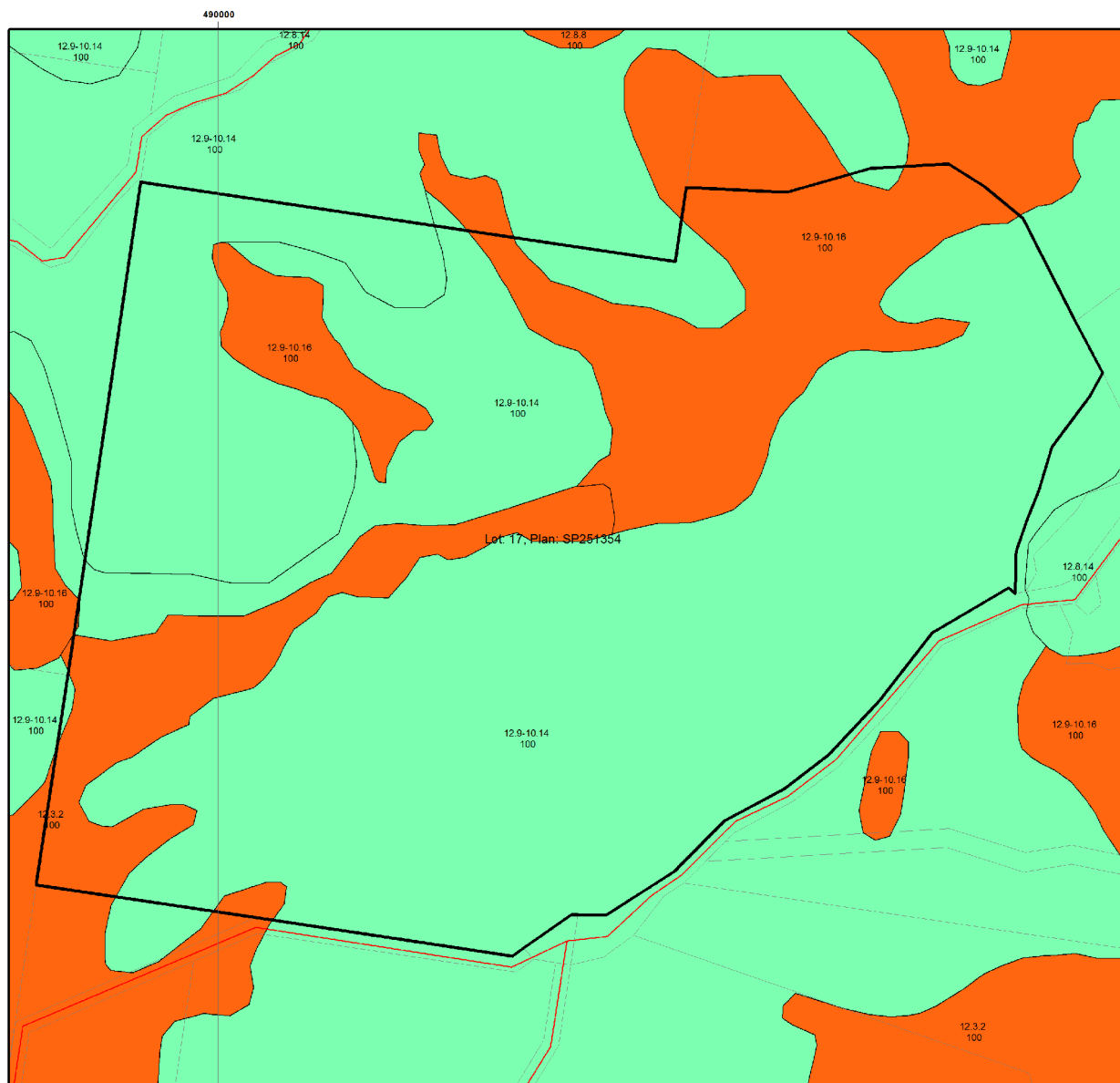
5.1 Regulated vegetation management map



5.2 Vegetation management supporting map










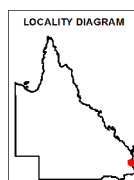
5.3 Pre-clear map



Vegetation Management Pre-clear Regional Ecosystem Map



-  Selected Lot and Plan
 Pre-clearing area containing Endangered RE
 Pre-clearing area containing Of Concern RE
 Pre-clearing area that is a Least Concern RE
 Water
 Roads
 Other land parcel boundaries



This product is projected into:
GDA 1994 MGA Zone 56

Disclaimer:

While every care is taken to ensure the accuracy of this product, the Department of Natural Resources, Mines and Energy 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 or negligence) for all expenses, losses and damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

Pre-clearing regional ecosystem line-work reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only.

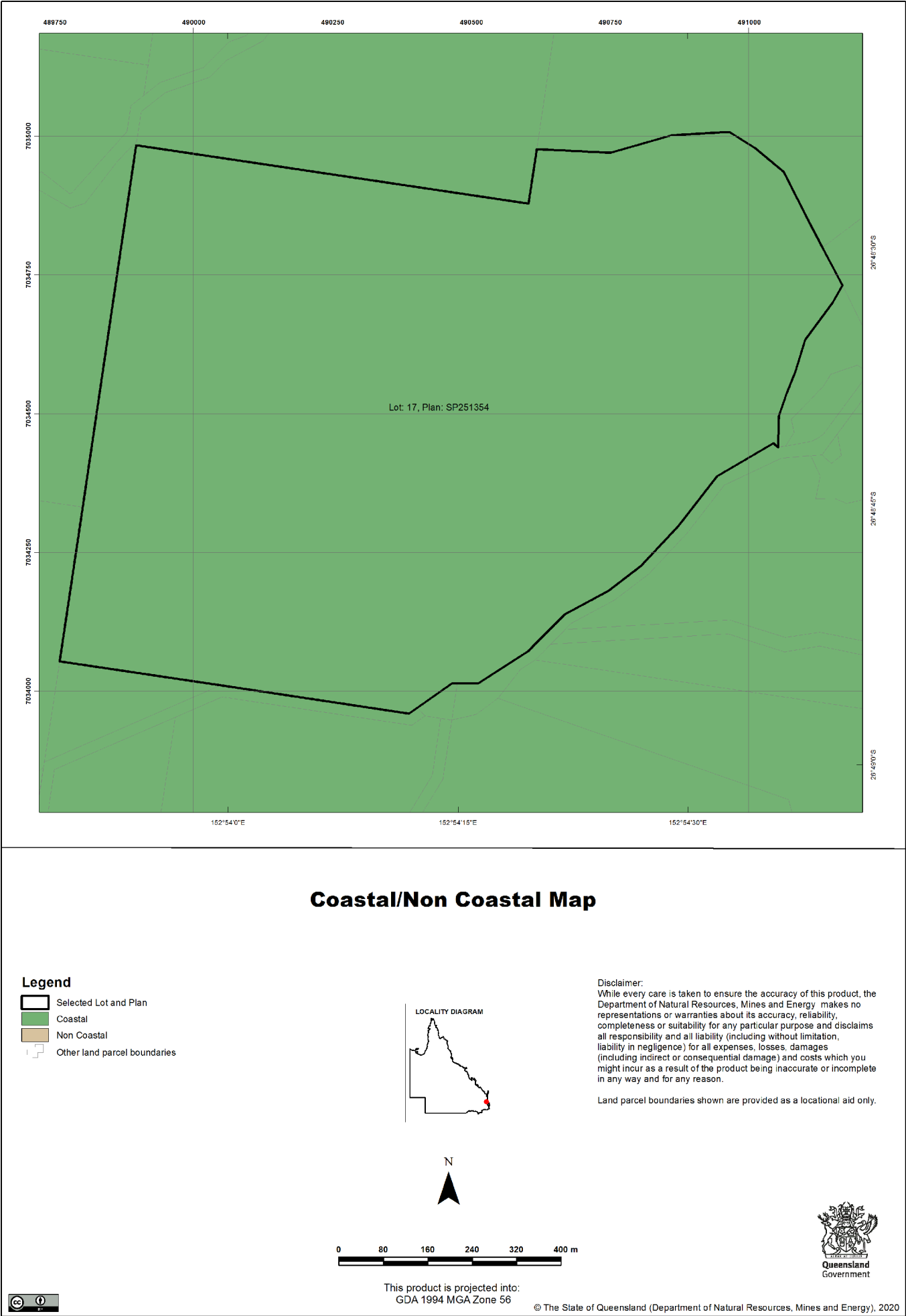
Digital data for the Pre-clearing regional ecosystem map is available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>

Land parcel boundaries shown are provided as a locational aid only.

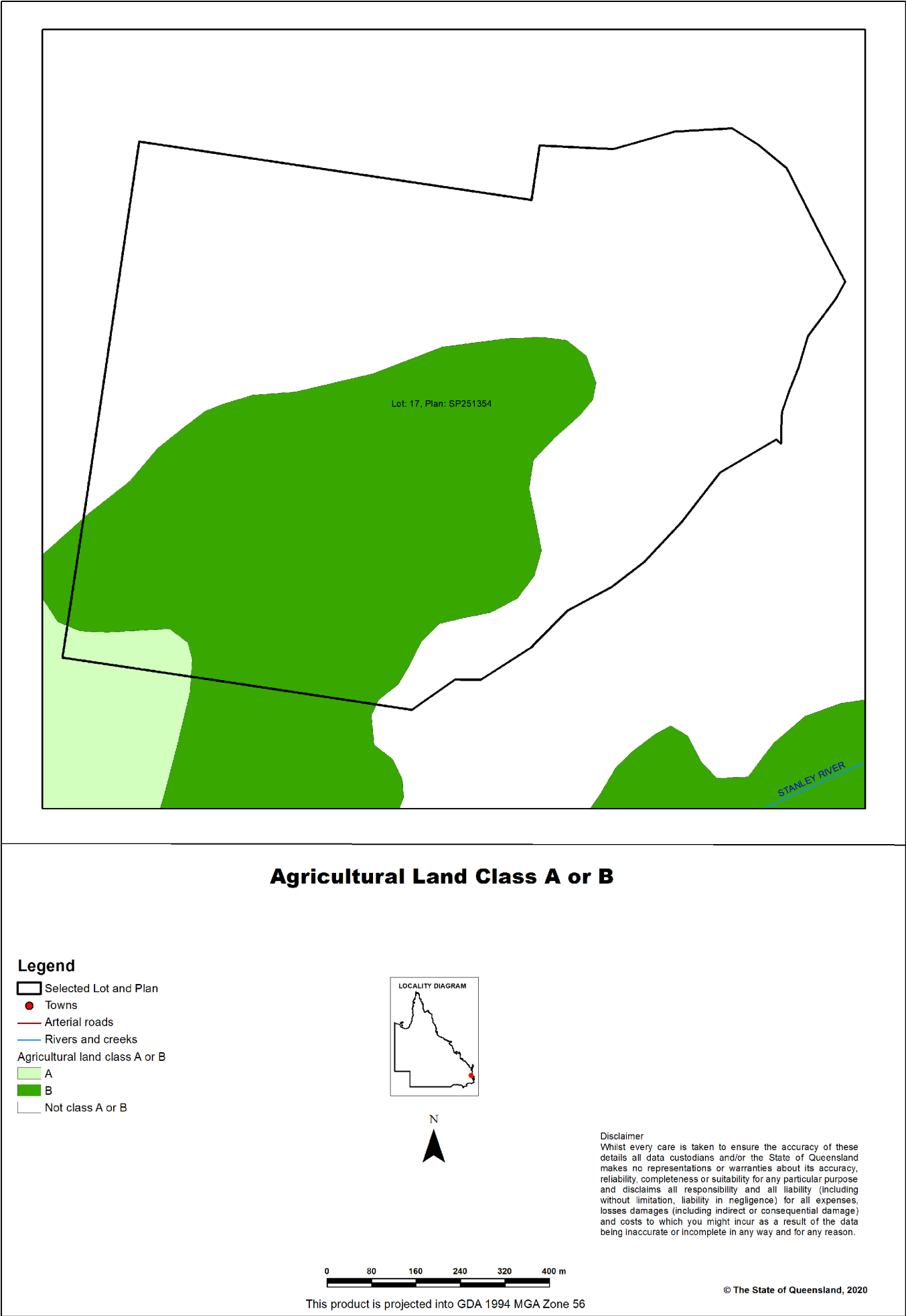


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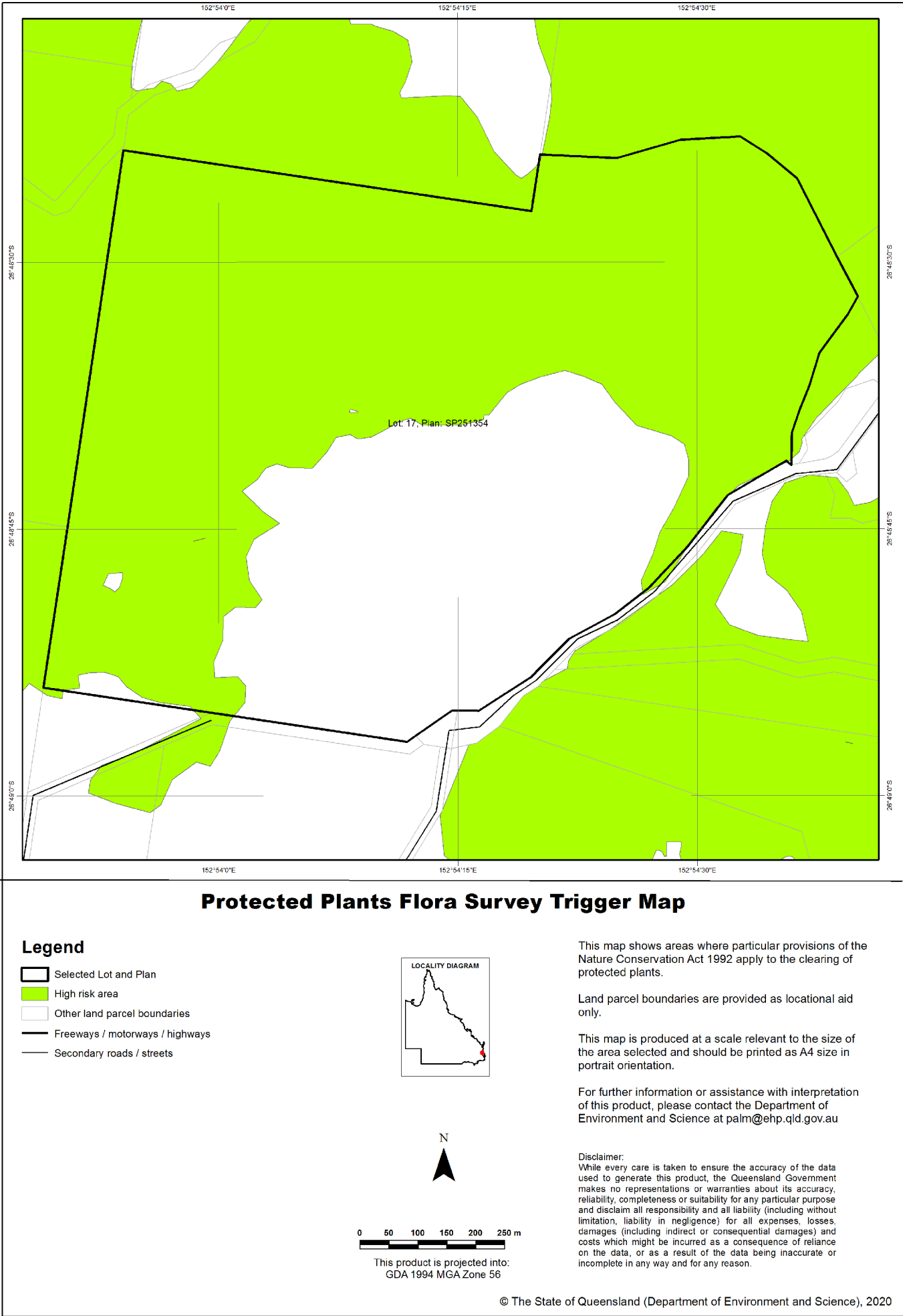
5.4 Coastal/non coastal map



5.5 Agricultural Land Class A or B map



5.6 Protected plants map administered by DES



Protected plants flora survey trigger map

The protected plants flora survey trigger map identifies 'high risk areas' where endangered, vulnerable or near threatened plants are known to exist or are likely to exist. Under the *Nature Conservation Act 1992* (the Act) it is an offence to clear protected plants that are 'in the wild' unless you are authorised or the clearing is exempt, for more information see [section 89](#) of the Act.

Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for information on what exemptions may apply in your circumstances, whether you may need to undertake a flora survey, and whether you may need a protected plants clearing permit.

Updates to the data informing the flora survey trigger map

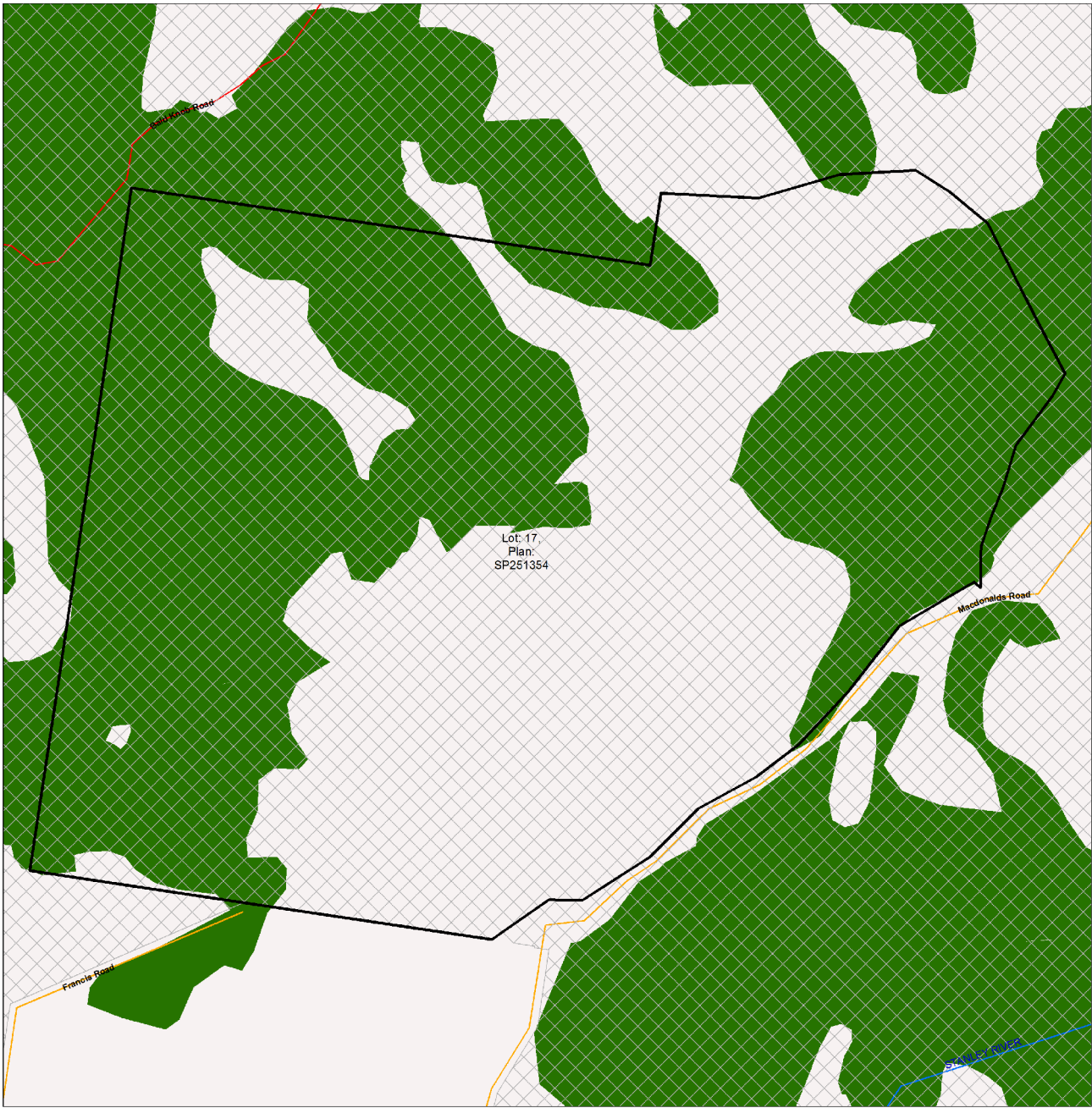
The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the [Queensland Spatial Catalogue](#), the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for more information.

5.7 Koala priority area and koala habitat area map administered by DES

(Applies in South East Queensland "Shaping SEQ" Regional Plan area only).

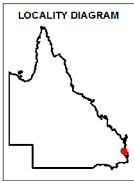


Koala priority area and koala habitat area

Legend

- Selected Lot and Plan
- Koala habitat area (core)
- Koala habitat area (locally refined)
- Koala priority area
- Cadastral Boundaries
- Towns
- Highway
- Connector
- Street/Local Road
- Major rivers/creeks
- Queensland

The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.



0 75 150 225 300 375 m

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Environment and Science acting on behalf of the State of Queensland 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 you might incur as a result of the data being inaccurate or incomplete in any way and for any reason. Due to varying sources of data, spatial locations may not coincide when overlaid.

The koala conservation plan maps will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

In order to ensure that the most recent map for an area of interest can be accessed, prior to the annual update, a register of changes made to koala habitat areas as a result of the map amendment process will be available at:
<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/>.
The register will include lot on plan for the change, the date the decision was made and the map issued to the landholder which shows areas determined to be koala habitat areas.

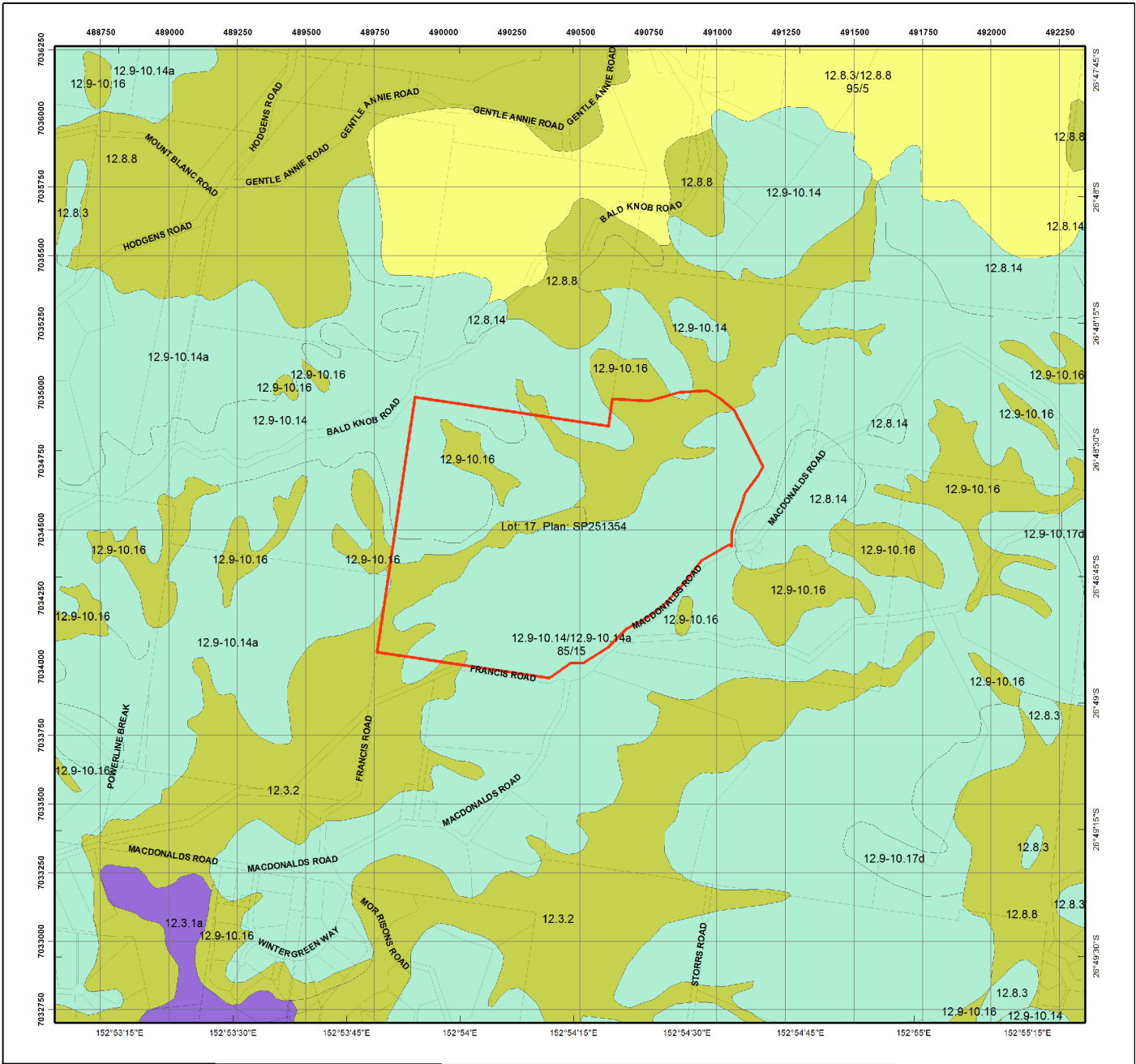
6. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
<ul style="list-style-type: none"> Interference with overland flow Earthworks, significant disturbance 	<i>Water Act 2000</i> <i>Soil Conservation Act 1986</i>	Department of Natural Resources, Mines and Energy (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dnrme.qld.gov.au
<ul style="list-style-type: none"> Indigenous Cultural Heritage 	<i>Aboriginal Cultural Heritage Act 2003</i> <i>Torres Strait Islander Cultural Heritage Act 2003</i>	Department of Aboriginal and Torres Strait Islander Partnerships (Queensland Government)	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
<ul style="list-style-type: none"> Mining and environmentally relevant activities Infrastructure development (coastal) Heritage issues Protected plants and protected areas¹ Koalas 	<i>Environmental Protection Act 1994</i> <i>Coastal Protection and Management Act 1995</i> <i>Queensland Heritage Act 1992</i> <i>Nature Conservation Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
<ul style="list-style-type: none"> Interference with fish passage in a watercourse, mangroves Forestry activities² 	<i>Fisheries Act 1994</i> <i>Forestry Act 1959</i>	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
<ul style="list-style-type: none"> Matters of National Environmental Significance including listed threatened species and ecological communities 	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Department of the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
<ul style="list-style-type: none"> Development and planning processes 	<i>Planning Act 2016</i> <i>State Development and Public Works Organisation Act 1971</i>	Department of State Development, Manufacturing, Infrastructure and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
<ul style="list-style-type: none"> Local government requirements 	<i>Local Government Act 2009</i> <i>Planning Act 2016</i>	Department of Local Government, Racing and Multicultural Affairs (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office

1. In Queensland, all plants that are native to Australia are protected plants under the [Nature Conservation Act 1992](http://www.des.qld.gov.au), which endeavours to ensure that protected plants (whether whole plants or protected plants parts) are not illegally removed from the wild, or illegally traded. Prior to clearing, you should check the flora survey trigger map to determine if the clearing is within a high-risk area by visiting www.des.qld.gov.au. For further information or assistance on the protected plants flora survey trigger map for your property, please contact the Department of Environment and Science on 13QGOV (13 74 68) or email palm@des.qld.gov.au.

2. Contact the Department of Agriculture and Fisheries before clearing:

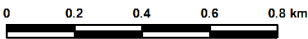
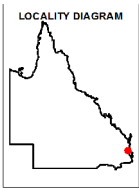
- Any sandalwood on state-owned land (including leasehold land)
- On freehold land in a 'forest consent area' or a 'forest entitlement area'
- More than five hectares on state-owned land (including leasehold land) containing commercial timber species listed in parts 2 or 3 of Schedule 6 of the Vegetation Management Regulation 2012 and located within any of the following local government management areas-Banana, Bundaberg Regional, Fraser Coast Regional, Gladstone Regional, Isaac Regional, North Burnett Regional, Somerset Regional, South Burnett Regional, Southern Downs Regional, Tablelands Regional, Toowoomba Regional, Western Downs Regional.



Pre-clearing Regional Ecosystems

Biodiversity Status

- Selected Lot and Plan
- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Water
- Cadastral Boundaries

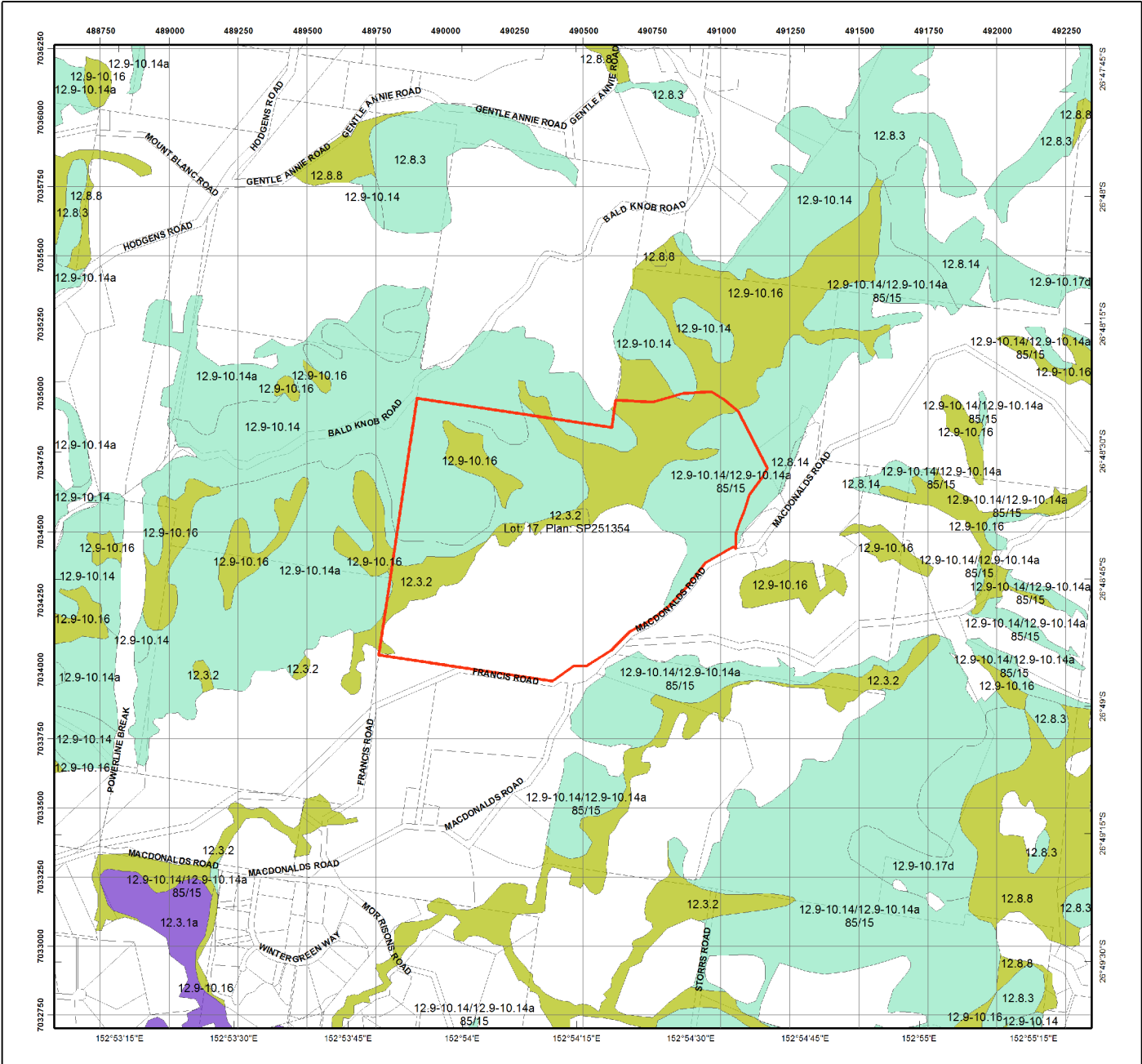


This product is projected into GDA 1994 MGA Zone 56

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The polygons are labelled by regional ecosystem (RE); where more than one RE occurs, the percentage of each is labelled. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

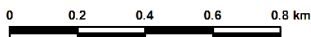
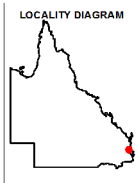
Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.



Remnant 2017 Regional Ecosystems

Biodiversity Status

- Selected Lot and Plan
- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Non-remnant vegetation, cultivated or built environment
- Plantation
- Water
- Cadastral Boundaries



This product is projected into GDA 1994 MGA Zone 56

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The polygons are labelled by regional ecosystem (RE); where more than one RE occurs, the percentage of each is labelled. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

Remnant woody vegetation is defined as vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy. Non-remnant vegetation includes regrowth and disturbed native vegetation.



Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

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 coordinates" option, the resulting assessment area encompasses an area extending for a 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: Planning.Support@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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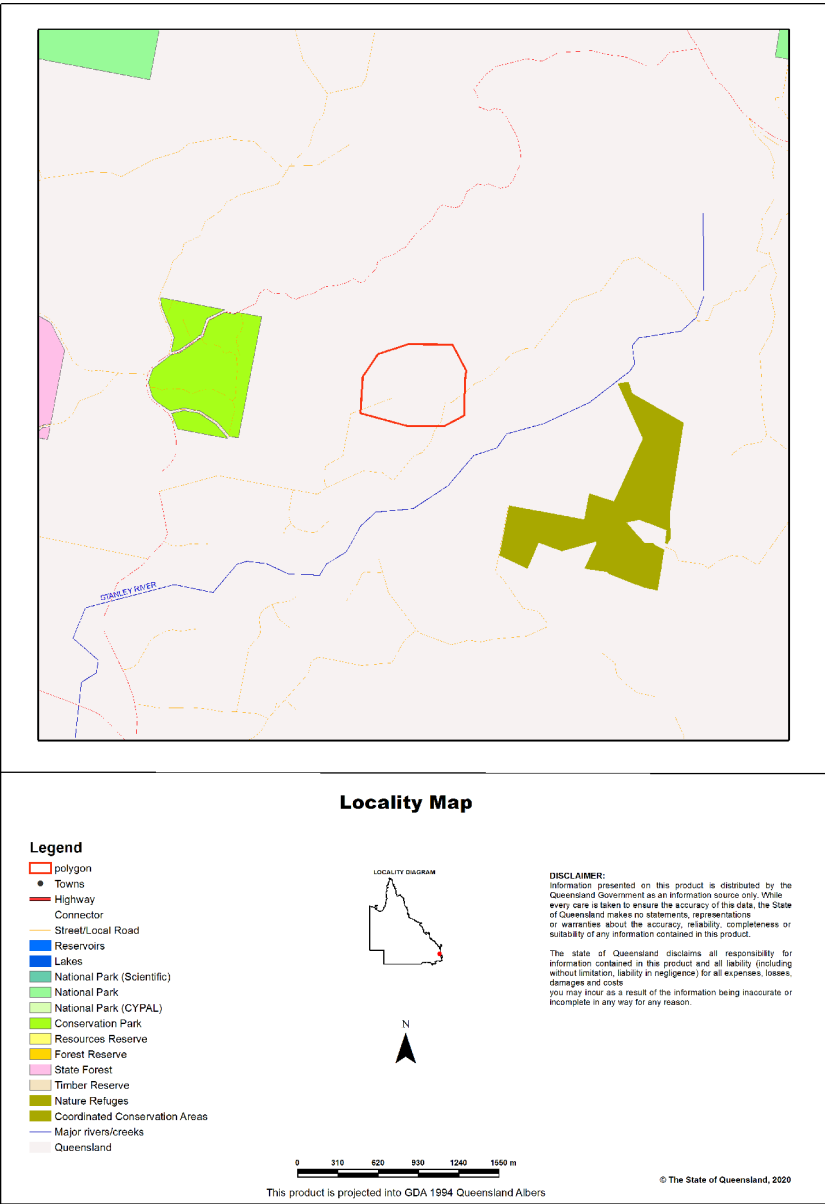
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Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI

Size (ha)	43.86
Local Government(s)	Sunshine Coast Regional
Bioregion(s)	Southeast Queensland
Subregion(s)	Sunshine Coast - Gold Coast Lowlands
Catchment(s)	Brisbane



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* ;
- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004* ;
- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;
- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;
- Regulated vegetation under the *Vegetation Management Act 1999* that is:
 - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
 - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
 - Category R areas on the regulated vegetation management map;
 - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
 - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;
- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;
- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;
- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0.0 ha	0.0 %
1b Protected Areas- nature refuges	0.0 ha	0.0 %
2 State Marine Parks- highly protected zones	0.0 ha	0.0 %
3 Fish habitat areas (A and B areas)	0.0 ha	0.0 %
4 Strategic Environmental Areas (SEA)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	1.16 ha	2.6%
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways **	0.0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	11.94 ha	27.2%
7b Special least concern animals	0.0 ha	0.0 %
7c i Koala habitat area - core (SEQ)	11.94 ha	27.2%
7c ii Koala habitat area - locally refined (SEQ)	0.0 ha	0.0 %
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	1.16 ha	2.6%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	2.86 ha	6.5%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	0.0 ha	0.0 %
8d Regulated Vegetation - Essential habitat	11.94 ha	27.2%
8e Regulated Vegetation - intersecting a watercourse **	2.3 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0.0 ha	0.0 %
9a Legally secured offset areas- offset register areas	0.0 ha	0.0 %
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0.0 ha	0.0 %

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(no results)

1b. Protected Areas - nature refuges

(no results)

2. State Marine Parks - highly protected zones

(no results)

3. Fish habitat areas (A and B areas)

(no results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(no results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

Natural wetlands that are 'High Ecological Significance' (HES) on the Map of Queensland Wetland Environmental Values are present.

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Values are present

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
<i>Boronia keysii</i>		V	None
<i>Calyptorhynchus lathamii</i>	Glossy black cockatoo	V	None
<i>Casuarus casuarus johnsonii</i>	Sthn population cassowary	E	None
<i>Crinia tinnula</i>	Wallum froglet	V	None
<i>Denisonia maculata</i>	Ornamental snake	V	None
<i>Litoria freycineti</i>	Wallum rocketfrog	V	None
<i>Litoria olongburensis</i>	Wallum sedgefrog	V	None
<i>Melaleuca irbyana</i>		E	None
<i>Petaurus gracilis</i>	Mahogany Glider	E	None
<i>Petrogale persephone</i>	Proserpine rock-wallaby	E	None
<i>Phascogale cinereus</i>	Koala - outside SEQ*	V	None
<i>Pezoporus wallicus wallicus</i>	Eastern ground parrot	V	None
<i>Taudactylus Pleione</i>	Kroombit tinkerfrog	E	None
<i>Xeromys myoides</i>	Water Mouse	V	None

*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

Threatened (endangered or vulnerable) wildlife species records

Scientific name	Common name	NCA status	EPBC status	Migratory status
<i>Adelotus brevis</i>	tusked frog	V		
<i>Rhodamnia rubescens</i>		E		
<i>Helicia ferruginea</i>	rusty oak	V		
<i>Syzygium hodgkinsoniae</i>	red lilly pilly	V	V	
<i>Mixophyes iteratus</i>	giant barred frog	E	E	
<i>Podargus ocellatus plumiferus</i>	plumed frogmouth	V		
<i>Macadamia ternifolia</i>	bopple nut	V	V	
<i>Romnaldia strobilacea</i>		V	V	

Special least concern animal species records

(no results)

*Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL).
Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

<https://www.qld.gov.au/environment/plants-animals/species-list/>

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/>

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

<https://environment.ehp.qld.gov.au/regional-ecosystems/>

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
12.3.2	O-dom	rem_oc

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Regional ecosystem	Vegetation management polygon	Vegetation management status
12.3.2	O-dom	hvr_oc

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Not applicable

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Not applicable

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

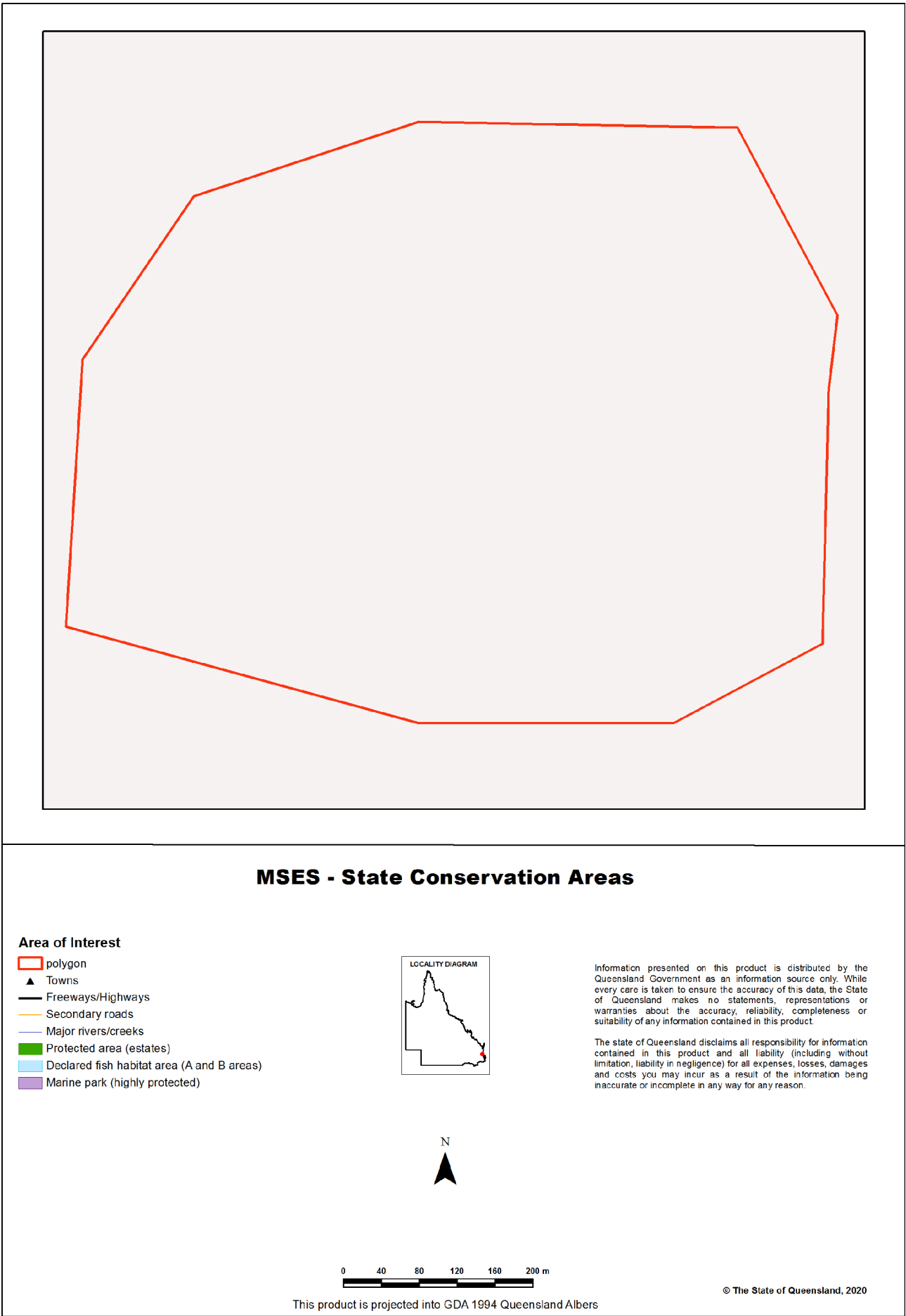
(no results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

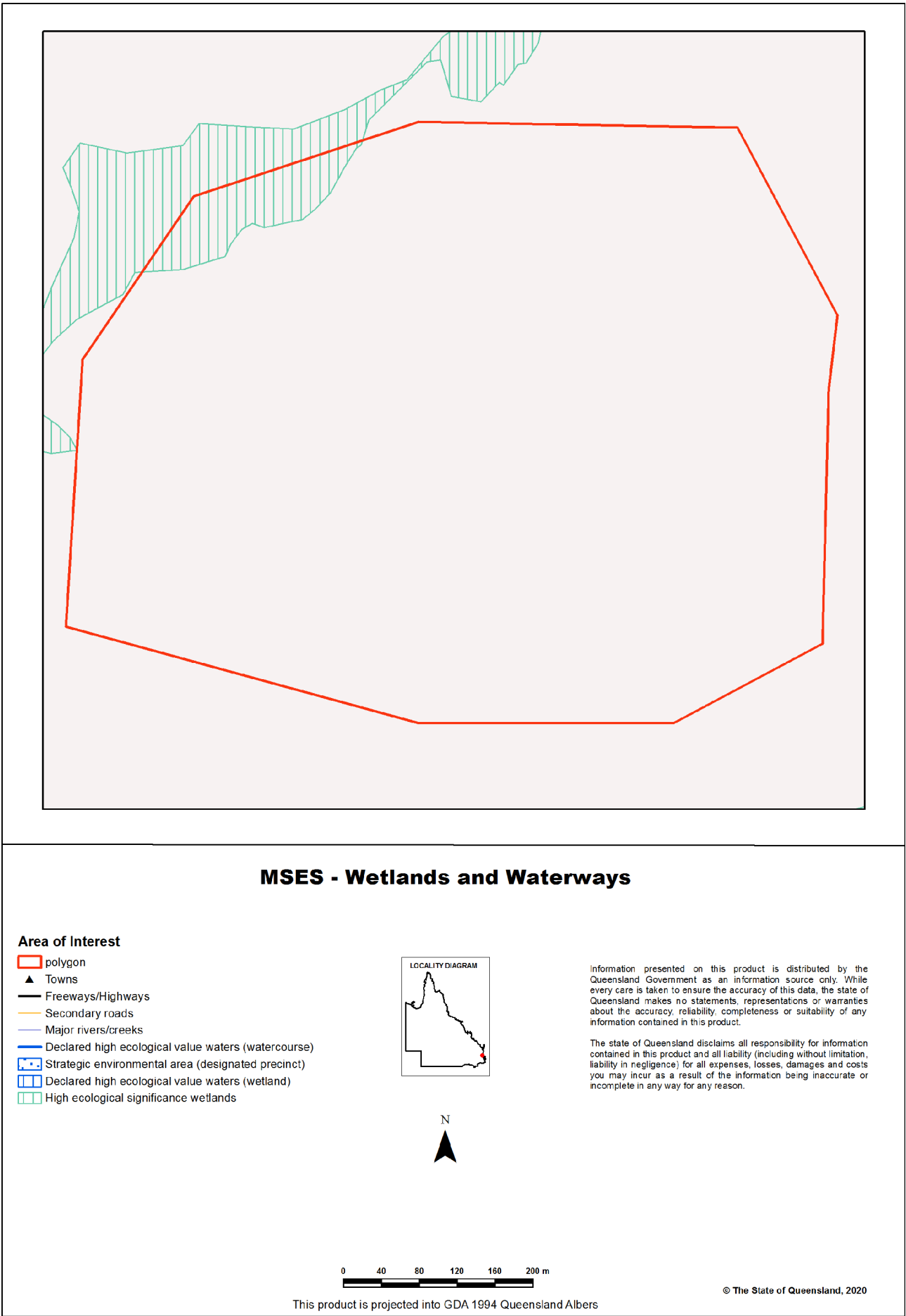
(no results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

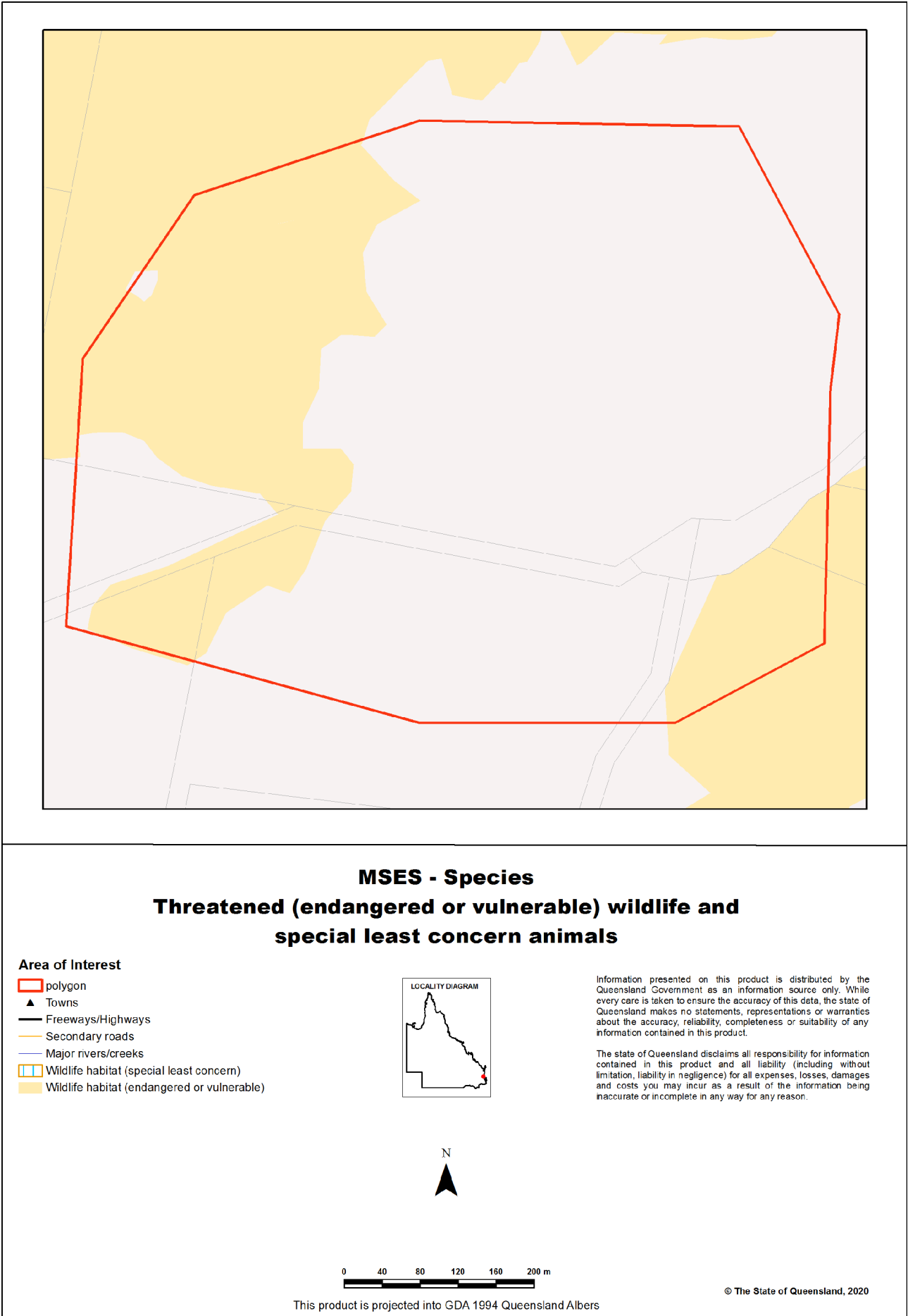
Map 1 - MSES - State Conservation Areas



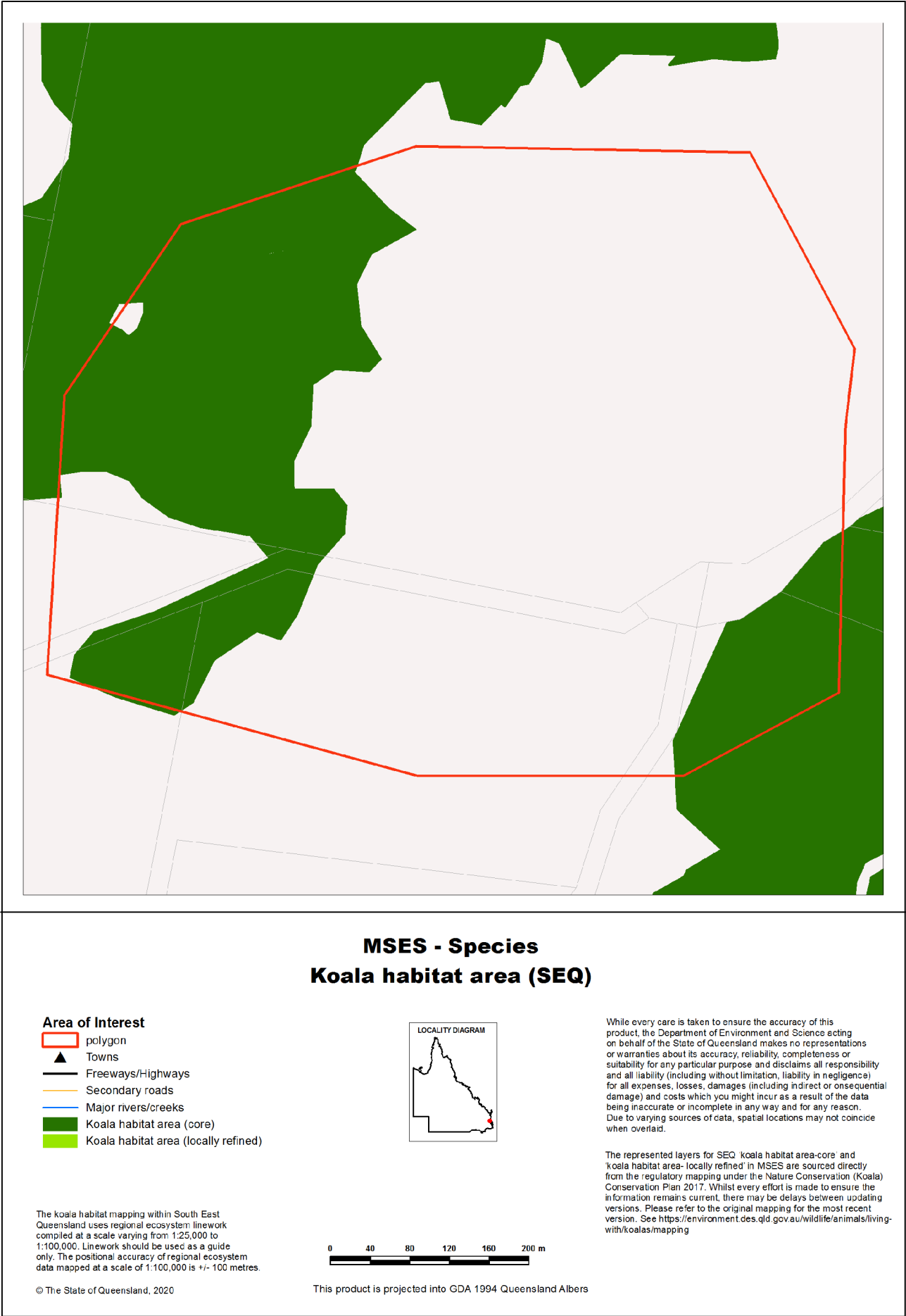
Map 2 - MSES - Wetlands and Waterways



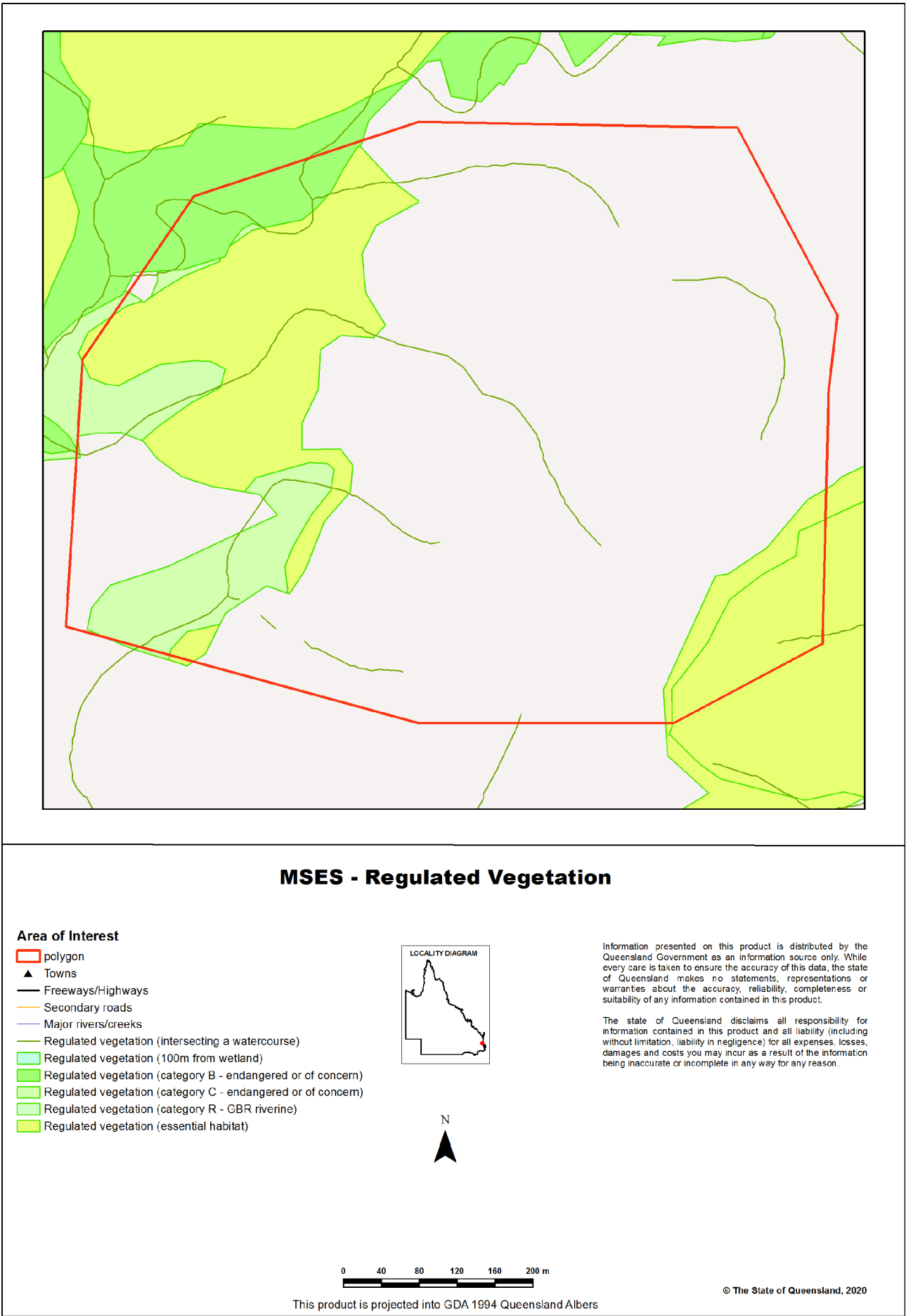
Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



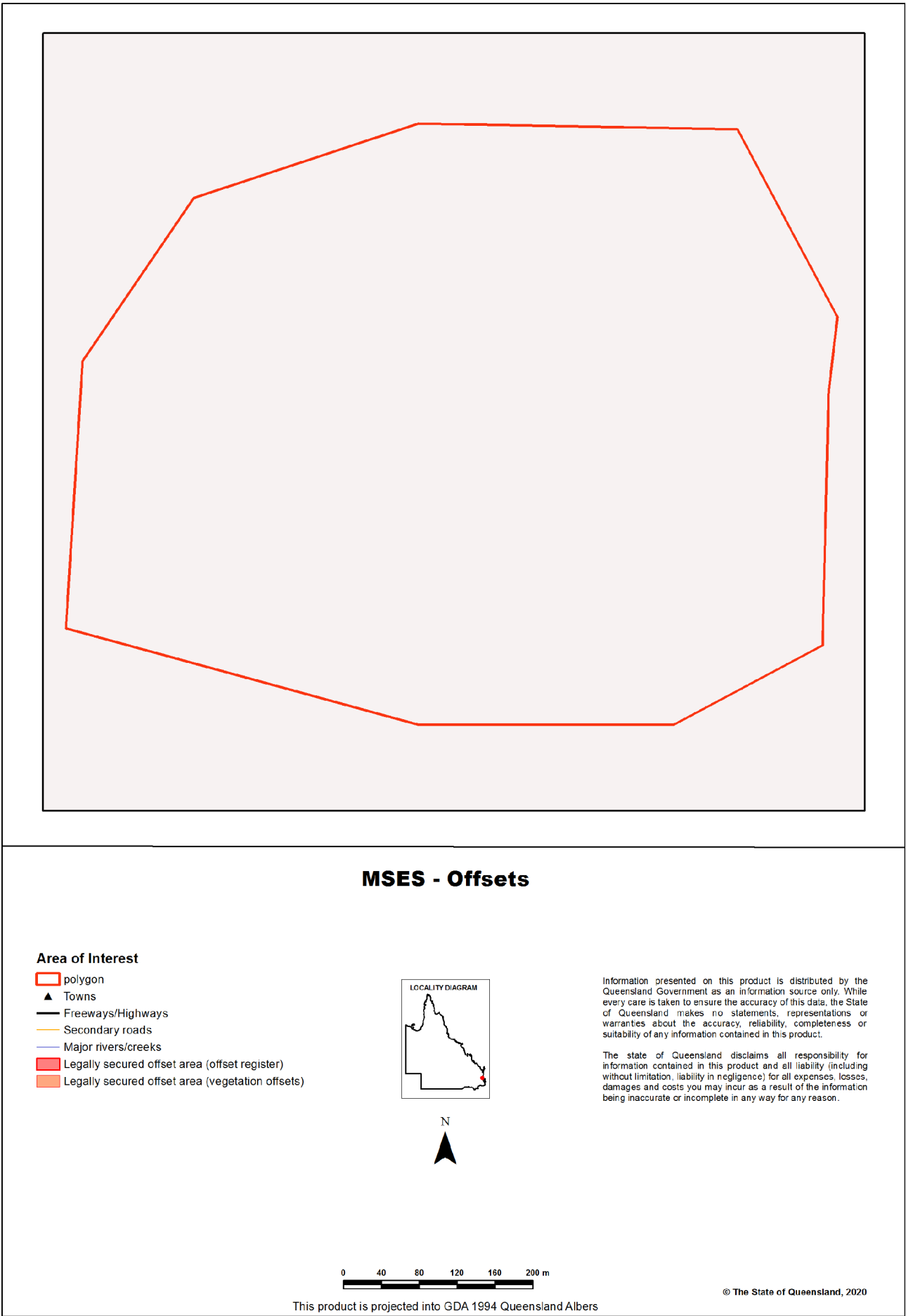
Map 3b - MSES - Species - Koala habitat area (SEQ)



Map 4 - MSES - Regulated Vegetation



Map 5 - MSES - Offset Areas



Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

<http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html> .

Appendix 2 - Source Data

The datasets listed below are available on request from:

<http://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

MSES layers	current QSpatial data (http://qspatial.information.qld.gov.au)
Protected Areas-Estates and Nature Refuges	- Protected areas of Queensland - Nature Refuges - Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water (multiple locations) intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 4, 2015) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DES
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DES	- Department of Environment and Science
EP Act	- <i>Environmental Protection Act 1994</i>
EPP	- Environmental Protection Policy
GDA94	- Geocentric Datum of Australia 1994
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- <i>Nature Conservation Act 1992</i>
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- <i>Vegetation Management Act 1999</i>

Appendix D.
Survey Photographs



Photo Plate 1. Site 1 – Elliott Trap



Photo Plate 2. Site 1 – Funnel/Pitfall Drift Fence Line



Photo Plate 3. Site 1 – Camera 12



Photo Plate 4. Site 1 – Camera 15



Photo Plate 5. Site 1 – Song Meter 1



Photo Plate 6. Site 1 – Harp Trap 1



Photo Plate 7. Site 2 – Camera 6



Photo Plate 8. Site 2 – Funnel/Pitfall Drift Fence Line



Photo Plate 9. Site 2 – Elliott Trap



Photo Plate 10. Site 2 – Camera 5



Photo Plate 11. Habitat Stack 1 – Camera 14



Photo Plate 12. Habitat Stack 1 – Camera 3



Photo Plate 13. Habitat Stack 2 – Camera 1



Photo Plate 14. Habitat Stack 3 – Camera 18



Photo Plate 15. Habitat Stack 4 – Camera 10



Photo Plate 16. Habitat Stack 4 – Camera 7



Photo Plate 17. Song Meter 2



Photo Plate 18. Additional Camera 9



Photo Plate 19. Additional Camera 4



Photo Plate 20. Additional Camera 13



Photo Plate 21. Additional Camera 20 (Survey 2 only)



Photo Plate 22. Additional Camera 8 (Survey 2 only)



Photo Plate 23. BAR Set-up (BAR 2)

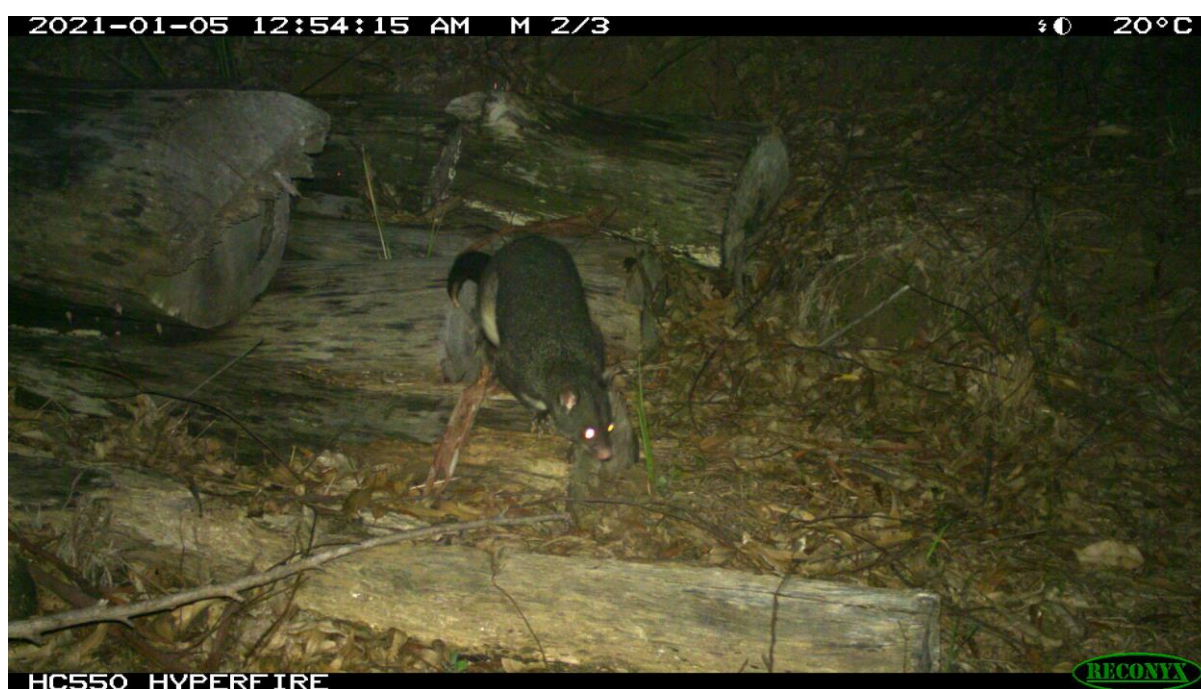


Photo Plate 24. Short-eared Brushtail Possum (*Trichosurus caninus*) on HS2 (Survey 2)



Photo Plate 25. Common Brushtail Possum (*Trichosurus vulpecula*) captured at Cam 9 (Survey 2)



Photo Plate 26. Koala Capture on Camera 5 on 16 May 2020 (Survey 1)



Photo Plate 27. Swamp Wallaby (*Wallabia bicolor*)



Photo Plate 28. Red-necked Wallaby (*Macropus rufogriseus*)



Photo Plate 29. Echidna Foraging on Habitat Stack 2 (Survey 1)



Photo Plate 30. Long-nosed Bandicoot captured around Habitat Stack 4 (Survey 1)



Photo Plate 31. Northern Brown Bandicoot observed on Camera 5, Site 2 (Survey 2)



Photo Plate 32. Lace Monitor Utilising Habitat Stack 3 (Survey 1)



Photo Plate 33. Fox captured at Habitat Stack 2 (Survey 1)

Appendix E.

Acoustic Bat Reports



Microbat Call Identification Report

Prepared for ("Client"):	Future-plus Environmental
Survey location/project name:	London Creek Env. Reserve
Survey dates:	May 2020
Client project reference:	5284
Job no.:	FPE-2001
Report date:	19 June 2020

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Methods

Data received

Balance! Environmental received 2188 full-spectrum (WAV) files recorded with two Song Meter SM3 bat detectors (Wildlife Acoustics, Maynard MA, USA). Each unit was deployed at a separate site (both at dams), with Site 1 sampled for 14 consecutive nights (12-26 May 2020) and Site 2 sampled for seven consecutive nights.

Call analysis and identification

The job request sought analysis for the first five survey nights (12th-16th May, inclusive) on each detector; however, the complete dataset was processed to ensure any “rare” calls were detected and identified in the analysis.

The data were processed in three steps using *Anabat Insight* (Version 1.9.3; Titley Scientific, Brisbane):

1. All WAV files were scanned automatically with a generic noise filter to separate files containing only non-bat background noise from those with potentially identifiable bat calls.
2. Files that passed the noise filter (*i.e.* contained bat calls) were then processed through a Decision Tree analysis to group calls with similar pulse characteristics (e.g. characteristic frequency, slope, duration) and apply tentative species labels.
3. Each “species” group was reviewed manually to verify and/or correct species labels by comparing call spectrograms and derived metrics with those of regionally relevant reference calls and published call descriptions (Reinhold *et al.* 2001; Pennay *et al.* 2004). Where calls could not be attributed unequivocally to a single species (*i.e.* “unresolved calls”), they were assigned to multi-species groups.

Species attribution was also guided by considering probability of occurrence based on published distributional information (Churchill 2008; van Dyck *et al.* 2013) and/or records held in Atlas of Living Australia (<http://www.ala.org.au>).

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

Noise filtration initially excluded over 50% of the WAV files; however, manual review of the excluded files found that many contained low-amplitude bat calls that were identifiable. The “noise” files were subsequently processed manually, with identifiable calls found in all but 172 of the WAV files. In total, some 2014 individual bat calls were identified. Almost 93% (1867) of the calls were reliably identified to individual species, while the other 147 unresolved calls each potentially represented two or more species.

At least 14 and up to 17 species were detected during the survey (see **Table 1**). Thirteen call types were reliably attributed to 12 unique species plus the *Nyctophilus* genus, of which three species potentially occur in the study area (*N. bifax*, *N. geoffroyi* & *N. gouldi*). Another two “unresolved” call types potentially indicated the presence of two additional species (*Scotorepens orion* and either *Chalinolobus nigrogriseus* or *Scotorepens greyii*).

More than 60% (1232) of the recorded calls were from *Myotis macropus*, which was active at both dams but much more so at Site 2 (average of 173 calls per detector-night *cf.* <2 calls/d-n at Site 1) (see **Table 1**). If the *M. macropus* calls are excluded from the Site totals, the average activity level of all other bats, quantified as mean number of calls recorded per detector night, was twice as high at Site 2 as at Site 1.

Example spectrograms for each identified species appear in **Appendix 1**.

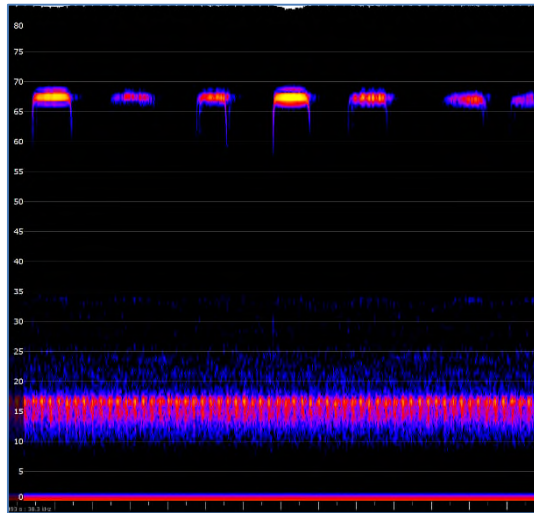
Table 1 Bats recorded in the London Creek Environmental Reserve, 12-26 May 2020.

	SITE-1 (14 detector-nights)		SITE-2 (7 detector-nights)	
	total calls	mean calls/d-n	total calls	mean calls/d-n
Positively identified calls				
<i>Rhinolophus megaphyllus</i>	78	5.57	32	4.57
<i>Chalinolobus gouldii</i>	16	1.14	19	2.71
<i>Chalinolobus morio</i>	0	0.00	7	1.00
<i>Myotis macropus</i>	22	1.57	1210	172.86
<i>Nyctophilus</i> sp.	26	1.86	2	0.29
<i>Scoteanax rueppellii</i>	1	0.07	7	1.00
<i>Vespadelus pumilus</i>	16	1.14	83	11.86
<i>Miniopterus australis</i>	46	3.29	27	3.86
<i>Miniopterus orianae</i>	1	0.07	2	0.29
<i>Austronomus australis</i>	83	5.93	39	5.57
<i>Micronomus norfolkensis</i>	7	0.50	31	4.43
<i>Ozimops lumsdenae</i>	0	0.00	8	1.14
<i>Ozimops ridei</i>	54	3.86	50	7.14
Unresolved calls				
<i>Chalinolobus nigrogriseus</i> / <i>Scotorepens</i> sp.	1	0.07	0	0.00
<i>S. rueppellii</i> / <i>Scotorepens orion</i>	0	0.00	9	1.29
<i>V. pumilus</i> / <i>M. australis</i>	1	0.07	0	0.00
<i>O. ridei</i> / <i>M. norfolkensis</i>	6	0.43	29	4.14
<i>O. ridei</i> / <i>C. gouldii</i>	71	5.07	30	4.29
Site total	351	25.07	1553	221.86

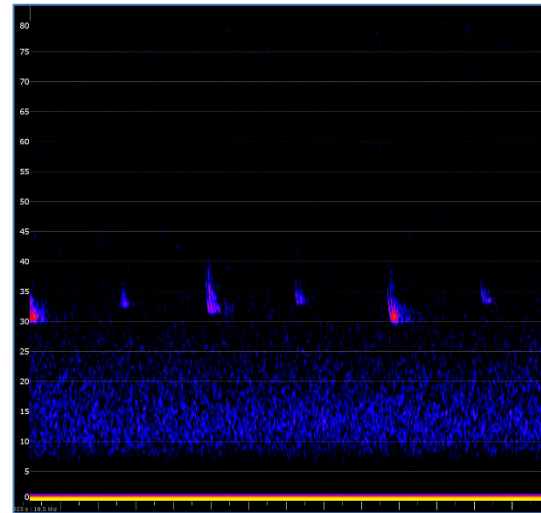
References

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- Jackson, S. and Groves, C. (2015). *Taxonomy of Australian Mammals*. CSIRO Publishing, Melbourne.
- Pennay, M., Law, B. and Reinhold, L. (2004). *Bat Calls of New South Wales*. Department of Environment and Conservation, Hurstville.
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- 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.

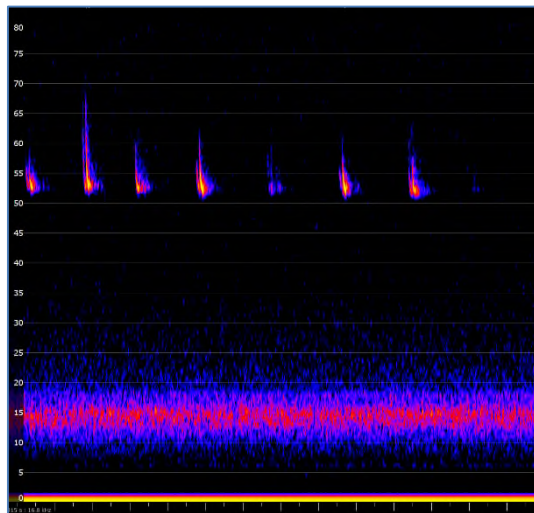
Appendix 1 Representative bat-calls recorded in the London Creek Environmental Reserve.
True-time display; time-scale (x-axis) = 25ms per tick



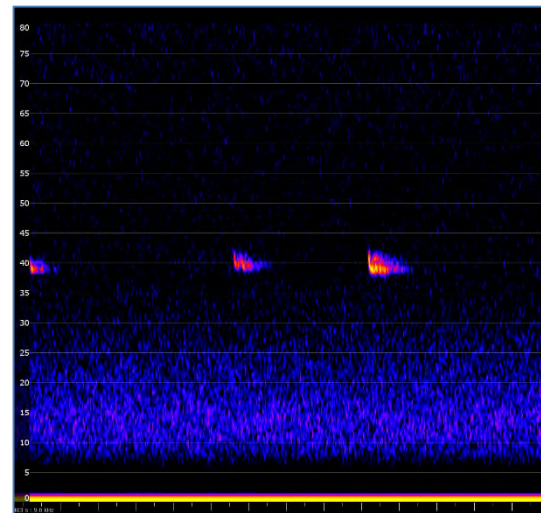
Rhinolophus megaphyllus



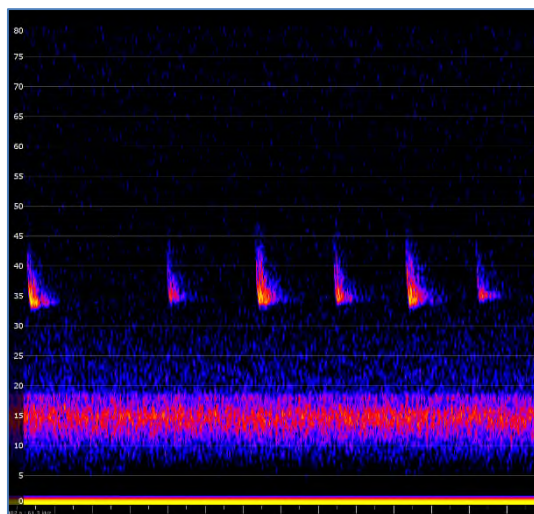
Chalinolobus gouldii



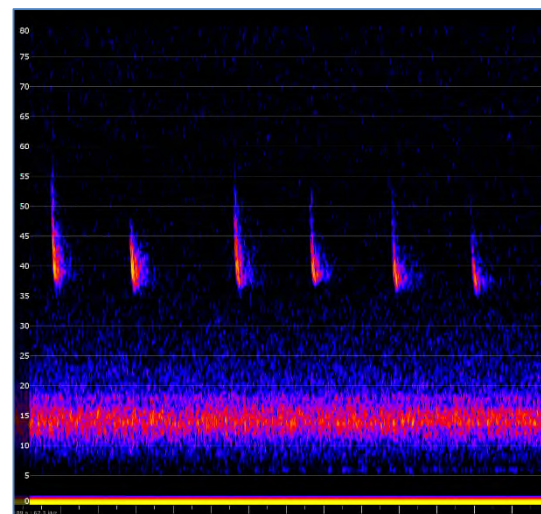
Chalinolobus morio



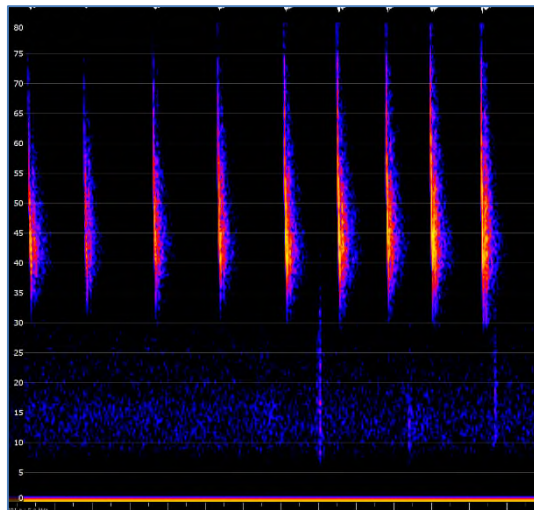
Chalinolobus nigrogriseus or *Scotorepens greyii*



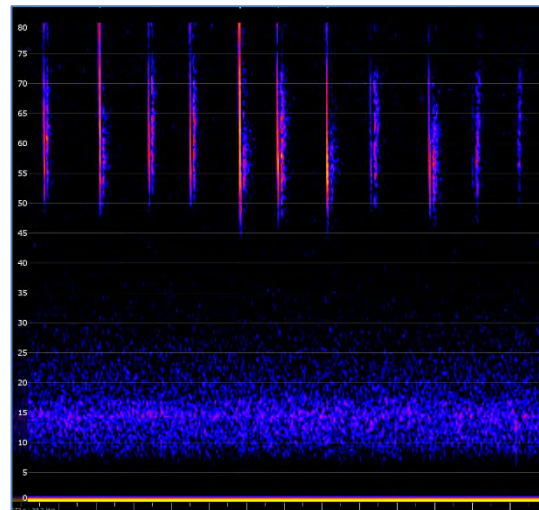
Scoteanax rueppellii



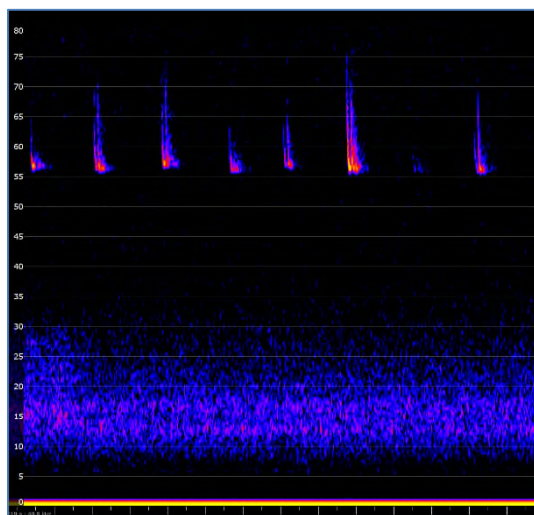
S. rueppellii / *Scotorepens orion*



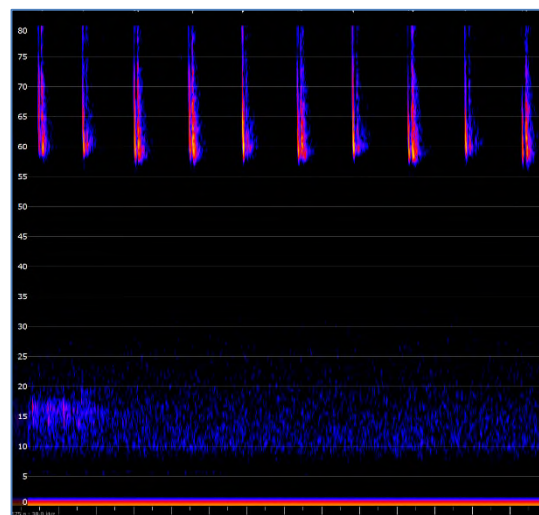
Myotis macropus



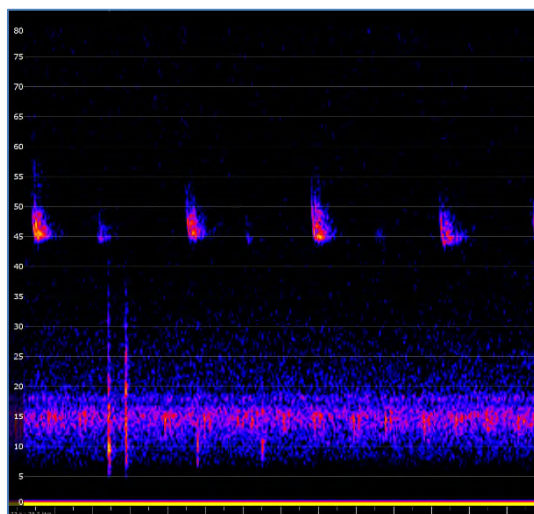
Nyctophilus sp.



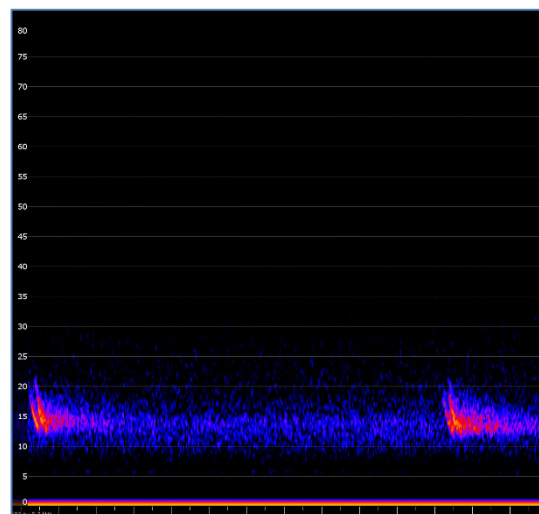
Vespadelus pumilus



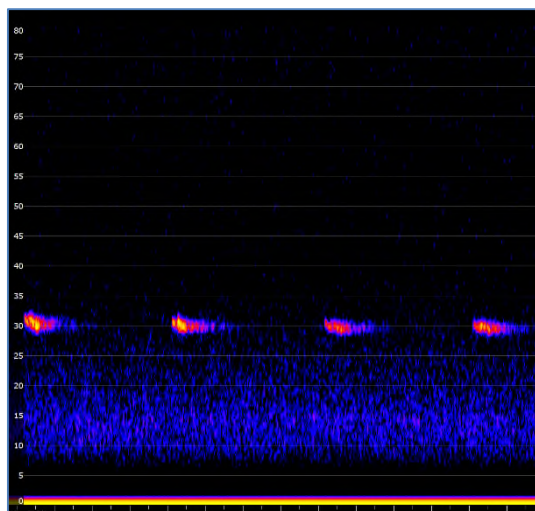
Miniopterus australis



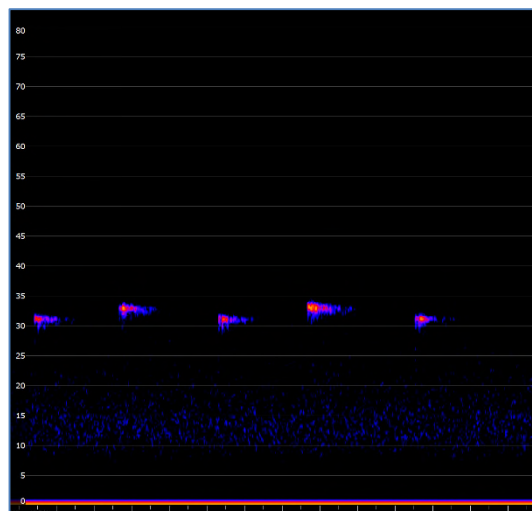
Miniopterus orianae



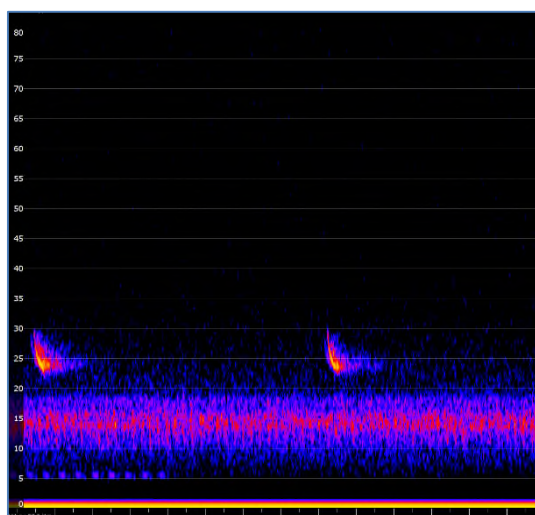
Austronomus australis



Ozimops ridei



Micronomus norfolkensis



Ozimops lumsdenae



Microbat Call Identification Report

Prepared for ("Client"):	Future-plus Environmental
Survey location/project name:	London Creek Env. Reserve
Survey dates:	7-12 December 2020
Client project reference:	5284
Job no.:	FPE-2002
Report date:	15 February 2021

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Methods

Data received

Balance! Environmental received 2221 full-spectrum (WAV) files recorded over five consecutive nights (7th – 11th December 2020) at two separate sites, using two Song Meter SM3 bat detectors (Wildlife Acoustics, Maynard MA, USA).

Call analysis and identification

The data were processed in several steps, using *Anabat Insight* (Version 1.9.7; Titley Scientific, Brisbane) and *Kaleidoscope Pro* (Version 5.3.6; Wildlife Acoustics, Maynard MA, USA):

1. *Insight* was used to scan all WAV files with a generic noise filter to extract files containing potentially identifiable bat calls.
2. Files that passed the noise filter (*i.e.* contained bat calls) were then processed through a Decision Tree analysis to group calls with similar pulse characteristics (e.g. characteristic frequency, slope, duration) and apply tentative species labels.
3. Each “species” group was reviewed manually to verify and/or correct species labels by comparing call spectrograms and derived metrics with those of regionally relevant reference calls and published call descriptions (Reinhold *et al.* 2001; Pennay *et al.* 2004). Where calls could not be attributed unequivocally to a single species (*i.e.* “unresolved calls”), they were assigned to multi-species groups.
4. A random selection of the files that failed the initial noise filter were reviewed manually and found to contain numerous low-amplitude bat calls. Consequently, these files were run through a *Kaleidoscope* Cluster Analysis with “advanced signal enhancement” enabled. Cluster group spectrograms were then reviewed in *Kaleidoscope* and species labels assigned as per Step 3.

Species attribution was also guided by considering probability of occurrence based on published distributional information (Churchill 2008; van Dyck *et al.* 2013) and/or records held in Atlas of Living Australia (<http://www.ala.org.au>).

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

Some 1560 of the WAV files were found to contain 1590 identifiable bat calls, with 661 files consisting only of non-bat background noise. Almost 72% (1142) of the calls were reliably identified to individual species, while the other 448 unresolved calls each potentially represented two or more species (see **Table 1**).

At least 14 and up to 18 species were detected during the survey. Twelve call types were positively attributed to 11 unique species plus the *Nyctophilus* genus (see upper section of **Table 1**). Up to three *Nyctophilus* species potentially occur in the study area: *N. bifax*; *N. geoffroyi*; and *N. gouldi*.

Of the six multi-species groups to which “unresolved” calls were allocated (**Table 1**, bottom portion), four represented species that were otherwise positively identified from more definitive calls. The other two “unresolved” call types each potentially represent two additional species: *Scotorepens orion*/*Scoteanax rueppellii* and *Scotorepens greyii*/*Chalinolobus nigrogriseus*.

Example spectrograms for each identified species appear in **Appendix 1**.

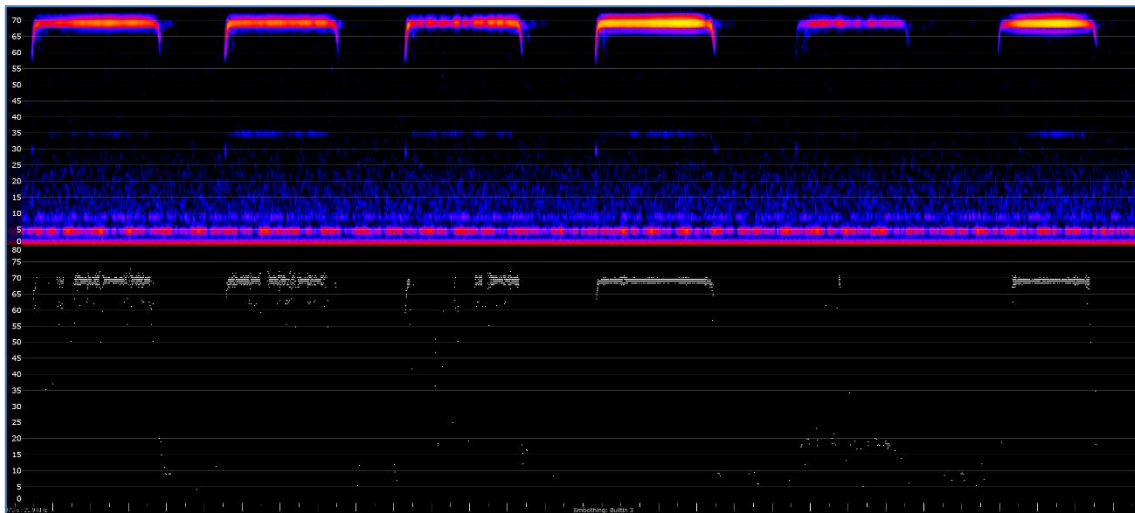
Table 1 Bats recorded in the London Creek Environmental Reserve, 7-12 December 2020.

Site:	SITE-1	SITE-2	Species Total
Positively identified calls			
<i>Rhinolophus megaphyllus</i>	9	1	10
<i>Chalinolobus gouldii</i>	48	87	135
<i>Chalinolobus morio</i>		7	7
<i>Myotis macropus</i>	13	125	138
<i>Nyctophilus</i> sp.	5		5
<i>Vespadelus pumilus</i>	183	299	482
<i>Miniopterus australis</i>	4	1	5
<i>Austronomus australis</i>	53	9	62
<i>Micronomus norfolkensis</i>	34	98	132
<i>Ozimops lumsdenae</i>	14	24	38
<i>Ozimops ridei</i>	43	112	155
Unresolved calls			
<i>C. gouldii</i> / <i>O. ridei</i>	58	98	156
<i>O. ridei</i> / <i>M. norfolkensis</i>	26	167	193
<i>Scotorepens greyii</i> / <i>Chalinolobus nigrogriseus</i>		4	4
<i>Scotorepens orion</i> / <i>Scoteanax rueppellii</i>	8	65	73
<i>V. pumilus</i> / <i>C. morio</i>	3		3
<i>V. pumilus</i> / <i>M. australis</i>	19	11	30
Site Total	520	1108	1628

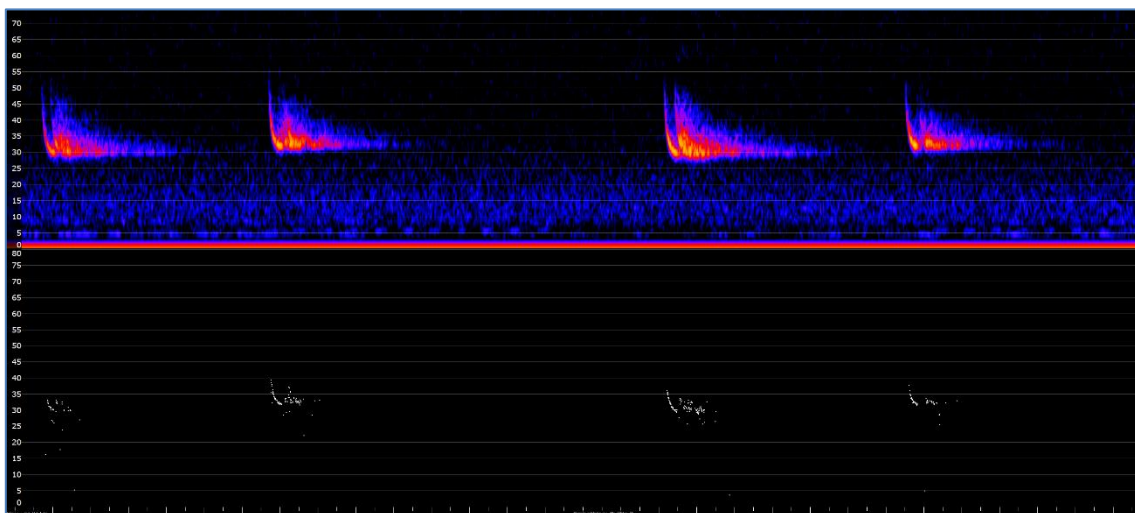
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- Jackson, S. and Groves, C. (2015). *Taxonomy of Australian Mammals*. CSIRO Publishing, Melbourne.
- Pennay, M., Law, B. and Reinhold, L. (2004). *Bat Calls of New South Wales*. Department of Environment and Conservation, Hurstville.
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- 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.
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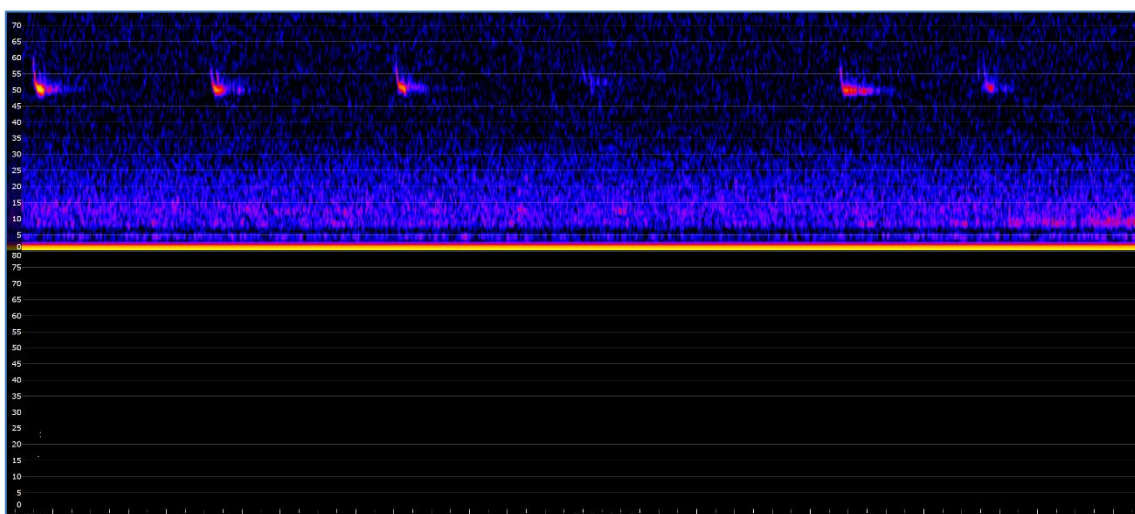
Appendix 1 Representative bat-calls recorded in the London Creek Environmental Reserve.
Each image shows spectrogram (top) + zero-crossing (bottom) - note some calls too weak for ZC
True-time display; time-scale (x-axis) = 10ms per tick



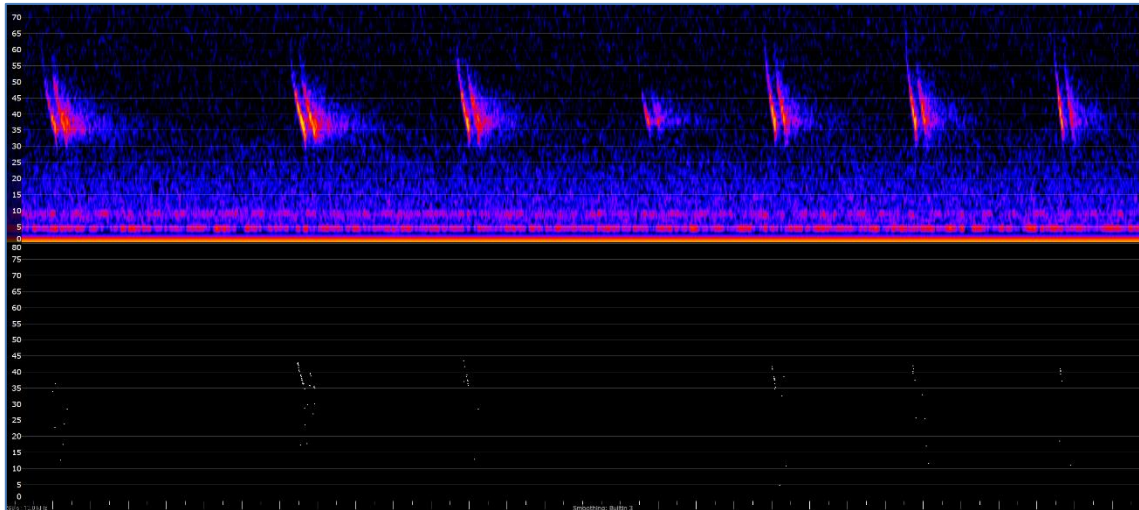
Rhinolophus megaphyllus



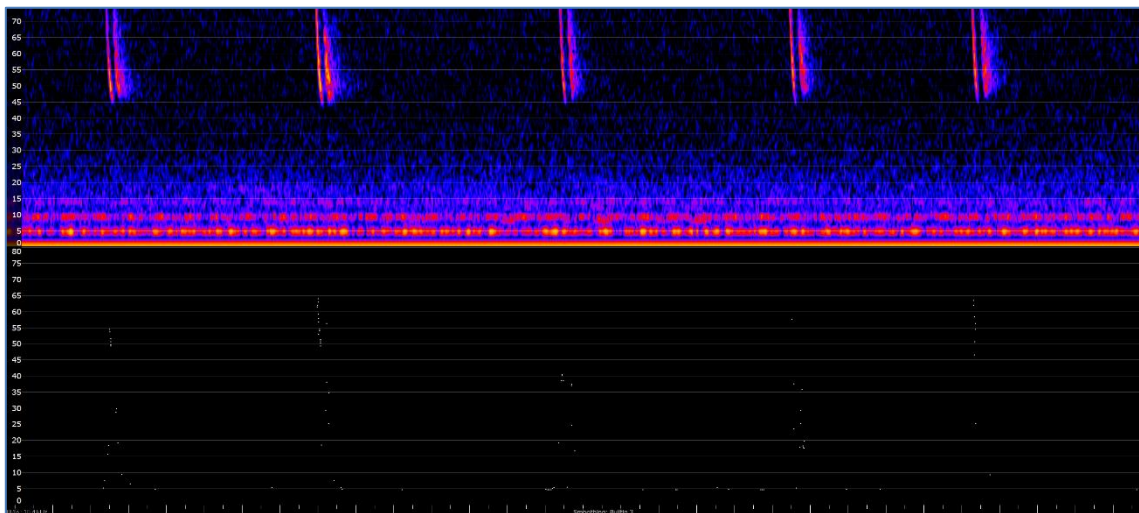
Chalinolobus gouldii



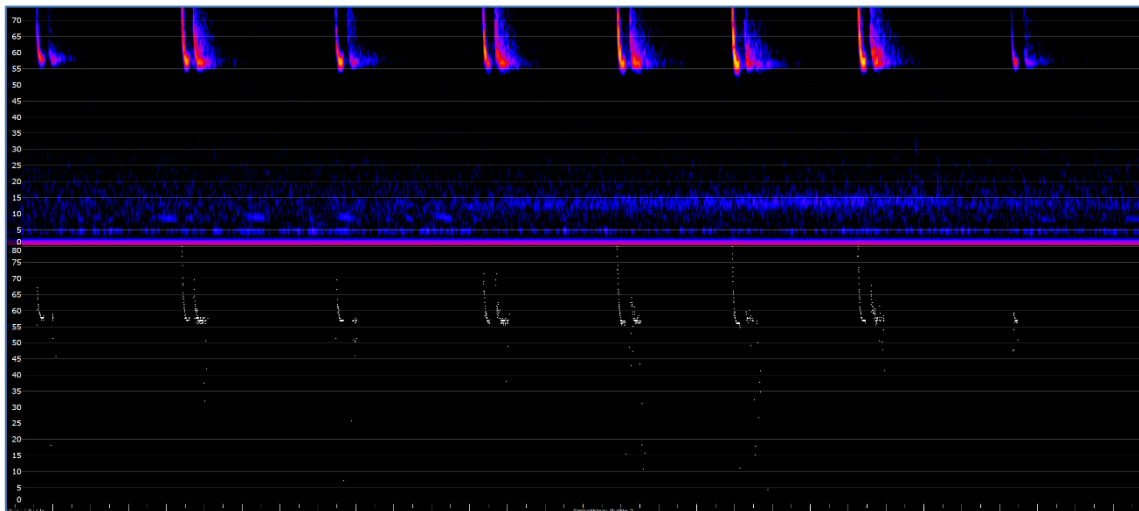
Chalinolobus morio



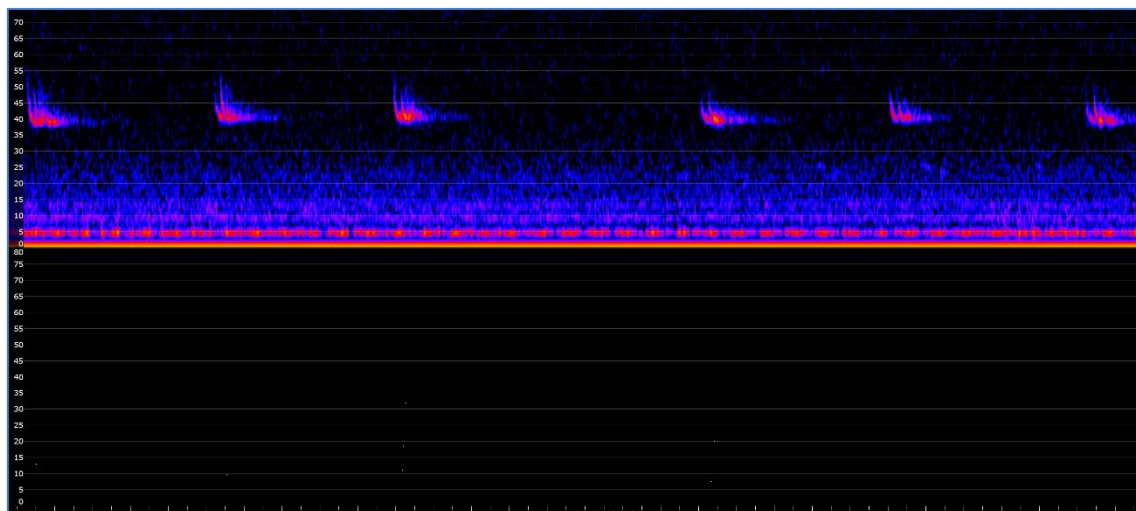
Myotis macropus



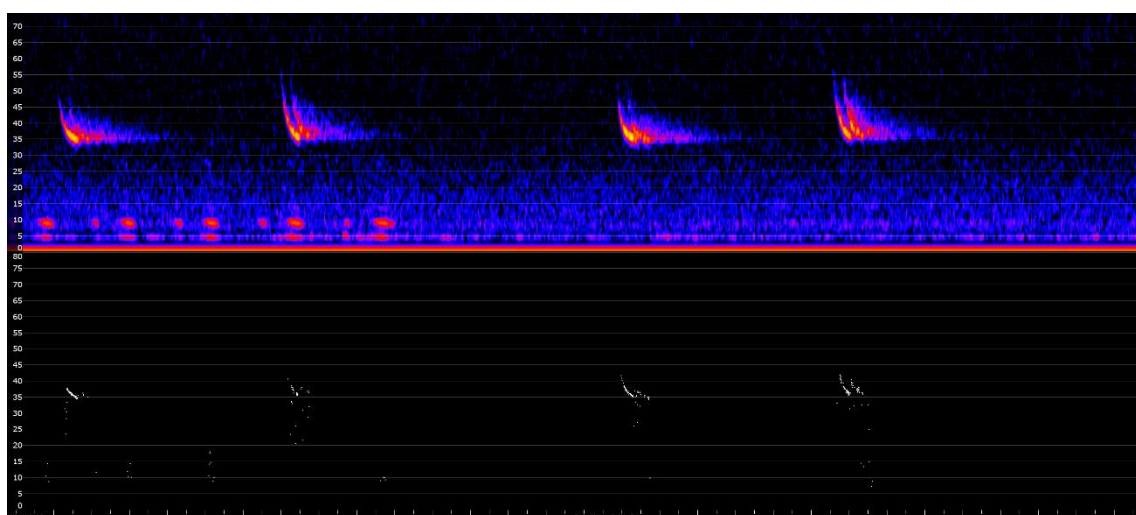
Nyctophilus sp.



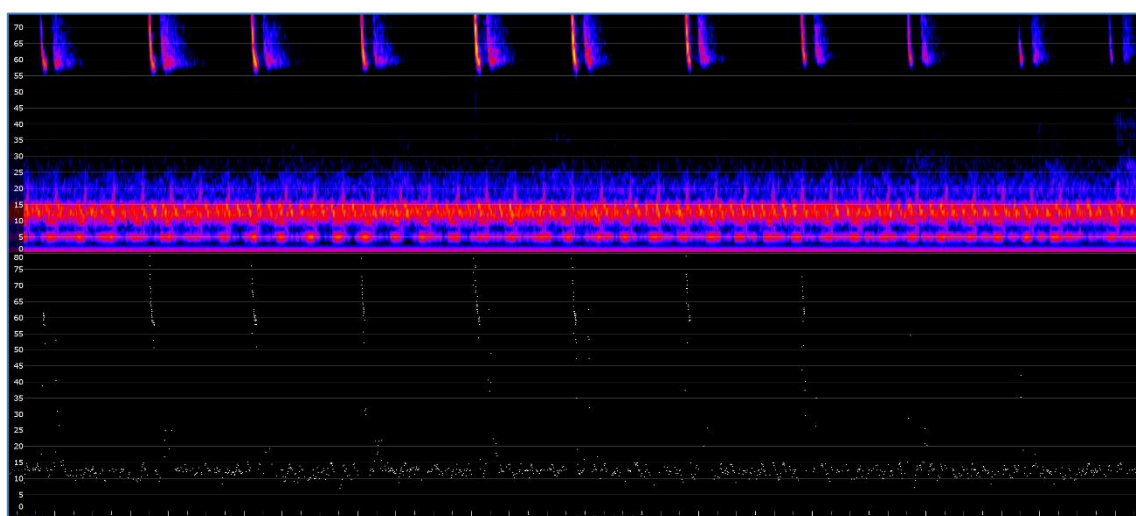
Vespadelus pumilus



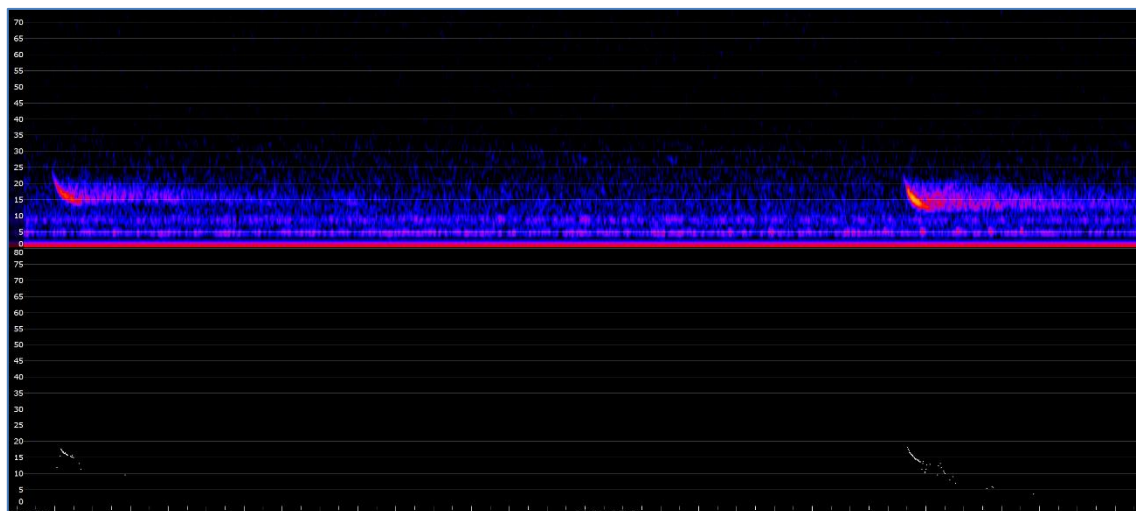
Scotorepens greyii / *Chalinolobus nigrogriseus*



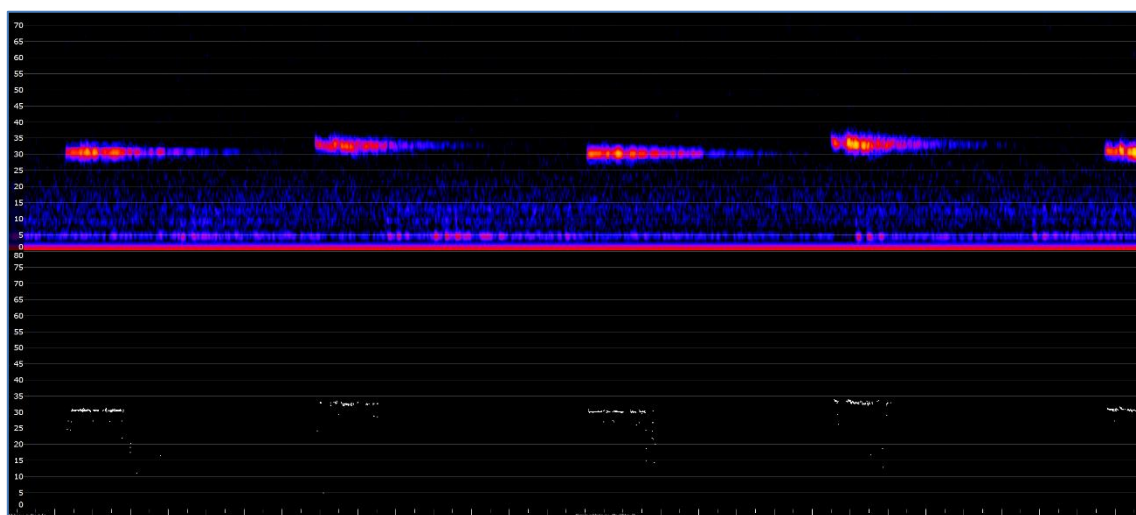
Scotorepens orion / *Scoteanax rueppellii*



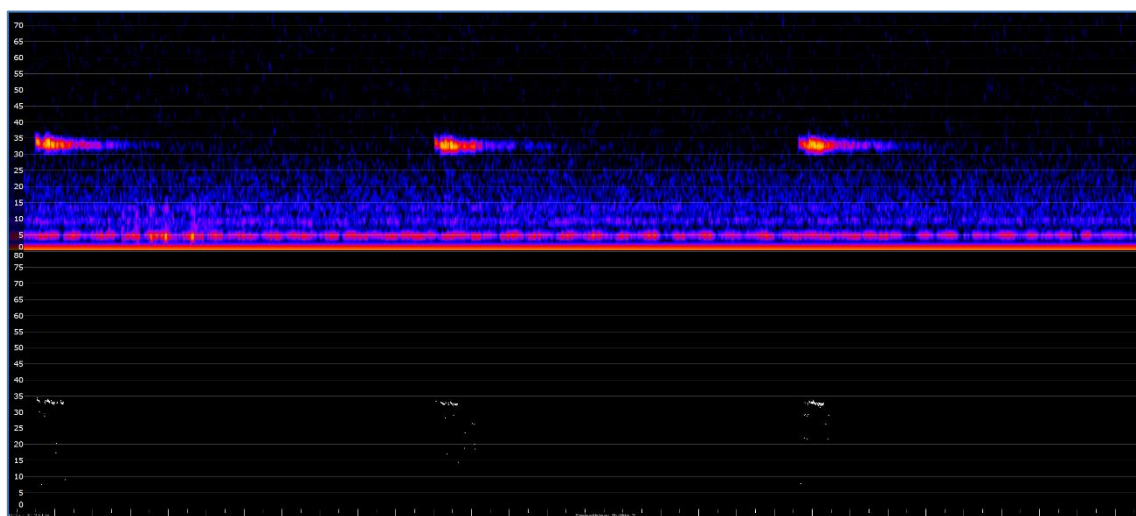
Miniopterus australis



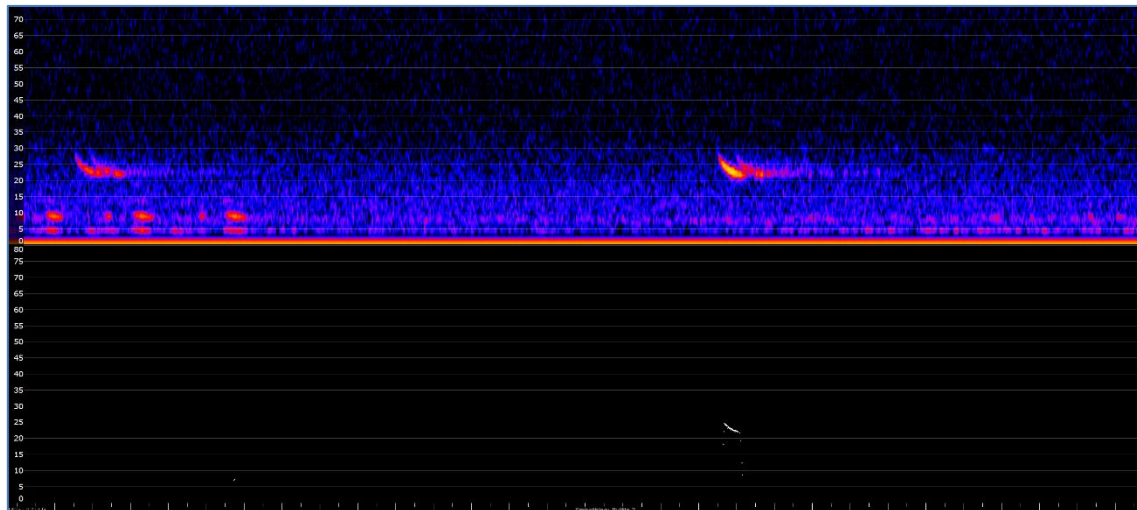
Austronomus australis



Micronomus norfolkensis



Ozimops ridei



Ozimops lumsdenae