

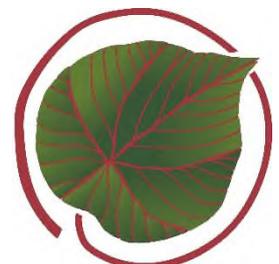
**Ben Bennett Bushland Park
(745CG6381, 525CG813466)
Regeneration Works Plan**



January 2020

Review Date January 2025

For Sunshine Coast Council



**SOUTHEAST
LAND REPAIR**

By Chad Oliver

South East Land Repair

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Version Control

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1 – Introduction

Ben Bennett Bushland Park encompasses 21.9 hectares of bushland within the western portion of the Caloundra urban footprint. Bordered by Nicklin Way directly to the west, Queen Street to the north, Caloundra High School to the east and Arthur Street to the south, the reserve does not form direct connectivity with other nearby bushland areas. However, the reserve does contain diverse bushland types in mostly ‘very good’ condition. Forest types include: open Tallowwood (*Eucalyptus microcorys*) and Blackbutt (*Eucalyptus pilularis*) wet sclerophyll; diverse *Eucalyptus racemosa* woodland and heath; diverse wet heath mixed with *Melaleuca quinquenervia* and *Eucalyptus robusta* wetland; and riparian rainforest with large canopy emergents, a good mid-storey and good locally native recruitment.

In addition to consisting of crucial flora and fauna habitat, Ben Bennett Bushland Park is also an important bushland green space in an area of rapid urbanisation. Park facilities include a car park along Queen Street, mown recreation areas with picnic shelters, a toilet block and both paved and un-sealed walkways with interpretive signs.

Fire management, both as a result of arson and planned, has been a focus of overall bushland management strategy in the reserve. Fires, whether lit by arsonists, as a natural phenomenon or for ecological purposes, have a potentially large impact on park user safety, regeneration of flora species and/or habitat for different fauna species. For example, many of the parks protected frog species need wet refuges during times of fire, highlighting the importance of minimising any negative impacts of unplanned fire events during droughts.

Given the incidence fire in the reserve, the pathways serve as useful fire breaks. However, these pathways also increase the spread of weeds throughout the reserve, posing a challenge for future management activities. In particular, the paved section of the westernmost trail leaches relatively nutrient rich alkaline nutrient into nearby reserve acidic soils, favouring the germination and growth of exotic groundcover species.

Most of the sites various ecosystems are in very good condition. Most dangerous weed populations are concentrated along reserve boundaries and are under active management. Within the central ‘very good’ portions of the reserve, most of the known populations of threatening weeds have been treated, including gidee-gidee (*Abrus precatorius*), corky passionfruit (*Passiflora suberosa*), red silky oak (*Grevillea banksii*), mickey mouse plant (*Ochna serrulata*) and Indian hawthorne (*Raphiolepis indica*). However, relict populations of these weeds will continue to appear and should be the focus of weed management activities in the future.

2 – Site Information

Reserve	Ben Bennett Bushland Park
Other names	NA
Reserve classification (Year)	B1 – District – ‘Bushland Reserve’ Category
Locality	Ben Bennett Park Queen St, Caloundra, QLD 4551
Size (hectares)	21.9 Hectares
Boundary Length (metres)	2829 metres
Lot on plan	745CG6381, 525CG813466
Tenure	State of Queensland - Reserve for Park and Recreation Under Control of Council.
Purpose	Managed for Conservation
Electorate	Local Government: Division 5 State district: Glasshouse Federal division: Fisher
Catchment/ Sub-catchment	Pumicestone/ Pumicestone Passage Creeks
Geology & Soils	Land Zone 2 – Coastal sand dunes and beach ridges. Land Zone 3 - Alluvium along river and creek flats. Land Zone 9-10 – Undulating country on fine-grained sedimentary rocks.
Planning Reports	Flora assessment: Ben Bennett Bushland Park Flora Assessment 2011. Fauna assessment: Fauna survey Ben Bennett 2013-14 Fauna list Ben Bennett BOA 2009/2010 BOA: Ben Bennett BOA 2016 Ben Bennett BOA 2009/10 Regeneration Works Plan: No Management Plan: Ben Bennett Botanical Park Management Plan, June 2002. Cultural heritage search: No Statement of Management Intent: No Fire Management Plan: SCC Bushland Reserve Network Fire Management Guidelines, 2014, Statement of Fire Management Intent, Ben Bennett, 2012 Nature Refuge Agreement: No

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Key Management Information	<p>-Park areas in the north of the reserve include areas of mown grass, a toilet block, a recently constructed sewage effluent trap and picnic tables. Weed control in and along the periphery of these areas is a management priority.</p> <p>-Planned, unplanned and illegal fires have occurred in the park since 2007. Responding to the impacts of these fires is a management priority.</p> <p>-Pathways throughout the reserve serve as potential weed vectors. Pathways also serve as effective fire breaks for planned and unplanned fires.</p> <p>-Weed management in the reserve has been ongoing. Weed concentrations are highest along reserve boundaries, but scattered populations exist throughout central portions of the reserve, as well.</p> <p>-Plantings in the central rainforest section undertaken years ago included non-local species, such as: golden penda (<i>Xanthostemon chrysanthus</i>), Brisbane golden wattle (<i>Acacia fimbriata</i>), red silky oak (<i>Grevillea banksii</i>), ivory curl (<i>Buckinghamia celissima</i>) and Queensland wattle (<i>Acacia podalyriifolia</i>).</p>		
Regional Ecosystems mapped by the Queensland Herbarium (VMA and Biodiversity Status)	Mapped Regional Ecosystems	VM Status	Biodiversity Status
	RE 12.2.7 – <i>Melaleuca quinquenervia</i> or rarely <i>M. dealbata</i> open forest on sand plains.	Least Concern	No Concern at Present
	RE 12.2.12 – Closed heath on seasonally waterlogged sand plains.	Of Concern	Of Concern
	RE 12.3.1 – Gallery rainforest (notophyll vine forest) on alluvial plains.	Endangered	Endangered
	RE 12.9-10.14 – <i>Eucalyptus pilularis</i> tall open forest on sedimentary rocks.	Least Concern	No Concern at Present
	RE 12.9-10.17d – Open forest containing <i>Eucalyptus siderophloia</i> , <i>E. propinqua</i> or <i>E. major</i> , <i>Corymbia intermedia</i> .	Least Concern	No Concern at Present
Regional Ecosystems observed by Thomas (2011).	RE 12.3.1 – See above description.	Endangered	Endangered
	RE 12.3.4 – <i>Melaleuca quinquenervia</i> , <i>Eucalyptus robusta</i> open forest on or near coastal alluvial plains.	Of Concern	Of Concern
	RE 12.3.5 – <i>Melaleuca quinquenervia</i> open forest on coastal alluvium.	Least Concern	No Concern at Present
	RE 12.9/10.4 – <i>Eucalyptus racemosa</i> woodland on sedimentary rocks.	Least Concern	No Concern at Present
	RE 12.9/10.14 – See above description.	Least Concern	No Concern at Present
	RE 12.9/10.17– Open forest complex often with <i>Eucalyptus acmenoides</i> , <i>E. major</i> , <i>E. siderophloia</i> +/- <i>Corymbia citriodora</i> on sedimentary rocks.	Least Concern	No Concern at Present
	RE 12.9/10.17d – See above description.	Least Concern	No Concern at Present

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Observed Site Ecosystems	Ecosystems onsite are generally consistent with those identified by Regional Ecosystem mapping and Thomas (2011).
EPBC Act Threatened Ecological Community	Regional Ecosystem 12.2.12 – Closed heath on seasonally waterlogged sand plains – VMA and Biodiversity status classified as ‘Of Concern’. Regional Ecosystem 12.3.1 – Gallery rainforest (notophyll vine forest) on alluvial plains - VMA and Biodiversity status classified as ‘Endangered’. Regional Ecosystem 12.3.4 - <i>Melaleuca quinquenervia</i> , <i>Eucalyptus robusta</i> open forest on or near coastal alluvial plains – VMA and Biodiversity status classified as ‘Of Concern’.
Scheduled Species Present	Fauna: <i>Pteropus poliocephalus</i> – grey-headed flying fox. Vulnerable EPBC (1999). Aland, K. et al. (2014). <i>Calyptorhynchus lathami</i> – glossy black-cockatoo. Vulnerable NCA (1992). SCRC (2010-2018). <i>Allocaeusuarina</i> spp. noted in 2011 Management Considerations. Flora: <i>Pararistolochia praevenosa</i> – Richmond birdwing butterfly. Threatened NCA (1992). Thomas, G. (2011).
Current Offset Program/Plan	NA
SCC Contact details	Natural Areas Project Officer
Community Group Coordinator Contact details	No
Contractor Contact details	South East Land Repair

3 – Management Activities

Current Management 2019 - 2020

- (1) Environmental weed control in bushland areas, along pathways and along margins of parkland in north of site.
- (2) Fire management throughout the reserve.
- (3) Access/boundary maintenance.

Proposed Management Activities

- (1) Environmental weed control in bushland areas, along pathways and along margins of parkland in north of site.
- (2) Fire management throughout the reserve.
- (3) Access/boundary maintenance.

4 – Management Zones



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4.1 – Management Activities

Ben Bennett Bushland Park has been divided into 7 zones. Zones have been delineated based on shared ecosystem types; similarities in weed pressures; similarities of past and present fire regimes; location within the reserve; and access for future weed control. Natural resilience is generally very good across all systems. Management activities suggested in the table below include site sweeps, monitoring for fire hazards and targeted weed control in strategic areas.

Mgt Zone	Management Zone Description	Current BOA Condition Return to Good Bush Schedule	Management Activities	Priority
A 5.02 Ha	Zone A is composed of mature notophyll rainforest, mapped as Regional Ecosystem 12.3.1, 'Gallery rainforest (notophyll vine forest) on alluvial plains.' Most seedlings, saplings and canopy trees are local natives. However, some large trees, including hoop pine individuals (<i>Araucaria cunninghamii</i>), kaori pines (<i>Agathis robusta</i>) and ivory curl (<i>Buckinghamia celissima</i>) were erroneously planted at some time in the past. Small weed populations, including corky passionfruit (<i>Passiflora suberosa</i>), Indian hawthorne (<i>Raphiolepis indica</i>) and mickey mouse plant (<i>Ochna serrulata</i>) have been treated in the past. Given the seed viability of these weeds, their eradication will continue to be a management priority for the near future.	Very Good 5 Years: Year 1-5 - Frequent sweeps	-Frequent sweeps of the zone to check for reshooting weeds, including corky passionfruit (<i>Passiflora suberosa</i>), Indian hawthorne (<i>Raphiolepis indica</i>) and mickey mouse plant (<i>Ochna serrulata</i>). -Monitoring and treatment of exotic grasses along pathways	High
B 2.83 Ha	Zone B forms the northern boundary of the reserve along Queen Street. A paved walkway parallel to Queen street stretches from the NW boundary of the reserve to the car park in the eastern portion of Zone B. In addition to this car park, the eastern portion of the zone includes a mown recreation area with picnic benches, a toilet block and large grassy patches underneath widely spaced <i>Eucalyptus racemosa</i> individuals. Sewage effluent pipework has been laid recently in a fenced-off area adjacent to the toilet block. It has been revegetated strategically with sedges and plants chosen to help filter possibly contaminated water.	Very Good, Nil 5 Years: Year 1-5 – Frequent sweeps Ongoing: Given high human usage, weed control and monitoring will be an indefinite priority.	-Handweed landscaped beds between car park and recreation area. -Control of legumes and panic (<i>Megathyrsus maximus var. pubiglumis</i>) within regrowth areas directly to east of toilet block. -Exotic grass control along eastern boundary. -Sweeps along NW boundary, targeting any remaining gidee-gidee (<i>Abrus precatorius</i>), corky passionfruit (<i>Passiflora suberosa</i>) and red silky oak (<i>Grevillea banksia</i>). -Monitoring and treatment of exotic grasses along pathways	High
C 1.71 Ha	Zone C consists of mature and regrowth mixed rainforest and wet sclerophyll. The interior is in relatively good condition with good recruitment of native shrubs, vines, trees and groundcovers. The southern and western boundaries are exposed to higher light levels allowing for weed penetration into the interior of the reserve. An artificial drainage ditch running along the northern and eastern boundaries serves as a weed vector, particularly along the easement	Moderate, Good, Very Good 5 years: Year 1-2 – Intensive management along western and southern areas where works have already been initiated.	-Sweeps through 'very good' areas targeting large woody weeds. -Continuation of current weed management works along southern and western boundary. -Vine and exotic grass control along artificial drainage ditch on northern and eastern boundary.	High

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	to the north where mile-a-minute (<i>Ipomoea cairica</i>) populations are heaviest. The high edge-to-core ratio of the bushland area surrounding the extended segment in the NW of the zone will necessitate ongoing maintenance for the foreseeable future.	Year 3-5 – Exotic grass and vine control along northern boundary. Years 3 -5 – Maintenance, monitoring throughout interior of zone.		
D 3.08 Ha	Zone D includes mixed woodland and <i>Eucalyptus pilularis</i> sclerophyll in the western boundary of the reserve. A paved pathway extends from the north of the site to the south. Leaching from the alkaline concrete during rains encourages exotic grass growth in normally acidic soils along the path edges. Exotic grasses, some vine weeds and a small population of Singapore daisy (<i>Sphagneticola trilobata</i>) are present along the power easement in the southern portion of the zone. The bushland in the southwest of the zone is comprised primarily of good woodland. However, given the area's isolation from other tracts of bushland, woody weeds, including umbrella trees (<i>Schefflera actinophylla</i>), cocos palms (<i>Syagrus romanzoffiana</i>) and star apple (<i>Chrysophyllum cainito</i>) have begun to establish in the understory.	Very Good, Good, Nil 5 Years: Years 1-5 – Sweeps along western boundary. Years 1-5 – Targeted weed control in southern section.	-Sweeps along western boundary to prevent re-establishment of any gidee-gidee (<i>Abrus precatorius</i>), Corky Passionfruit (<i>Abrus precatorius</i>), Indian hawthorne (<i>Raphiolepis indica</i>) or red silky oak (<i>Grevillea banksii</i>). -Work along edges of power easement to limit penetration of groundcover weeds into interior of the reserve to the north or south. -Woody weed control in isolated southern block, targeting umbrella trees (<i>Schefflera actinophylla</i>), cocos palms (<i>Syagrus romanzoffiana</i>) and star apple (<i>Chrysophyllum cainito</i>). -Monitoring and treatment of exotic grasses along pathways	Medium
E 2.36 Ha	Zone E, forming the south east of the reserve, is composed of mixed <i>Melaleuca quinquinervia</i> woodland and diverse heath in mostly good condition. Illegal paths lead from the north of the zone to a recreation area where rubbish has been discarded. Fires have been illegally lit in the northern portion of the zone, impacting resilience. Hazard reduction burns have also been lit in all other areas. An illegal N/S path parallels the eastern boundary of the reserve. An artificial mound has been constructed along the southern boundary of the reserve, impacting hydrology in the reserve. Weed populations along this boundary, as well as the western boundary where there is a walking path, are greater than in other areas of the reserve. A small population of <i>Lomandra multiflora</i> showing atypical growth forms was collected from the NW of Zone E and sent to the Queensland herbarium for analysis. The specimen is being assessed as a new subspecies.	Very Good 5 Years: Years 1-2 – Frequent weed sweeps along all boundaries. Years 3-5 – Maintenance, monitoring throughout zone.	-Frequent sweeps for exotic grasses (<i>Andropogon virginicus</i> , <i>Urochloa mutica</i>) and other weeds (<i>Tephrosia glomeruliflora</i>) along southern, western and northern boundary. -Fire reduction burns to prevent potential for arsonist fire. -Monitor condition and status of <i>Lomandra multiflora</i> subspecies.	Medium

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<p>F 4.48 Ha</p>	<p>Zone F is characterised by open <i>Eucalyptus racemosa</i> woodland with diverse heath elements in the understory. An area of past establishment of dense <i>Grevillea banksii</i> in the central part of the has been treated recently. Some of these regrowth areas have been replaced by densely clustered ‘whipstick’ <i>Allocasuarina littoralis</i> stands. A persistent population of <i>Cyperus proliifer</i> is present in a small inundated sedgeland in the SW of the zone. During dry times when soil is exposed in this area, exotic grasses can colonise. In the southeast of the zone an area that drains high fertility soils to the east of the reserve boundary has been historically populated by exotic grasses, including broad-leaved paspalum (<i>Paspalum mandiocanum</i>) and vasey grass (<i>Paspalum urvillei</i>). Fires have recently extended into the southern portions of zone F.</p>	<p>Moderate, Good, Very Good</p> <p>5 Years: Year 1-2 – Eradicate <i>Cyperus proliifer</i> population in sedgeland, either manually or using foliar spray. Years 1-5 – Monitoring and control of exotic grasses along paths.</p>	<p>-Frequent sweeps through bushland areas to check for persistent <i>Grevillea banksii</i> populations. -Target <i>Cyperus proliifer</i> in sedgeland area, as well as any exotic grasses that have recruited in the area. -Monitoring and treatment of exotic grasses along pathways and in areas of excess nutrient supply.</p>	<p>Low</p>
<p>G 2.41 Ha</p>	<p>Zone G is comprised of <i>Eucalyptus racemosa</i> woodland with diverse understory heath elements. The area has been subject to hazard control burns in the past. While most areas are in very good condition, some densely clustered ‘whipstick’ <i>Allocasuarina littoralis</i> stands have established. Weed concentrations are highest in the east of the zone, where a walkway parallels the reserve boundary. Small illegal paths exist within the zone, leading to an illegal recreation area where some rubbish has been discarded on the ground.</p>	<p>Very Good</p> <p>5 Years Years 1-5 – Sweep through area, checking for any recruiting or reshooting weed populations.</p>	<p>-Frequent sweeps along eastern boundary to prevent incursion of exotic grasses including signal grass (<i>Urochloa decumbens</i>), broad-leaved paspalum (<i>Paspalum mandiocanum</i>) and vasey grass (<i>Paspalum urvillei</i>). -Monitoring and treatment of exotic grasses along pathways</p>	<p>Low</p>

5 – Weed Management Techniques and Guidelines

TECHNIQUE	MIX RATE/HERBICIDE	
Handweed	-	<p>This table is to be used as a guideline only. Application of herbicides (including mixing rates, use of adjuvants, treatment of priority species and correct techniques) must comply with the following legislation, plans and permits:</p> <ul style="list-style-type: none"> • <i>Agricultural Chemicals Distribution Control Act 1966</i> • <i>Agricultural Chemicals Distribution Control Act 1998</i> • <i>Agricultural and Veterinary Chemicals Code Act 1994</i> • <i>Chemical Usage (Agricultural and Veterinary) Control Act 1988</i> • <i>Chemical Usage (Agricultural and Veterinary) Control Regulation 1999</i> • <i>Biosecurity Act 2014</i> • <i>Biosecurity Regulation 2016</i> • <i>Sunshine Coast Council Local Government Area Biosecurity Plan 2017</i> • <i>Sunshine Coast Local Government Area Pest Management Plan 2012-2016</i> • Product labels and material safety data sheets (MSDS) • Off label permits: <ul style="list-style-type: none"> • PER11463 ver. 5 • PER82307 ver.2 • PER9792 ver. 9 • PER83165
Fell	-	
Bag and Remove		
Cut and Paint (A)	1:1 Glyphosate 360g/L to water	
Cut and Paint (B)	43 g/kg PICLORAM POTASSIUM GEL (Vigilant)	
Scrape and Paint	1:1 Glyphosate 360g/L to water 1:1	
Spot Spray (A)	Glyphosate 360g/L 10mL per 1L water	
Spot Spray (B)	Glyphosate 360g/L 10mL per 1L water with wetting agent	
Spot Spray (C)	1g per 10L water, Metsulfuron methyl 600 g/kg with wetting agent	
Spot Spray (D)	1g per 10L water, Metsulfuron-methyl 600 g/kg with wetting agent PLUS Glyphosate 360g/L 10mL per 1L water	
Spot Spray (E)	9mL/1L 200g/L Fluroxypyr	
Spot Spray (F)	2mL/1L 745g/L Fluproponate	
Drill, Frill or Axe (F)	1:1 Glyphosate 360g/L to water	
Drill, Frill or Axe (G)	1:1 Glyphosate 360g/L to water plus 1g metsulfuron-methyl per 1L water	

5.1 – Weeds on Site and Control Methodologies

The following table includes information about the most prominent weeds that were noted on the Bushland Operational Assessment and Management Considerations for Ben Bennett Bushland Park. The weed status is taken from the Sunshine Coast Local Government Area Biosecurity Plan 2017 for the Upper Stanley River Catchment. This document is based on the Queensland Biosecurity Act 2014. Information about weeds, as described in the column 'Impact on Site Ecology', is derived from both field experience and from the Queensland Government website 'Weeds of Australia: Biosecurity Queensland Edition Fact Sheet (2016).'

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Plant Name	Status	Priority	Impact on Site Ecology	Ecological Value	Control Methodology
<i>Abrus precatorius</i> gidee-gidee Fabaceae	'Locally Significant'	High	Native to tropical Africa and Madagascar. Widely cultivated for attractive red and black seeds. Aggressive weed in bushland on sandy substrates that can smother native seedlings and saplings. Seed dispersed by birds. Ingestion of seeds toxic to humans.	Soil stability Nitrogen Fixer Cover and shelter for fauna	Handweed Bag and Remove Cut and Paint (A) Cut and Paint (B)
<i>Ageratum houstonianum</i> blue top Asteraceae	'Locally Significant'	Medium	Native of Central America. An aggressive invader of disturbed areas. It can outcompete native groundcovers and disrupt germination of native shrub and tree species.	Soil stability Cover and shelter for fauna	Handweed Spot Spray (B) Spot Spray (C)
<i>Andropogon virginicus</i> Whisky Grass Poaceae	'Locally Significant'	High	Native to North America. A common grass of disturbed open woodland and heathland areas. Outcompetes native vegetation and disperses easily, by wind or adhering to animals, clothing or vehicles.	Soil stability Cover and shelter for fauna	Handweed Spot Spray (A)
<i>Archontophoenix alexandrae</i> Alexander palm Arecaceae	NA	Medium	Native to northern Queensland. Invasive to riparian and wetland systems in south-eastern Queensland where it outcompetes locally native piccabeen palm. Seed dispersed by birds, terrestrial mammals and bats. It is likely hybridising with piccabeen palms.	Soil stability Canopy cover and shelter Food source for birds, native fauna (fruit)	Handweed Fell Drill, Frill or Axe (F) Drill, Frill or Axe (G)
<i>Ardisia crenata</i> , <i>Ardisia elliptica</i> Coral berry Myrsinaceae	'Locally Significant'	High	Native to southern and eastern Asia. Shade-resistant shrub to 2 metres that fruits prolifically at maturity. Bright red berries are attractive to birds and are spread rapidly. Creates a carpet in rainforest understory and outcompetes native groundcovers as well as recruiting tree and shrub species.	Soil stability Food source for birds, native fauna (fruit) Lower-canopy cover and shelter for fauna	Handweed Cut and Paint(A) Cut and Paint(B) Scrape and Paint
<i>Axonopus compressus</i> and <i>A. affinis</i> Broad-leaved carpet grass Poaceae	'Locally Significant'	Medium	A popular naturalised lawn grass native to the American tropics. Widely distributed in N and E Australia, particularly along coast. Spreads along runners into bushland areas particularly on margins of parks and yards.	Soil stability	Handweed Spot Spray(A) Spot Spray(B)
<i>Chrysophyllum cainito</i> Star apple	'Locally Significant'	Low	Native to SE USA, Central America, Caribbean. Weed of riparian areas, rainforest gaps and margins. Produces	Soil stability Canopy cover and shelter	Handweed Cut and Paint(A) Cut and Paint(B)

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Sapotaceae			fruit attractive to birds, enabling distribution into bushland areas.	Food source for birds, native fauna (fruit)	Drill, Frill or Axe(F) Drill, Frill or Axe(G)
<i>Cyperus prolifer</i> Dwarf papyrus Cyperaceae	NA	Medium	Native to Africa, it is a weed of damp habitats that can displace native flora and impact oxygen exchange in aquatic systems.	Water filtration, oxygenation Food source for some birds (seed)	Handweed Spot Spray(A)
<i>Grevillea banksii</i> Dwarf silky oak Proteaceae	NA	High	Native of Queensland from Maryborough north. In the Sunshine Coast a weed of disturbed areas, particularly on sandy substrates. Can create thickets in regrowth areas, restricting recruitment of native tree and shrub species.	Soil stability Canopy cover and shelter Food source for birds, native fauna (nectar)	Handweed Cut and Paint (A) Cut and Paint (B) Drill, Frill or Axe (F) Drill, Frill or Axe (G)
<i>Ipomoea cairica</i> Coastal Morning Glory Convolvulaceae	'Locally Significant'	Medium	Native to North Africa and the Middle East. Very fast-growing vine which can grow great lengths along the ground with the need for supporting structure. Can smother low-growing native vegetation and outcompete recruiting tree and shrub species.	Soil stability	Handweed Scrape and Paint Spot Spray (A) Spot Spray (C) Spot Spray (D)
<i>Lantana camara</i> lantana Verbenaceae	'Restricted'	High	Native to South America. A scrambling shrub of open areas and regenerating bushland areas. Can grow aggressively in thickets or as a climber, creating monocultures which outcompete native regeneration and prevent germination of native seed.	Soil stability Shelter Food source for birds, native fauna (nectar, fruit) Cover and shelter for fauna	Handweed Cut and Paint (A) Cut and Paint (B) Spot Spray (A) Spot Spray (B) Spot Spray (C) Spot Spray (D)
<i>Macroptilium atropurpureum</i> Siratro Fabaceae	'Locally Significant'	Medium	Native to tropical America. A low-growing legume to 3 metres long with a deep taproot. Creates dense infestations in disturbed areas with high light-penetration. Smothers native vegetation, preventing native groundcover, shrubs and tree recruitment.	Soil stability Shelter Nitrogen fixer	Handweed Cut and Paint Spot Spray (B) Spot Spray (C) Spot Spray (E)

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<i>Megathyrsus maximus</i> var. <i>pubiglumis</i> green panic Poaceae	'Locally Significant'	High	A native to Africa. Long-lived clumping grass to 3m tall which spreads easily in canopy gaps in all types of forest. Frequently a weed of disturbed areas. Outcompetes native groundcovers and suppresses native tree and shrub recruitment.	Soil stability Shelter Food source for birds (seed) Cover and shelter for fauna	Handweed Spot Spray (A) Spot Spray (B)
<i>Melinis minutiflora</i> molasses grass Poaceae	'Locally Significant'	High	Native to Africa. It grows from rooted runners and can out-compete and smother native groundcovers, creating a monoculture. It has high fire resistance and can dominate in a variety of habitats as a result.	Soil stability Food source for birds (seed) Cover and shelter for fauna	Handweed Spot Spray (A) Spot Spray (B)
<i>Nephrolepis cordifolia</i> fishbone fern Nephrolepidaceae	'Locally Significant'	Medium	Locally native groundcover planted as garden ornamental outside of its natural range. Common garden escapee. Very invasive - outcompetes native groundcover vegetation and hinders germination of native tree, shrub and vine species.	Soil stability Cover and shelter for fauna	Handweed Spot Spray (C) Spot Spray (D)
<i>Ochna serrulata</i> Mickey Mouse Plant Ochnaceae	'Locally Significant'	Urgent	Native to Africa. Planted as an ornamental in Australian gardens. Spreads readily in shady forest floors, with seedlings creating carpets and adults creating impenetrable thickets. Fruit attractive to birds and spread readily. Outcompetes native groundcovers, as well as native shrubs and trees.	Food source for birds, native fauna (fruit) Soil stability Shelter	Scrape and Paint
<i>Paspalum conjugatum</i> sour grass Poaceae	'Locally Significant'	Medium	Native to the American tropics. Sour grass is a fast growing grass of disturbed rainforest, particularly along slow-moving watercourses. It has long-spreading stems that enable it to spread rapidly in the wet season and it can also spread by seed.	Soil stability Cover and shelter for fauna	Handweed Spot Spray (A) Spot Spray (B)
<i>Paspalum mandiocanum</i> broad-leaved paspalum Poaceae	'Locally Significant'	High	Native to Brazil. An aggressive grass that smothers native groundcovers, hinders native seed germination, spreads rapidly and is extremely shade tolerant.	Soil stability Cover and shelter for fauna Food source for birds (seed)	Handweed Spot Spray (A) Spot Spray (B)
<i>Paspalum urvillei</i> Vasey grass Poaceae	NA	High	Native to South America, Vasey Grass is widely naturalised in eastern Australia. It is a weed of disturbed sites, particularly wetland areas. Outcompetes native grasses and sedges, as well as potentially regenerating native trees and shrubs.	Soil stability Food source for birds (seed) Cover and shelter for fauna	Handweed Spot Spray (A)

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<i>Passiflora foetida</i> Stinking Passionfruit Passifloraceae	'Locally Significant'	Low	Native to southern USA, Central America and South America. Widely-naturalised throughout Australian bush, it is predominantly a weed of disturbed areas. Seed eaten and distributed by birds and bats.	Food source for birds, native fauna (fruit)	Handweed Cut and Paint (A)
<i>Passiflora suberosa</i> Corky Passionfruit Passifloraceae	'Locally Significant'	Medium	Native to South America. Aggressive invader of remnant edges and disturbed areas. Smothers groundcovers, trees and shrubs in the sub-canopy. With abundant fruit that are very attractive to birds and fauna, it spreads rapidly.	Food source for birds, native fauna (fruit)	Handweed Cut and Paint (A) Spot Spray (B)
<i>Pittosporum ferrugineum</i> Rusty pittosporum	NA	Medium	Native from Central Queensland north - possibly naturalising further south. A shrub or small tree that readily colonises coastal bushland on sandy substrates. The seed, coated in an attractive red aril, is mostly dispersed by birds.	Soil stability Food source for birds, native fauna (fruit) Mid-storey canopy cover and shelter	Handweed Cut and Paint (A) Cut and Paint (B) Drill, Frill or Axe (F) Drill, Frill or Axe (G)
<i>Raphiolepis indica</i> Indian hawthorne Rosaceae	'Locally Significant'	High	Native to China, Taiwan and south-eastern Asia. Widely cultivated as an ornamental, it has become naturalised on the Sunshine Coast. It out-competes native shrubs in disturbed areas, along the suburban/bushland interface, and in sandy dunal areas. With a bird-attracting fruit, the seed is readily spread into bushland areas.	Soil stability Food source for birds, native fauna (fruit) Mid-storey canopy cover and shelter	Handweed Cut and Paint (A) Cut and Paint (B) Drill, Frill or Axe (F) Drill, Frill or Axe (G)
<i>Ruellia squarrosa</i> ruellia Acanthaceae	'Locally Significant'	Medium	Native to southern Mexico. This species is naturalised in eastern Australia. It can create monocultures in disturbed riparian areas, where it is spread by water flow throughout whole sub-catchment areas.	Soil stability Cover and shelter for fauna	Handweed Spot Spray (C) Spot Spray (D)
<i>Schefflera actinophylla</i> umbrella tree Araliaceae	'Locally Significant'	Medium	A native to North Queensland. Medium-sized tree which aggressively outcompetes native vegetation, having the potential to change Eucalypt systems into rainforest monocultures. Has attractive fruit to birds and spreads readily.	Soil stability Food source for birds, native fauna (fruit) Canopy cover and shelter for fauna	Handweed Scrape and Paint (seedlings) Drill, Frill or Axe (F) Drill, Frill or Axe (G)
<i>Schinus terebinthifolius</i> Pepper tree Anacardiaceae	'Restricted'	Medium	Native to South America, <i>Schinus terebinthifolius</i> outcompetes native tree and shrub species (both above and below ground), spreads rapidly and displaces native vegetation.	Soil stability Food source for birds, native fauna (fruit) Canopy cover and shelter for fauna	Handweed Cut and Paint (A) Cut and Paint (B) Drill, Frill or Axe (F) Drill, Frill or Axe (G)
<i>Senna pendula</i> var. <i>glabrata</i> easter cassia	'Locally Significant'	Medium	Native to South America. A shrub that grows in thickets, outcompeting native vegetation and spreading rapidly in native bushland.	Soil stability Canopy cover and shelter for fauna	Handweed Cut and Paint (A) Cut and Paint (B)

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Caesalpinaceae				Nitrogen fixer	Drill, Frill or Axe (F) Drill, Frill or Axe (G)
<i>Setaria sphacelata</i> South African pigeon grass Poaceae	'Locally Significant'	Medium	Native to tropical and southern Africa. Grown as a pasture grass, it outcompetes native grasses and sedges, particularly in wet areas with no dense canopy. It can also prevent germination of native tree, shrub and vine species. A rapid grower, it sets seed quickly and persists in seed bank.	Soil stability Food source for birds, native fauna (seed) Cover and shelter for fauna	Handweed Spot Spray (A) Spot Spray (B)
<i>Syagrus romanzoffiana</i> cocos palm Arecaceae	'Locally Significant'	Medium	Native to South America, Cocos Palm is cultivated as a garden ornamental. Most populous in bushland adjacent to suburban areas. With a bird-attracting fruit it is readily spread by seed. It can also appear in intact bushland.	Soil stability Canopy cover and shelter for fauna Food source for birds, native fauna (fruit)	Handweed Fell Drill, Frill or Axe (F) Drill, Frill or Axe (G)
<i>Syngonium podophyllum</i> Syngonium Araceae	'Locally Significant'	Medium	Native to Central and South America, <i>Syngonium podophyllum</i> is a creeping or climbing plant which spreads along the forest floor along fast-growing runners and readily climbs and smothers native trees and shrubs. It reproduces vegetatively and is very difficult to eradicate.	Soil stability Cover and shelter for fauna	Handweed Spot Spray (E)
<i>Tephrosia glomeruliflora</i> Pink tephrosia Fabaceae	NA	Low	Native to southern Africa. Widely naturalised in eastern Australia, particularly in disturbed areas, roadways and areas of soil alteration. Spreads readily by seed.	Soil stability Nitrogen fixer Lower-canopy cover and shelter for fauna	Handweed Cut and Paint (A) Cut and Paint (B)
<i>Urena lobata</i> urena burr Malvaceae	'Locally Significant'	Medium	Likely native to tropical Asia, now naturalised throughout the world. An upright shrub, it produces fruit enclosed by hooked spines that adhere to animals and clothing. Can outcompete native vegetation.	Soil stability Mid-canopy cover and shelter for fauna	Handweed Cut and Paint (A) Cut and Paint (B) Drill, Frill or Axe (F) Drill, Frill or Axe (G)
<i>Urochloa decumbens</i> signal grass Poaceae	'Locally Significant'	High	Native to tropical eastern Africa. Fast growing grass that prefers disturbed edges or gaps in the forest canopy where light is abundant. Outcompetes native groundcovers as well as recruiting native shrub and tree species.	Soil stability Shelter Food source for birds (seed)	Handweed Spot Spray (A) Spot Spray (B)
<i>Urochloa mutica</i> para grass	'Locally Significant'	High	Native to sub-Saharan Africa. Initially introduced as a pasture grass, it is a very aggressive creeping grass of	Water filtration Soil stability	Handweed Spot Spray (A)

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Poaceae			wetland areas with long, coarse stolons to 5m. Completely outcompetes native and other grasses and stops the flow of slowly moving waterways.	Cover and shelter for fauna	
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Appendix A – Scheduled Species Table Flora and Fauna

Scheduled Flora

Thomas (2011) found one protected species in Ben Bennett Bushland Park. Information relating to threatened flora species were also obtained by performing an online search in April 2020 from EPBC Protected Matter (2020) and Wildlife Online Extract (2020). Results include species from a 2.5 kilometre radius of the reserve. The Wildlife Online search reported records for 15 species under conservation status in the area. The EPBC Protected Matter search showed 17 species under conservation status that may occur in the local area. Nine of the species found in the online searches were considered by SELR to potentially be present in ecosystems in Ben Bennett Bushland Park and are listed below. In addition, SELR personnel believe that one additional species not identified by EPBC Protected Matter (2019) and Wildlife Online Extract (2019) may be found in Ben Bennett Bushland Park. In 2017 SELR personnel also identified an atypical form of a *Lomandra* species (*Lomandra multiflora*), which they sent to the Queensland Herbarium for correct identification. The herbarium indicated that the species is a new subspecies and are currently investigating its correct classification.

Genus species	Common Name	Status Qld. NCA	Status EPBC	Recorded on Site?	Reference
<i>Acacia attenuata</i>		Vulnerable	Vulnerable	No	Wildlife Online 2020; EPBC Protected Matter 2020
<i>Acacia baueri subsp. baueri</i>	tiny wattle	Vulnerable		No	Wildlife Online 2020
<i>Allocasuarina emuina</i>	Emu mountain she oak	Endangered	Endangered	No	Wildlife Online 2020; EPBC Protected Matter 2020
<i>Blandfordia grandiflora</i>	Christmas bells	Endangered		No	Wildlife Online 2020
<i>Boronia rivularis</i>	Wide Bay boronia	Near Threatened		No	Wildlife Online 2020
<i>Cryptostylis hunteriana</i>	leafless tongue-orchid		Vulnerable	No	EPBC Protected Matter 2020
<i>Eucalyptus conglomerata</i>	swamp stringybark	Endangered	Endangered	No	Wildlife Online 2020; EPBC Protected Matter 2020
<i>Lomandra multiflora</i> - new species	NA	NA	NA	Yes	SELR
<i>Pararistolochia praevenosa</i>	Richmond birdwing butterfly vine	Near Threatened		Yes	Thomas (2011); Wildlife Online 2020
<i>Prasophyllum exilis</i>		Near Threatened		No	Wildlife Online 2020
<i>Prasophyllum wallum</i>	Wallum leek orchid		Vulnerable	No	EPBC Protected Matter 2020
<i>Schoenus scabripes</i>	NA	Rare		No	SELR

Key: NCA – Nature Conservation Act (1992); EPBC – Environment Protection and Biodiversity Conservation Act (1999);

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Scheduled Fauna

Aland et al. (2014) recorded one species under conservation status in Ben Bennett Bushland Park (*Pteropus poliocephalus* – grey headed flying fox). In addition, personnel from the Sunshine Coast Council Natural Areas team confirmed the presence of glossy black cockatoos. Additional information relating to threatened fauna species was obtained by performing an online search in April 2020 from EPBC Protected Matter (2020) and Wildlife Online Extract (2020). Results include species from a 2.5 kilometre radius of the reserve. The Wildlife Online search showed records for 36 protected fauna species and the EPBC Protected Matter search showed 50 fauna species with conservation status. Most of these species are found in parts of the nearby Pumicestone Passage (northern region) and are not likely to occur in the reserve. Some of these species are shorebirds who use roosts along the passage, and while they may occasionally fly over the reserve, they do not necessarily reside in or use the reserve for habitat. Species whose presence in the reserve is deemed possible by SELR personnel are listed below.

Genus species	Common Name	Status Qld. NCA	Status EPBC	Recorded on Site?	Reference
<i>Adelotus brevis</i>	tusked frog	Vulnerable		No	Wildlife Online 2020
<i>Calyptorhynchus lathami lathami</i>	glossy black-cockatoo (eastern)	Vulnerable		Yes	Wildlife Online 2020; SCC (2010-2018)
<i>Chalinolobus dwyeri</i>	large-eared pied bat		Vulnerable	No	EPBC Protected Matter 2020
<i>Crinia tinnula</i>	wallum froglet	Vulnerable		No	Wildlife Online 2020
<i>Litoria freycineti</i>	wallum rocketfrog	Vulnerable		No	Wildlife Online 2020
<i>Litoria olongburensis</i>	wallum sedgefrog	Vulnerable	Vulnerable	No	Wildlife Online 2020; EPBC Protected Matter 2020
<i>Ninox strenua</i>	powerful owl	Vulnerable		No	Wildlife Online 2020
<i>Pteropus poliocephalus</i>	grey-headed flying fox		Vulnerable	Yes	Aland et al. (2014)

Key: NCA – Nature Conservation Act (1992); EPBC – Environment Protection and Biodiversity Conservation Act (1999);

Data sources for flora and fauna listed:

Aland, K., Zwar, A. & Hooper, J., 2014. *Preliminary Assessment Report of Mammal & Reptile Fauna – Baseline Pre- & Post-Wet Season Surveys*. Ben Bennett Bushland Reserve. Prepared for Sunshine Coast Council, Future Plus Environmental.

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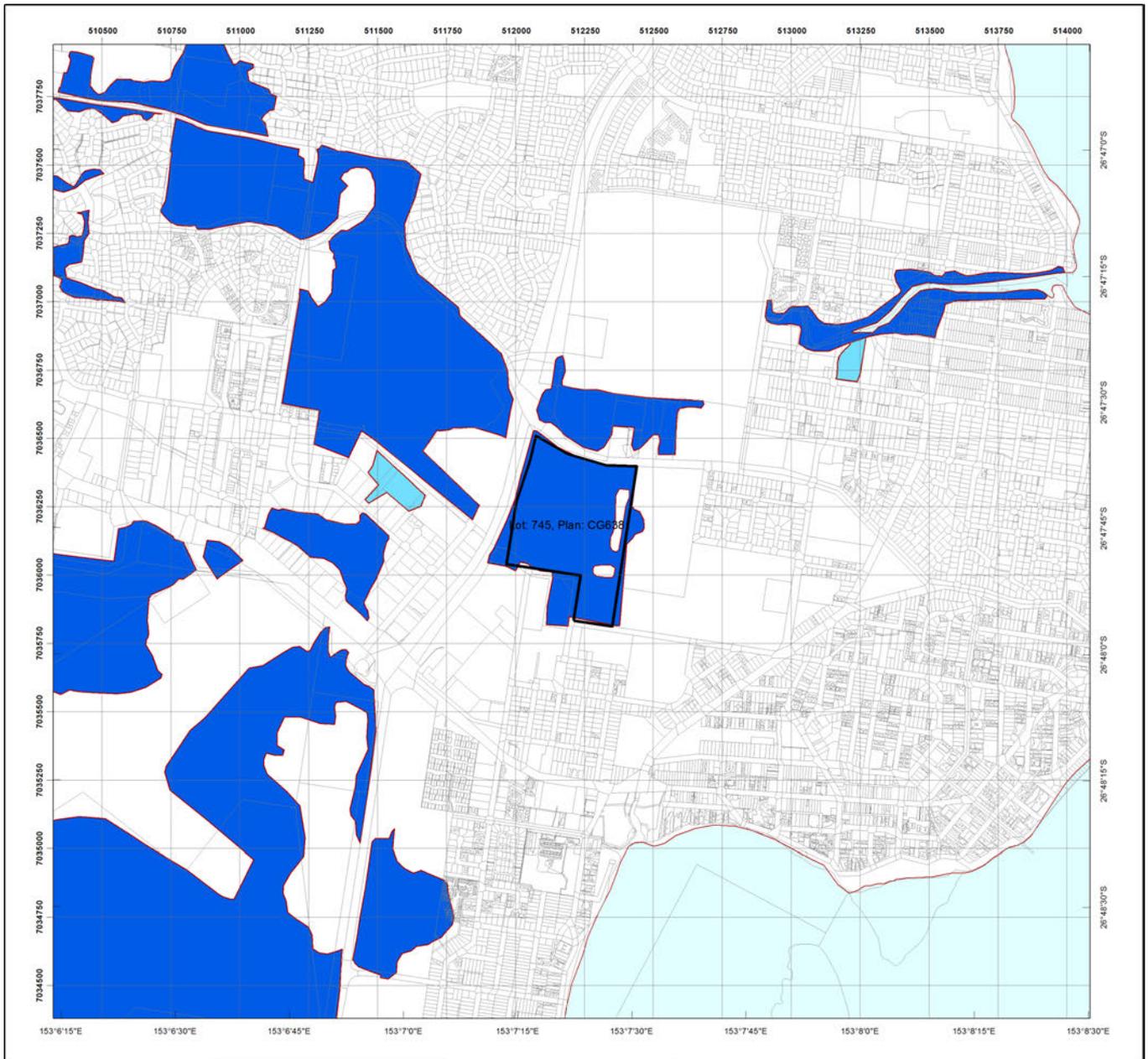
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Appendix B: Regulated Vegetation Map



Regulated Vegetation Management Map

Legend

- Selected Lot and Plan
- Category A area (Vegetation offsets/compliance notices/VDecs)
- Category B area (Remnant vegetation)
- Category C area (High-value regrowth vegetation)
- Category R area (Reef regrowth watercourse vegetation)
- Category X area (Exempt clearing work on Freehold, Indigenous and Leasehold land)
- Water
- Area not categorised
- Other land parcel boundaries



This product is projected into:
 GDA 1994 MGA Zone 56

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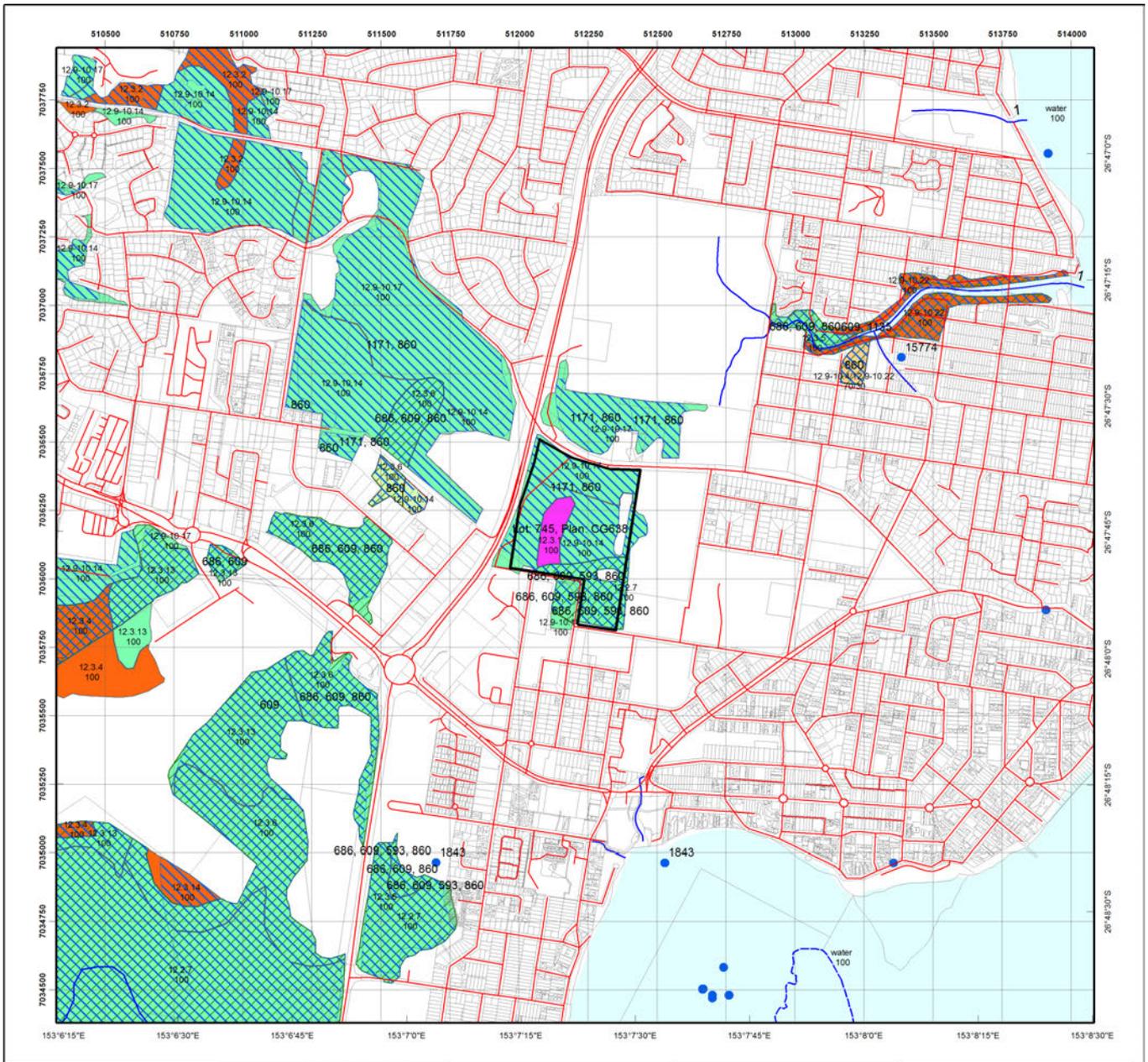
Additional information required for the assessment of vegetation values is provided in the accompanying "Vegetation Management Supporting map". For further information go to the web site: www.dnrme.qld.gov.au or contact the Department of Natural Resources, Mines and Energy.

Digital data for the regulated vegetation management map is available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>

Land parcel boundaries are provided as locational aid only.

This map is updated on a monthly basis to ensure new PMAVs are included as they are approved.

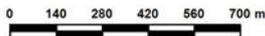
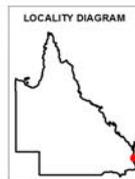




Vegetation Management Supporting Map

Legend

- Selected Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category A or B area under Section 20AH
These areas are edged in yellow and filled with the remnant RE Status
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category C area under Section 20AI
These areas are edged in purple and filled with the remnant RE Status
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map
(Stream order shown as black number against stream where available)
- Roads
- National Parks, State Forest and other reserves
- Other land parcel boundaries



This product is projected into:
 GDA 1994 MGA Zone 56

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

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 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 in negligence) for all expenses, losses, 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.

Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.dnrme.qld.gov.au or contact the Department of Natural Resources, Mines and Energy.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>

Land parcel boundaries are provided as locational aid only.



Vegetation Management Act 1999 - Extract from the essential habitat database

Essential habitat is required for assessment under the:

- State Development Assessment Provisions - State Code 16: Native vegetation clearing which sets out the matters of interest to the state for development assessment under the *Planning Act 2016*, and
- Accepted development vegetation clearing codes made under the *Vegetation Management Act 1999*

Essential habitat for one or more of the following species is found on and within 1.1 km of the identified subject lot/s on the accompanying essential habitat map.

This report identifies essential habitat in Category A, B and Category C areas.

The numeric labels on the essential habitat map can be cross referenced with the database below to determine which essential habitat factors might exist for a particular species.

Essential habitat is compiled from a combination of species habitat models and buffered species records.

The Department of Natural Resources, Mines and Energy website (<http://www.dnrme.qld.gov.au>) has more information on how the layer is applied under the State Development Assessment Provisions - State Code 16: Native vegetation clearing and the *Vegetation Management Act 1999*.

Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated.

Essential habitat, for protected wildlife, means a category A area, a category B area or category C area shown on the regulated vegetation management map-

- 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; or
- 2) in which the protected wildlife, at any stage of its life cycle, is located.

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

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
1171	<i>Calyptorhynchus lathamii</i>	glossy black-cockatoo	V	Lowland and highland eucalypt forest and woodland, including riparian, callitris and brigalow scrub areas, with Casuarina (<i>C. glauca</i> , <i>C. cristata</i>)/ <i>Allocasuarina</i> spp. (<i>A. torulosa</i> , <i>A. littoralis</i>). Nest in large vertical hollow (1-2m deep, 25-50cm diameter) up to 28m above ground in tall slightly isolated tree usually near principal food source (<i>Allocasuarina</i> / <i>Casuarina</i>).	Sea level to 1200m.	None	None
860	<i>Phascolarctos cinereus</i>	koala	V	SEQ: Open eucalypt forest and woodland that has: a) multiple strata layers containing <i>Eucalyptus</i> , <i>Corymbia</i> , <i>Angophora</i> , <i>Lophostemon</i> or <i>Melaleuca</i> 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: <i>Eucalyptus tereticornis</i> , <i>E. fibrosa</i> , <i>E. propinqua</i> ; <i>E. umbra</i> , <i>E. grandis</i> , <i>E. microcorys</i> , <i>E. lindalae</i> , <i>E. resinifera</i> , <i>E. populnea</i> , <i>E. robusta</i> , <i>E. nigra</i> , <i>E. racemosa</i> , <i>E. crebra</i> , <i>E. exserta</i> , <i>E. seiana</i> ; <i>Lophostemon confertus</i> , <i>L. suaveolens</i> , <i>Melaleuca quinquenervia</i> . Outside SEQ: Open eucalypt forest and woodland that contains <i>Eucalyptus</i> &/or <i>Corymbia</i> spp. Tree species used for food varies across State and can include <i>Eucalyptus tereticornis</i> , <i>E. camaldulensis</i> , <i>E. coolabah</i> , <i>E. drepanophylla</i> , <i>E. platyphylla</i> , <i>E. orgadophylla</i> , <i>E. thozettiana</i> , <i>E. melanophloea</i> , <i>E. populnea</i> , <i>E. melliodora</i> , <i>E. dealbata</i> , <i>E. microtheca</i> , <i>E. crebra</i> , <i>E. exserta</i> , <i>E. blakelyi</i> , <i>E. papuana</i> , <i>Corymbia tessellaris</i> , <i>C. citriodora</i> , <i>Melaleuca quinquenervia</i> , <i>M. leucadendra</i> .	Sea level to 1000m.	None	Riparian areas, plains and hill/escarpment slopes.
686	<i>Crinia tinnula</i>	wallum froglet	V	Vegetation community is a mandatory essential habitat factor for this species. Permanent to ephemeral acidic (pH 4.3 - 5.2), soft freshwater in <i>Melaleuca</i> (e.g. <i>M. quinquenervia</i>) swamps, sedgeland, wet and dry heathland (e.g. <i>Banksia robur</i> , <i>Xanthorrhoea</i>) and wallum (<i>Banksia aemula</i> shrubland/woodland) areas coastal lowlands on sand or sandstone, occasionally in adjacent open forest/woodland (e.g. <i>Eucalyptus racemosa</i> , <i>Corymbia citriodora</i>) with heathy understorey; known to persist in small remnants (<10ha); may be found well away from water.	Sea level to 150m.	Sandy and sandy-alluvial substrates.	None
609	<i>Litoria freycineti</i>	wallum rocketfrog	V	Vegetation community is a mandatory essential habitat factor for this species. Freshwater acidic swamps/lagoons (permanent or temporary still water) dominated by sedges (e.g. <i>Baumea</i> and <i>Eleocharis</i> spp.) in heathland (e.g. <i>Banksia/Xanthorrhoea</i>) wallum (<i>Banksia aemula</i> shrubland/woodland) or <i>Melaleuca</i> open forest (e.g. <i>M. quinquenervia</i>), and adjacent <i>Eucalyptus racemosa</i> forest, also found around acidic coastal lakes; on sand and sandstone; can be found well away from water during non-breeding season.	Sea level to 200m.	Sandy and alluvial substrates.	None
593	<i>Litoria olongburensis</i>	wallum sedgelfrog	V	Vegetation community is a mandatory essential habitat factor for this species. Well vegetated permanent to ephemeral freshwater swamp, sedgeland, lake or creek, e.g. dense reed beds (including <i>Baumea</i> , <i>Restio</i> spp.) occasionally with <i>Melaleuca quinquenervia</i> or <i>Callistemon pachyphyllus</i> , acidic wallum swamps and wallum creeks on coastal sand masses; most abundant in wallum (<i>Banksia aemula</i>) swamps that seasonally flood where they are found year-round; recorded in adjacent wet heath, dry heath, <i>Gahnia</i> heath and <i>Melaleuca</i> swamp forest/open forest.	Sea level to 200m.	Sandy substrates.	Near/in waterbodies.
1843	<i>Numenius madagascariensis</i>	eastern curlew	E	Foraging on soft, intertidal mudflat, with a preference for broad flats, often in sheltered areas near mangroves and estuaries/creeks, also on sandflats and occasionally ocean beaches, rock platforms and coral reefs. Roost on saltflat, saltmarsh, mangroves, reef flat, sandy spits and grassland near water.	Sea level to 100m.	Sand, sandy mud and mud substrates.	Associated with coastlines and wetlands.

Label	Regional Ecosystem (mandatory unless otherwise specified)
1171	6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.8, 6.3.9, 6.3.16, 6.3.17, 6.3.18, 6.3.24, 6.3.25, 6.4.1, 6.4.2, 6.4.3, 6.5.1, 6.5.2, 6.5.3, 6.5.5, 6.5.17, 6.5.19, 6.7.2, 6.7.5, 6.7.6, 8.2.1, 8.2.3, 8.2.4, 8.2.6, 8.2.7, 8.2.8, 8.2.12, 8.2.13, 8.2.14, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.8, 8.3.11, 8.3.13, 8.5.1, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.9.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 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, 8.12.31, 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, 9.3.9, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.18, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.23, 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, 9.5.16, 9.7.1, 9.7.2, 9.7.3, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.4, 9.8.5, 9.8.6, 9.8.9, 9.8.10, 9.8.11, 9.10.1, 9.10.3, 9.10.4, 9.10.5, 9.10.6, 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, 9.11.11, 9.11.12, 9.11.13, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.23, 9.11.26, 9.11.28, 9.11.29, 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, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.26, 9.12.28, 9.12.30, 9.12.31, 9.12.33, 9.12.35, 9.12.37, 9.12.39, 11.2.1, 11.2.2, 11.2.5, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.6, 11.3.7, 11.3.8, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.23, 11.3.25, 11.3.26, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.35, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.4.2, 11.4.3, 11.4.5, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.7, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.16, 11.5.17, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.4, 11.7.6, 11.8.1, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.8.9, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.1, 11.9.2, 11.9.3, 11.9.5, 11.9.6, 11.9.7, 11.9.9, 11.9.10, 11.9.13, 11.9.14, 11.10.1, 11.10.2, 11.10.3, 11.10.4, 11.10.5, 11.10.6, 11.10.7, 11.10.9, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.3, 11.11.4, 11.11.6, 11.11.7, 11.11.8, 11.11.9, 11.11.10, 11.11.11, 11.11.13, 11.11.14, 11.11.15, 11.11.16, 11.11.19, 11.12.0, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.11, 11.12.12, 11.12.13, 11.12.14, 11.12.15, 11.12.17, 11.12.19, 11.12.20, 11.12.21, 12.2.5, 12.2.6, 12.2.13, 12.2.14, 12.3.11, 12.5.1, 12.5.2, 12.5.3, 12.5.4, 12.5.6, 12.8.1, 12.8.2, 12.8.8, 12.8.10, 12.8.11, 12.8.12, 12.8.14, 12.8.16, 12.8.19, 12.8.20, 12.8.23, 12.8.25, 12.9-10.2, 12.9-10.4, 12.9-10.5, 12.9-10.6, 12.9-10.9, 12.9-10.12, 12.9-10.14, 12.9-10.17, 12.9-10.19, 12.9-10.20, 12.11.2, 12.11.3, 12.11.5, 12.11.6, 12.11.9, 12.11.15, 12.11.23, 12.11.24, 12.11.25, 12.11.27, 12.12.2, 12.12.5, 12.12.6, 12.12.9, 12.12.11, 12.12.15, 12.12.20, 12.12.23, 12.12.26, 13.3.1, 13.3.2, 13.3.3, 13.3.4, 13.3.5, 13.3.7, 13.9.2, 13.11.1, 13.11.2, 13.11.3, 13.11.4, 13.11.5, 13.11.6, 13.11.8, 13.12.1, 13.12.2, 13.12.3, 13.12.4, 13.12.5, 13.12.8, 13.12.9, 13.12.10

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, 9.12.8, 9.12.9, 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, 11.3.3, 11.3.4, 11.3.5, 11.3.6, 11.3.7, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.21, 11.3.23, 11.3.25, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.32, 11.3.33, 11.3.35, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.4.2, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.7, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.17, 11.5.18, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.3, 11.7.4, 11.7.6, 11.7.7, 11.8.1, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.1, 11.9.2, 11.9.3, 11.9.5, 11.9.6, 11.9.7, 11.9.8, 11.9.9, 11.9.11, 11.9.13, 11.9.14, 11.10.1, 11.10.2, 11.10.3, 11.10.4, 11.10.5, 11.10.6, 11.10.7, 11.10.9, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.2, 11.11.3, 11.11.4, 11.11.6, 11.11.7, 11.11.8, 11.11.9, 11.11.10, 11.11.11, 11.11.12, 11.11.13, 11.11.14, 11.11.15, 11.11.16, 11.11.17, 11.11.19, 11.11.20, 11.11.21, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.13, 11.12.14, 11.12.15, 11.12.16, 11.12.17, 11.12.19, 11.12.20, 13.3.1, 13.3.2, 13.3.3, 13.3.4, 13.3.5, 13.3.7, 13.9.2, 13.11.1, 13.11.2, 13.11.3, 13.11.4, 13.11.5, 13.11.6, 13.11.8, 13.11.9, 13.12.1, 13.12.2, 13.12.3, 13.12.4, 13.12.5, 13.12.6, 13.12.8, 13.12.9, 13.12.10.
686	12.2.5, 12.2.7, 12.2.9, 12.2.10, 12.2.12, 12.2.15, 12.3.4, 12.3.5, 12.3.6, 12.3.12, 12.3.14, 12.3.20, 12.5.2, 12.5.10. These regional ecosystems are not a mandatory essential habitat factor for this species.
609	12.2.2, 12.2.5, 12.2.7, 12.2.9, 12.2.10, 12.2.12, 12.2.13, 12.2.15, 12.3.4, 12.3.5, 12.3.6, 12.3.11, 12.3.12, 12.3.13, 12.3.14, 12.3.20, 12.5.4, 12.5.9, 12.9-10.4, 12.9-10.10, 12.9-10.22. These regional ecosystems are not a mandatory essential habitat factor for this species.
593	12.2.5, 12.2.7, 12.2.12, 12.2.15, 12.3.5, 12.3.20. These regional ecosystems are not a mandatory essential habitat factor for this species.
1843	2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 7.1.1, 7.1.2, 7.1.3, 8.1.1, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 11.1.4, 12.1.2, 12.1.3