



Aquatic Conservation Assessment

**Riverine and non-riverine wetlands of the
Queensland Fitzroy Great Barrier Reef
Connecting Catchments**

Flora, Fauna and Ecology Expert Panel Report, Version 2.1

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Version history

Version	Type	Release Date	Description
1.1	Riverine	2009	Aquatic Conservation Assessment using AquaBAMM for the riverine wetlands of the Great Barrier Reef catchments.
1.3	Non-riverine	2012	Aquatic Conservation Assessments, using AquaBAMM for the non-riverine wetlands of the Great Barrier Reef catchments.
2.1	Riverine and non-riverine	2026	Aquatic Conservation Assessment using AquaBAMM for the riverine and non-riverine wetlands of the Queensland Fitzroy Great Barrier Reef Connecting Catchments.

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This report should be read in conjunction with the accompanying summary report:

DETSI (2026) Aquatic Conservation Assessment using AquaBAMM: Riverine and non-riverine wetlands of the Queensland Fitzroy Great Barrier Reef Connecting Catchments: Summary Report, Version 2.1.
Brisbane: Department of the Environment, Tourism, Science and Innovation, Queensland Government.

Glossary

ACA	Aquatic Conservation Assessment
AquaBAMM	Aquatic Biodiversity Assessment and Mapping Method
ASFB	Australian Society for Fish Biology
ASL	Above Sea Level
BAMM	Biodiversity Assessment and Mapping Method
BONN	Bonn Convention on the Conservation of Migratory Species
BPA	Biodiversity Planning Assessment
C	Least Concern
CAMBA	China-Australia Migratory Bird Agreement
CIM	Criterion, Indicator and Measure (used in AquaBAMM)
DIWA	Directory of Important Wetlands in Australia
DETSI	Department of the Environment, Tourism, Science and Innovation
E	Endangered
EPBC	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FGBRCC	Fitzroy Great Barrier Reef Connecting Catchments
GBRCC	Great Barrier Reef Connecting Catchments
IBA	Important Bird Areas
JAMBA	Japan-Australia Migratory Bird Agreement
KBA	Key Biodiversity Areas
NCA	<i>Nature Conservation Act 1992</i>
NR	non-riverine
QBEIS	Queensland Biodiversity and Ecology Information System
QFD	Queensland Fauna Database
R	riverine
Ramsar	Ramsar Convention on Wetlands
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
V	Vulnerable
WIS	Wetland indicator species
WWF	World Wildlife Fund

Introduction

The Department of the Environment, Tourism, Science and Innovation (DETSI) has undertaken a review and update of the freshwater Aquatic Conservation Assessments (ACA) for catchments in the Fitzroy and Mackay/Whitsunday region. The current combined assessments are titled – *Queensland Fitzroy Great Barrier Reef Connecting Catchments Aquatic Conservation Assessments (FGBRCC ACA) version 2.1*.

The Aquatic Biodiversity Assessment and Mapping Methodology (AquaBAMM) was developed in 2006 to provide a robust and repeatable method for assessing the biological and ecological values of Queensland's wetlands (Clayton et al. 2006). It does not assess social, cultural, economic or tenure values.

Part of the AquaBAMM methodology uses expert knowledge to acquire data for several criterion measures. This data is elicited during expert panel workshops comprised of individuals with knowledge and expertise in local wetland dependent species, wetland ecology, water quality, hydrology, geomorphology and vegetation. Expert panel processes aim to add flexibility and a reality check to the assessment process. They are based on the premise of scientific reasoning, multiple lines of evidence and consensus building, allowing the incorporation of unpublished or anecdotal data.

This report describes results and recommendations stemming from the expert panel workshops held for the FGBRCC ACA. Three workshops assessed the flora, fauna and ecology values were held in Rockhampton in April 2024. Terms of reference for these workshops can be found in Appendix I – Expert panel terms of reference.

This report should be read in conjunction with the accompanying summary report – *An Aquatic Conservation Assessment for the riverine and non-riverine wetlands of the Queensland Fitzroy Great Barrier Reef Connecting Catchments: Summary Report, Version 2.1*. Department of the Environment, Tourism, Science and Innovation, Queensland Government.

Queensland Fitzroy Great Barrier Reef Connecting Catchments study regions

This ACA covers 18 individual catchments, or study area, all which flow into the southern Great Barrier Reef (Figure 1). Further information regarding each study area is outlined in the accompanying summary report (DETSI 2026).

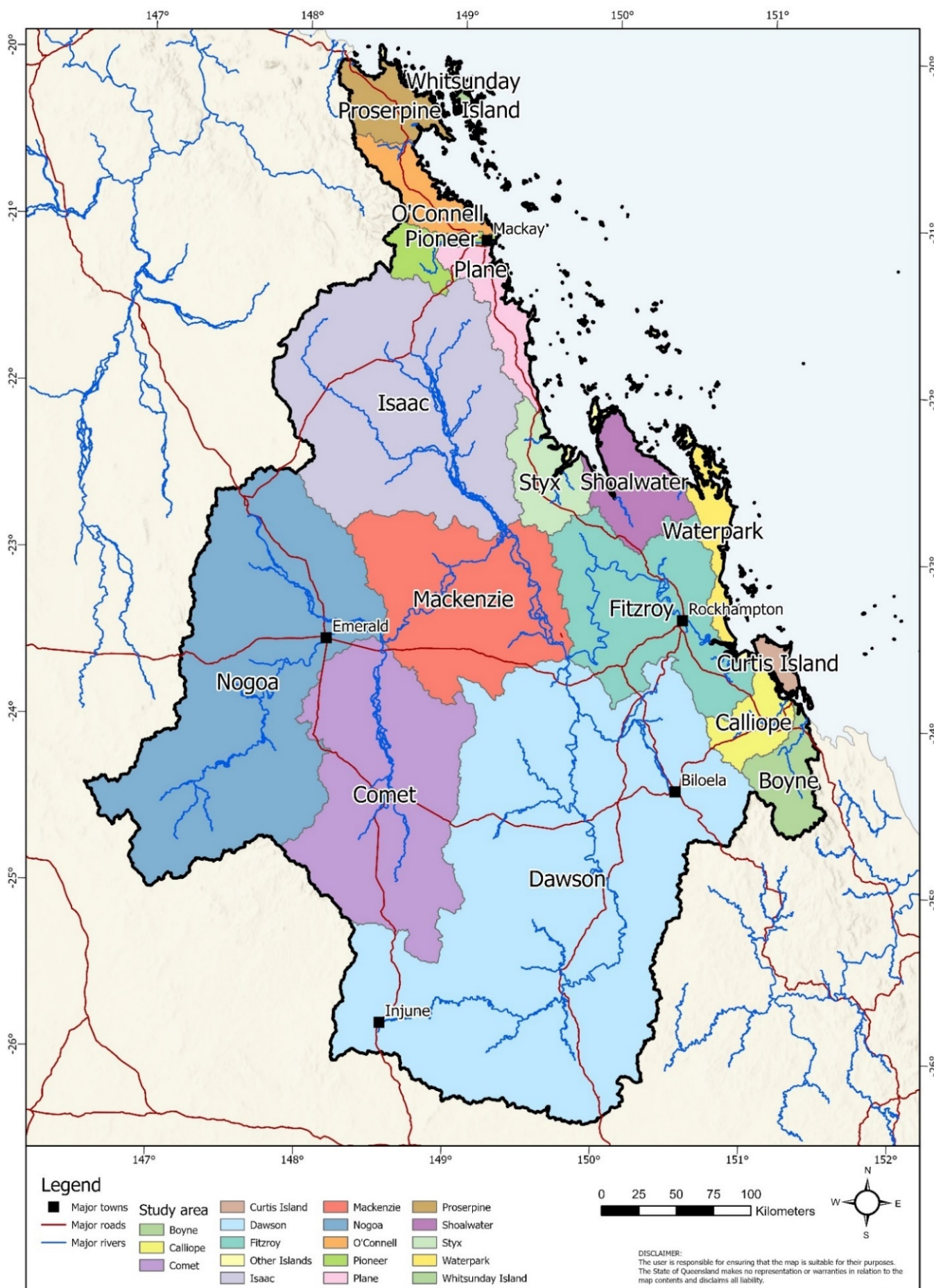


Figure 1 Study areas of the Fitzroy Great Barrier Reef Connecting Catchments Aquatic Conservation Assessment

Methods and implementation

Panel composition

The expert panels for the FGBRCC ACA were comprised of the persons listed in Table 1. They included individuals with local knowledge and expertise in wetland dependent flora and fauna, and non-riverine and riverine wetland ecology including fish, macro invertebrates, water quality, hydrology, geomorphology and vegetation communities. Members who were unavailable to attend the workshop were consulted prior to or after the workshop.

All participants were provided with background materials prior to attending the workshops. These materials included a Terms of Reference (Appendix I – Expert panel terms of reference), relevant definitions (Appendix II – Expert panel definitions), and draft taxon lists for the wetland dependant flora and fauna recorded within each study area.

The flora, fauna and ecology workshops were facilitated by Dr Darren Fielder from Redleaf Environmental.

Table 1. Scientific experts of the Fitzroy GBRCC expert panel workshops.

Name	Organisation	Area of Expertise	Flora panel	Fauna panel	Ecology panel
Shannon Van Nunen	Fitzroy Basin Authority	Aquatic Ecology	Y	Y	Y
Sandy Pollock	Department of the Environment, Tourism, Science and Innovation – Queensland Herbarium and Biodiversity Science	Botanist	Y		
Carlos Bueno	Reef Catchments	Fauna / Flora / Ecology	Y	Y	Y
Alan Briggs	Birdlife Capricornia	Waterbirds / shorebirds		Y	
Kimberly Robinson	Department of the Environment, Tourism, Science and Innovation – Queensland Parks and Wildlife Service and Partnerships	Fauna / Ecology		Y	Y
Andrew McDougall	Department of the Environment, Tourism, Science and Innovation – Queensland Parks and Wildlife Service and partnerships	Fauna / Ecology		Y	Y
Nicole Flint	Central Queensland University	Aquatic ecology		Y	Y
Fiona Small	Department of Regional Development, Manufacturing and Water	Fauna / Ecology		Y	Y
Col Limpus	Department of the Environment, Tourism, Science	Fauna / Ecology		Y	Y

Name	Organisation	Area of Expertise	Flora panel	Fauna panel	Ecology panel
	and Innovation – Threatened Species unit				

Workshop format

Expert panel workshops were held in Rockhampton in April 2024 and were hosted by the Fitzroy Basin Association and Reef Catchments. The workshops centred around three main areas, being flora, fauna and ecology. The workshops used a combination of spatial information and textual lists of species names, to help identify wetland locations, components, processes and species of interest. If possible, region-specific datasets were requested and sourced from the experts where available.

Traditional Owner connections to wetlands and wetland values

Wetland ecosystems are of material and cultural importance to First Nations peoples, and many wetlands have profound cultural significance and value (DES, 2016). Wetlands are known to have significance as ceremonial sites, initiation sites and as boundary markers (DoE, 2016). In addition, many wetland species have significance as totems, symbols that acknowledge specific birds, animals, rocks or flora species, and are considered sacred by their owners (DoE, 2016). In fact, almost all wetland plant and animal species have some form of traditional importance as sources of food or medicine, particularly vegetation, crustaceans, fish, reptiles, mammals and waterbirds (particularly their eggs), or cultural significance (e.g. totemic significance).

Flora

The role of the flora expert panel is to provide expert advice on the aquatic flora values of the waterways and wetlands within each study area.

Flora records were compiled from corporate databases including WildNet (extracted October 2024), HERBRECS (within the WildNet database), CORVEG (extracted January 2024). Additional records were sourced from Ann Moran's sightings database. Records were filtered by precision ($\leq 2,000\text{m}$) and year (≥ 1950). Duplicate records, defined as same species collected in same location in same year, were removed. Only records of flora species dependent upon freshwater wetlands for all or part of their lifecycle were used for measures 1.1.2, 3.1.5, 4.1.2, and 5.1.2.

Exotic flora

In the context of the AquaBAMM, exotic flora are non-native plants that cause, or have the potential to cause, significant detrimental impact to riverine or non-riverine wetland systems.

The panel identified 30 exotic wetland dependant flora taxa impacting riverine or non-riverine wetlands within the study areas (Table 2). Sightings records for the listed species were used to identify spatial units containing exotic flora species for measure 1.1.2 (presence of exotic aquatic species).

Table 2. Exotic wetland dependant flora taxa impacting study area wetland values

Exotic wetland flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Alternanthera philoxeroides</i>	alligator weed	Y	Y	
<i>Bacopa caroliniana</i>			Y	
<i>Bacopa lanigera</i>			Y	
<i>Cabomba caroliniana</i> var. <i>caroliniana</i>	cabomba	Y	Y	
<i>Callitriche stagnalis</i>		Y	Y	
<i>Cyperus involucratus</i>		Y	Y	It is a problem in small streams with particularly bad infestations near Gladstone.
<i>Cyperus papyrus</i>	papyrus	Y	Y	
<i>Cyperus proliifer</i>	dwarf papyrus	Y	Y	
<i>Echinochloa colona</i>	awnless barnyard grass	Y	Y	
<i>Echinochloa crus-galli</i>	barnyard grass	Y	Y	
<i>Egeria densa</i>	dense waterweed	Y	Y	
<i>Pontederia crassipes</i>	water hyacinth	Y	Y	Key species in terms of wetland condition indicator. <i>Previously known as: Eichhornia crassipes</i>
<i>Hydrocharis dubia</i>	frogbit	Y	Y	
<i>Hydrocleys nymphoides</i>	water poppy	Y	Y	
<i>Hygrophila costata</i>		Y	Y	
<i>Hygrophila polysperma</i>		Y	Y	
<i>Hymenachne amplexicaulis</i> 'Olive'		Y	Y	Significant weed that outcompetes native species.

Exotic wetland flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Myriophyllum aquaticum</i>	Brazilian water milfoil	Y	Y	Limited in this region but should be flagged as becoming a potential future problem as it becomes a threat when deliberately introduced.
<i>Neptunia plena</i>	water mimosa or sensitive neptunia	Y	Y	Is a long-lived aquatic plant which poses an extreme threat to Queensland's waterways and wetlands. Habitat includes water bodies and riparian zones in the tropics and subtropics.
<i>Nymphaea caerulea</i>		Y	Y	
<i>Paspalum distichum</i>	water couch	Y	Y	
<i>Paspalum vaginatum</i>	saltwater couch	Y	Y	
<i>Pistia stratiotes</i>	water lettuce	Y	Y	Major problem particularly in slow moving backwaters and around weirs.
<i>Pontederia cordata</i>		Y	Y	
<i>Rorippa nasturtium-aquaticum</i>	watercress	Y	Y	
<i>Rotala rotundifolia</i>			Y	
<i>Sagittaria platyphylla</i>	sagittaria	Y	Y	
<i>Salvinia molesta</i>	salvinia	Y	Y	A problem particularly in dry times as it builds up significantly.
<i>Sparganium erectum</i> subsp. <i>stoloniferum</i>	erect bur-reed		Y	
<i>Urochloa mutica</i>		Y	Y	Coastal weed that can create ponded pastures. In the absence of grazing, it smothers wetlands reducing the diversity of birds and fish.

The panel identified 189 exotic terrestrial (i.e., not wetland dependant) flora taxa impacting riverine or non-riverine wetlands within the study areas (Table 3). Sightings records for the listed species were used to identify spatial units containing exotic flora species for measure 2.1.1 (Presence of exotic riparian (i.e., semi-aquatic and non-aquatic) plants in the assessment unit).

Table 3. Exotic terrestrial flora taxa impacting study area wetland values

Exotic terrestrial flora - Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Acanthocereus tetragonus</i>	sword pear		Y	
<i>Aeschynomene villosa</i>			Y	
<i>Agave americana</i>		Y	Y	

Exotic terrestrial flora - Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Agave americana</i> var. <i>americana</i>		Y	Y	
<i>Agave americana</i> var. <i>americana</i> 'Marginata'		Y	Y	
<i>Agave sisalana</i>	sisal hemp	Y	Y	
<i>Agave vivipara</i> var. <i>vivipara</i>		Y	Y	
<i>Ageratina riparia</i>	mistflower	Y	Y	
<i>Ageratum conyzoides</i>	billygoat weed		Y	
<i>Ageratum conyzoides</i> subsp. <i>conyzoides</i>			Y	
<i>Ageratum houstonianum</i>	blue billygoat weed		Y	
<i>Allamanda cathartica</i>	yellow allamanda	Y	Y	
<i>Alternanthera ficoidea</i>		Y	Y	
<i>Annona glabra</i>	pond apple	Y	Y	Grows on the edge of floodplains.
<i>Anredera cordifolia</i>	Madeira vine	Y	Y	Found in riparian areas along upper Cattle creek, Plain creek and the Sarina area.
<i>Ardisia crenata</i>			Y	
<i>Argemone mexicana</i>	prickly poppy	Y		
<i>Aristolochia elegans</i>	calico-flower	Y	Y	Impacts on the Birdwing butterfly (<i>Ornithoptera priamus</i>).
<i>Arundo donax</i>		Y	Y	
<i>Asparagus plumosus</i>	feathered asparagus fern	Y		
<i>Asystasia gangetica</i> subsp. <i>gangetica</i>		Y		
<i>Baccharis halimifolia</i>	groundsel bush	Y	Y	
<i>Bauhinia monandra</i>		Y		
<i>Berula erecta</i>	water parsnip		Y	
<i>Biancaea decapetala</i>		Y	Y	
<i>Bryophyllum delagoense</i>		Y	Y	
<i>Bryophyllum pinnatum</i>	resurrection plant	Y	Y	Infestations in Marlborough Creek.
<i>Calopogonium mucunoides</i>			Y	
<i>Canna indica</i>	Indian shot	Y	Y	
<i>Cardiospermum grandiflorum</i>	heart seed vine	Y	Y	
<i>Cardiospermum halicacabum</i>		Y	Y	

Exotic terrestrial flora - Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Cardiospermum halicacabum</i> var. <i>halicacabum</i>		Y	Y	
<i>Cascabela thevetia</i>	yellow oleander	Y	Y	Infestations are becoming a problem.
<i>Catharanthus roseus</i>	pink periwinkle	Y	Y	No significant impact observed yet although but may become a problem in the future.
<i>Cecropia peltata</i>	Mexican bean tree		Y	
<i>Celtis sinensis</i>	Chinese elm	Y	Y	
<i>Cenchrus ciliaris</i>		Y	Y	
<i>Cenchrus echinatus</i>	Mossman River grass	Y	Y	
<i>Cenchrus pennisetiformis</i>		Y		
<i>Cenchrus purpureus</i>		Y	Y	
<i>Centrosema molle</i>		Y	Y	
<i>Chromolaena odorata</i>	Siam weed	Y	Y	
<i>Chrysopogon aciculatus</i>	Mackie's pest		Y	
<i>Cinnamomum camphora</i>	camphor laurel	Y		
<i>Coffea arabica</i>	Arabian coffee		Y	
<i>Colocasia esculenta</i>	taro	Y		
<i>Cryptostegia grandiflora</i>	rubber vine	Y	Y	Presence can be used as an indicator of poor condition.
<i>Cyperus aromaticus</i>		Y	Y	
<i>Cyperus brevifolius</i>	Mullumbimby couch	Y	Y	
<i>Cyperus compressus</i>		Y		
<i>Cyperus eragrostis</i>		Y		
<i>Cyperus esculentus</i>	yellow nutgrass	Y	Y	
<i>Cyperus flavescens</i>		Y	Y	
<i>Cyperus melanospermus</i>		Y	Y	
<i>Cyperus rotundus</i>	nutgrass	Y		
<i>Diplachne fusca</i> var. <i>uninervia</i>		Y		
<i>Dolichandra unguis-cati</i>	cat's claw creeper	Y	Y	
<i>Duranta erecta</i>	duranta	Y	Y	
<i>Eclipta prostrata</i>	white eclipta	Y		
<i>Eleocharis minuta</i>			Y	
<i>Eleusine indica</i>	crowsfoot grass		Y	
<i>Eleutheranthera ruderalis</i>		Y	Y	
<i>Enydra fluctuans</i>		Y	Y	
<i>Eragrostis curvula</i>			Y	
<i>Eugenia uniflora</i>	Brazilian cherry tree	Y	Y	Mainly found in urban areas.

Exotic terrestrial flora - Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Euphorbia cyathophora</i>	dwarf poinsettia		Y	
<i>Flacourtia jangomas</i>		Y	Y	
<i>Furcraea foetida</i>		Y	Y	
<i>Gleditsia triacanthos</i>	honey locust	Y	Y	
<i>Gmelina elliptica</i>	badhara bush	Y	Y	
<i>Haematoxylum campechianum</i>	logwood tree	Y	Y	Highly invasive of some ecosystems around Mackay and across the Fitzroy River floodplain.
<i>Harrisia martinii</i>		Y		
<i>Harrisia pomanensis</i>		Y	Y	
<i>Harrisia tortuosa</i>		Y	Y	
<i>Heliotropium amplexicaule</i>	blue heliotrope	Y	Y	
<i>Heliotropium indicum</i>			Y	
<i>Hiptage benghalensis</i>		Y	Y	
<i>Hyparrhenia rufa</i>			Y	
<i>Hyptis capitata</i>		Y	Y	
<i>Impatiens walleriana</i>	balsam		Y	
<i>Ipomoea cairica</i>		Y	Y	
<i>Ipomoea indica</i>	blue morning-glory	Y	Y	
<i>Ipomoea purpurea</i>	common morning glory	Y		
<i>Jatropha gossypifolia</i>	bellyache bush	Y	Y	Highly invasive, declared weed, widespread around Styx River catchment and Alton Downs.
<i>Juncus bufonius</i>	toad rush	Y	Y	
<i>Juncus cognatus</i>		Y	Y	
<i>Lantana camara</i>	lantana	Y	Y	
<i>Lantana montevidensis</i>	creeping lantana	Y	Y	
<i>Leonotis nepetifolia</i>		Y	Y	
<i>Leucaena leucocephala</i>		Y	Y	
<i>Leucaena leucocephala</i> subsp. <i>glabrata</i>		Y	Y	
<i>Leucaena leucocephala</i> subsp. <i>leucocephala</i>		Y	Y	
<i>Leucas lavandulifolia</i>		Y		
<i>Ligustrum lucidum</i>	large-leaved privet	Y	Y	
<i>Ligustrum sinense</i>	small-leaved privet	Y	Y	
<i>Macroptilium atropurpureum</i>	siratro	Y	Y	Smotherers native plants growing on creek banks.
<i>Macroptilium lathyroides</i>			Y	

Exotic terrestrial flora - Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Macroptilium lathyroides</i> var. <i>semierectum</i>			Y	
<i>Macrotyloma axillare</i> var. <i>axillare</i>		Y	Y	Has potential to become a weed.
<i>Macrotyloma uniflorum</i> var. <i>stenocarpum</i>		Y	Y	Has potential to become a weed.
<i>Macrotyloma uniflorum</i> var. <i>uniflorum</i>		Y	Y	Has potential to become a weed.
<i>Malvastrum americanum</i>		Y		
<i>Malvastrum americanum</i> var. <i>americanum</i>		Y		
<i>Mangifera indica</i>	mango	Y	Y	Has become a problem around Mackay.
<i>Megathyrsus maximus</i>			Y	This species generates significant fuel loads that can carry hot fires which cause damage to native ecosystems.
<i>Megathyrsus maximus</i> var. <i>coloratus</i>		Y	Y	This species generates significant fuel loads that can carry hot fires which cause damage to native ecosystems.
<i>Megathyrsus maximus</i> var. <i>maximus</i>		Y	Y	This species generates significant fuel loads that can carry hot fires which cause damage to native ecosystems.
<i>Megathyrsus maximus</i> var. <i>maximus</i> 'Hamil'		Y	Y	This species generates significant fuel loads that can carry hot fires which cause damage to native ecosystems.
<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>		Y	Y	This species generates significant fuel loads that can carry hot fires which cause damage to native ecosystems.
<i>Melinis minutiflora</i>	molasses grass		Y	
<i>Mesosphaerum suaveolens</i>		Y		
<i>Mimosa pigra</i>	giant sensitive tree	Y	Y	
<i>Mimosa pudica</i>			Y	
<i>Mimosa pudica</i> var. <i>hispida</i>			Y	
<i>Mimosa pudica</i> var. <i>unijuga</i>			Y	
<i>Momordica charantia</i>	balsam pear		Y	
<i>Montanoa hibiscifolia</i>			Y	
<i>Neonotonia wightii</i> var. <i>wightii</i>		Y	Y	

Exotic terrestrial flora - Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Opuntia aurantiaca</i>	tiger pear	Y	Y	
<i>Opuntia leucotricha</i>		Y	Y	
<i>Opuntia microdasys</i>		Y	Y	
<i>Opuntia monacantha</i>		Y	Y	
<i>Opuntia streptacantha</i>	cardona pear	Y	Y	
<i>Opuntia stricta</i>		Y	Y	
<i>Opuntia tomentosa</i>	velvety tree pear	Y	Y	
<i>Parkinsonia aculeata</i>	parkinsonia	Y	Y	
<i>Parthenium hysterophorus</i>	parthenium weed	Y	Y	
<i>Phyla canescens</i>		Y	Y	
<i>Pinus caribaea</i>	Caribbean pine	Y	Y	
<i>Pinus elliottii</i>	slash pine	Y	Y	
<i>Polygonum aviculare</i>	wireweed	Y	Y	
<i>Polypogon monspeliensis</i>	annual beardgrass	Y	Y	
<i>Praxelis clematidea</i>		Y	Y	
<i>Neltuma pallida</i>		Y	Y	Previously known as: <i>Prosopis pallida</i>
<i>Psidium guajava</i>	guava	Y	Y	
<i>Psidium guineense</i>	cherry guava	Y	Y	
<i>Pueraria montana</i> var. <i>lobata</i>	kudzu	Y		
<i>Ricinus communis</i>	castor oil bush	Y	Y	Grows in beds and banks of streams, and may possibly be wetland dependant.
<i>Rivina humilis</i>		Y	Y	Inhibits regeneration of native species particularly in scrub areas.
<i>Rubus alceifolius</i>	giant bramble	Y		
<i>Salix babylonica</i>	weeping willow	Y		
<i>Sarcocornia quinqueflora</i>			Y	
<i>Schinus terebinthifolius</i>	Brazilian pepper tree	Y	Y	Widespread
<i>Selaginella willdenovii</i>			Y	
<i>Senna obtusifolia</i>		Y	Y	
<i>Senna occidentalis</i>	coffee senna	Y	Y	
<i>Senna pendula</i> var. <i>glabrata</i>	Easter cassia	Y		
<i>Senna tora</i>		Y	Y	
<i>Setaria sphacelata</i>		Y	Y	
<i>Sida rhombifolia</i>			Y	
<i>Solanum americanum</i>		Y	Y	
<i>Solanum mauritianum</i>	wild tobacco	Y		
<i>Solanum nigrum</i>		Y	Y	

Exotic terrestrial flora - Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Solanum seaforthianum</i>	Brazilian nightshade	Y	Y	
<i>Solanum torvum</i>	devil's fig	Y	Y	
<i>Sorghum halepense</i>	Johnson grass	Y	Y	
<i>Spathodea campanulata</i>	West African tulip tree	Y	Y	
<i>Spathodea campanulata</i> subsp. <i>nilotica</i>		Y	Y	
<i>Sphagneticola trilobata</i>		Y	Y	Thrives around urban areas.
<i>Sporobolus africanus</i>	Parramatta grass		Y	
<i>Sporobolus coromandelianus</i>			Y	
<i>Sporobolus fertilis</i>	giant Parramatta grass		Y	
<i>Sporobolus indicus</i>			Y	
<i>Sporobolus jacquemontii</i>			Y	
<i>Sporobolus natalensis</i>			Y	
<i>Sporobolus pyramidalis</i>			Y	
<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed		Y	
<i>Stenotaphrum secundatum</i>	buffalo grass	Y		
<i>Synedrella nodiflora</i>			Y	
<i>Synedrellopsis grisebachii</i>		Y	Y	Problem weed in the Boyne and Calliope River catchments.
<i>Syngonium podophyllum</i>		Y	Y	
<i>Syzygium cumini</i>		Y	Y	
<i>Tecoma stans</i>	tecoma	Y	Y	
<i>Tecoma stans</i> var. <i>stans</i>		Y	Y	
<i>Tecoma stans</i> var. <i>velutina</i>		Y	Y	
<i>Thunbergia alata</i>	black-eyed Susan		Y	
<i>Thunbergia fragrans</i>			Y	
<i>Thunbergia grandiflora</i>	sky flower	Y	Y	
<i>Thunbergia mysorensis</i>			Y	
<i>Tithonia diversifolia</i>	Japanese sunflower		Y	
<i>Tradescantia fluminensis</i>		Y	Y	
<i>Tradescantia spathacea</i>		Y	Y	
<i>Tradescantia zebrina</i>		Y	Y	
<i>Urena lobata</i>	urena weed		Y	
<i>Urochloa decumbens</i>		Y		
<i>Vachellia nilotica</i>	prickly acacia	Y	Y	
<i>Xanthium occidentale</i>		Y	Y	
<i>Zantedeschia aethiopica</i>		Y	Y	
<i>Ziziphus mauritiana</i>	Indian jujube	Y	Y	

Flora species richness

Flora species richness (total number of species) was calculated for each riverine and non-riverine spatial unit using signings records, input for the expert panels, and a flora wetland indicator species list managed by the Queensland Herbarium and Biodiversity Science. The AquaBAMM definition of wetland dependant flora taxa is:

Species that are adapted to and dependent on living in wet conditions for at least part of their life and are found either within or immediately adjoining a riverine, non-riverine or estuarine wetland.

When applied to flora species this definition extends beyond the more traditional definition of submerged and floating aquatic plants as it includes plants inhabiting the littoral zone (water's edge) and plants that usually have 'wet feet' on the toe of the bank. This meaning was chosen because it was considered to best capture the intent of the measure of species richness (M3.1.5). The Criterion 3.1 Indicator is a measure of the floristic richness of a particular spatial unit's aquatic environment, and hence, a broader definition of aquatic species better depicts the flora richness values at a given location.

The panel identified 351 native wetland dependent flora species relevant to the riverine and non-riverine wetlands of the study areas (Table 4). Taxa were accessed from the corporate databases of WildNet, HERBRECS and CORVEG.

Sightings records for the listed species were used to calculate wetland flora indicator species richness scores for measure 3.1.5 (Richness of native aquatic plants).

Table 4. Native wetland dependent flora taxa known to occur within the study areas

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Acacia stenophylla</i>	belalie	Y	Y	
<i>Acrostichum speciosum</i>	mangrove fern	Y	Y	
<i>Actinoscirpus grossus</i>		Y		
<i>Aponogeton elongatus</i> <i>subsp. elongatus</i>		Y	Y	
<i>Aponogeton queenslandicus</i>			Y	Provides important freshwater habitat in the study areas
<i>Arthraxon hispidus</i>		Y	Y	
<i>Arthraxon hispidus</i> var. <i>hispidus</i>		Y	Y	
<i>Azolla pinnata</i>	ferny azolla	Y	Y	
<i>Bacopa floribunda</i>		Y	Y	
<i>Bacopa monnieri</i>		Y	Y	
<i>Baeckea frutescens</i>		Y		
<i>Baloskion pallens</i>		Y		
<i>Baloskion tenuiculme</i>		Y	Y	
<i>Baloskion tetraphyllum</i> <i>subsp. meiostachyum</i>		Y	Y	
<i>Banksia robur</i>	broad-leaved banksia	Y		
<i>Barringtonia racemosa</i>		Y	Y	

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Blyxa aubertii</i>			Y	
<i>Blyxa octandra</i>			Y	
<i>Bolboschoenus caldwellii</i>		Y		
<i>Bolboschoenus fluviatilis</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Brachyachne tenella</i>		Y		
<i>Brasenia schreberi</i>			Y	
<i>Bruguiera gymnorhiza</i>	large-fruited orange mangrove		Y	
<i>Burchardia umbellata</i>		Y		
<i>Caldesia oligococca</i>		Y		
<i>Callitriche muelleri</i>		Y		
<i>Callitriche sonderi</i>		Y		
<i>Carex fascicularis</i>	tassel sedge	Y	Y	Provides important freshwater habitat in the study areas
<i>Carex gaudichaudiana</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Carex lobolepis</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Casuarina cunninghamiana</i>			Y	
<i>Casuarina cunninghamiana</i> <i>subsp. cunninghamiana</i>			Y	
<i>Casuarina glauca</i>	swamp she-oak	Y		
<i>Ceratophyllum demersum</i>	hornwort		Y	
<i>Ceratopteris thalictroides</i>		Y	Y	A widespread wetland fern
<i>Chara globularis</i>		Y	Y	
<i>Chorizandra cymbaria</i>		Y		
<i>Chorizandra sphaerocephala</i>		Y		
<i>Cladium procerum</i>	leafy twigrush	Y		
<i>Crinum flaccidum</i>	Murray lily	Y		
<i>Crinum pedunculatum</i>	river lily	Y	Y	
<i>Cyclosorus interruptus</i>		Y	Y	
<i>Cycnogeton dubius</i>		Y		
<i>Cycnogeton multifructus</i>		Y		
<i>Cycnogeton procerus</i>		Y		
<i>Cycnogeton rheophilus</i>			Y	
<i>Cynometra iripa</i>			Y	
<i>Cyperus alopecuroides</i>		Y	Y	
<i>Cyperus alterniflorus</i>		Y	Y	
<i>Cyperus aquatilis</i>		Y		

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Cyperus betchei</i>		Y		
<i>Cyperus betchei</i> subsp. <i>betchei</i>		Y	Y	
<i>Cyperus cristulatus</i>		Y		
<i>Cyperus dactyloides</i>		Y	Y	
<i>Cyperus decompositus</i>		Y	Y	
<i>Cyperus difformis</i>	rice sedge	Y		Provides important freshwater habitat in the study areas
<i>Cyperus digitatus</i>		Y	Y	
<i>Cyperus distans</i>			Y	
<i>Cyperus enervis</i>			Y	
<i>Cyperus exaltatus</i>	tall flatsedge	Y	Y	
<i>Cyperus flaccidus</i>		Y	Y	
<i>Cyperus gunnii</i> subsp. <i>gunnii</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Cyperus gunnii</i> subsp. <i>novae-hollandiae</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Cyperus gymnocaulos</i>	spiny flatsedge		Y	
<i>Cyperus haspan</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Cyperus haspan</i> subsp. <i>haspan</i>		Y		
<i>Cyperus haspan</i> subsp. <i>juncoides</i>		Y	Y	
<i>Cyperus laevigatus</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Cyperus lucidus</i>			Y	
<i>Cyperus nutans</i> var. <i>eleusinoides</i>	flatsedge	Y	Y	
<i>Cyperus odoratus</i>		Y	Y	
<i>Cyperus ohwii</i>		Y		
<i>Cyperus pilosus</i>		Y		
<i>Cyperus platystylis</i>		Y		
<i>Cyperus polystachyos</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Cyperus polystachyos</i> var. <i>laxiflorus</i>		Y	Y	
<i>Cyperus polystachyos</i> var. <i>polystachyos</i>			Y	
<i>Cyperus procerus</i>		Y		Provides important freshwater habitat in the study areas

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Cyperus pygmaeus</i>	dwarf sedge	Y	Y	Provides important freshwater habitat in the study areas
<i>Cyperus sanguinolentus</i>		Y	Y	Records in the Proserpine, Fitzroy and Shoalwater study areas
<i>Cyperus scariosus</i>		Y	Y	
<i>Cyperus squarrosus</i>	bearded flatsedge	Y		
<i>Cyperus unioides</i>		Y	Y	
<i>Cyperus vaginatus</i>			Y	
<i>Damasonium minus</i>	starfruit	Y	Y	Found in Brigalow gilgai communities
<i>Dapsilanthus elatior</i>		Y		
<i>Dapsilanthus ramosus</i>		Y	Y	
<i>Dalbergia sissoo</i>	Penny leaf	Y	Y	Suckers profusely over long distance from parent after any disturbance and grows readily from all vegetative parts, including logs. https://cqclandcarenetwork.org.au/plants/penny-leaf/
<i>Dicranopteris linearis</i> var. <i>linearis</i>		Y		
<i>Diplachne fusca</i>		Y	Y	
<i>Diplachne fusca</i> var. <i>fusca</i>		Y		
<i>Drosera auriculata</i>		Y	Y	
<i>Drosera binata</i>	forked sundew	Y		
<i>Drosera burmanni</i>		Y		
<i>Drosera hookeri</i>		Y	Y	
<i>Drosera lanata</i>		Y	Y	
<i>Drosera lunata</i>		Y	Y	
<i>Drosera pygmaea</i>		Y		
<i>Drosera spatulata</i>		Y		
<i>Drosera spatulata</i> var. <i>spatulata</i>		Y	Y	
<i>Duma florulenta</i>		Y		
<i>Echinochloa telmatophila</i>	swamp barnyard grass	Y	Y	
<i>Elatine gratioloides</i>	waterwort	Y	Y	
<i>Eleocharis acuta</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Eleocharis acutangula</i>		Y		
<i>Eleocharis atricha</i>	tuber spikerush	Y	Y	

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Eleocharis atropurpurea</i>		Y		
<i>Eleocharis blakeana</i>		Y	Y	Found in Brigalow gilgai communities
<i>Eleocharis cylindrostachys</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Eleocharis dietrichiana</i>		Y		
<i>Eleocharis dulcis</i>		Y		Provides important freshwater habitat in the study areas
<i>Eleocharis equisetina</i>		Y		Provides important freshwater habitat in the study areas
<i>Eleocharis geniculata</i>		Y		Provides important freshwater habitat in the study areas
<i>Eleocharis ochrostachys</i>		Y	Y	
<i>Eleocharis pallens</i>	pale spikerush	Y		Provides important freshwater habitat in the study areas
<i>Eleocharis philippinensis</i>		Y		Provides important freshwater habitat in the study areas
<i>Eleocharis plana</i>	ribbed spikerush	Y		Provides important freshwater habitat in the study areas
<i>Eleocharis pusilla</i>	small spikerush	Y	Y	
<i>Eleocharis setifolia</i> subsp. <i>setifolia</i>		Y		
<i>Eleocharis sphacelata</i>	tall spikerush	Y		Provides important freshwater habitat in the study areas
<i>Eleocharis spiralis</i>		Y		
<i>Eleocharis sundaica</i>		Y		
<i>Eleocharis tetraquetra</i>		Y		
<i>Elytrophorus spicatus</i>		Y	Y	
<i>Empodisma minus</i>	spreading rope rush	Y		
<i>Eragrostis australasica</i>		Y	Y	
<i>Eremophila bignoniiflora</i>	eurah	Y	Y	
<i>Eriocaulon athertonense</i>		Y	Y	
<i>Eriocaulon australe</i>		Y		
<i>Eriocaulon carsonii</i>		Y	Y	
<i>Eriocaulon carsonii</i> subsp. <i>orientale</i>		Y		
<i>Eriocaulon cinereum</i>		Y	Y	
<i>Eriocaulon nanum</i>		Y		
<i>Eriocaulon pusillum</i>		Y	Y	
<i>Eriocaulon scariosum</i>		Y		
<i>Eucalyptus camaldulensis</i>		Y	Y	

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Eucalyptus camaldulensis</i> <i>subsp. acuta</i>		Y	Y	
<i>Eucalyptus coolabah</i>	<i>coolabah</i>	Y	Y	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. It provides important habitat and source of food for fauna species
<i>Eucalyptus robusta</i>	swamp mahogany	Y		
<i>Eurychorda complanata</i>		Y		
<i>Fimbristylis ferruginea</i>		Y		Typically found on the margins of brackish or fresh water coastal swamps close to the coast
<i>Fimbristylis littoralis</i>		Y	Y	
<i>Fimbristylis microcarya</i>		Y		
<i>Fimbristylis nuda</i>		Y		
<i>Fimbristylis nutans</i>		Y		
<i>Fimbristylis pauciflora</i>		Y		
<i>Fimbristylis polytrichoides</i>		Y		
<i>Fimbristylis quinquangularis</i>			Y	
<i>Fimbristylis schoenoides</i>		Y	Y	
<i>Fimbristylis sieberiana</i>		Y		
<i>Fimbristylis vagans</i>		Y		Provides important freshwater habitat in the study areas
<i>Fuirena incrassata</i>		Y	Y	
<i>Fuirena nudiflora</i>			Y	
<i>Fuirena umbellata</i>		Y		
<i>Gahnia sieberiana</i>	sword grass	Y		Provides important freshwater habitat in the study areas
<i>Glossostigma cleistanthum</i>		Y	Y	
<i>Glossostigma diandrum</i>		Y	Y	
<i>Hemarthria uncinata</i>		Y		Small population, subject to threatening processes
<i>Hemarthria uncinata</i> var. <i>spathacea</i>		Y		
<i>Hemarthria uncinata</i> var. <i>uncinata</i>		Y	Y	
<i>Heritiera littoralis</i>		Y		
<i>Hydrilla verticillata</i>	hydrilla	Y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Hydrocotyle verticillata</i>	shield pennywort	Y		

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Hygrophila angustifolia</i>		Y	Y	
<i>Hymenachne acutigluma</i>		Y		Found on black cracking clay soils in permanent swamps, on the margins of permanent waterholes
<i>Hypolaena fastigiata</i>	tassel rope rush	Y		
<i>Ipomoea aquatica</i>		Y		
<i>Isachne globosa</i>	swamp millet	Y		
<i>Ischaemum australe</i> var. <i>australe</i>		Y		
<i>Ischaemum fragile</i>		Y		
<i>Isoetes muelleri</i>	quillwort	Y	Y	
<i>Isolepis fluitans</i>	floating club rush	Y		Provides important freshwater habitat in the study areas
<i>Isolepis hookeriana</i>		Y	Y	
<i>Isolepis inundata</i>	swamp club rush	Y	Y	Provides important freshwater habitat in the study areas
<i>Juncus aridicola</i>	tussock rush	Y	Y	
<i>Juncus continuus</i>		Y		
<i>Juncus planifolius</i>		Y	Y	
<i>Juncus prismatocarpus</i>	branching rush	Y	Y	
<i>Juncus subglaucus</i>		Y	Y	
<i>Juncus usitatus</i>		Y		
<i>Leersia hexandra</i>	swamp rice grass	Y	Y	Occurs in and around swamps and creeks on coastal floodplains providing important freshwater habitat in the study areas
<i>Lemna aequinoctialis</i>	common duckweed	Y	Y	
<i>Lemna trisulca</i>		Y		
<i>Lepidosperma longitudinale</i>	pithy swordsedg	Y		
<i>Lepilaena australis</i>			Y	
<i>Lepironia articulata</i>		Y		Provides important freshwater habitat in the study areas
<i>Leptocarpus tenax</i>		Y		
<i>Leptochloa digitata</i>		Y	Y	
<i>Leptospermum liversidgei</i>		Y		
<i>Lepyrodia imitans</i>		Y		
<i>Lepyrodia scariosa</i>		Y		
<i>Limnophila aromatica</i>		Y	Y	
<i>Limnophila brownii</i>		Y		
<i>Liparophyllum exaltatum</i>		Y		

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Lomandra hystrix</i>		Y	Y	
<i>Lophostemon suaveolens</i>	swamp box	Y		
<i>Ludwigia octovalvis</i>	willow primrose	Y		
<i>Ludwigia peploides subsp. montevidensis</i>		Y	Y	First collected in New South Wales by George Caley in 1803, so is unlikely to be introduced
<i>Ludwigia perennis</i>			Y	
<i>Lycopus australis</i>	water horehound	Y	Y	
<i>Lygodium microphyllum</i>	snake fern	Y		
<i>Lythrum paradoxum</i>		Y	Y	
<i>Lythrum salicaria</i>	purple loosestrife	Y		
<i>Machaerina articulata</i>	jointed twigrush	Y		Forms significant macrophyte beds. Provides important habitat and a food source for fauna species
<i>Machaerina rubiginosa</i>	soft twigrush	Y		Forms significant macrophyte beds. Provides important habitat and a food source for fauna species
<i>Schoenoplectiella mucronata</i>		Y		Forms significant macrophyte beds. Provides important habitat and a source of food for fauna species
<i>Marsilea costulifera</i>	narrow-leaved nardoo	Y	Y	
<i>Marsilea crenata</i>		Y		
<i>Marsilea drummondii</i>	common nardoo	Y		
<i>Marsilea exarata</i>	sway-back nardoo	Y		
<i>Marsilea hirsuta</i>	hairy nardoo	Y		
<i>Marsilea mutica</i>	shiny nardoo	Y		
<i>Maundia triglochoides</i>		Y	Y	Rare and localised in the study areas
<i>Melaleuca bracteata</i>			Y	Important for structural complexity
<i>Melaleuca cheelii</i>		Y		
<i>Melaleuca dealbata</i>	swamp tea-tree	Y	Y	
<i>Melaleuca fluviatilis</i>			Y	
<i>Melaleuca leucadendra</i>	broad-leaved tea-tree		Y	Important for structural complexity
<i>Melaleuca linariifolia</i>	snow-in summer	Y	Y	Important for structural complexity
<i>Melaleuca pachyphylla</i>		Y		

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Melaleuca quinquenervia</i>	swamp paperbark	Y	Y	Important for structural complexity
<i>Melaleuca thymifolia</i>	thyme honeymyrtle	Y		
<i>Melaleuca trichostachya</i>			Y	
<i>Melaleuca viminalis</i>			Y	
<i>Melastoma malabathricum</i> subsp. <i>malabathricum</i>		Y		Extensive across Queensland but rare in the study areas
<i>Pontederia cyanea</i>		Y		Occurs in Brigalow gilgai communities and can form macrophyte beds. <i>Previously known as: Monochoria cyanea</i>
<i>Myriophyllum artesium</i>		Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Myriophyllum crispatum</i>		Y	Y	
<i>Myriophyllum gracile</i>		Y	Y	
<i>Myriophyllum gracile</i> var. <i>gracile</i>		Y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Myriophyllum gracile</i> var. <i>lineare</i>			Y	
<i>Myriophyllum implicatum</i>		Y	Y	Forms macrophyte beds and is provides important freshwater habitat in the study areas
<i>Myriophyllum jacobsonii</i>		Y	Y	
<i>Myriophyllum muricatum</i>			Y	
<i>Myriophyllum papillosum</i>	common water-milfoil	Y	Y	
<i>Myriophyllum simulans</i>			Y	
<i>Myriophyllum striatum</i>		Y		
<i>Myriophyllum variifolium</i>		Y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Myriophyllum verrucosum</i>	water milfoil		Y	
<i>Najas marina</i>		Y		
<i>Najas tenuifolia</i>	water nymph	Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Nauclea orientalis</i>	Leichhardt tree		Y	
<i>Nelumbo nucifera</i>	pink waterlily	Y	Y	Iconic Lotus species in the Dawson. Forms macrophyte beds and provides important

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
				freshwater habitat in the study areas. Culturally important
<i>Nitella hyalina</i>			Y	
<i>Nitella myriotricha</i>		Y		
<i>Nitella penicillata</i>		Y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Nitella pseudoflabellata</i>		Y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Nitella tasmanica</i>		Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Nymphaea gigantea</i>		Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Nymphaea immutabilis</i>		Y		
<i>Nymphaea pubescens</i>		Y		
<i>Nymphaea violacea</i>		Y	Y	Is an indicator species for better quality wetlands
<i>Nymphoides aurantiaca</i>		Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Nymphoides crenata</i>	wavy marshwort	Y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Nymphoides exiliflora</i>		Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Nymphoides geminata</i>		Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Nymphoides indica</i>	water snowflake	Y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Nymphoides parvifolia</i>		Y		
<i>Ottelia alismoides</i>		Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Ottelia ovalifolia</i>	swamp lily	Y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Panicum larcomianum</i>		Y		

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Panicum obseptum</i>	white water panic	Y		
<i>Panicum paludosum</i>	swamp panic	Y		
<i>Peplidium foecundum</i>		Y		
<i>Peplidium maritimum</i>		Y		
<i>Persicaria attenuata</i>		Y	Y	
<i>Persicaria barbata</i>		Y		
<i>Persicaria decipiens</i>	slender knotweed	Y	Y	
<i>Persicaria dichotoma</i>		Y	Y	
<i>Persicaria hydropiper</i>	water pepper	Y	Y	
<i>Persicaria lapathifolia</i>	pale knotweed	Y	Y	
<i>Persicaria orientalis</i>	princes feathers	Y	Y	
<i>Persicaria praetermissa</i>		Y	Y	
<i>Persicaria prostrata</i>	creeping knotweed	Y	Y	
<i>Persicaria strigosa</i>		Y	Y	
<i>Persicaria subsessilis</i>	hairy knotweed	Y		
<i>Phaius australis</i>		Y		
<i>Philydrum lanuginosum</i>	frogsmouth	Y		
<i>Phragmites australis</i>	common reed	Y	Y	Forms macrophyte beds
<i>Potamogeton crispus</i>	curly pondweed	Y	Y	Forms macrophyte beds
<i>Potamogeton ochreatus</i>	blunt pondweed	Y	Y	
<i>Potamogeton octandrus</i>		Y	Y	
<i>Potamogeton perfoliatus</i>	perfoliate pondweed	Y	Y	
<i>Potamogeton tepperi</i>		Y	Y	Forms macrophyte beds
<i>Potamogeton tricarinatus</i>	floating pondweed	Y	Y	Forms macrophyte beds
<i>Pseudoraphis paradoxa</i>	slender mudgrass	Y	Y	
<i>Pseudoraphis spinescens</i>	spiny mudgrass	Y		
<i>Ranunculus inundatus</i>	river buttercup	Y		
<i>Rhynchospora brownii</i>	beak rush	Y	Y	Provides important freshwater habitat in the study areas
<i>Rhynchospora corymbosa</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Rhynchospora heterochaeta</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Rhynchospora rubra</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Riccia multifida</i>		Y		
<i>Ricciocarpos natans</i>		Y		
<i>Rotala mexicana</i>		Y		Can be associated with Brigalow gilgai communities
<i>Rotala occultiflora</i>		Y		

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Rotala tripartita</i>		Y		
<i>Ruppia maritima</i>	sea tassel	Y	Y	Is a salt-tolerant freshwater species which grows in brackish to hypersaline perennial waterbodies
<i>Sacciolepis indica</i>	Indian cupscale grass	Y		
<i>Samolus valerandi</i>	brookweed		Y	
<i>Schoenoplectus subulatus</i>		Y	Y	
<i>Schoenoplectus tabernaemontani</i>		Y	Y	
<i>Schoenus brevifolius</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Schoenus centralis</i>		Y	Y	
<i>Schoenus falcatus</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Schoenus lepidosperma</i> <i>subsp. pachylepis</i>		Y	Y	
<i>Scleria laxa</i>		Y		
<i>Selaginella uliginosa</i>	swamp selaginella	Y		
<i>Sesuvium portulacastrum</i>	sea purslane	Y		
<i>Sowerbaea juncea</i>	vanilla plant	Y		
<i>Sparganium subglobosum</i>	floating bur-reed		Y	
<i>Sphenoclea zeylanica</i>		Y		Common in wet areas such as seasonal swamps, soaks, lagoons, and floodplains, often on black clay soils
<i>Sporadanthus caudatus</i>		Y	Y	
<i>Sporadanthus interruptus</i>		Y		
<i>Sporobolus virginicus</i>	sand couch	Y		
<i>Sprengelia sprengelioides</i>	sprengelia	Y		
<i>Stuckenia pectinata</i>		Y	Y	
<i>Stylidium debile</i>	frail trigger plant	Y	Y	
<i>Stylidium schizanthum</i>		Y	Y	
<i>Stylidium tenerum</i>		Y		
<i>Stylidium velleioides</i>		Y		
<i>Suaeda australis</i>		Y	Y	
<i>Thelypteris confluent</i>		Y		Mound spring species
<i>Triglochin striata</i>	streaked arrowgrass	Y	Y	
<i>Tristaniopsis exiliflora</i>	kanuka box		Y	
<i>Tristaniopsis laurina</i>			Y	

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Typha domingensis</i>		Y	Y	Provides important freshwater habitat in the study areas
<i>Typha orientalis</i>	broad-leaved cumbungi	Y	Y	
<i>Utricularia aurea</i>	golden bladderwort	Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Utricularia australis</i>	yellow bladderwort	Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Utricularia bifida</i>		Y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Utricularia biloba</i>	moth bladderwort	Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Utricularia blackmanii</i>		Y		
<i>Utricularia caerulea</i>	blue bladderwort	Y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Utricularia dichotoma</i>	fairy aprons	Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Utricularia foveolata</i>		Y		
<i>Utricularia gibba</i>	floating bladderwort	Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Utricularia lateriflora</i>	small bladderwort	Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Utricularia limosa</i>		Y		
<i>Utricularia stellaris</i>		Y		Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Utricularia subulata</i>		Y		
<i>Utricularia uliginosa</i>	asian bladderwort	Y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas
<i>Vallisneria annua</i>		Y		
<i>Vallisneria australis</i>		Y	Y	
<i>Vallisneria nana</i>		y	Y	Forms macrophyte beds and provides important freshwater habitat in the study areas. Is an

Native flora – Scientific Name	Common Name	R	NR	Expert Panel Comments
				indicator of good instream riverine conditions
<i>Vallisneria gigantea</i>		Y	Y	Synonymous with <i>Vallisneria nana</i> . Previously known as: <i>Vallisneria spiralis</i>
<i>Walwhalleya subxerophila</i>		Y	Y	
<i>Waterhousea floribunda</i>	weeping lilly pilly		Y	Found in Brigalow gilgai communities
<i>Xanthorrhoea fulva</i>	swamp grasstree	Y		
<i>Xyris complanata</i>	yellow-eye	Y		
<i>Xyris juncea</i>	dwarf yellow-eye	Y		
<i>Xyris pauciflora</i>		Y	Y	

Near-threatened and threatened flora

The panel identified nine native near-threatened or threatened wetland indicator flora taxa relevant to the riverine and non-riverine wetlands (Table 5). Only species judged to be aquatic or semi-aquatic and scheduled as Near threatened (NT), Vulnerable (V), Endangered (E), or Critically Endangered (CR/CE) under the Queensland Nature Conservation Act 1992 (NCA) or the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC) were considered.

Sightings records for the listed species were used to identify spatial units containing near-threatened or threatened flora taxa to calculate scores for measure 4.1.2 (Presence of near threatened or threatened aquatic ecosystem dependent flora species — NCA, EPBC Act).

Table 5. Native wetland dependent flora taxa that are near-threatened or threatened and known to occur within the study areas

Threatened or Near-threatened flora – Scientific Name	Common Name	NCA Status	EPBC Status	R	NR	Expert Panel Comments
<i>Aponogeton elongatus subsp. elongatus</i>		NT		Y	Y	
<i>Arthraxon hispidus</i>		V	V	Y	Y	
<i>Arthraxon hispidus var. hispidus</i>		V		Y	Y	
<i>Eriocaulon carsonii</i>		E		Y	Y	
<i>Eriocaulon carsonii subsp. orientale</i>		E	E		Y	
<i>Fimbristylis vagans</i>		E			Y	
<i>Maundia triglochinoides</i>		V		Y	Y	
<i>Phaius australis</i>		E	E		Y	

Threatened or Near-threatened flora – Scientific Name	Common Name	NCA Status	EPBC Status	R	NR	Expert Panel Comments
<i>Thelypteris confluens</i>		V			Y	Mound spring species.

Priority flora

Priority flora taxa are defined as wetland dependant flora taxa not listed as NT, V, E, or CR/CE in Queensland or Australian Government legislation but are considered important by the expert panel for the integrity of local aquatic ecosystems as they exhibit one or more of the following priority attributes:

1. It forms significant macrophyte beds (in shallow or deep water).
2. It is an important/critical food source.
3. It is important/critical habitat.
4. It is implicated in spawning or reproduction for other fauna and/or flora species.
5. It is at its distributional limit or is a disjunct population.
6. It provides stream bank or bed stabilisation or has soil-binding properties.
7. It is a small population and subject to threatening processes.
8. Taxa vulnerable to impacts of climate change - Species that are considered to be adversely affected by the predicted changes in climate, e.g. increasing temperatures, sea level rise and increasing frequency of extreme weather events (drought, flood & cyclones).
9. It is an important source of food or medicine for traditional owners.
10. It is associated one or more of five core Aboriginal values: language, song lines, creation stories, trading routes and lore.

The panel identified 45 priority wetland dependant flora taxa relevant to the riverine and non-riverine wetlands of the study areas (Table 6). Only species judged to be aquatic or semi-aquatic dependent were considered.

Sightings records for the listed species were used to identify spatial units containing priority flora taxa to calculate scores for measure 5.1.2 (Presence of aquatic ecosystem dependent 'priority' flora species).

Table 6. Native wetland dependent priority flora taxa nominated by experts

Priority flora – Scientific Name	Common Name	R	NR	Priority Attributes	Expert Panel Comments
<i>Azolla pinnata</i>		Y	Y	1	Important for oxygenating water and improving water quality. Habitat for small insect species.
<i>Casuarina cunninghamiana</i>		Y		2,3	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. Provides important habitat and a food source for fauna species.
<i>Casuarina cunninghamiana</i> subsp. <i>cunninghamiana</i>	She-oak	Y		2,3	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. Provides important habitat and a food source for fauna species.
<i>Cyperus exaltatus</i>	tall flatsedge		Y	1,2,3	Forms significant macrophyte beds. Provides important habitat

Priority flora – Scientific Name	Common Name	R	NR	Priority Attributes	Expert Panel Comments
					and a food source for fauna species.
<i>Duma florulenta</i>	lignum	Y	Y	1,2,3	Forms significant macrophyte beds. Provides important habitat and a food source for fauna species.
<i>Eleocharis dulcis</i>			Y	1,2,3	Forms significant macrophyte beds. Provides important habitat and a food source for fauna species.
<i>Eleocharis sphacelata</i>	tall spikerush		Y	1,2,3	Forms significant macrophyte beds. Provides important habitat and a food source for fauna species.
<i>Eucalyptus camaldulensis</i>		Y		2,3	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. Provides important habitat and a food source for fauna species.
<i>Eucalyptus coolabah</i>	coolabah	Y	Y	2,3,6	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. Provides important habitat and a food source for fauna species.
<i>Eucalyptus robusta</i>	swamp mahogany		Y	3,5	Provides important/critical habitat and is at its distributional limit or is a disjunct population.
<i>Eucalyptus tereticornis</i>		Y	Y	2,3,6	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. Provides important habitat and a food source for fauna species.
<i>Gahnia sieberiana</i>	sword grass		Y	1,2,3	Forms significant macrophyte beds. Provides important habitat and a food source for fauna species.
<i>Ischaemum australe</i> var. <i>australe</i>			y	3,7,8	Forms a grassland on floodplains near Mackay Harbour.
<i>Leersia hexandra</i>	swamp rice grass		Y	1,2	Forms significant macrophyte beds. Provides important habitat

Priority flora – Scientific Name	Common Name	R	NR	Priority Attributes	Expert Panel Comments
					and a food source for fauna species.
<i>Lemna aequinoctialis</i>	common duckweed	Y	Y	1,2	
<i>Lemna trisulca</i>			Y	1,2	
<i>Lepironia articulata</i>			Y	1,2,3	
<i>Lomandra hystrix</i>		Y		2,3,6	Provides important habitat and a food source for fauna species. Helps maintain water quality via bank stabilisation and water filtering.
<i>Machaerina articulata</i>	jointed twigrush		Y	1,2,3	Forms significant macrophyte beds. Provides important habitat and a food source for fauna species.
<i>Machaerina rubiginosa</i>	soft twigrush		Y	1,2,3	Forms significant macrophyte beds. Provides important habitat and a food source for fauna species.
<i>Melaleuca bracteata</i>		Y	Y	2,3,6	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. Provides important habitat and a food source for fauna species.
<i>Melaleuca fluviatilis</i>		Y		2,3	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. Provides important habitat and a food source for fauna species.
<i>Melaleuca leucadendra</i>	Broad-leaved tea-tree	Y	Y	2,3	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. Provides important habitat and a food source for fauna species.
<i>Melaleuca linariifolia</i>	snow-in summer	Y	Y	2,3,6	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. Provides important habitat and a food source for fauna species.

Priority flora – Scientific Name	Common Name	R	NR	Priority Attributes	Expert Panel Comments
<i>Melaleuca quinquenervia</i>	swamp paperbark	Y	Y	2,3,6	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. Provides important habitat and a food source for fauna species.
<i>Melaleuca viminalis</i>	Callistemon	Y	Y	2,3	One of the canopy dominants in regional ecosystem 11.3.25 that contributes to structural complexity. Provides important habitat and a food source for fauna species.
<i>Monochoria cyanea</i>			Y	1,2,3	Forms significant macrophyte beds. Provides important habitat and a source of food for fauna species.
<i>Myriophyllum simulans</i>		Y	Y	2,3	Provides important habitat and a source of food for fauna species.
<i>Myriophyllum verrucosum</i>	Water milfoil	Y	Y	2,3	Provides important habitat and a source of food for fauna species.
<i>Najas tenuifolia</i>	Water nymph	Y	Y	1,2,3	Provides important habitat and a source of food for fauna species.
<i>Nelumbo nucifera</i>	Pink waterlily	Y	Y	1,2,3	Provides important habitat and a source of food for fauna species.
<i>Nymphaea gigantea</i>		Y	Y	1	Forms significant macrophyte beds.
<i>Nymphaea violacea</i>		Y	Y	5	
<i>Nymphoides exiliflora</i>		Y	Y	1,2,3	Forms significant macrophyte beds. Provides important habitat and a source of food for fauna species.
<i>Nymphoides indica</i>	Water snowflake	Y	Y	1,2,3	Forms significant macrophyte beds. Provides important habitat and a source of food for fauna species.
<i>Ottelia alismoides</i>		Y	Y	1,2,3	Forms significant macrophyte beds. Provides important habitat and a source of food for fauna species.
<i>Phragmites australis</i>	common reed	Y	Y	1,3,4,6	Forms significant macrophyte beds. Provides important habitat and a source of food for fauna species.

Priority flora – Scientific Name	Common Name	R	NR	Priority Attributes	Expert Panel Comments
<i>Schoenoplectiella mucronata</i>			Y	1,3,4	Forms significant macrophyte beds. Provides important habitat and a source of food for fauna species.
<i>Schoenoplectus subulatus</i>			Y	1,3,4	
<i>Typha domingensis</i>		Y	Y	1,3,4,6	
<i>Typha orientalis</i>	Broad-leaved cumbungi	Y	Y	1,3,6	Forms significant macrophyte beds. Provides important habitat and a source of food for fauna species.
<i>Vallisneria annua</i>		Y	Y	1	
<i>Vallisneria australis</i>		Y	Y	1	
<i>Vallisneria nana</i>		Y		1	Forms significant macrophyte beds.
<i>Vallisneria spiralis</i>		Y	Y	1	

Fauna

The role of the fauna expert panel is to provide expert advice on the aquatic fauna values of the waterways and wetlands within each study area.

Fauna sightings records compiled from corporate databases including WildNet (extracted October 2024) and the Queensland Fauna Database (extracted January 2025). Records were filtered by precision ($\leq 2,000\text{m}$) and year (≥ 1975). Only records for fauna species dependent upon freshwater wetlands for all or part of their lifecycle were retained.

Exotic fauna

Exotic fauna species found in or likely to invade study area wetlands were evaluated by the panel. Only species known or suspected to cause significant detrimental impact to wetland habitat and/or native species were considered.

The panel identified 29 exotic fauna taxa impacting riverine or non-riverine wetlands within the study areas (Table 7). Sightings records for the listed species were used to identify spatial units containing exotic vertebrate fauna taxa. These taxa counts were used to calculate scores for the measure 1.1.1 (Presence of 'alien' fish species within the wetland), 1.1.3 (Presence of exotic invertebrate fauna within the wetland) and 1.1.4 (Presence of feral/exotic vertebrate fauna (other than fish)).

The expert panel noted that the exotic fish species list is unlikely to include all exotic fish species in the Fitzroy waterways. The north side of Rockhampton has a wide diversity of introduced fish in the waterways from the dumping of introduced pet fish in the 1980s.

The experts listed only one species of invasive ant, yellow crazy ant, as impacting wetlands in the region at this time. However, experts agreed that other invasive ant species are highly likely to have a detrimental effect on wetlands and should be included on this list if incursions are detected in future.

Table 7. Exotic fauna taxa impacting study area wetland values

Exotic fauna – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Bidyanus bidyanus</i>	silver perch	Y		Not native to region.
<i>Carassius auratus</i>	goldfish	Y	Y	Common throughout the Fitzroy River catchments. Uncertain of its impact. Primarily a riverine species.
<i>Cichla sp.</i>	peacock bass	Y	Y	Recently caught. Common in the pet trade and known invasive fish with documented impacts.
<i>Gambusia holbrooki</i>	mosquitofish	Y	Y	Widespread throughout the study area.
<i>Macquaria ambigua</i>	golden perch	Y		Stocking with non-local subspecies threatens genetic integrity of local subspecies (<i>Macquaria ambigua oriens</i>).
<i>Oreochromis mossambica</i>	Mozambique mouthbrooder	Y	Y	Also known as Mozambique tilapia.
<i>Parachromis managuensis</i>	jaguar cichlid	Y	Y	In Mackay region. Capable of colonizing wetlands.

Exotic fauna – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Poecilia reticulata</i>	guppy	Y	Y	
<i>Xiphophorus hellerii</i>	swordtail	Y	Y	Mainly found close to towns, especially Gladstone, as it is usually a fish tank escapee.
<i>Xiphophorus maculatus</i>	platy	Y	Y	Mainly found close to towns as it is usually a fish tank escapee.
<i>Anoplolepis gracilipes</i>	yellow crazy ant	Y	Y	Control program in Whitsundays is underway.
<i>Cherax quadricarinatus</i>	Redclaw crayfish	Y	Y	This species is introduced through aquaculture and stocked impoundments. It is an identified threatening process and a high threat to young freshwater turtles. It can be at very high density in areas with low currents and is spread by flood.
<i>Jamella australiae</i>	pandanus planthopper	Y	Y	Endemic to northern Australia, spread through plant trade. Spreads dieback in Pandanus.
<i>Acridotheres tristis</i>	common myna	Y	Y	Documented predators of marine turtle hatchlings, as well as on lizards and frogs.
<i>Anas platyrhynchos</i>	northern mallard	Y	Y	
<i>Bos indicus</i>	zebu	Y	Y	
<i>Bos taurus</i>	European cattle	Y	Y	
<i>Canis familiaris</i>	dog	Y	Y	
<i>Capra hircus</i>	goat	Y	Y	
<i>Cervus timorensis</i>	rusa deer	Y	Y	Present around Mackay. Impact via browsing on riparian plants. Impacting on St Lawrence Wetlands and Tedlands.
<i>Emydura macquarii macquarii</i>	Murray turtle	Y		Translocated species through the pet trade
<i>Equus caballus</i>	horse	Y	Y	
<i>Felis catus</i>	cat	Y	Y	Widespread throughout the study area.
<i>Mus musculus</i>	house mouse	Y	Y	
<i>Rattus norvegicus</i>	brown rat	Y	Y	
<i>Rattus rattus</i>	black rat	Y	Y	
<i>Rhinella marina</i>	cane toad	Y	Y	Widespread throughout the study area.
<i>Sus scrofa</i>	pig	Y	Y	Major threat to freshwater turtles.
<i>Vulpes vulpes</i>	red fox	Y	Y	Major threat to freshwater turtles.

Fauna species richness

Wetland fauna species richness (total number of species) was calculated for each riverine and non-riverine spatial unit using sightings records and input from the fauna expert panel. The AquaBAMM definition of a fauna wetland dependant species is:

Species that are adapted to and dependent on living in wet conditions for at least part of their life and are found either within or immediately adjoining a riverine, non-riverine or estuarine wetland.

Amphibian richness

The panel identified 34 native wetland dependant amphibian species relevant to the riverine and non-riverine wetlands of the study areas (Table 8). Sightings records for the listed species were used to identify spatial units containing native amphibian taxa to calculate species richness scores for measures 3.1.1 (Richness of native amphibians (riverine wetland breeders)) and 3.1.6 (Richness of native amphibians (non-riverine wetland breeders)).

Table 8. Native wetland dependent amphibian taxa known to occur within study areas

Native amphibians - Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Adelotus brevis</i>	tusked frog	Y	Y	Restricted within the region to Kroombit Tops and Blackdown Tableland.
<i>Crinia deserticola</i>	chirping froglet	Y	Y	
<i>Crinia parinsignifera</i>	beeping froglet	Y	Y	
<i>Crinia signifera</i>	clicking froglet	Y	Y	
<i>Cyclorana brevipes</i>	superb collared frog		Y	
<i>Cyclorana cultripes</i>	grassland collared frog		Y	
<i>Cyclorana novaehollandiae</i>	eastern snapping frog		Y	
<i>Cyclorana platycephala</i>	water holding frog		Y	
<i>Cyclorana verrucosa</i>	rough collared frog		Y	
<i>Limnodynastes convexiusculus</i>	marbled frog		Y	
<i>Limnodynastes grayi</i>	scarlet sided pobblebonk		Y	
<i>Limnodynastes peronii</i>	striped marshfrog	Y	Y	
<i>Limnodynastes salmini</i>	salmon striped frog		Y	Possible population decline.
<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		Y	
<i>Litoria balatus</i>	slender bleating treefrog		Y	
<i>Litoria bicolor</i>	northern sedgefrog	Y	Y	Thought to be at its southernmost extent in the study area.
<i>Litoria fallax</i>	eastern sedgefrog	Y	Y	
<i>Litoria gracilenta</i>	graceful treefrog	Y	Y	
<i>Litoria inermis</i>	bumpy rocketfrog		Y	

Native amphibians - Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Litoria kroombitensis</i>	Kroombit treefrog	Y		
<i>Litoria infrafrenata</i>	white lipped treefrog	Y	Y	
<i>Litoria latopalmata</i>	broad palmed rocketfrog		Y	
<i>Litoria nasuta</i>	striped rocketfrog	Y	Y	
<i>Litoria peronii</i>	emerald spotted treefrog	Y	Y	
<i>Litoria revelata</i>	whirring treefrog	Y	Y	
<i>Litoria rothii</i>	eastern laughing treefrog	Y	Y	
<i>Litoria rubella</i>	ruddy treefrog	Y	Y	
<i>Litoria wilcoxii</i>	eastern stony creek frog	Y		Many records from across the study area but distribution is still poorly understood and risks to species are unknown.
<i>Mixophyes fasciolatus</i>	great barred frog	Y	Y	Within the region it is restricted to Kroombit Tops.
<i>Notaden bennettii</i>	holy cross frog		Y	
<i>Platyplectrum ornatum</i>	ornate burrowing frog	Y	Y	
<i>Taudactylus eungellensis</i>	Eungella dayfrog	Y		This species is endemic to the study area.
<i>Taudactylus liemi</i>	Eungella tinkerfrog	Y		This species is endemic to the study area.
<i>Taudactylus pleione</i>	Kroombit tinkerfrog	Y		Globally restricted to rainforest streams of Kroombit Tops.

Fish richness

The panel identified 61 native wetland dependant fish species relevant to the riverine and non-riverine wetlands of the study areas (Table 9). Sightings records for the listed species were used to identify spatial units containing native fish taxa to calculate species richness scores for measure 3.1.2 (Richness of native fish).

Table 9. Native wetland dependant fish taxa known to occur within the study areas

Native fish – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Ambassis agassizii</i>	Agassiz's glassfish	Y		Common in the region. Also known as olive perchlett.
<i>Ambassis agrammus</i>	sailfin glassfish	Y	Y	Recorded rarely in Carmila Creek.
<i>Ambassis vachellii</i>	Vachell's glassfish	Y		

Native fish – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Ambassis marianus</i>	Estuary glassfish	Y	Y	https://reefcatchments.com.au/files/2023/09/Macs-Alligator-Creek-Wetlands-Fish-community-Assessment-2023.pdf
<i>Amniataba percoides</i>	barred grunter	Y	Y	
<i>Anguilla australis</i>	southern shortfin eel	Y	Y	
<i>Anguilla obscura</i>	Pacific shortfin eel	Y	Y	Shortfin and longfin eel are easily misidentified. Shortfin eel is primarily found in habitats close to the coast.
<i>Anguilla reinhardtii</i>	longfin eel	Y	Y	Shortfin and longfin eel are easily misidentified. Shortfin eel is primarily found in habitats close to the coast.
<i>Arrhamphus sclerolepis</i>	snubnose garfish	Y	Y	
<i>Awaous acritosus</i>	roman-nose goby	Y		
<i>Carcharhinus leucas</i>	bull shark	Y		Sometimes use freshwater to shed parasite loads.
<i>Craterocephalus fulvus</i>		Y		Caught in the lower Dawson.
<i>Craterocephalus marjoriae</i>	silverstreak hardyhead	Y		
<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead	Y	Y	
<i>Gerres filamentosus</i>	threadfin silverbidy	Y		Known to occur in freshwater.
<i>Elops hawaiiensis</i>	giant herring	Y	Y	https://reefcatchments.com.au/files/2023/09/Macs-Alligator-Creek-Wetlands-fishway-monitoring-report.pdf
<i>Giuris margaritacea</i>	snakehead gudgeon	Y	Y	
<i>Glossamia aprion</i>	mouth almighty	Y	Y	
<i>Glossogobius giuris</i>	tank goby	Y		
<i>Gobiomorphus australis</i>	striped gudgeon	Y		
<i>Hephaestus fuliginosus</i>	sooty grunter	Y	Y	Introduced into Fitzroy Catchment. Found in Proserpine. Some populations may be translocated, treat as native unless other evidence is found.
<i>Hypseleotris acropinna</i>	cryptic carp gudgeon	Y	Y	Difficult to distinguish from and often hybridises with <i>H. bucephala</i> (Thacker et al. 2022a,b). Formerly Murray-Darling carp gudgeon.

Native fish – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Hypseleotris bucephala</i>	boofhead carp gudgeon	Y		Difficult to distinguish from and often hybridises with <i>H. acropinna</i> (Thacker et al. 2022a,b). Formerly Midgley's carp gudgeon.
<i>Hypseleotris compressa</i>	empire gudgeon	Y	Y	<i>Hypseleotris</i> spp. area not a good water quality indicator as tolerant of high turbidity and high EC.
<i>Hypseleotris galii</i>	firetail gudgeon	Y	Y	
<i>Hypseleotris klunzingeri</i>	western carp gudgeon	Y	Y	
<i>Kuhlia rupestris</i>	jungle perch	Y		Very rare in Mackay - Whitsundays area now. St Lawrence is still a location for the species. Climate change and fish barriers are significantly affecting the population.
<i>Lates calcarifer</i>	barramundi	Y	Y	Populations are suspected to have increased following net fishing ban.
<i>Leiopotherapon unicolor</i>	spangled perch	Y	Y	Found throughout the study area.
<i>Liza subviridis</i>	greenback mullet	Y	Y	Sometimes feeds in freshwater. Spawns at sea.
<i>Lutjanus argentimaculatus</i>	mangrove jack	Y		Unique species that uses all habitats from freshwater to coral reefs. Tends to use freshwater environs on an opportunistic basis.
<i>Macquaria ambigua orientalis</i>	golden perch	Y		Subspecies <i>orientalis</i> is endemic to region. Subspecies has experienced a significant reduction in its already naturally restricted distribution. Stocking with non-local subspecies threatens genetic integrity of local subspecies (<i>Macquaria ambigua orientalis</i>)
<i>Megalops cyprinoides</i>	oxeye herring	Y	Y	Migratory species that has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area. Its habitat is also under threat. More correctly known as oxeye tarpon.

Native fish – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Melanotaenia splendida splendida</i>	eastern rainbowfish	Y	Y	
<i>Mogurnda adspersa</i>	southern purplespotted gudgeon	Y	Y	Seen around the Whitsundays and Fitzroy Basin.
<i>Mordacia praecox</i>	non-parasitic lamprey	Y		Newly listed. Lampreys captured near Byfield. Praecox most likely recorded in region, known to be riverine.
<i>Mugil cephalus</i>	sea mullet	Y	Y	Migratory species that has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area. Its habitat is also under threat.
<i>Nematalosa erebi</i>	bony bream	Y	Y	Not a good water quality indicator as tolerant of high turbidity and high EC.
<i>Neoarius graeffei</i>	blue catfish	Y	Y	Found throughout the study area.
<i>Neosilurus ater</i>	black catfish	Y	Y	
<i>Neosilurus hyrtlui</i>	Hyrtl's catfish	Y	Y	Common throughout the study area.
<i>Notesthes robusta</i>	bullrout	Y	Y	
<i>Ophiocara porocephala</i>	spangled gudgeon	Y	Y	Small population that has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area.
<i>Ophisternon gutturale</i>	swamp eel	Y	Y	
<i>Ophisternon bengalense</i>	One-gilled eel	Y	Y	https://reefcatchments.com.au/files/2023/09/J1060-Sandringham-Bay-Fish-Community-Survey-2021-1-1.pdf
<i>Oxyeleotris aruensis</i>	Aru gudgeon	Y		
<i>Oxyeleotris lineolata</i>	sleepy cod	Y	Y	
<i>Philypnodon grandiceps</i>	flathead gudgeon	Y	Y	
<i>Porochilus rendahli</i>	Rendahli's catfish	Y	Y	
<i>Prionobutis microps</i>	smalleye gudgeon	Y		
<i>Pseudomugil mellis</i>	honey blue eye		Y	
<i>Pseudomugil signifer</i>	Pacific blue eye	Y	Y	
<i>Redigobius bikolanus</i>	speckled goby	Y	Y	
<i>Rhadinocentrus ornatus</i>	ornate rainbowfish	Y	Y	Reliable records from Shoalwater Bay.

Native fish – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Scatophagus argus</i>	spotted scat	Y		
<i>Scleropages leichardti</i>	southern saratoga	Y	Y	Endemic to the study area. This species' entire breeding population occurs within wetlands.
<i>Scortum barcoo</i>	Barcoo grunter	Y		Caught at Comet weir.
<i>Scortum hillii</i>	leathery grunter	Y	Y	Endemic to the study area. This species' entire breeding population occurs within wetlands. The small population is also threatened by loss of habitat.
<i>Selenotoca multifasciata</i>	striped scat	Y	Y	
<i>Strongylura krefftii</i>	freshwater longtom	Y	Y	Population fluctuates markedly. It is found in Awoonga Dam, Calliope, Callide, Fitzroy and Pioneer River catchments. Experienced a serious population decline and is further threatened by loss of habitat.
<i>Tandanus tandanus</i>	freshwater catfish	Y	Y	
<i>Terapon jarbua</i>	crescent grunter	Y		Found in the Calliope River.
<i>Toxotes chatareus</i>	sevenspot archerfish	Y	Y	
<i>Trachystoma petardi</i>	Pinkeye mullet	Y	Y	Migratory species that has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area. Its habitat is also under threat.

Reptile richness

The panel identified 17 native wetland dependant reptile species relevant to the riverine and non-riverine wetlands of the study areas (Table 10). Sightings records for the listed species were used to identify spatial units containing native reptile taxa to calculate scores for measure 3.1.3 (Richness of native wetland dependent reptiles).

Table 10. Native wetland dependent reptile taxa known to occur within the study areas

Native reptiles – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Chelodina canni</i>	Cann's snake-necked turtle	Y	Y	Found in Mackay area, but not in Fitzroy Basin. No confirmed sightings south of Mackay.

Native reptiles – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Chelodina canni x longicollis</i>	Snake-necked Turtle	Y	Y	Found in Styx/Shoalwater catchments. Stable hybrid population.
<i>Chelodina longicollis</i>	eastern snake-necked turtle	Y	Y	Northern boundary is Water Park, Fitzroy and into the Isaac. No records along coastal strip in Shoalwater, Styx and Plain. Turtles in the Shoalwater Bay/Styx area are a hybrid population of longicollis x canni.
<i>Chelodina expansa</i>	broad-shelled river turtle	Y	Y	Scattered at low density throughout broader Fitzroy Catchment, but no confirmed records further north. At the northern limit of its range in this study area.
<i>Crocodylus porosus</i>	estuarine crocodile	Y	Y	
<i>Denisonia maculata</i>	ornamental snake	Y	Y	Frog specialist that inhabits non-riverine wetlands and cracking clay soil on floodplains.
<i>Elseya albagula</i>	white-throated snapping turtle	Y	Y	This species aggregates to breed, which means that there is critical breeding habitat that needs to be protected. This breeding habitat is threatened by bank stabilisation. Will use non riverine habitat near a riverine system.
<i>Emydura macquarii krefftii</i>	Krefft's river turtle	Y	Y	
<i>Eulamprus quoyii</i>	eastern water skink	Y	Y	
<i>Hemiaspis damelii</i>	grey snake		Y	
<i>Hemiaspis signata</i>	black-bellied swamp snake	Y	Y	Largely non-riverine as it prefers swampy areas with frogs as a food source.
<i>Intellagama lesueurii</i>	eastern water dragon	Y	Y	
<i>Liasis fuscus</i>	water python	Y	Y	
<i>Pseudechis porphyriacus</i>	red-bellied black snake	Y	Y	Frog specialist that inhabits aquatic systems primarily, but in rainforest can occur away from water.
<i>Rheodytes leukops</i>	Fitzroy River turtle	Y		Listed as endangered under EPBA (September 2024) and NCA (December 2023). This species aggregates to breed, which means that there is critical

Native reptiles – Scientific Name	Common Name	R	NR	Expert Panel Comments
				breeding habitat that needs to be protected. This breeding habitat is threatened by bank stabilisation.
<i>Tropidonophis mairii</i>	freshwater snake	Y	Y	
<i>Wollumbinia latisternum</i>	saw-shelled turtle	Y		

Waterbird richness

The panel identified 93 native wetland dependant bird species relevant to the riverine and non-riverine wetlands of the study areas (Table 11). Only bird species inhabiting freshwater wetland environments for all, or part of their life history were considered.

Sightings records for the listed species were used to identify spatial units containing native bird taxa to calculate species richness scores for measure 3.1.4 (Richness of native waterbirds).

Table 11. Native wetland dependent bird taxa known to occur within the study areas

Native birds – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Acrocephalus australis</i>	Australian reed-warbler	Y	Y	
<i>Actitis hypoleucos</i>	common sandpiper	Y	Y	
<i>Amaurornis cinerea</i>	white-browed crane	Y	Y	
<i>Amaurornis moluccana</i>	pale-vented bush-hen	Y	Y	
<i>Anas castanea</i>	chestnut teal	Y	Y	
<i>Anas gracilis</i>	grey teal	Y	Y	
<i>Anas superciliosa</i>	Pacific black duck	Y	Y	
<i>Anhinga novaehollandiae</i>	Australasian darter	Y	Y	
<i>Anseranas semipalmata</i>	magpie goose	Y	Y	
<i>Antigone rubicunda</i>	Brolga	Y	Y	
<i>Ardea alba modesta</i>	eastern great egret	Y	Y	Also known or believed to migrate in large numbers to New Guinea and/or Indonesia.
<i>Ardea intermedia</i>	intermediate egret	Y	Y	
<i>Ardea pacifica</i>	white-necked heron	Y	Y	
<i>Ardea sumatrana</i>	great-billed heron	Y	Y	Rarely seen in region.
<i>Aythya australis</i>	Hardhead	Y	Y	
<i>Botaurus poiciloptilus</i>	Australasian bittern		Y	
<i>Bubulcus ibis</i>	cattle egret	Y	Y	Sedentary and migratory populations can be present at same location.
<i>Butorides striata</i>	striated heron	Y	Y	

Native birds – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Calidris acuminata</i>	sharp-tailed sandpiper		Y	
<i>Calidris ferruginea</i>	curlew sandpiper		Y	
<i>Calidris ruficollis</i>	red-necked stint		Y	
<i>Caligavis chrysops</i>	yellow honeyeater	Y	Y	Strongly associated with rivers and wetlands, less so in the north.
<i>Ceyx azureus</i>	azure kingfisher	Y	Y	
<i>Ceyx pusillus</i>	little kingfisher	Y	Y	Present from Mackay to Cape Hillsborough and west to Eungella NP. Present in Waterpark Creek.
<i>Charadrius ruficapillus</i>	red-capped plover		Y	
<i>Chenonetta jubata</i>	Australian wood duck	Y	Y	
<i>Chlidonias hybrida</i>	whiskered tern	Y	Y	
<i>Chlidonias leucopterus</i>	white-winged black tern	Y	Y	
<i>Chroicocephalus novaehollandiae</i>	silver gull	Y	Y	
<i>Circus approximans</i>	swamp harrier		Y	
<i>Cygnus atratus</i>	black swan	Y	Y	
<i>Dendrocygna arcuata</i>	wandering whistling-duck		Y	
<i>Dendrocygna eytoni</i>	plumed whistling-duck		Y	
<i>Egretta garzetta</i>	little egret	Y	Y	
<i>Egretta novaehollandiae</i>	white-faced heron	Y	Y	
<i>Eseyornis melanopus</i>	black-fronted dotterel	Y	Y	
<i>Ephippiorhynchus asiaticus</i>	black-necked stork	Y	Y	
<i>Epthianura crocea macgregori</i>	yellow chat (Dawson)		Y	Limited distribution, habitat threatened.
<i>Erythronys cinctus</i>	red-kneed dotterel	Y	Y	
<i>Fulica atra</i>	Eurasian coot	Y	Y	
<i>Gallinago hardwickii</i>	Latham's snipe	Y	Y	
<i>Gallinula tenebrosa</i>	dusky moorhen	Y	Y	
<i>Gallirallus philippensis</i>	buff-banded rail		Y	
<i>Gelochelidon macrotarsa</i>	Australian tern	Y	Y	
<i>Gelochelidon nilotica</i>	gull-billed tern	Y	Y	A coastal sighting near Yeppoon; it's use of other wetlands is likely.
<i>Haematopus longirostris</i>	Australian pied oystercatcher		Y	

Native birds – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle	Y	Y	
<i>Haliastur indus</i>	brahminy kite	Y	Y	Travels well up river systems and hunts in both riverine and non-riverine habitats.
<i>Himantopus leucocephalus</i>	pied stilt	Y	Y	
<i>Hydroprogne caspia</i>	Caspian tern	Y	Y	
<i>Irediparra gallinacea</i>	comb-crested jacana	Y	Y	
<i>Ixobrychus dubius</i>	Australian little bittern	Y	Y	
<i>Ixobrychus flavicollis</i>	black bittern	Y	Y	
<i>Lewinia pectoralis</i>	Lewin's rail	Y	Y	Limited sightings in region.
<i>Limosa limosa</i>	black-tailed godwit		Y	
<i>Malacorhynchus membranaceus</i>	pink-eared duck		Y	
<i>Microcarbo melanoleucos</i>	little pied cormorant	Y	Y	
<i>Myiagra Alecto</i>	shining flycatcher	Y	Y	
<i>Neochmia phaeton phaeton</i>	crimson finch	Y	Y	One known population remains, north-west of Marlborough.
<i>Nettapus coromandelianus</i>	cotton pygmy-goose	Y	Y	Habitat has been extensively modified and range has become restricted. Fluctuating population.
<i>Nettapus pulchellus</i>	green pygmy-goose	Y	Y	
<i>Nycticorax caledonicus</i>	nankeen night-heron	Y	Y	
<i>Pandion haliaetus cristatus</i>	eastern osprey	Y	Y	
<i>Pelecanus conspicillatus</i>	Australian pelican	Y	Y	
<i>Phalacrocorax carbo</i>	great cormorant	Y	Y	
<i>Phalacrocorax sulcirostris</i>	little black cormorant	Y	Y	
<i>Phalacrocorax varius</i>	pied cormorant	Y	Y	
<i>Platalea flavipes</i>	yellow-billed spoonbill	Y	Y	
<i>Platalea regia</i>	royal spoonbill	Y	Y	
<i>Plegadis falcinellus</i>	glossy ibis		Y	
<i>Pluvialis fulva</i>	Pacific golden plover		Y	
<i>Podiceps cristatus</i>	great crested grebe		Y	
<i>Poliocephalus poliocephalus</i>	hoary-headed grebe		Y	
<i>Poodytes gramineus</i>	little grassbird	Y	Y	
<i>Porphyrio melanotus</i>	purple swamphen	Y	Y	
<i>Porzana fluminea</i>	Australian spotted crane	Y	Y	
<i>Radjah radjah</i>	radjah shelduck	Y	Y	

Native birds – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Ramsayornis fasciatus</i>	bar-breasted honeyeater	Y	Y	
<i>Recurvirostra novaehollandiae</i>	red-necked avocet		Y	In riverine systems only found in the estuaries of rivers and creeks where it feeds on mudflats.
<i>Rostratula australis</i>	Australian painted-snipe	Y	Y	Habitat and feeding grounds have been extensively modified. Reduction in population is cause for concern.
<i>Spatula rhynchotis</i>	Australasian shoveler		Y	
<i>Stictonetta naevosa</i>	freckled duck		Y	
<i>Tachybaptus novaehollandiae</i>	Australasian grebe	Y	Y	
<i>Thalasseus bergii</i>	crested tern	Y	Y	
<i>Threskiornis Molucca</i>	Australian white ibis	Y	Y	
<i>Threskiornis spinicollis</i>	straw-necked ibis		Y	
<i>Tribonyx ventralis</i>	black-tailed native-hen	Y	Y	
<i>Tringa glareola</i>	wood sandpiper	Y	Y	
<i>Tringa nebularia</i>	common greenshank	Y	Y	
<i>Tringa stagnatilis</i>	marsh sandpiper		Y	
<i>Vanellus miles miles</i>	masked lapwing (northern subspecies)	Y	Y	
<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)	Y	Y	
<i>Zapornia pusilla</i>	Baillon's crake	Y	Y	Cryptic species that is irregularly reported in region.
<i>Zapornia tabuensis</i>	Spotless crake	Y	Y	

Mammal richness

Seven native wetland dependant mammal species were considered by the panel to be relevant to the riverine and non-riverine wetlands of the study areas (Table 12). Sightings records for the listed species were used to identify spatial units containing mammal taxa to calculate species richness scores for measure 3.1.7 (Richness of native wetland dependent mammals).

Table 12. Native dependent mammal taxa known to occur within the study areas

Native mammals – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Hydromys chrysogaster</i>	water rat	Y	Y	Before resort was built on Wild Duck Island, this species was

Native mammals – Scientific Name	Common Name	R	NR	Expert Panel Comments
				uncommon. Resort built impoundments to hold water through dry season and water rat is now abundant and is now a regular predator of turtle hatchlings.
<i>Myotis macropus</i>	large-footed myotis	Y	Y	
<i>Ornithorhynchus anatinus</i>	platypus	Y	Y	Common species which thrives even in disturbed habitats.
<i>Pteropus alecto</i>	black flying-fox	Y	Y	
<i>Pteropus poliocephalus</i>	grey-headed flying-fox	Y	Y	
<i>Pteropus scapulatus</i>	little red flying-fox	Y	Y	
<i>Rattus lutreolus</i>	swamp rat	Y	Y	
<i>Xeromys myoides</i>	Water mouse	Y	Y	https://pioneercatchment.org.au/wp-content/uploads/2020/05/Project-Flyer.pdf , https://pioneercatchment.org.au/wp-content/uploads/2024/08/Water-mouse-case-study.pdf

Macroinvertebrate richness

Eight native wetland dependant macroinvertebrate taxa were considered by the panel to be relevant to the riverine and non-riverine wetlands of the study areas (Table 13). However, the expert panel advised against using this wetland dependent macroinvertebrate taxa list to calculate macroinvertebrate diversity for AquaBAMM measure 3.2.1 (Richness of macroinvertebrate taxa). They based this recommendation on the lack of macroinvertebrate surveys across the region.

Where available, ACAs have used maximum richness scores derived from higher-level macroinvertebrates studies undertaken using recognised survey and analysis methods (i.e., those used by Conrick & Cockayne 2000, Chessman 2003, and Healthy Waterways 2014). Such methods estimate macroinvertebrate diversity at the broad taxonomic group level (e.g., sub-family, family, order, or class) and are better suited to regional scale assessments of biodiversity values.

Higher-level macroinvertebrates studies were unavailable for the region so measure 3.2.1 (Richness of macroinvertebrate taxa) was not calculated for the FGBRCC ACA.

Table 13. Native wetland dependent macroinvertebrate taxa known to occur within the study areas

Native macroinvertebrates – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Cherax austini</i>			Y	Endemic to Whitsunday Island, known only from a single location (Coughran et al. 2012)

Native macroinvertebrates – Scientific Name	Common Name	R	NR	Expert Panel Comments
<i>Cherax cid</i>		Y		Endemic to Whitsunday Island, known only from a single location (Coughran et al. 2012)
<i>Cherax depressus</i>		Y	Y	Adults are typically semi-aquatic in gullies, temporary pools and shallow creeks with limited flow; also common in farm dams.
<i>Cherax destructor</i>	common yabby	Y	Y	
<i>Euastacus eungella</i>	Eungella spiny crayfish	Y		Endemic species with only a small population threatened by loss of habitat.
<i>Euastacus monteithorum</i>	Monteith's crayfish	Y		Endemic species with only a small population threatened by loss of habitat.
<i>Macrobrachium sp.</i>	freshwater prawns	Y		
<i>Triops australiensis</i>	shield shrimp	Y	Y	Extremely abundant where present.
<i>Austrathelphusa transversa</i>	freshwater crab	Y	Y	Exists in natural creek lines, but not engineered creek channels. It can be found west of the Great Dividing range from Fitzroy River to Chillagoe and south to Lake Eyre.
<i>Varuna litterata</i>	freshwater crab	Y	Y	Can be found in tropical and subtropical areas. It lives in coastal flowing streams and waterbodies. Marine larval development is required.
<i>Alathyria jacksoni</i>	jacksons freshwater mussel	Y		Abundant in the Fitzroy, good water quality indicator.
<i>Velesunio ambiguus</i>	billabong mussel		Y	Abundant in the Fitzroy, good water quality indicator. Important food source for Water Mouse.
<i>Ephydatia multidentate</i>	freshwater sponge	Y		Observed to be eaten by turtles but not the primary food source.

Near threatened and threatened fauna

The panel identified 24 native near-threatened or threatened wetland dependant fauna taxa relevant to the riverine and non-riverine wetlands of the study areas (Table 14). Only wetland dependent species scheduled as NT, V, E, or CR/CE under the NCA or the EPBC Act were considered.

Sightings records for the listed species were used to identify spatial units containing near threatened or threatened fauna taxa to calculate scores for measure 4.1.1 (Presence of rare or threatened aquatic ecosystem dependent fauna species - NCA, EPBC Act).

Table 14. Threatened and near-threatened wetland dependent fauna taxa known to occur within the study areas

Threatened or Near-threatened fauna – Scientific Name	Common Name	NCA Status	EPBC Status	R	NR	Expert panel Comments
<i>Adelotus brevis</i>	tusked frog	V		Y	Y	Restricted within the region to Kroombit Tops and Blackdown Tableland.
<i>Botaurus poiciloptilus</i>	Australasian bittern	E	E		Y	
<i>Calidris acuminata</i>	sharp-tailed sandpiper	SL	V		Y	
<i>Calidris ferruginea</i>	curlew sandpiper	CR	CE		Y	
<i>Crocodylus porosus</i>	estuarine crocodile	V		Y	Y	
<i>Denisonia maculata</i>	ornamental snake	V	V	Y	Y	Frog specialist that inhabits non-riverine wetlands and cracking clay soil on floodplains.
<i>Elseya albagula</i>	white-throated snapping turtle	CR	CE	Y	Y	This species aggregates to breed, which means that there is critical breeding habitat that needs to be protected. This breeding habitat is threatened by bank stabilisation. Will use non riverine habitat near a riverine system.
<i>Epthianura crocea macgregori</i>	yellow chat (Dawson)	E	CE		Y	This taxon is endemic to the study area.
<i>Euastacus eungella</i>	Eungella spiny crayfish	E	E	Y		Endemic species with only a small population threatened by loss of habitat.

Threatened or Near-threatened fauna – Scientific Name	Common Name	NCA Status	EPBC Status	R	NR	Expert panel Comments
<i>Euastacus monteithorum</i>	Monteith's crayfish	E	E	Y		Endemic species with only a small population threatened by loss of habitat.
<i>Gallinago hardwickii</i>	Latham's snipe	SL	V	Y	Y	
<i>Hemiaspis damelii</i>	grey snake	E	E		Y	
<i>Limosa limosa</i>	black-tailed godwit	SL	E		Y	
<i>Litoria kroombitensis</i>	Kroombit treefrog	CR	CE	Y		
<i>Mordacia praecox</i>	non-parasitic lamprey	E	E	Y		Newly listed. Lampreys captured near Byfield. Praecox most likely recorded in region, known to be riverine.
<i>Pseudomugil mellis</i>	honey blue eye	E	E		Y	
<i>Pteropus poliocephalus</i>	grey-headed flying-fox	C	V	Y	Y	
<i>Rheobatrachus vitellinus</i>	northern gastric brooding frog	EX	EX	Y		This species has now been formally declared as extinct. It was endemic to the study area.
<i>Rheodytes leukops</i>	Fitzroy River turtle	E	V	Y		Listed as endangered under EPBA (September 2024) and NCA (December 2023). This species aggregates to breed, which means that there is critical breeding habitat that needs to be protected. This breeding habitat is threatened by bank stabilisation.

Threatened or Near-threatened fauna – Scientific Name	Common Name	NCA Status	EPBC Status	R	NR	Expert panel Comments
<i>Rostratula australis</i>	Australian painted-snipe	E	E	Y	Y	Habitat and feeding grounds have been extensively modified.
<i>Taudactylus eungellensis</i>	Eungella dayfrog	E	E	Y		This species is endemic to the study area.
<i>Taudactylus liemi</i>	Eungella tinkerfrog	NT		Y		This species is endemic to the study area.
<i>Taudactylus pleione</i>	Kroombit tinkerfrog	CR	CE	Y		Globally restricted to rainforest streams of Kroombit Tops.
<i>Tringa nebularia</i>	common greenshank	SL	E	Y	Y	
<i>Xeromys myoides</i>	Water mouse	V	V			https://pioneercatchment.org.au/wp-content/uploads/2020/05/Project-Flyer.pdf , https://pioneercatchment.org.au/wp-content/uploads/2024/08/Water-mouse-case-study.pdf

Priority fauna

The panel deliberated on all wetland dependent fauna species within the study areas to identify priority fauna. Priority taxa are defined as those not listed as NT, V, E, or CE in Queensland or Australian Government legislation but are considered significant within the study region as they exhibit one or more of the following attributes:

1. It is endemic to the study area (75% of its distribution is in the study area/catchment).
2. It has experienced, or is suspected of experiencing, a serious population decline.
3. It has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area/catchment.
4. It is currently a small population and threatened by loss of habitat.
5. It is a significant disjunct population.
6. It is a migratory species (other than birds).
7. A significant proportion of the breeding population (1% for waterbirds, 75% other species) occurs in the waterbody (see Ramsar Criterion 6 for waterbirds).
8. Taxa vulnerable to impacts of climate change - Species that are considered to be adversely affected by the predicted changes in climate e.g. increasing temperatures, sea level rise and increasing frequency of extreme weather events (drought, flood & cyclones). Species can only be listed under this reason if there is sufficient knowledge of species' biology and

its interaction with climate that would support an assessed impact under climate change scenarios.

9. It is an important source of food or medicine for traditional owners.
10. It is associated with one or more of the five core Aboriginal values: language, song lines, creation stories, trading routes and lore.

Priority species

The panel identified 15 priority fauna taxa relevant to the riverine and non-riverine wetlands of study areas (Table 15). Sightings records for the listed species were used to identify spatial units containing priority fauna taxa to calculate scores for measure 5.1.1 (Presence of aquatic ecosystem dependent 'priority' fauna species).

Table 15. Wetland dependent priority fauna taxa known to occur within the study areas

Priority fauna – Scientific Name	Common Name	R	NR	Priority Attributes	Expert Panel Comments
<i>Cherax austini</i>			Y	1,7	Endemic to Whitsunday Island, known only from a single location (Coughran et al. 2012)
<i>Cherax cid</i>		Y		1,7	Endemic to Whitsunday Island, known only from a single location (Coughran et al. 2012)
<i>Kuhlia rupestris</i>	jungle perch	Y		2,3,4,5,6,8	Very rare in Mackay-Whitsundays area now. St Lawrence is still a location for the species. Climate change and fish barriers are significantly affecting the population.
<i>Lates calcarifer</i>	barramundi	Y	Y	6,8	Species is iconic, thought to be increasing in abundance locally following ban on net fishing. In-stream impoundments will always be an issue, which is compounded by climate change. 8000 barriers identified in Mackay-Whitsundays. Stocking is causing superabundance in some parts of the study area. Currently population is not at risk but given threatening processes they could become so in future.
<i>Macquaria ambigua</i>	golden perch	Y		1,2,3,4,6,8	<i>Macquaria ambigua oriens</i> . Stocked <i>M. ambigua</i> may represent a hybridisation threat. Threatened by water management impacting on

Priority fauna – Scientific Name	Common Name	R	NR	Priority Attributes	Expert Panel Comments
					spawning behaviour. High EC impacts on egg survival. Impacted by climate change through sea-level rise. Possibly migratory and impacted by fish barriers.
<i>Megalops cyprinoides</i>	oxeye herring	Y	Y	2,3,6	More correctly known as oxeye tarpon. Complex lifecycle, need a range of habitat types. Migratory.
<i>Mixophyes fasciolatus</i>	great barred frog	Y	Y	5,8	Within the region it is restricted to Kroombit Tops. Disjunct population and northern limit for the species.
<i>Mugil cephalus</i>	sea mullet	Y	Y	2,3,6	Not rare, but not as common as it used to be. Important commercial, recreational and cultural fish species. Migratory.
<i>Neochmia phaeton phaeton</i>	crimson finch	Y	Y	3,5	Species is now known from only one site, northwest of Marlborough. They are often associated with large biomass grasses which would otherwise be pasture grasses but where cattle can't get to riverbank they are allowed to grow and provide food for the finches. Nest at the top of trees above the flood height and away from fire.
<i>Ophiocara porocephala</i>	spangled gudgeon	Y	Y	2,3	Small population that has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area.
<i>Ornithorhynchus anatinus</i>	platypus	Y	Y	3,8	Threatened by pumped hydro plans in Eungella. Work going on in the upper Dawson finding platypus, as well as Theodore, Pioneer. With 100-year level flood events and alteration of banks, burrow systems platypus were using have disappeared. Increased

Priority fauna – Scientific Name	Common Name	R	NR	Priority Attributes	Expert Panel Comments
					frequency of floods could impact on this species.
<i>Scleropages leichardti</i>	southern saratoga	Y	Y	1,8	Tied to water holes, so increasing drought and increasing water use presents a threat to the species. Likely impacted by climate change.
<i>Scortum hillii</i>	leathery grunter	Y	Y	1,4	Endemic to the study area this species' entire breeding population occurs within wetlands. The small population is also threatened by loss of habitat.
<i>Strongylura krefftii</i>	freshwater longtom	Y	Y	2	Population fluctuates markedly. It is found in Awoonga Dam, Calliope and Callide River catchments. Experienced a serious population decline and is further threatened by loss of habitat.
<i>Trachystoma petardi</i>	Pinkeye mullet	Y	Y	2,3,6	Very rare in Mackay-Whitsundays area now. St Lawrence is still a location for the species. Climate change and fish barriers are significantly affecting the population. Migratory.

Migratory species

In addition to the priority species identified above, the panel nominated migratory species for inclusion in measure 5.1.3. Only species listed under the Convention on Migratory Species (Bonn), Japan Australia Migratory Bird Agreement (JAMBA), the China Australia Migratory Bird Agreement (CAMBA), or Republic of Korea Australia Migratory Bird Agreement (ROKAMBA) as significant fauna taxa were considered.

The panel identified 16 migratory species relevant to the riverine and non-riverine wetlands of the study areas (Table 16). Sightings records for the listed species were used to identify spatial units containing migratory taxa to calculate the scores for measure 5.1.3 (Habitat for, or presence of, migratory species).

Table 16. Migratory fauna taxa listed on international agreements known to occur within the study areas

Migratory fauna – Scientific Name	Common Name	NCA Status	R	NR	Agreements/ Conventions
<i>Actitis hypoleucos</i>	common sandpiper	SL	Y	Y	CAMBA, JAMBA, ROKAMBA, BONN
<i>Calidris acuminata</i>	sharp-tailed sandpiper	SL		Y	CAMBA, JAMBA, ROKAMBA, BONN
<i>Calidris ferruginea</i>	curlew sandpiper	CR		Y	CAMBA, JAMBA, ROKAMBA, BONN
<i>Calidris ruficollis</i>	red-necked stint	SL		Y	CAMBA, JAMBA, ROKAMBA, BONN
<i>Chlidonias leucopterus</i>	white-winged black tern	SL	Y	Y	CAMBA, JAMBA, ROKAMBA
<i>Gallinago hardwickii</i>	Latham's snipe	SL	Y	Y	JAMBA, ROKAMBA, BONN
<i>Gelochelidon macrotarsa</i>	Australian tern	SL	Y	Y	CAMBA
<i>Hydroprogne caspia</i>	Caspian tern	SL	Y	Y	JAMBA
<i>Limosa limosa</i>	black-tailed godwit	SL		Y	CAMBA, JAMBA, ROKAMBA, BONN
<i>Pandion haliaetus cristatus</i>	eastern osprey	SL	Y	Y	BONN
<i>Plegadis falcinellus</i>	glossy ibis	SL		Y	BONN
<i>Pluvialis fulva</i>	Pacific golden plover	SL		Y	CAMBA, JAMBA, ROKAMBA, BONN
<i>Thalasseus bergii</i>	crested tern	SL	Y	Y	JAMBA
<i>Tringa glareola</i>	wood sandpiper	SL	Y	Y	CAMBA, JAMBA, ROKAMBA, BONN
<i>Tringa nebularia</i>	common greenshank	SL	Y	Y	CAMBA, JAMBA, ROKAMBA, BONN
<i>Tringa stagnatilis</i>	marsh sandpiper	SL		Y	CAMBA, JAMBA, ROKAMBA, BONN

Springs

An artesian spring is a hydrogeological feature by which groundwater discharges naturally to the land. Most spring wetlands are located where the aquifers are shallow or fractured by a fault and where water escapes to the surface. Springs can have permanent and non-permanent (i.e. intermittent or ephemeral) saturation regimes, dynamic or static geographic locations, and diffuse or point source geographic locations. Springs have been recognised worldwide as groundwater-dependent ecosystems of disproportionately high biological diversity (Cantonati et al., 2020). Spring wetlands support plants such as sedges, reeds, grasses, herbs and algae, and provide habitat for fauna including an array of unique crustaceans, fish and snails.

The aquatic conservation values of springs wetlands within the Fitzroy and Mackay/Whitsunday region were not explicitly assessed as part of the FGBRCC assessments due to irregular and incomplete spring mapping for the region. In the absence of a comprehensive ACA for spring wetlands end-users are referred to the Queensland Spring Database published by the Queensland Herbarium and Biodiversity Science (DESI, 2020) which provides a catalogue of mapped springs with a permanently saturated saturation regime that have fixed locations in Queensland and any associated surface expression groundwater dependent ecosystems. The database includes data on the condition, threats and biodiversity values of springs currently mapped by the Queensland Government. The database also includes a conservation priority rating for springs within the Great Artesian Basin. These ratings were developed by Fensham and Fairfax (2005) and are based on the following criteria:

Category 1a: These spring wetlands provide habitat for biota endemic to one spring complex.

Category 1b: These spring wetlands provide habitat for biota endemic to more than one spring complex.

Category 1c: These spring wetlands provide habitat for species listed under Queensland or Australian legislation (except *Callistemon* sp. *Bouli* (L. Pedley 5297) which is listed as vulnerable under the EPBC and has since been identified as the common species *C. viminalis*).

Category 2: These spring wetlands provide habitat for some isolated populations of plant species or are outstanding examples of their type.

Category 3: Any spring of lower value than above that is relatively intact.

Category 4: Severely degraded by any threatening processes.

For the FGBRCC assessments, in the absence of comprehensive spring mapping, an expert panel special and unique feature decision was created to assign conservation value to non-riverine spatial units known to contain one or more “active” springs. The Queensland’s Groundwater Dependent Ecosystems Surface Points dataset (DES 2018) was used as a basis for selecting “active” spring locations. Non-riverine spatial units intersecting mapped springs were assigned an AquaBAMM conservation rating for measure 6.3.1 (Presence of distinct, unique or special habitat including habitat that functions as refugia or other critical purpose) as per Table 17.

Table 17. Conversion of springs database conservation ratings to AquaBAMM measure 6.3.1 conservation ratings.

Springs Database Conservation Rating (i.e., Fensham and Fairfax (2005))	Measure 6.3.1 Conservation Rating
1a, 1b, 1c, 2	4 (i.e., Very High)
3, 4a, 4b, 5	3 (i.e., High)

Significant waterbird habitat areas

Measure 5.1.4 aims to capture waterbird habitat areas that are significant at the international, national, regional, and local level. The process used was to first identify relevant WHA (World Heritage Area), Ramsar, DIWA (Directory of Important Wetlands in Australia), and IBA/KBA (Important Bird Areas / Key Biodiversity Areas) areas and to review these at the workshops. Additional sites of regional or local significance were then elicited from experts at the workshops. For each area identified, a conservation rating of 4, 3 or 2 (Very High, High or Medium respectively) was assigned.

A decision was made by experts at the beginning of the expert panel workshops to only assign values to artificial wetlands if explicitly identified by the expert panel. Where artificial wetlands have been identified as having significant or unique values, these values are meant to serve as an ecological inventory, and their inclusion is not meant to imply any policy, protective or legislative requirements. For example, Kinchant Dam (pl_nr_fa_02) was developed for irrigation purposes in the Plane study area is important to a number of breeding waterbirds.

The riverine and non-riverine significant waterbird habitat areas identified by expert panels are listed in Table 18 and Table 19 respectively.

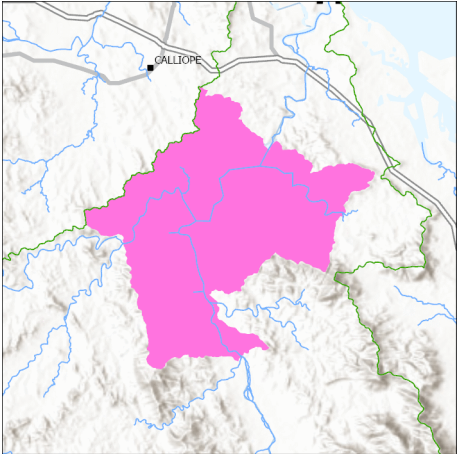
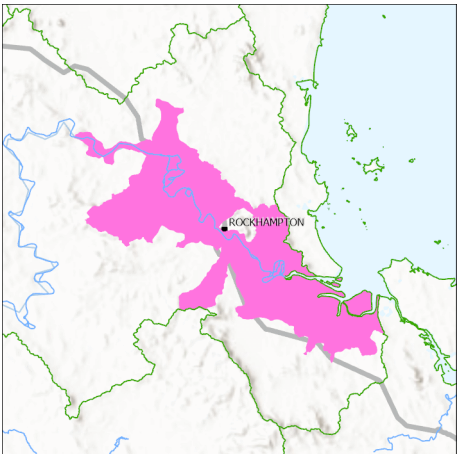
Table glossary

bo	Boyne	no	Nogoa
ca	Calliope	nr	Non-riverine
ci	Curtis Island	oc	O'Connell
ct	Comet	pi	Pioneer
dn	Dawson	pl	Plane
ec	Ecology	pr	Proserpine
fa	Fauna	r	Riverine
fi	Fitzroy	sh	Shoalwater
fl	Flora	st	Styx
ig	Fitzroy Other Islands	wa	Waterpark
is	Isaac	wi	Whitsunday Island
ma	Mackenzie		

Map legend

	Special features
	Towns
	Watercourses
	Study area boundary

Table 18. Riverine significant waterbird habitat areas

Significant waterbird habitat area	Ratings and values
Awoonga Dam 	Decision codes: bo_r_fa_03 CIM 5.1.4 with a rating of 3. Lake Awoonga is a large artificial water storage lake created by a dam on the Boyne river. the lake hosts more than 225 species of birds including the vulnerable southern squatter pigeon and a further 27 bird species listed on International Migratory Conservation Agreement lists. Large number of diving birds such as cormorants have been observed particularly in shallow areas at the top end of the dam.
Fitzroy Floodplain and Delta DIWA and KBA 	Decision codes: fi_r_fa_04 CIM 5.1.4 with a rating of 4. The floodplain area comprises the Fitzroy River and associated floodplain wetlands to the north, west and immediate south of Rockhampton. It includes 81 identified water bodies (Houston and McCabe 1996): there are permanent, seasonal and intermittent oxbows, waterholes and swamps, as well as the Fitzroy River channel and its backwaters. It supports a high number of waterbird species, including the threatened Australian painted-snipe (<i>Rostratula australis</i>), and consistently sustains one of the highest known populations of cotton pygmy-goose (<i>Nettapus coromandelianus</i>) (some breeding) in Australia. Over 20,000 waterbirds occur on the site late in the dry season: these are dominated by Anatidae but include substantial numbers of grebes, spoonbills, swampheens and migratory shorebirds. High numbers also occur in the wet season but are dominated then by magpie geese, egrets and ibises. The Fitzroy River Delta contains 10% of national population of Australia painted-snipe (<i>Rostratula australis</i>).

Significant waterbird habitat area	Ratings and values
Hedlow Wetlands DIWA	Decision codes: fl_r_fa_05 CIM 5.1.4 with a rating of 2. The Hedlow DIWA is a good example of a floodplain complex in the middle reaches of a small river system. The wetlands are similar to the Fitzroy River Floodplain wetlands in that they provide significant habitat for numerous species of waterbirds in both the wet and dry seasons. Several small, deep, permanent, freshwater lakes and lagoons (e.g. Lake Mary); some semi-permanent freshwater swamps and marshes; most of the area is low lying and becomes inundated for short periods in most years. Inundation may be prolonged for many months in very wet years. It is thought that the area may be a major source for southward dispersal of species such as the cotton pygmy-goose (<i>Nettapus coromandelianus</i>): the population in the Hedlow-Fitzroy-Capricorn Coast wetlands may represent up to one third of the total Australian population of this species. The area provides important wet season breeding habitat for the cotton pygmy-goose, magpie goose (<i>Anseranas semipalmata</i>) and other waterbirds. The radjah shelduck (<i>Tadorna radjah</i>) is very near its southern limit of distribution in this area. Surveys of seven component sites in October 1994 yielded 1700 birds of 38 species; surveys of seven sites in October 2003 yielded 1400 birds of 40 species. The most abundant species have been magpie goose, straw-necked ibis (<i>Threskiornis spinicollis</i>), Pacific black duck (<i>Anas superciliosa</i>) and Eurasian coot (<i>Fulica atra</i>).
Palm Tree - Robinson Creeks DIWA	Decision codes: dn_r_fa_04 CIM 5.1.4 with a rating of 4. The area is characterised by a series of shallow lakes and seasonal streams associated with the junction of Palm Tree and Robinson Creeks. Associated landforms include floodout, drainage depression, stream channel, stream bed, swamp and lake. Water depth is shallow, seasonally variable and semi-permanent. The area contains high waterbird diversity including magpie goose (<i>Anseranas semipalmata</i>) and cotton pygmy-goose (<i>Nettapus coromandelianus</i>).

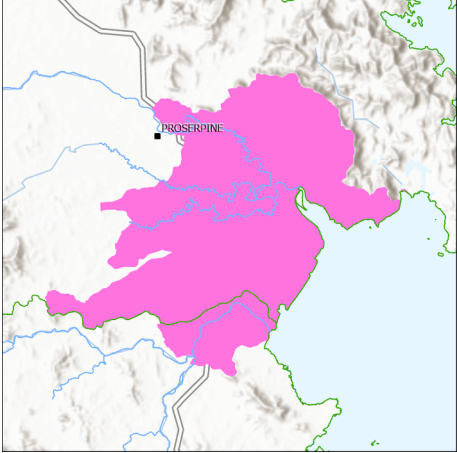
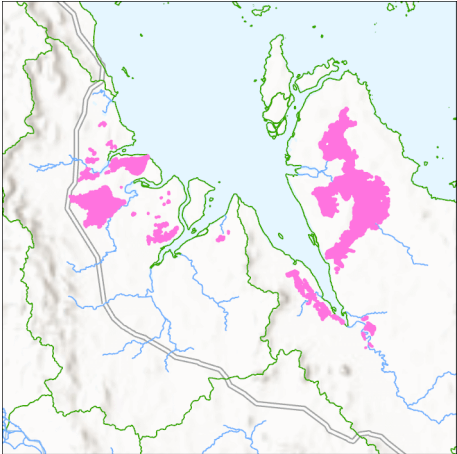
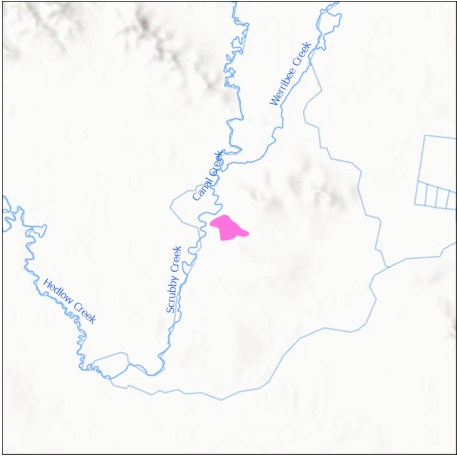
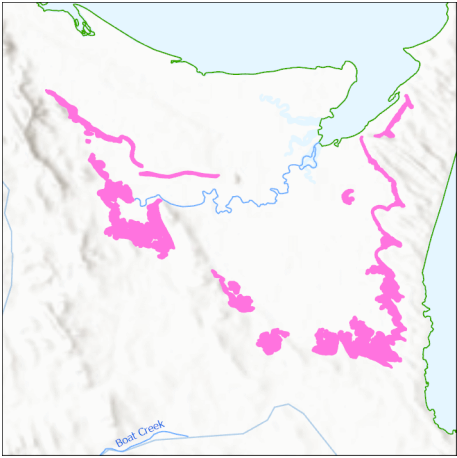
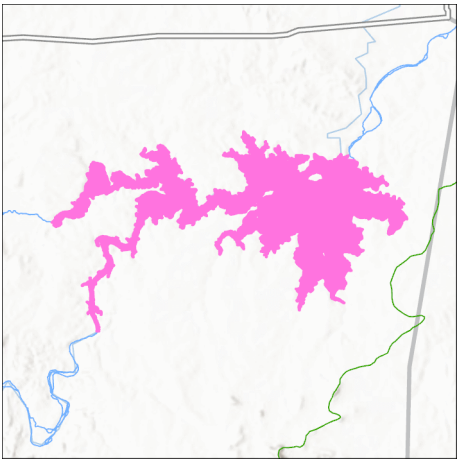
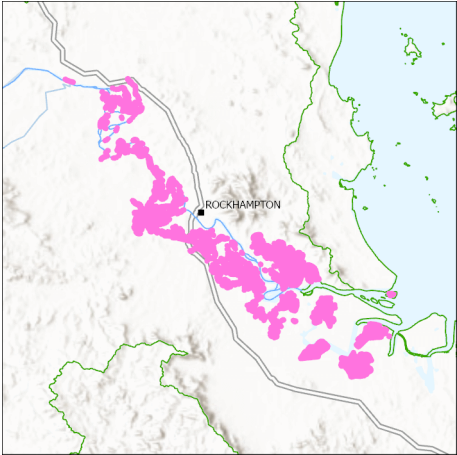
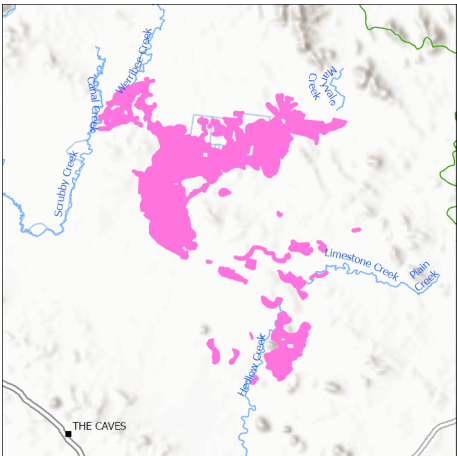
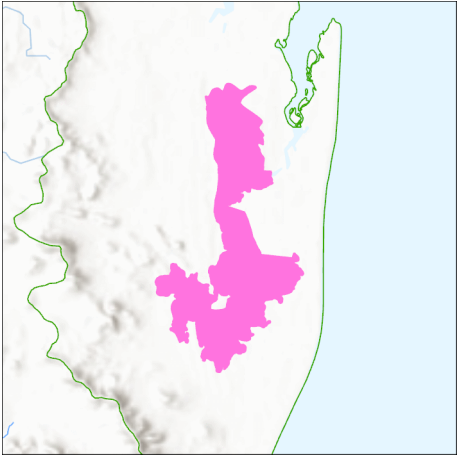
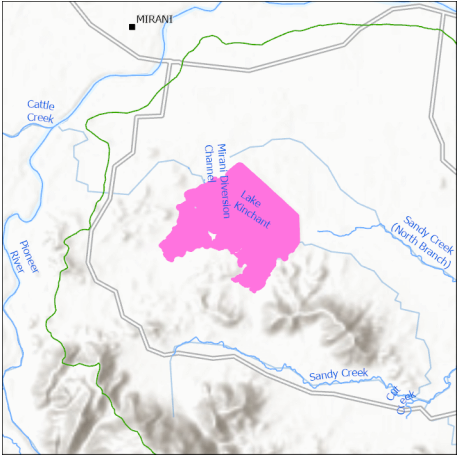
Significant waterbird habitat area	Ratings and values
Proserpine - Goorganga Plain DIWA 	Decision codes: pr_r_fa_01; oc_r_fa_03 CIM 5.1.4 with a rating of 4. The site is part of a coastal floodplain, with low beach ridges, coastal foreshores, intertidal areas and associated shallow marine waters, and extends from Rocky Point to the mouth of the OConnell River. High water bird diversity with 132 species recorded. The area also supports large numbers of open grassland birds, like Australian pratincole (<i>Stiltia isabellae</i>), brown songlark (<i>Cincloramphus cruralis</i>), singing bushlark (<i>Mirafra javanica</i>), Australasian pipit (<i>Anthus novaeseelandiae</i>) and spotted harrier (<i>Circus assimilis</i>).

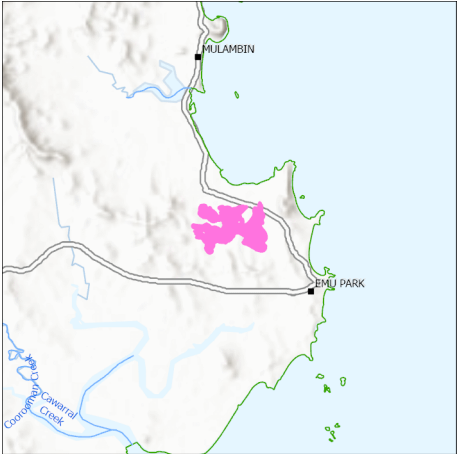
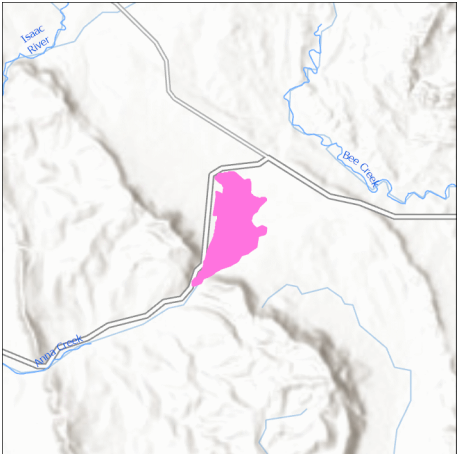
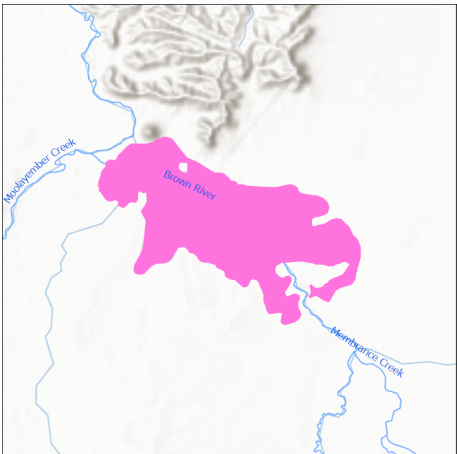
Table 19 Non-riverine significant waterbird habitat areas

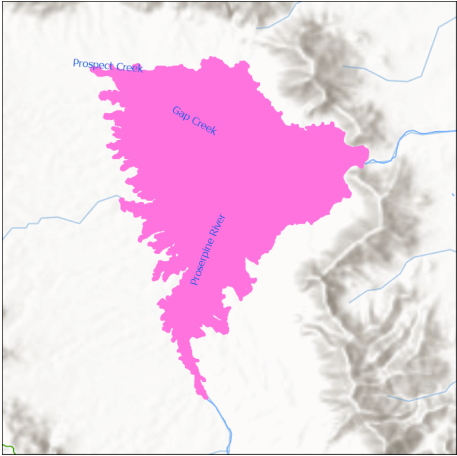
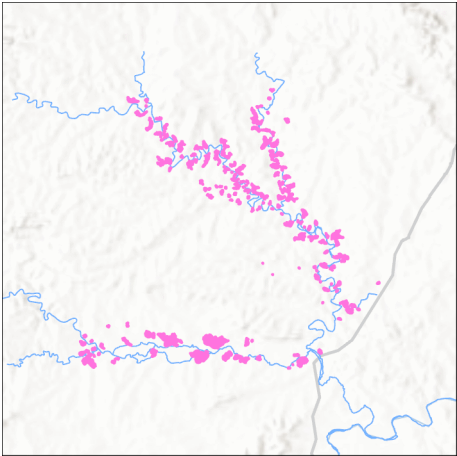
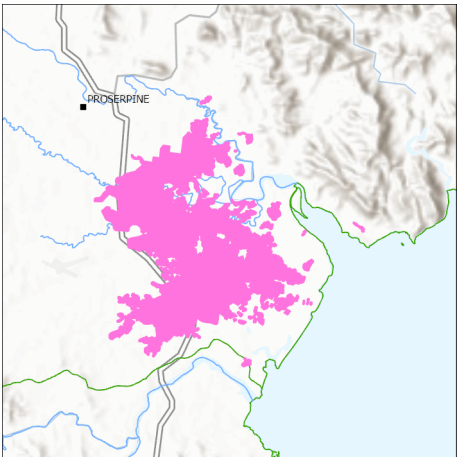
Significant waterbird habitat areas	Ratings and values
Broad Sound KBA and DIWA (Incl. Torilla Plain) 	Decision codes: sh_nr_fa_01; st_nr_fa_01 CIM 5.1.4 with a rating of 3. Freshwater, estuarine and marine wetlands in the Broad Sound KBA and DIWA plays a major ecological role, supporting substantial breeding activity by Anatidae, including black swan (<i>Cygnus atratus</i>) and the declining radjah shelduck (<i>Tadorna radjah</i>), and by stilts and terns; also migration stop-over by substantial numbers of sandpipers and terns. A population of the critically endangered yellow chat (Dawson) (<i>Epthianura crocea macgregori</i>) occurs and breeding by the vulnerable Australian painted-snipe (<i>Rostratula benghalensis australis</i>) has been documented. Numbers of several waterbirds, notably straw-necked ibis (<i>Threskiornis spinicollis</i>) and royal spoonbill (<i>Platalea regia</i>), at times may exceed 1% of the estimated total population in Australia; large numbers of plumed whistling-duck (<i>Dendrocygna eytoni</i>), magpie goose (<i>Anseranas semipalmata</i>) and brolga (<i>Grus rubicunda</i>) also occur.

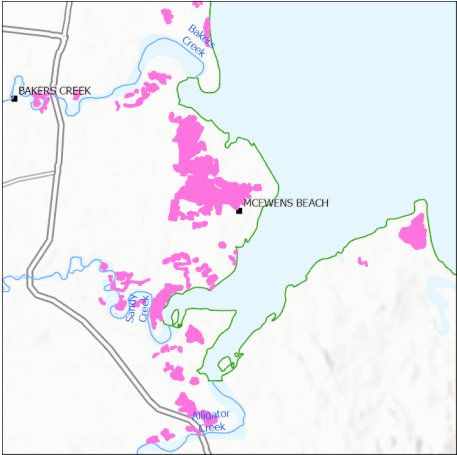
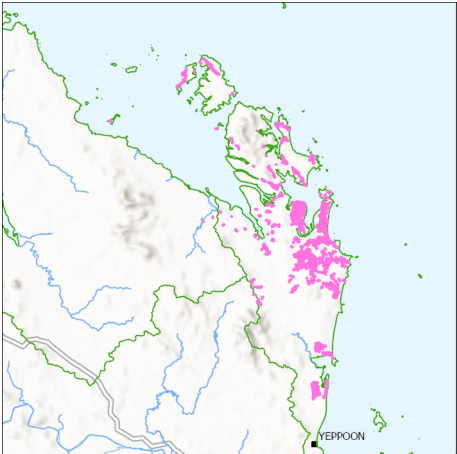
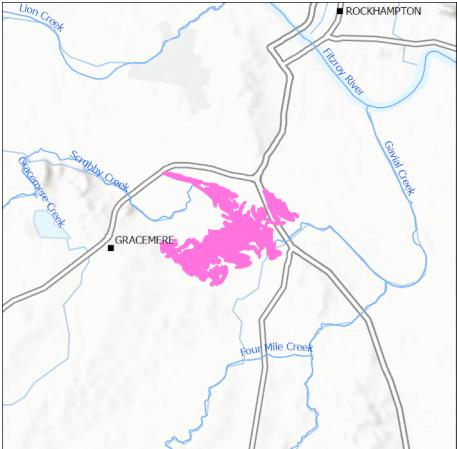
Significant waterbird habitat areas	Ratings and values
Canal Creek Wetland 	Decision codes: fl_nr_fa_02 CIM 5.1.4 with a rating of 3. High waterbird numbers and diversity. Up to 400 cotton pygmy-goose observed. Part of the wetland is bunded/dammed. High numbers of magpie goose.
Curtis Island 	Decision codes: ci_nr_fa_01 CIM 5.1.4 with a rating of 4. The adjacent marine plain supports breeding populations of the yellow chat (<i>Epthianura crocea</i>) and zitting cisticola (<i>Cisticola juncidis</i>), as well as the radjah shelduck (<i>Tadorna radjah</i>), several hundred brolga (<i>Grus rubicundus</i>) (permanent residents) and several thousand magpie goose (<i>Anseranas semipalmata</i>) (seasonal vagrants). The red goshawk (<i>Erythrotriorchis radiatus</i>), black-necked stork (<i>Ephippiorhynchus asiaticus</i>) and Australian little bittern (<i>Ixobrychus minutus</i>) have also been seen in the area.
Fairbairn Dam DIWA 	Decision codes: no_nr_fa_01 CIM 5.1.4 with a rating of 2. The site is Fairbairn Dam to the maximum water level of the impoundment. The wetland has been created by damming a valley of the Nogoa River. The wetland is an inundated stream channel of the Nogoa River. The dam is permanent, but water levels fluctuate seasonally depending upon usage by the water authority. The area comprises of deep water habitat and lacustrine wetlands. It is a notable refuge for a large variety of waterbirds.

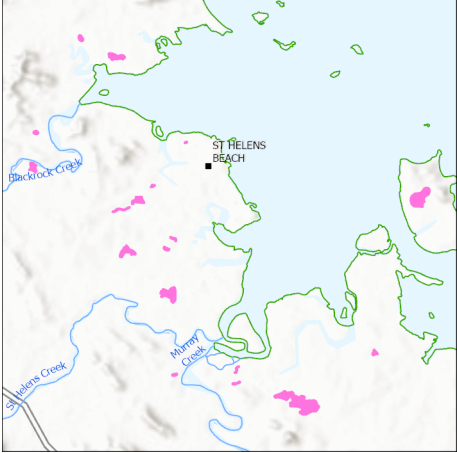
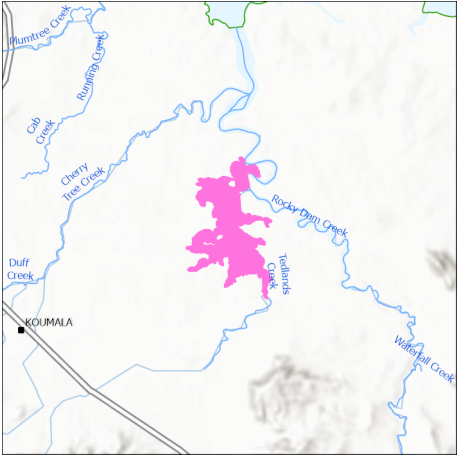
Significant waterbird habitat areas	Ratings and values
Fitzroy Floodplain and Delta DIWA and KBA 	Decision codes: ig_nr_fa_02; fi_nr_fa_03 CIM 5.1.4 with a rating of 4. The floodplain area comprises the Fitzroy River and associated floodplain wetlands to the north, west and immediate south of Rockhampton. It includes 81 identified water bodies (Houston and McCabe 1996); there are permanent, seasonal and intermittent oxbows, waterholes and swamps, as well as the Fitzroy River channel and its backwaters. It supports a high number of waterbird species, including the threatened Australian painted-snipe (<i>Rostratula australis</i>), and consistently sustains one of the highest known populations of cotton pygmy-goose (<i>Nettapus coromandelianus</i>) (some breeding) in Australia. Over 20,000 waterbirds occur on the site late in the dry season: these are dominated by Anatidae but include substantial numbers of grebes, spoonbills, swampheens and migratory shorebirds. High numbers also occur in the wet season but are dominated then by magpie geese, egrets and ibises. The Fitzroy River Delta contains 10% of national population of Australia painted-snipe (<i>Rostratula australis</i>).
Hedlow Wetlands DIWA 	Decision codes: fi_nr_fa_04 CIM 5.1.4 with a rating of 2. The Hedlow DIWA is a good example of a floodplain complex in the middle reaches of a small river system. The wetlands are similar to the Fitzroy River Floodplain wetlands in that they provide significant habitat for numerous species of waterbirds in both the Wet and Dry seasons. Several small, deep, permanent, freshwater lakes and lagoons (e.g. Lake Mary); some semi-permanent freshwater swamps and marshes; most of the area is low lying and becomes inundated for short periods in most years. Inundation may be prolonged for many months in very wet years. It is thought that the area may be a major source for southward dispersal of species such as the cotton pygmy-goose (<i>Nettapus coromandelianus</i>) where the population in the Hedlow-Fitzroy-Capricorn Coast wetlands may represent up to one third of the total Australian population of this species. The area provides important wet season breeding habitat for the cotton pygmy-goose, magpie goose (<i>Anseranas semipalmata</i>) and other waterbirds. The radjah shelduck (<i>Tadorna radjah</i>) is very near its southern limit of distribution in this area. Surveys of seven component sites in October 1994 yielded 1700 birds of 38 species: surveys of seven sites in October 2003 yielded 1400 birds of 40 species. The most abundant species have been magpie goose, straw-necked ibis (<i>Threskiornis spinicollis</i>), Pacific black duck (<i>Anas superciliosa</i>) and eurasian coot (<i>Fulica atra</i>).

Significant waterbird habitat areas	Ratings and values
Iwasaki Wetlands DIWA 	Decision codes: wa_nr_fa_04 CIM 5.1.4 with a rating of 3 Extensive freshwater marshes dominated by grasses; lesser areas of freshwater sedge marshes; large waterbird populations inhabit these marshes for many months each year. Large, shallow, freshwater marshes and ponds mostly protected from saltwater intrusion by extensive system of bund walls. Large waterbird populations inhabit these marshes for many months each year. For example, magpie goose (<i>Anseranas semipalmata</i>), black swan (<i>Cygnus atratus</i>), brolgas (<i>Grus rubicundus</i>) and cotton pygmy-goose (<i>Nettapus coromandelianus</i>) breed in this area. Inundation of freshwater areas is permanent, although most dry out during severe drought. Shallow, saline marshes and mangrove swamps with tidal influence. The water quality is very good. Grass and sedge marshes provide significant breeding habitat for numerous waterbirds.
Kinchant Dam 	Decision codes: pl_nr_fa_02 CIM 5.1.4 with a rating of 2. An artificial dam developed for the irrigation scheme. Breeding little pied cormorant (<i>Microcarbo melanoleucos</i>), little black cormorant (<i>Phalacrocorax sulcirostris</i>), white-bellied sea eagle (<i>Haliaeetus leucogaster</i>) and black swan (<i>Cygnus atratus</i>).

Significant waterbird habitat areas	Ratings and values
Kinka Wetlands 	Decision codes: wa_nr_fa_05 CIM 5.1.4 with a rating of 3. Birdlife Capricornia conduct monthly surveys at Kinka Wetlands and It is a very important location for waterbirds and migratory shorebirds. Some statistics as follows: • Black swan - up to 200 at times and many nests after rain. • Grey teal - up to 950 during dry spells when the birds are concentrating on the remaining wetlands. • Pacific black duck - up to 300. • Hardhead - up to 90. Brolga - up to 20 at any one time and they breed there every year. • Pied stilt - up to 150 with many breeding. Shorebirds - Greenshank, Marsh Sandpiper, sharp-tailed sandpiper, red-necked stint, black-fronted dotterel, red-kneed dotterel, masked lapwing, red-capped plover and Australian pied oystercatcher all use the wetlands on a regular basis.
Lake Elphinstone DIWA 	Decision codes: is_nr_fa_01 CIM 5.1.4 with a rating of 2. The lake provides important waterbird habitat. Extensive aquatic and emergent beds provide a food source for a wide range of water birds. The lake is the largest natural freshwater body in Central Queensland and provides drought refuge and probably breeding sites for a range of fauna. The site is known to be a breeding area for the black swan (<i>Cygnus atratus</i>) and the brolga (<i>Grus rubicundus</i>). In total, 86 species of birds have been recorded.
Lake Nuga Nuga DIWA 	Decision codes: ct_nr_fa_02 CIM 5.1.4 with a rating of 2. Lake Nuga Nuga is a large water body in an otherwise semi arid area. Aquatic bed communities dominated by <i>Nymphaea</i> sp. Species such as <i>Acacia harpophylla</i> and <i>Casuarina cunninghamiana</i> occur on the margins. Significant use of the lake is made by waterbirds such as Australian pelican and cormorant species.

Significant waterbird habitat areas	Ratings and values
Lake Proserpine 	Decision codes: pr_nr_fa_01 CIM 5.1.4 with a rating of 3. Lake Proserpine is a major storage and water infrastructure on the Proserpine River. The lake has good waterbird diversity and aggregations of tens of thousands of waterbirds have been observed. The lake is surveyed annually as part of Eastern Australian Waterbird Survey and has been impacted by redclaw (<i>Cherax quadricarinatus</i>) and <i>Mimosa pigra</i>.
Palm Tree - Robinson Creeks DIWA 	Decision codes: dn_nr_fa_01 CIM 5.1.4 with a rating of 4. The area is characterised by a series of shallow lakes and seasonal streams associated with the junction of Palm Tree and Robinson Creeks. Associated landforms include floodout, drainage depression, stream channel, stream bed, swamp and lake. Water depth is shallow, seasonally variable and semi-permanent. The area contains high waterbird diversity including magpie goose (<i>Anseranas semipalmata</i>) and cotton pygmy-goose (<i>Nettapus coromandelianus</i>).
Proserpine - Goorganga Plain DIWA 	Decision codes: pr_nr_fa_02; oc_nr_fa_02; ig_nr_fa_03 CIM 5.1.4 with a rating of 4. The site is part of a coastal floodplain, with low beach ridges, coastal foreshores, intertidal areas and associated shallow marine waters, and extends from Rocky Point to the mouth of the OConnell River. High water bird diversity with 132 species recorded. The area supports large numbers of open grassland birds, e.g. cisticolas, Australian pratincole (<i>Stiltia isabella</i>), brown songlark (<i>Cincloramphus cruralis</i>), singing bushlark (<i>Mirafra javanica</i>), Australasian pipit (<i>Anthus novaeseelandiae</i>) and spotted harrier (<i>Circus assimilis</i>).

Significant waterbird habitat areas	Ratings and values
Sandringham - Baker's Creek Aggregation DIWA 	Decision codes: pl_nr_fa_03 CIM 5.1.4 with a rating of 3. The site is part of a low coastal plain and adjacent marine waters with extensive shallow water, subtidal and intertidal mudflats, from the inlet at Far Beach to Dudgeon Point. The site is recognised as a nationally important area for shorebirds. Species of shorebirds recorded between Bakers Creek and Far Beach and to the immediate north and south of the site. The site is of international significance for the lesser sand plover, eastern curlew, great knot, sooty oystercatcher and national importance for the terek sandpiper, bar-tailed godwit and ruddy turnstone.
Shoalwater Bay Ramsar site (Incl. Corio Bay) and KBA 	Decision codes: wa_nr_fa_03; sh_nr_fa_02; ig_nr_fa_01 CIM 5.1.4 with a rating of 4. The site is biodiverse, supporting approximately 908 native plants and native animals comprising 445 fish, 11 frogs, 60 reptiles, 265 birds and 42 mammals. The site is home to an abundance of shorebirds and migratory waterbirds, with over 23,000 individuals recorded on several occasions. It is of international importance to listed migratory bird species and regularly supports more than 20,000 waterbirds; many listed under the Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA) and/or Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA). Shoalwater Bay is also listed as a Network Site under the East Asian-Australasian Flyway Partnership. The extensive freshwater peat swamps in the site are rare within the bioregion and in Australia.
Springers Lagoon, Sheepwash Lagoon, Sheepwash Creek, Scrubby Creek and wetlands, Pierce's Swamp 	Decision codes: fi_nr_fa_01 CIM 5.1.4 with a rating of 3. Springers Lagoon is a deep, permanent waterhole that provides aquatic refuge for freshwater fish and other aquatic animals through the dry season and connects with other waterways during wet season flows. The lagoons in this area are home to diving birds such as cormorants and hardheads with red-backed fairy-wrens and finches also to be found in the grassy verges. Several pairs of breeding great-crested grebe have been observed at Sheepwash Lagoon. The whole area has large numbers and species of waterbirds.

Significant waterbird habitat areas	Ratings and values
St. Helen's Bay DIWA 	Decision codes: ig_nr_fa_04; oc_nr_fa_03 CIM 5.1.4 with a rating of 4. The site, which is part of a low coastal plain with adjacent coastal islands, coral reefs, extensive shallow water, subtidal and intertidal mudflats and associated marine waters, extends from Dewars Beach to Finlayson Point. Some of the waterbirds and waders recorded from the area (Driscoll 1995) are: white-faced Heron (<i>Ardea novaehollandiae</i>), striated heron (<i>Butorides striatus</i>) and eastern great egret (<i>Ardea alba modesta</i>). Shorebirds include Australian pied oystercatcher (<i>Haematopus longirostris</i>), whimbrel (<i>N. phaeopus</i>), grey-tailed tattler (<i>Heteroscelus brevipes</i>), terek sandpiper (<i>Xenus cinereus</i>), great knot (<i>Calidris tenuirostris</i>), red-necked stint (<i>C. ruficollis</i>), and Caspian tern (<i>Hydroprogne caspia</i>).
Tedlands Wetlands 	Decision codes: pl_nr_fa_01 CIM 5.1.4 with a rating of 3. Part of Sarina Inlet Ince DIWA aggregation. Bunded to retain freshwater. This lagoon contains large congregations of waterbirds. Hymenachne and Rusa Deer are expanding in this area.

Priority ecosystems

Priority aquatic ecosystems (measure 5.2.1) are mapped and described by experts at the expert panel workshops. AquaBAMM priority ecosystems are defined as aquatic ecosystems that:

- support important ecological processes or functioning at the regional or local level
- have limited protection under state or national regs (i.e., listed as “Least Concern” under *Vegetation Management Act 1999* (QLD))
- are under threat or severely degraded at the local level.

Examples include wetland ecosystems supporting natural water, nutrient or energy flows, habitat provision, or animal and plant succession. The spatial implementations for measure 5.2.1 (Priority ecosystems) are commonly based on wetland regional ecosystems. For each area identified, a conservation rating of 4, 3 or 2 (Very High, High or Medium respectively) was assigned.

The riverine and non-riverine priority ecosystems identified by the expert panels are listed in Table 20 and Table 21 respectively.

Table glossary

bo	Boyne	no	Nogoa
ca	Calliope	nr	Non-riverine
ci	Curtis Island	oc	O’Connell
ct	Comet	pi	Pioneer
dn	Dawson	pl	Plane
ec	Ecology	pr	Proserpine
fa	Fauna	r	Riverine
fi	Fitzroy	sh	Shoalwater
fl	Flora	st	Styx
ig	Fitzroy Other Islands	wa	Waterpark
is	Isaac	wi	Whitsunday Island
ma	Mackenzie		

Map legend

	Special features
	Towns
	Watercourses
	Study area boundary

Table 20 Riverine Priority Ecosystems

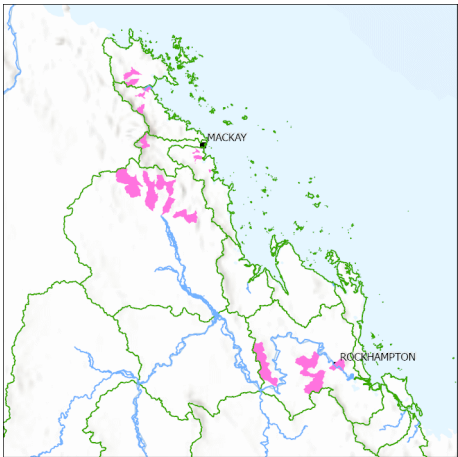
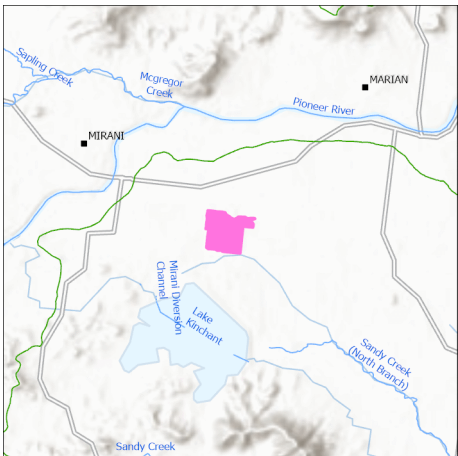
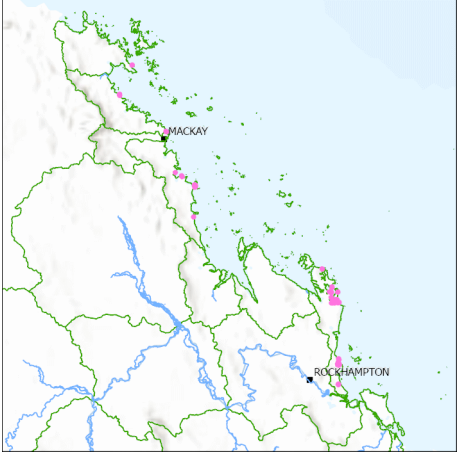
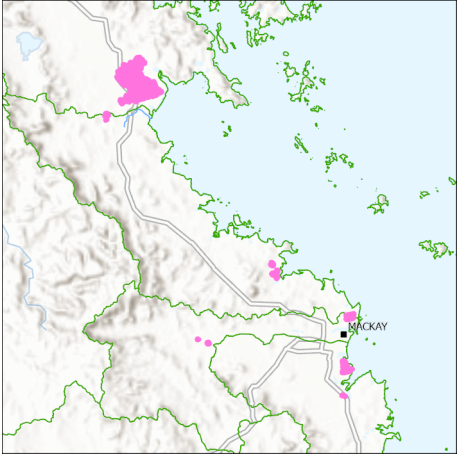
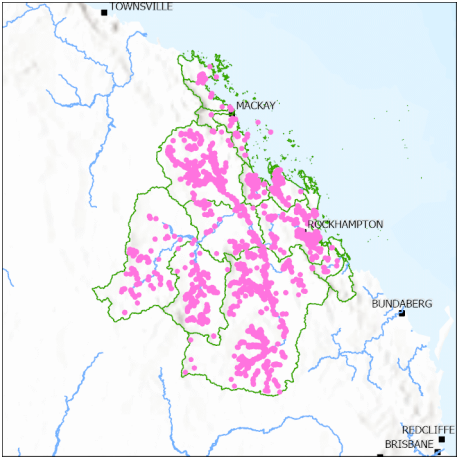
Priority ecosystems	Ratings and values
Black ironbox (<i>Eucalyptus raveretiana</i>) 	Decision codes: bo_r_fl_03; ca_r_fl_02; ci_r_fl_01; fi_r_fl_02; is_r_fl_03; oc_r_fl_01; pi_r_fl_02; pl_r_fl_01; pr_r_fl_02; sh_r_fl_02; st_r_fl_01; wa_r_fl_01 CIM 5.2.1 with a rating of 4. Black ironbox (<i>Eucalyptus raveretiana</i>) is a large tree species restricted to riparian ecosystems. It sometimes grows along river flats or open woodlands (Chippendale 1988; Halford 1997). It is captured by RE11.3.25a, though sightings occur in other areas between Townsville, Charters Towers and Rockhampton. The species supports ecological processes and functions of associated riparian ecosystems and are under threat due to past habitat loss and degradation from water resource developments. Currently no records are found in Boyn (bo), Calliope (ca), Curtis Island (ci), Shoalwater (sh), Styx (st) and Waterpark (wa).

Table 21 Non-riverine Priority Ecosystems

Priority ecosystems	Ratings and Values
De Moleyns Lagoon 	Decision codes: pl_nr_ec_05 CIM 5.2.1 with a rating of 3. This unique wetland supports and extensive birdlife and traditional cultural values. The wetlands are under pressure by surrounding farmland and new practices have been recently implemented to protect and restore conservation values.

Priority ecosystems	Ratings and Values
Regional ecosystem 8.2.11 	Decision codes: pr_nr_fl_01; wa_nr_fl_02 oc_nr_fl_03; pl_nr_fl_02 CIM 5.2.1 with a rating of 4. This endangered regional ecosystem is often found adjacent to saltpan wetlands. It contains significant habitat values due to it's highly nectivorous nature and therefore is important as food resource. Note: This priority ecosystem decision also applies to the following catchments: O'Connell, Plane, Proserpine, Waterpark and Other Islands.
Regional ecosystem 8.3.12 	Decision codes: pl_nr_fl_08; pi_nr_fl_03 pr_nr_fl_03; oc_nr_fl_04 CIM 5.2.1 with a rating of 4. This is a floodplain grassland system found on river deltas and a major meeting point of freshwater systems. Species include <i>Imperata cylindrica</i>, <i>Sorghum nitidum forma aristatum</i> and <i>Ischaemum australe</i> tussock. The areas are habitat for the Red-cheeked Dunnart (<i>Sminthopsis virginiae</i>) and many frogs, waterbirds and reptiles. Much of the ecosystem has been ploughed and drained for sugar cane, sown with pasture grasses like parra grass, hymenachne and thatch grass, or invaded by weeds. It is naturally treeless, but some areas have now been occupied by <i>Melaleuca</i> spp. or <i>Eucalyptus</i> spp.
Regional ecosystems 8.3.4 & 11.3.27 	Decision codes: st_nr_fl_02; dn_nr_fl_02; is_nr_fl_01; no_nr_fl_01; ct_nr_fl_01; oc_nr_fl_02; pr_nr_fl_02; pl_nr_fl_03; ma_nr_fl_02; wa_nr_fl_03; ig_nr_fl_03; ca_nr_fl_01; fi_nr_fl_01; pi_nr_fl_02; sh_nr_fl_01 CIM 5.2.1 with a rating of 3. These regional ecosystems contain significant habitat values that are under threat from threatening processes such as physical alteration/ destruction and invasion by hymenachne. Note: This priority ecosystem decision applies to other catchments.

Special and unique features

Wetlands with special or unique values are mapped and described as part of the AquaBAMM expert panel process. Experts reviewed all version 1 special feature decisions and created new decisions for version 2. Each decision is assigned a conservation rating of 2 (Medium), 3 (High) or 4 (Very High) to one or more of the following measures (CIM):

- 6.1.1 - Presence of distinct, unique or special geomorphic features.
- 6.2.1 - Presence of or requirement for distinct, unique or special ecological processes.
- 6.3.1 - Presence of distinct, unique or special habitat, including habitat that functions as refugia or other critical purpose.
- 6.3.3 - Ecologically significant wetlands identified through expert opinion and/or documented study.
- 6.3.4 - Areas important as refugia from the predicted effects of climate change (e.g. source of species re-population).
- 6.4.1 - Presence of distinct, unique or special hydrological regimes, e.g. spring fed stream, ephemeral stream or boggomoss.
- 7.1.1 - The contribution (upstream or downstream) of the spatial unit to the maintenance of significant species or populations.
- 7.1.2 - Migratory or routine 'passage' of fish and other fully aquatic species (upstream, lateral or downstream movement) within the spatial unit.
- 7.2.1 - The contribution (upstream or downstream) of the spatial unit to the maintenance of groundwater ecosystems with significant biodiversity values.
- 7.3.2 - Extent to which the wetland retains critical ecological and hydrological connectivity, where it should exist, with floodplains, rivers, groundwater, etc.
- 7.5.1 - The contribution of the spatial unit to the maintenance of estuarine and marine ecosystems with significant biodiversity values.
- 7.5.2 - Extent to which the wetland retains critical ecological and hydrological connectivity, where it should exist in marine or estuarine areas.
- 8.2.5 - Wetland type representative of the study area.

Where a single expert panel decision crossed more than one study area, the decision was implemented separately in each study area. Decisions were based on either flora or fauna characteristics. Areas having multiple values of either flora, fauna or hydrological, were consolidated and implemented as ecology decisions. Decisions that were not able to be implemented due to uncertainty or a lack of available data are indicated as 'Not Implemented'.

A decision was made by experts at the beginning of the expert panel workshops to only assign special feature values to artificial wetlands if explicitly identified by the expert panel. Where artificial wetlands have been identified as having special or unique values, these values are meant to serve as an ecological inventory, and their inclusion is not meant to imply any policy, protective or legislative requirements.

The riverine and non-riverine special feature decisions identified by the expert panels are listed in the following tables from Table 22 through to Table 27. A particular spatial unit may have fauna, flora and/or ecology values, either singularly or in combination.

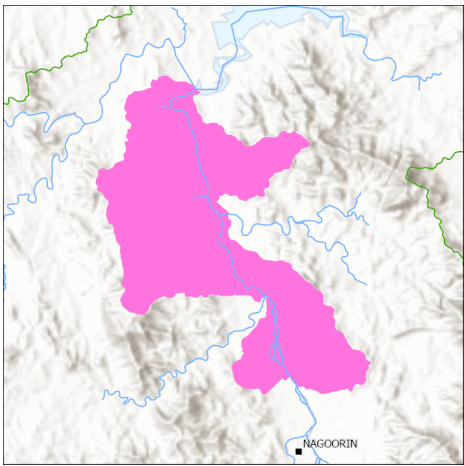
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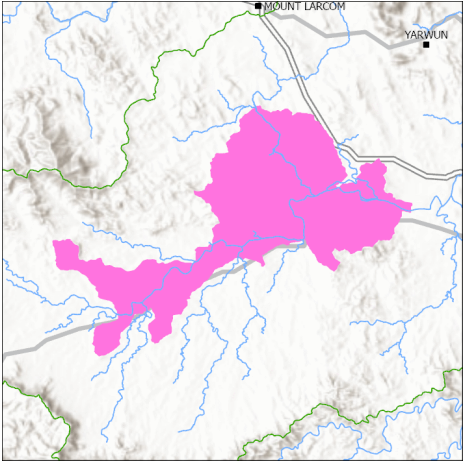
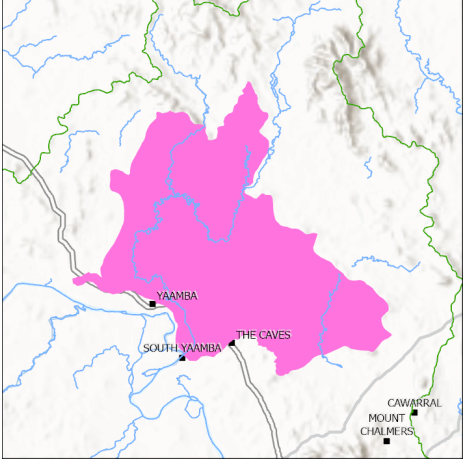
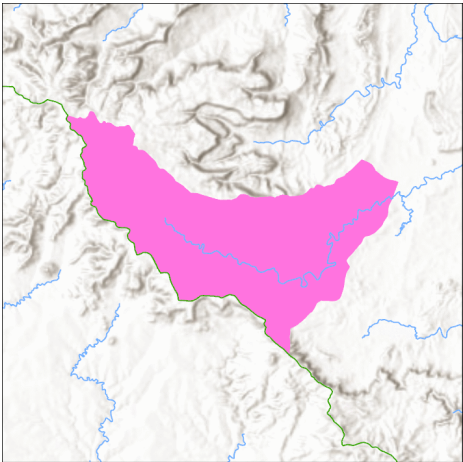
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ct	Comet	pi	Pioneer
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fi	Fitzroy	sh	Shoalwater
fl	Flora	st	Styx
ig	Fitzroy Other Islands	wa	Waterpark
is	Isaac	wi	Whitsunday Island
ma	Mackenzie		

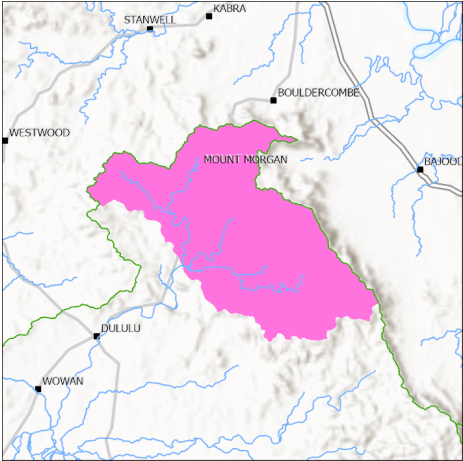
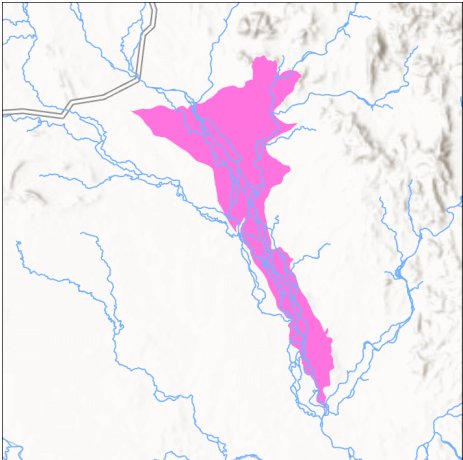
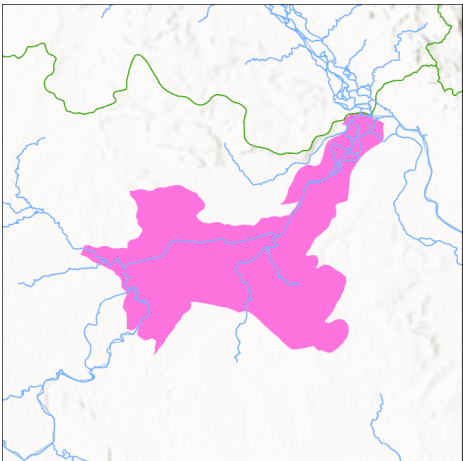
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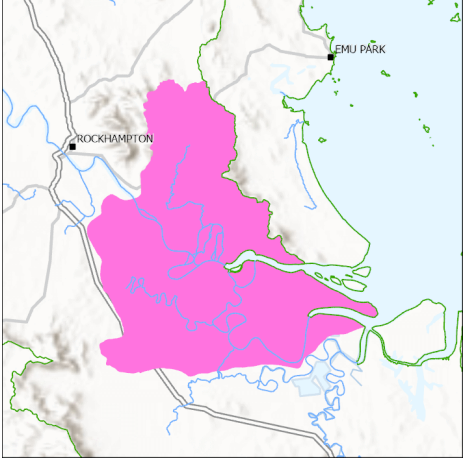
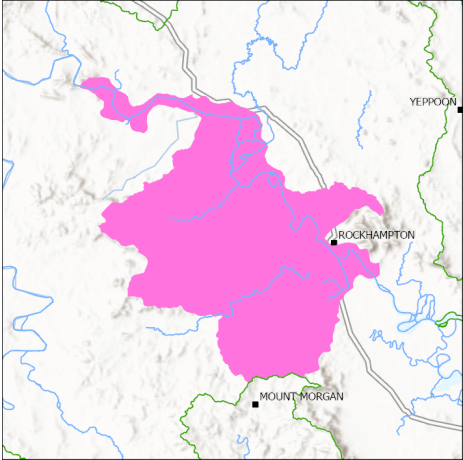
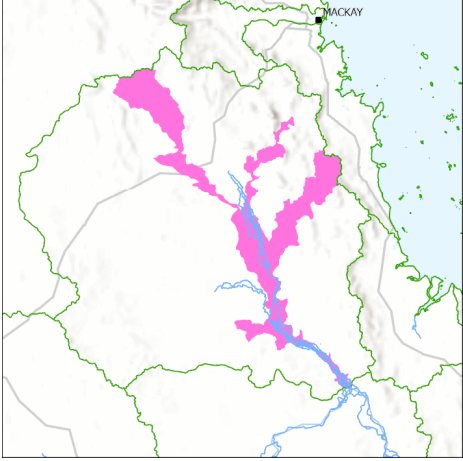
■	Special features
■	Towns
—	Watercourses
—	Study area boundary

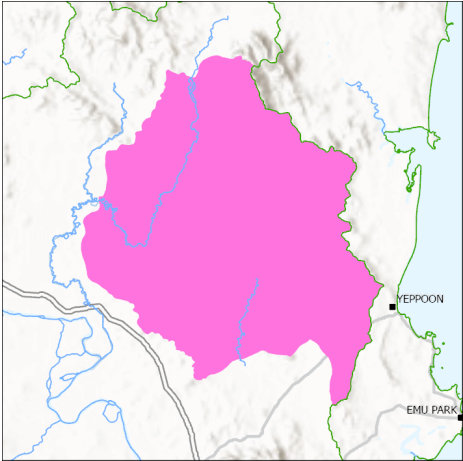
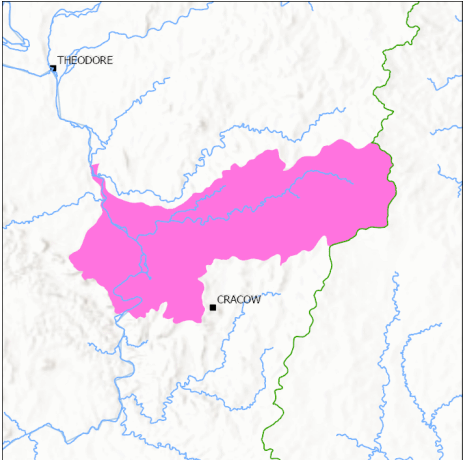
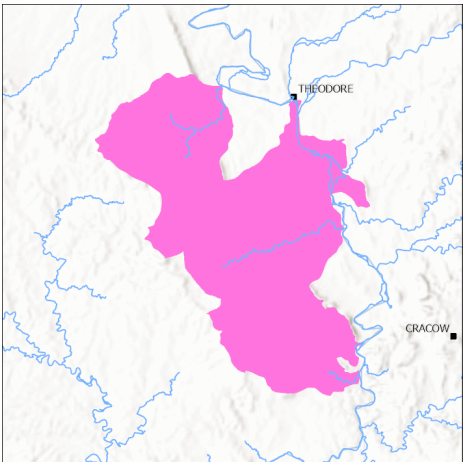
Table 22. Special Features - Riverine Ecology decisions

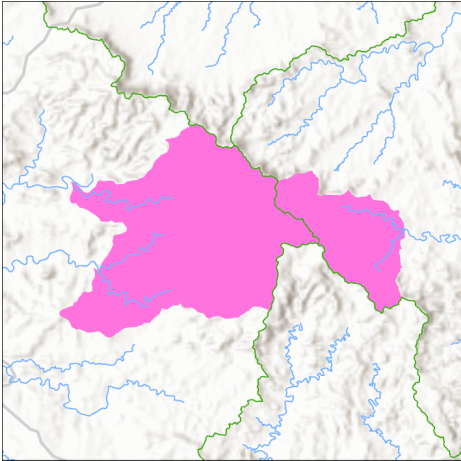
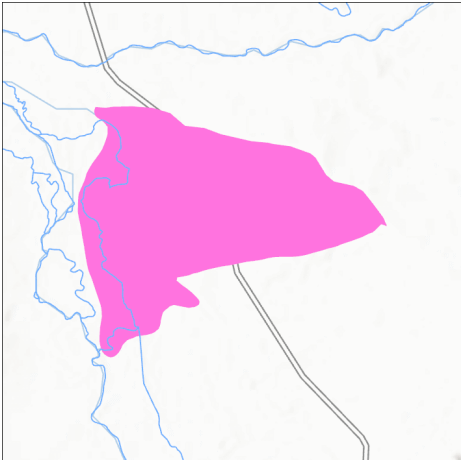
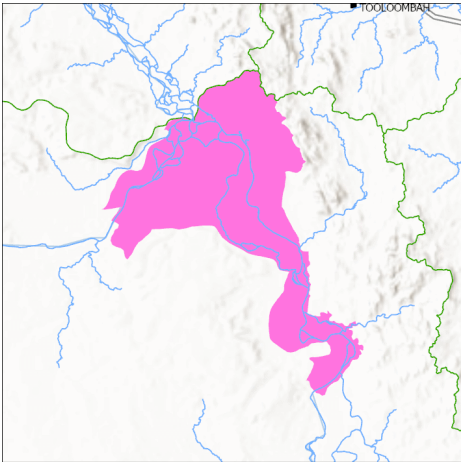
Riverine ecology decisions	Ratings and values
Boyne crossing (riverine) 	Decision codes: bo_r_ec_01 CIM 6.3.1 with a rating of 4. The Boyne crossing (approximately 15km south of Calliope) provides excellent habitat for waterplants with 22 species of waterplants being recorded from this locality. With crystal clear waters, there is high fish diversity and is considered to be only one of five sites like this in the entire region. However, this area is above the impoundment of Awoonga Reservoir and may be affected by clearing of the riparian zone.

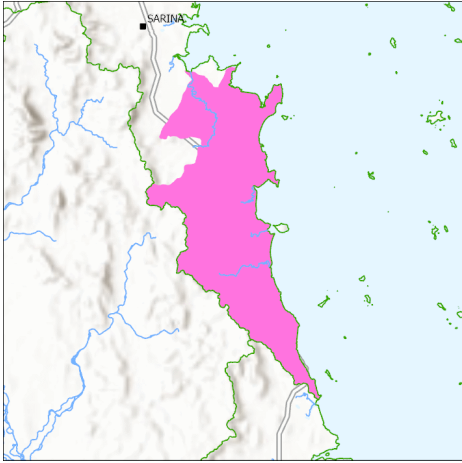
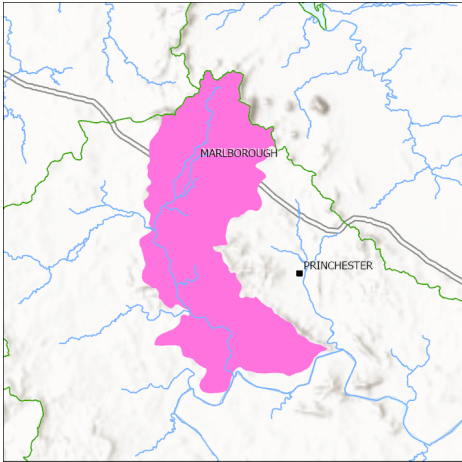
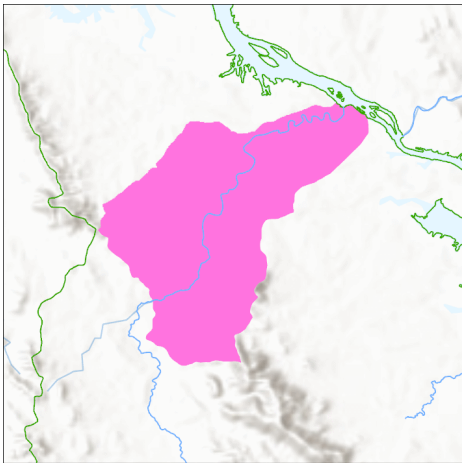
Riverine ecology decisions	Ratings and values
Calliope River from Larcombe Creek to Mount Alma 	Decision codes: ca_r_ec_01 CIM 6.3.1 with a rating of 4. This extensive waterhole within the Calliope River has good connectivity and is unmodified, meaning that its flow regime is still natural. It is the last remaining major river on the coast that has not been dammed and as a result it has a diverse suite of macrophytes. It provides good fish habitat and supports a diversity of fish including mullet and barramundi (<i>Lates calcarifer</i>). It is considered to be an area of high diversity for macrophytes.
Canal Creek (part of Alligator Creek catchment) 	Decision codes: fi_r_ec_06 CIM 6.3.1 with a rating of 4. This massive meander system incorporates the largest polygon of regional ecosystem 11.3.4 in the entire Brigalow Belt bioregion. The area supports mature specimens of hollow bearing blue gums and includes some of the regional ecosystem 11.3.38. Canal creek supports a diversity of macroinvertebrates and aquatic macrophytes. It is also quite sandy with a hard layer of clay metres beneath the sandy sediments. The aquatic values in this area are similar to Hedlow Creek.
Carnarvon Gorge 	Decision codes: ct_r_ec_01 CIM 6.3.1 with a rating of 4; 6.4.1 with a rating of 4; 6.1.1 with a rating of 4; 6.3.4 with a rating of 4. The Carnarvon Gorge is a unique perennial riverine system with unique geomorphology that supports a relictual plant community containing high macrophyte diversity including species such as the giant fern (<i>Angiopteris evecta</i>). In addition, there are springs and very clear waters containing <i>Potamogeton perfoliatus</i>.

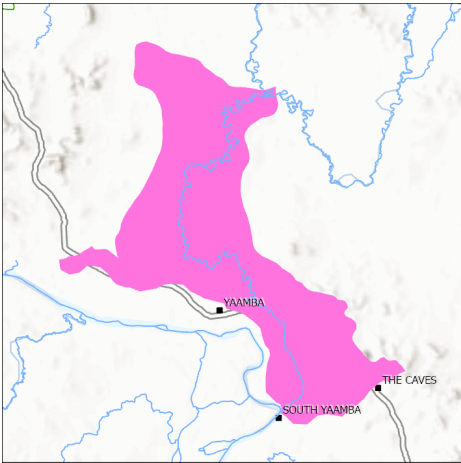
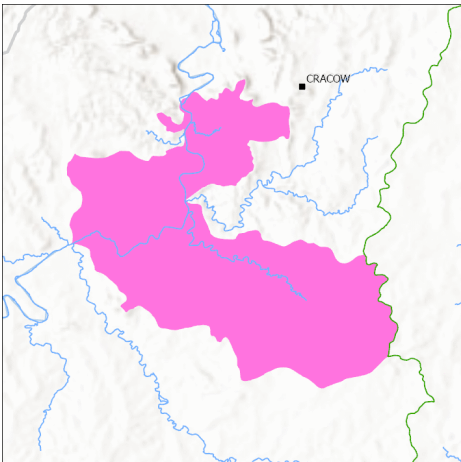
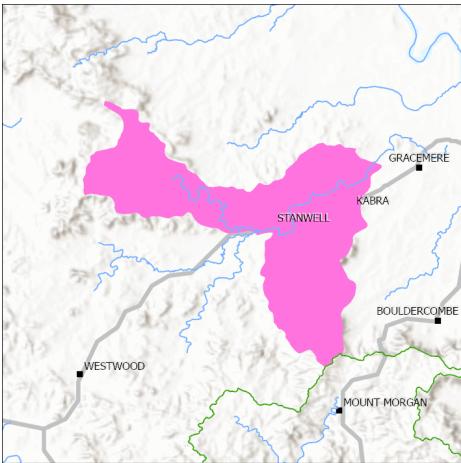
Riverine ecology decisions	Ratings and values
Dee River headwaters 	Decision codes: dn_r_ec_04 CIM 6.3.1 with a rating of 4. This area has very high macrophyte diversity particularly when compared to the remainder of the Dawson River catchment. In addition to this there is a high diversity of macroinvertebrate taxa with around 30 taxa known from the area.
Denison Creek and Funnel Creek 	Decision codes: is_r_ec_02 CIM 6.3.1 with a rating of 4. These creek systems support a mixture of fish species including saratoga, translocated sooty grunter (<i>Hephaestus fuliginosus</i>) and yellowbelly (<i>Macquaria ambigua</i>) as well as rainforest species. The long, deep waterholes have paperbarks over them which support large numbers of platypus (<i>Ornithorhynchus anatinus</i>). Overall, it is a relatively short stream in good condition with permanent water and is prime habitat for rare and threatened species such as black ironbox (<i>Eucalyptus raveretiana</i>). Note: This decision was also included in the non-riverine assessment (is_nr_ec_01).
Downstream from Bingegang Weir 	Decision codes: ma_r_ec_02 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4. This area is important habitat for fauna species. The area is prime habitat for macroinvertebrates and over 30 taxa can be found.

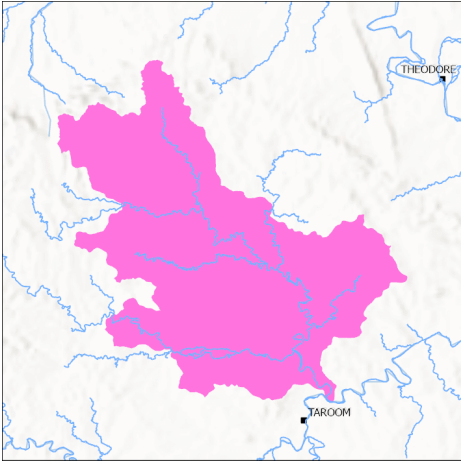
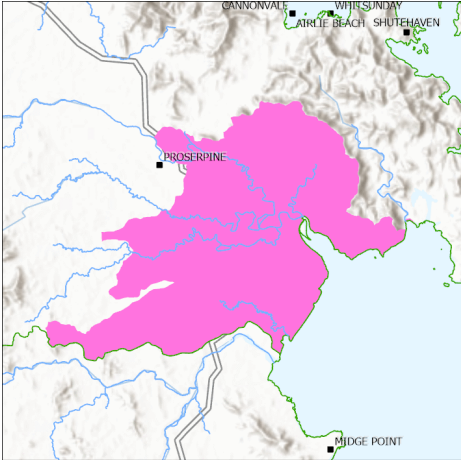
Riverine ecology decisions	Ratings and values
Fitzroy Delta 	Decision codes: fi_r_ec_03 CIM 6.3.1 with a rating of 4; 6.3.3 with a rating of 4. The Fitzroy Delta is listed separately on the DIWA from the Fitzroy floodplain. The area has large sedge swamps, very important nursery habitat for fish as well as good waterbird habitat. Aquatic macrophytes of the Nankin Creek area have high diversity. Note: This decision was also included in the non-riverine assessment (fi_nr_ec_03).
Fitzroy Floodplain 	Decision codes: fi_r_ec_02 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4; 6.3.3 with a rating of 4. The Fitzroy Floodplain is listed separately on the Directory of Important Wetlands (DIWA) from the Fitzroy Delta. The floodplain contains deep water lagoon systems and is a very important nursery habitat for fish. The area has unique geomorphology and is one of the least modified large floodplains on the eastern seaboard. Other areas like this have been cleared for agriculture. The area provides good waterbird habitat with over 30,000 waterbirds recorded here in a recent survey (as part of the national waterbird inventory). The Fitzroy River with the area is important to breeding populations of <i>Rheodytes leukops</i> and <i>Elseya albagula</i>. Note: This decision was also included in the non-riverine assessment (fi_nr_ec_02).
Funnel Creek, Bee Creek and Connors River to the intersection of Isaac River 	Decision codes: is_r_ec_01 CIM 6.3.1 with a rating of 4; 6.3.3 with a rating of 4; 6.3.4 with a rating of 4. This area supports the last population of the crimson finch (<i>Neochmia phaeton</i>) with habitat provided by native grasses in the braided stream. There are also very deep, clear, long pools in this area with good water quality in Connors River (low turbidity, high oxygen levels). The white throated turtle and Fitzroy River turtle have been sighted.

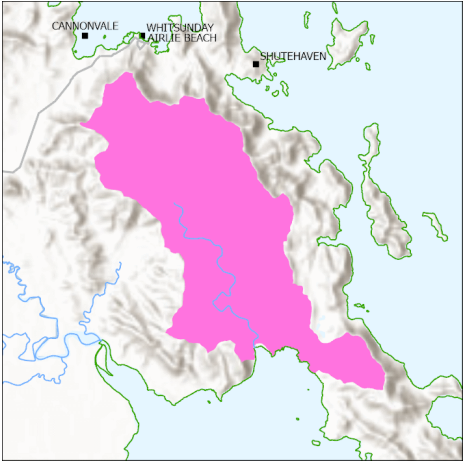
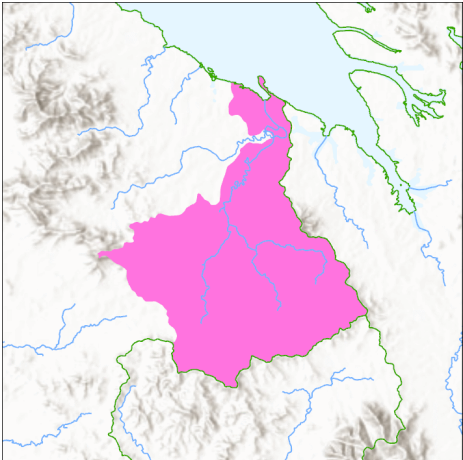
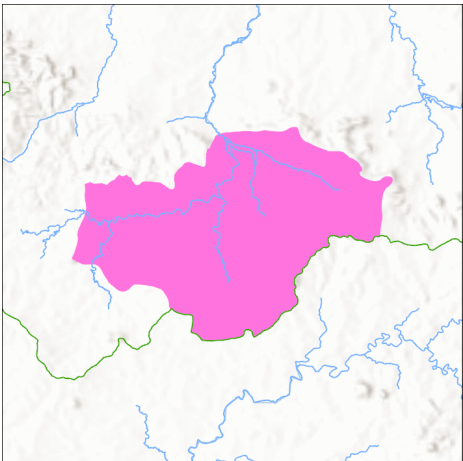
Riverine ecology decisions	Ratings and values
Hedlow Basin & Creek 	Decision codes: fi_r_ec_01 CIM 6.3.1 with a rating of 4; 6.3.3 with a rating of 4. This area contains remnants of regional ecosystem 8.3.13a and includes Serpentine Lagoon, Lake Mary and Green Lake. It is geomorphologically and hydrologically unique having a high water table and a basin area that floods out regularly and picks up backwater floodwater off the Fitzroy River. The water also often builds up and overflows into Alligator Creek. The creek has been stocked with barramundi (<i>Lates calcarifer</i>) because fish passage has been impeded by a barrage. The area is also important for waterbirds despite being quite modified. Note: This decision was also included in the non- riverine assessment (fi_nr_ec_01).
Isla Delusion crossing 	Decision codes: dn_r_ec_02 CIM 6.3.1 with a rating of 3. This area supports well developed palm swamps (<i>Livistona nitida</i>) and is outside the influence of weirs. The area is in good condition enabling good fish recruitment and very clear waters. The waters in this area are much clearer than the rest of the Dawson River, particularly the creek section where the Isla delusion connects to the Dawson River. The substrate here is very gravelly.
Isla Gorge 	Decision codes: dn_r_ec_07 CIM 6.3.1 with a rating of 4. The Isla Gorge supports rare and threatened plants and ancient flora as well as livistona palms

Riverine ecology decisions	Ratings and values
Kroombit Tops National Park and Forest Reserve 	Decision codes: bo_r_ec_02; dn_r_ec_05 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4. The creeks flowing through sandstone geology of Kroombit Tops contain the northern limit of warm temperate rainforest. The area contains wet montane heath and springs, coachwood palm forests along upper creeks and unique geomorphology. It also provides good habitat for the rare and threatened Kroombit tinker frog (<i>Taudactylus pleione</i>), Kroombit tree frog (<i>Litoria kroombitensis</i>) and other fauna.
Lake Victoria 	Decision codes: dn_r_ec_08 CIM 6.4.1 with a rating of 3. This area has unique hydrological values including being a natural sump/perched lake which is uncommon in the region. The site has been likened to a brigalow gilgai that is permanent.
Mackenzie River where it joins Isaac River down to Coolmaringa 	Decision codes: ma_r_ec_01 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4. This section has unique geomorphology and stream morphology with many braided flood plain creeks as well as numerous large, long permanent pools. This provides good habitat for saratoga. Note: This decision was also included in the non- riverine assessment (ma_nr_ec_01).

Riverine ecology decisions	Ratings and values
Marion, West Hill & Basin Creeks 	Decision codes: pl_r_ec_01 CIM 6.3.1 with a rating of 3. In this area there are no barriers and very little water extraction resulting in well vegetated riparian zones and a good diversity of fish. It is particularly good habitat for diadromous fish. The short creeks south of Flaggy Rock are in good condition with good water quality and fish passage despite being under the influence of dry cane farming. Note: This decision was also included in the non-riverine assessment (pl_nr_ec_01).
Marlborough Creek 	Decision codes: fi_r_ec_05 CIM 6.3.1 with a rating of 4; 6.3.3 with a rating of 4. Marlborough Creek is important for serpentinite plant species and is known to support very large macrophyte beds as well as a number of rare and threatened plants. The area contains a good nesting site for the Fitzroy River turtle (<i>Rheodytes leukops</i>) with large numbers having been recorded there. The area supports a good population of crocodiles and a diversity of fish species. The area has good connectivity and very clear waters.
Monduran Creek 	Decision codes: ca_r_ec_02 CIM 6.3.1 with a rating of 3. The Monduran Creek is an important barramundi (<i>Lates calcarifer</i>) and other fish nursery area. The area also contains good riparian vine scrub. Note: This decision was also included in the non-riverine assessment (ca_nr_ec_02).

Riverine ecology decisions	Ratings and values
Mt Etna tufa dams 	Decision codes: fi_r_ec_04 CIM 6.1.1 with a rating of 4. This area forms a series of tufa dams which are rare in Australia. They are calcified dams associated with the Mt Etna limestone.
Nathan Gorge (ecology) 	Decision codes: dn_r_ec_03 CIM 6.3.1 with a rating of 4. The Nathan Gorge provides very important fish habitat supporting a wide range of fish species including yellowbelly (<i>Macquaria ambigua</i>), leathery grunter (<i>Scortum hillii</i>) and saratoga (<i>Scleropages leichardti</i>). The sandstone gorges support rare and threatened plants and ancient flora as well as livistona palms.
Neerkol Creek near Stanwell 	Decision codes: fi_r_ec_07 CIM 6.3.1 with a rating of 2. This section of Neerkol Creek is a good stretch of permanently flowing water with high macrophyte and fish diversity. It provides habitat for rare and threatened species including the black ironbox (<i>Eucalyptus raveretiana</i>). The natural water conductivity can reach up to about 5000 however the nearby power station regulates this at about 2000.

Riverine ecology decisions	Ratings and values
Palm Tree and Robinson Creek 	Decision codes: dn_r_ec_01 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4; 6.3.3 with a rating of 4. The wetlands in this area contain sandstone geomorphology that provides good habitat for <i>Livistona nitida</i> and supports extensive <i>Eleocharis</i> swamps. The area contains rare and threatened species and a high waterbird diversity including magpie goose (<i>Anseranas semipalmata</i>) and cotton pygmy-goose (<i>Nettapus coromandelianus</i>). Aquatic macrophyte diversity in this area is very high, despite some of these wetlands completely drying out at times. The channel is groundwater fed in some locations, leading to permanent water spots. Note: This decision was also included in the non-riverine assessment (dn_nr_ec_01).
Proserpine River at Goorganga Plane 	Decision codes: pr_r_ec_02 CIM 6.3.1 with a rating of 4; 6.3.3 with a rating of 4. The Central Queensland Coast BPA Panel nominated all of Goorganga Plain (from Proserpine River to O'Connell River as a state significant- nationally important wetland, to be listed on the Directory of Important Wetlands in Australia. The area of beach scrub and regional ecosystem 8.3.13b are only found in this area. The area also contains the most southern population of <i>Livistona drudei</i> at Conway Beach/Wilsons Beach. highest density of crocodiles (<i>Crocodylus porosus</i>) in the region and also provides habitat for false water-rats (<i>Xeromys myoides</i>), sea turtles and species listed in the JAMBA convention. Links from Goorganga to Proserpine River provide important wildlife corridors and should be included with the Goorganga Plain for its importance as wildlife refugia. In addition, the area boasts very high species richness and provides significant breeding and roosting sites throughout. Threats to the area include Condor Oil Shale development.

Riverine ecology decisions	Ratings and values
Repulse Creek 	Decision codes: pr_r_ec_01 CIM 6.3.1 with a rating of 4. This intact ecosystem is contained largely within the National Park. It is a short fast stream in excellent natural condition and provides habitat for the Proserpine rock-wallaby (<i>Petrogale persephone</i>) as well as rare and threatened flora species. The creeks have good connectivity, good water quality and support an abundance of fish including jungle perch (<i>Kuhlia rupestris</i>) and mangrove jack (<i>Lutjanus argentimaculatus</i>).
Shoalwater Creek 	Decision codes: sh_r_ec_01 CIM 6.4.1 with a rating of 4; 7.1.1 with a rating of 4. This intact ecosystem is within a pristine landscape and is the only creek with any significant freshwater on that side. It has good connectivity and provides a very good reference site for water quality.
Springs of Nogoa River headwaters 	Decision codes: no_r_ec_01 CIM 6.1.1 with a rating of 4. This area contains a number of spring-fed sand bed flow systems.

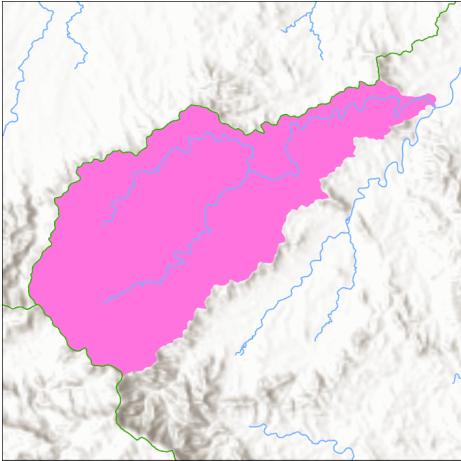
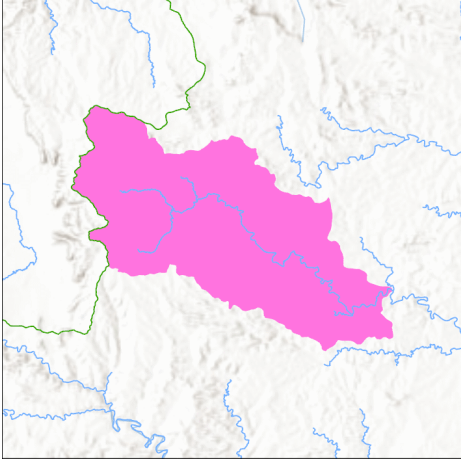
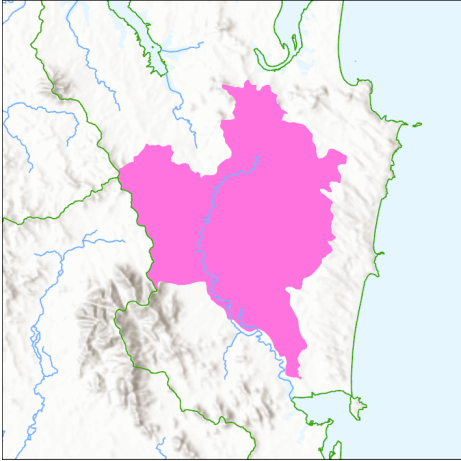
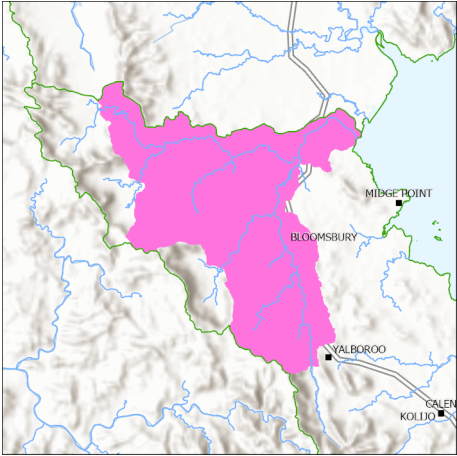
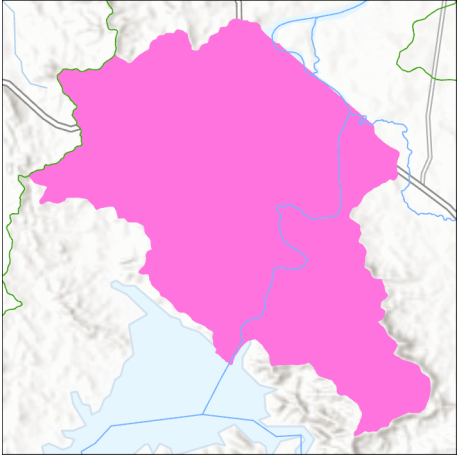
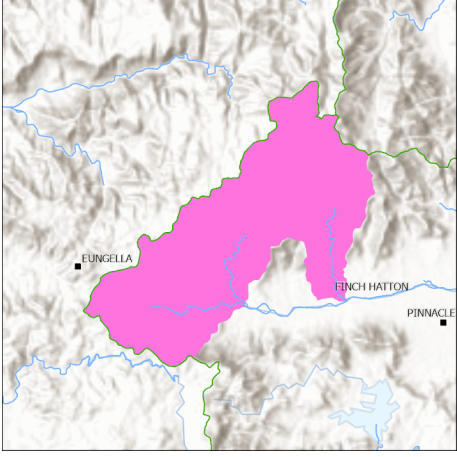
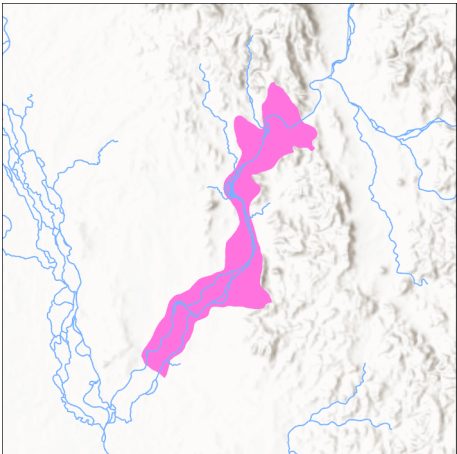
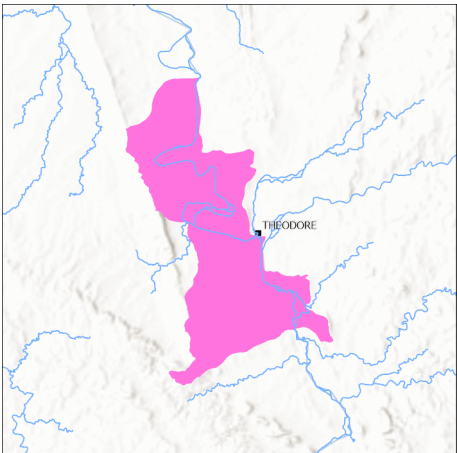
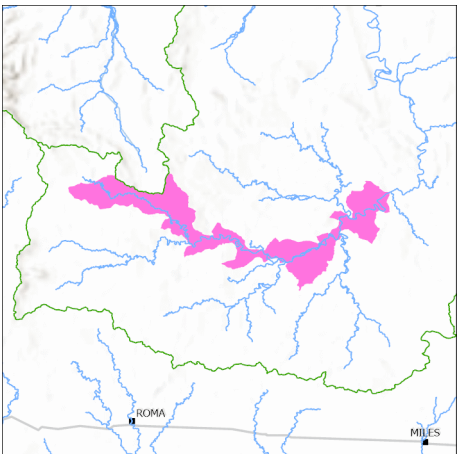
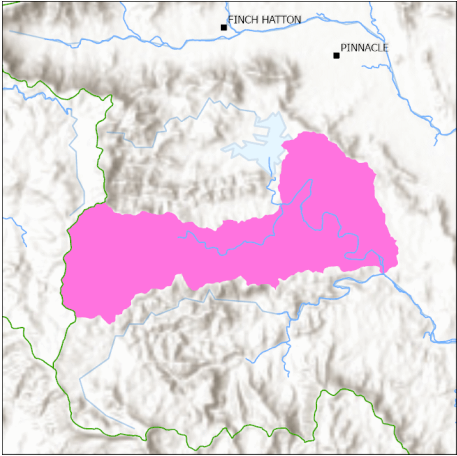
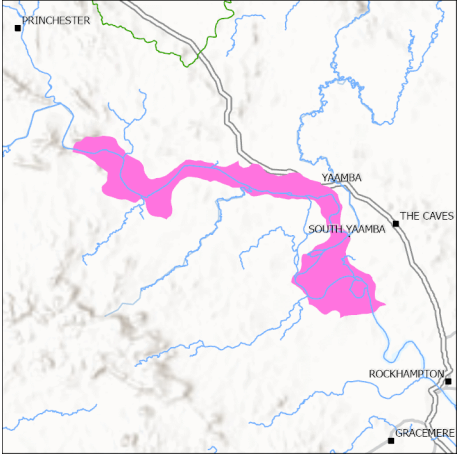
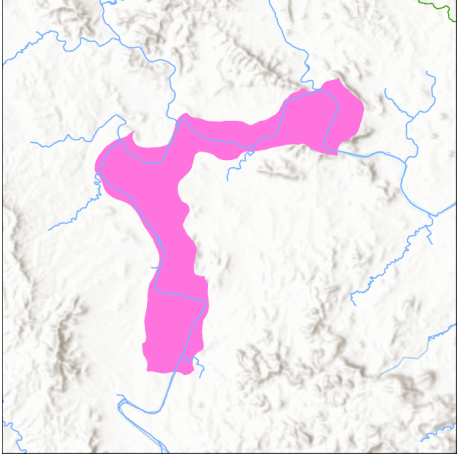
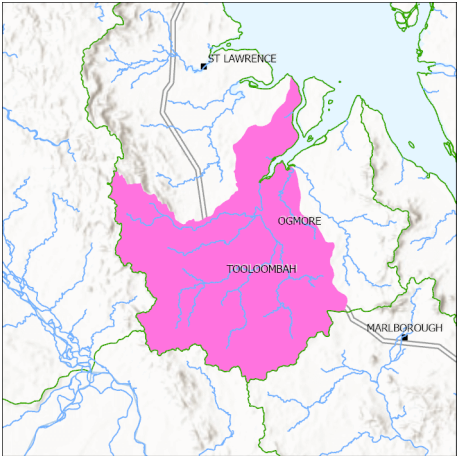
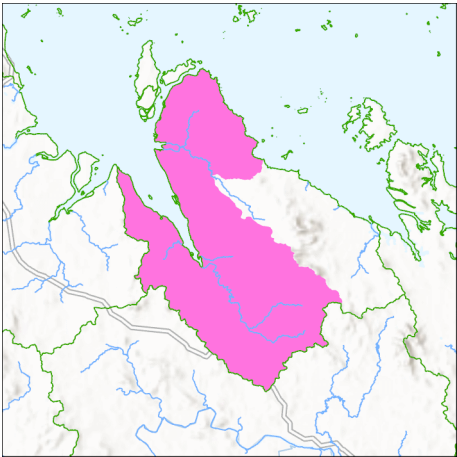
Riverine ecology decisions	Ratings and values
Springs on Futter Creek on Braeside property 	Decision codes: bo_r_ec_03 CIM 6.3.1 with a rating of 3; 6.4.1 with a rating of 3. Unique flora values in bottom of the springs such as palm trees and ferns, good contribution to base flows, provide significant contribution to water quality. Note: There are no springs, lacustrine or palustrine wetlands mapped in the Queensland Wetlands Mapping for this area.
The amphitheatre (Robinson National Park) 	Decision codes: dn_r_ec_06 CIM 6.1.1 with a rating of 3; 6.3.1 with a rating of 3. This area has unique sandstone geomorphology providing unique habitats despite some disturbance by grazing.
Waterpark Creek catchment 	Decision codes: wa_r_ec_01 CIM 6.3.1 with a rating of 4. This area is derived from coastal sands and granite and has unique drainage. It has a very low pH of about 5.5 with clear deep pools and contains excellent water quality. There are large numbers of mullet (<i>Myxus petardi</i>) and tarpon (<i>Megalops cyprinoides</i>) and the area may provide habitat for jungle perch (<i>Kuhlia rupestris</i>) as well. The area supports alluvial rainforest and palm swamps and feather palm rainforest as well as rare and threatened species such as Sowerbaea, <i>Phaius australis</i> and the endemic Byfield fern (<i>Bowenia serrulata</i>). Note: This decision was also included in the non-riverine assessment (wa_nr_ec_01).

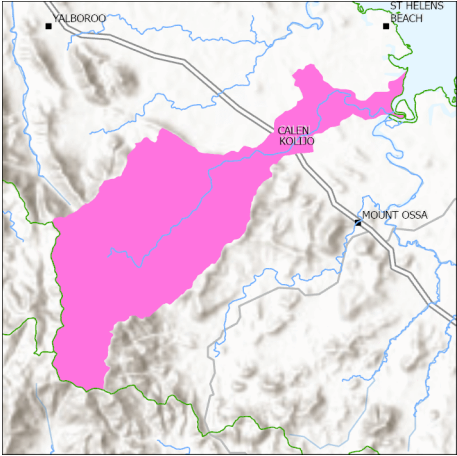
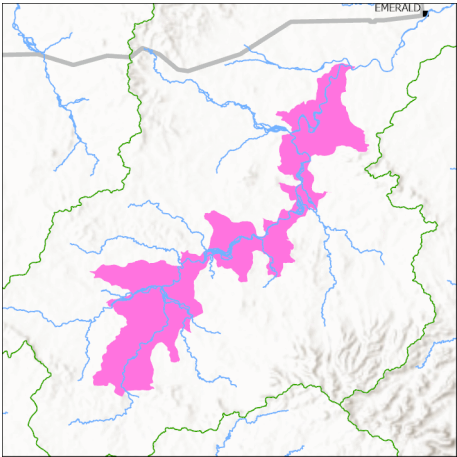
Table 23. Special Features - Riverine Fauna decisions

Riverine fauna decisions	Ratings and values
Andromache and O'Connell Rivers 	Decision codes: oc_r_fa_01 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4. The Andromache River provides good habitat for an abundance of fish. The catchment is fairly intact with good connectivity and a few sand dams in the lower reaches providing good habitat. The upper catchment has small pockets of good habitat with the rest of the system dominated by sand. The area also contains one of the largest remnant populations of Jungle Perch south of the wet tropics. Jungle Perch have been sighted and caught in Fish Creek.
Below Awoonga Dam 	Decision codes: bo_r_fa_01 CIM 6.3.1 with a rating of 4. This site is the most important section of a small 1 km freshwater stretch of river immediately below Awoonga Dam. It is the only section where fish can complete the freshwater part of their lifecycle in this catchment.
Cattle Creek & Finch Hatton Creek 	Decision codes: pi_r_fa_01 CIM 6.3.1 with a rating of 4. This area of intact ecosystem provides good frog habitat and supports a number of rare and threatened species. Most of the population of the Eungella tinker frog (<i>Taudactylus liemi</i>) is found here. The rainforest streams also provide prime habitat for freshwater crayfish (<i>Euastacus eungella</i>).

Riverine fauna decisions	Ratings and values
Connors River at Cardowan 	Decision codes: is_r_fa_01 CIM 6.3.1 with a rating of 4. This area provides good turtle habitat supporting a breeding populations of the Fitzroy River turtle (<i>Rheodytes leukops</i>).
Dawson River near Willawa Nature Reserve 	Decision codes: dn_r_fa_02 CIM 6.3.1 with a rating of 3; 6.3.3 with a rating of 3. This site is an important recruitment area for the southern snapping turtle (<i>Elseya albagula</i>). The area has good riffle zones and sand beds and supports a significant population of the Fitzroy River turtle (<i>Rheodytes leukops</i>) behind Theodore Weir.
Dawson River north of Wide Water 	Decision codes: dn_r_fa_03 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4. This section of the Dawson River is the last natural section left. The reach is very intact containing no infrastructure and an unmodified hydrological regime despite surrounding land uses. The area is good habitat for yellowbelly (<i>Macquaria ambigua</i>). Spring fed pools occur in the upper reaches of this section, which provide permanent water sources.

Riverine fauna decisions	Ratings and values
Endeavour Creek 	Decision codes: pi_r_fa_02 CIM 6.3.1 with a rating of 4. This area is known to be good frog, sooty grunter (<i>Hephaestus fuliginosus</i>) and freshwater catfish (<i>Tandanus tandanus</i>) habitat. It contains relatively intact and undisturbed ecosystems with only minor grazing.
Fitzroy River above Alligator Creek 	Decision codes: fi_r_fa_02 CIM 6.3.1 with a rating of 4. The sandy banks in this area provide prime nesting habitat for the Fitzroy River turtle (<i>Rheodytes leukops</i>).
Fitzroy River near Glenroy Crossing 	Decision codes: fi_r_fa_03 CIM 6.3.1 with a rating of 3. The sandy banks in this area provide prime nesting habitat for the Fitzroy River turtle (<i>Rheodytes leukops</i>) and is the southern most known nesting point for estuarine crocodiles (<i>Crocodylus porosus</i>).

Riverine fauna decisions	Ratings and values
Frog habitat in the upper reaches of the Boyne Catchment. 	Decision codes: bo_r_fa_02 CIM 6.3.1 with a rating of 3. The upper reaches of the Boyne catchment is good frog habitat. There is a significant amount of water in this location.
Granite Creek and Tooloomba Creek 	Decision codes: st_r_fa_01 CIM 6.2.1 with a rating of 4; 6.3.1 with a rating of 4; 7.1.2 with a rating of 4; 7.5.1 with a rating of 4. These stream systems provide good freshwater in between the estuary and the highway. They have good connectivity between estuarine and freshwater being relatively intact without fish barriers and good riparian zone. There is much ponded pasture in this area that is good habitat for waterbirds including yellow chat (Dawson) (<i>Epthianura crocea macgregori</i>).
Herbert Creek upstream from Block Creek, including Boundary Lagoons 	Decision codes: sh_r_fa_01 CIM 6.3.1 with a rating of 3. This site provides good fish habitat and important waterbird habitat but is heavily cleared due to the Magnetite mines throughout the area.

Riverine fauna decisions	Ratings and values
Jungle Perch Habitat St Helens Creek 	Decision codes: oc_r_fa_02 CIM 6.3.1 with a rating of 4; 6.3.4 with a rating of 4. St Helens Creek is a known habitat for a permanent population of Jungle Perch. There are limited barriers to fish movement. The riparian habitat is intact and in good condition, particularly in the upper reaches of St Helens Creek. The coastal strip catches a lot of rain which allows the creek to flow for a majority of the year.
Mimosa Creek 	Decision codes: dn_r_fa_01 CIM 6.3.1 with a rating of 2. Mimosa Creek is the main stream running off the Blackdown Tableland. The area is a unique wetland situated on land zone 5 containing sand beds and is often dry. Despite this, it provides habitat for a diverse range of fish including a wide range of size classes from small to large.
Nogoa River upstream of Fairburn Dam 	Decision codes: no_r_fa_01 CIM 6.3.1 with a rating of 4; 6.3.3 with a rating of 4. This section of the Nogoa River has extremely high numbers of yellowbelly (<i>Macquaria ambigua</i>) individuals and eggs. There are more eggs in this area than typically found in the Murray-Darling basin. The long stretches of water are favourable to the planktonic eggs. The river in this area is very intact containing no infrastructure and an unmodified hydrological regime despite surrounding land uses (Roberts, Duivenvoorden and Stewart, 2008).

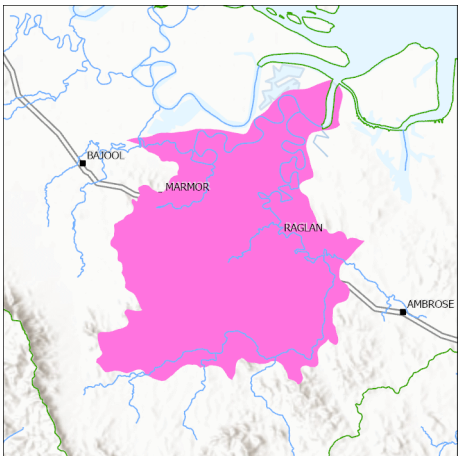
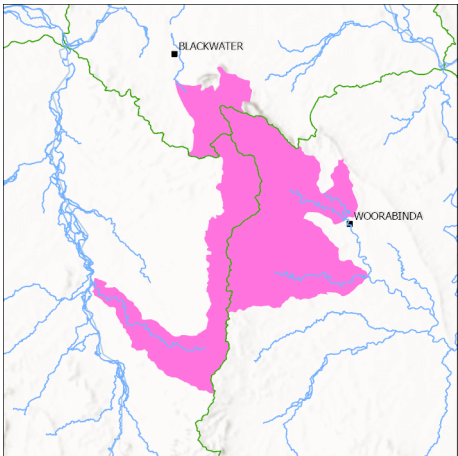
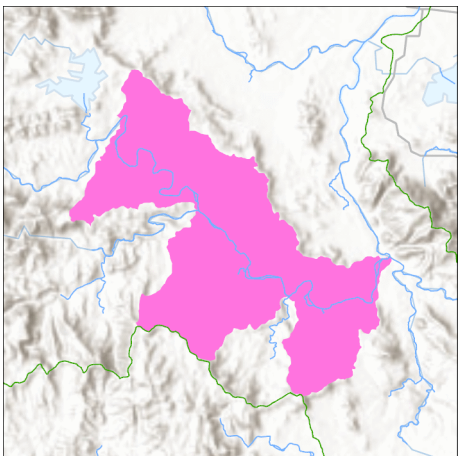
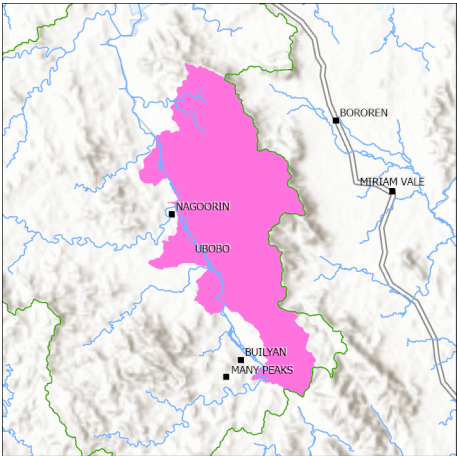
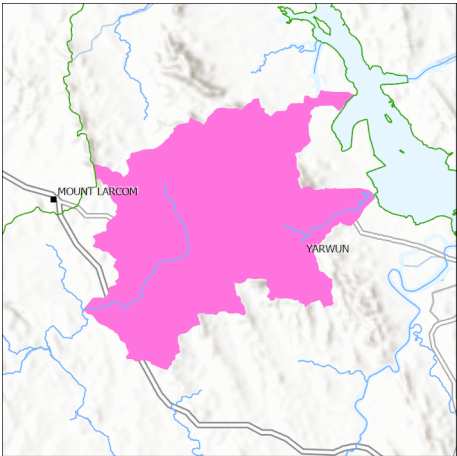
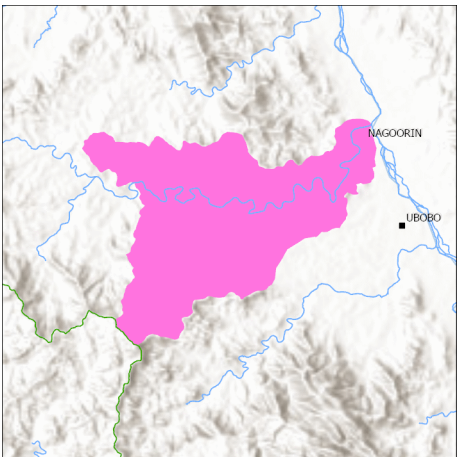
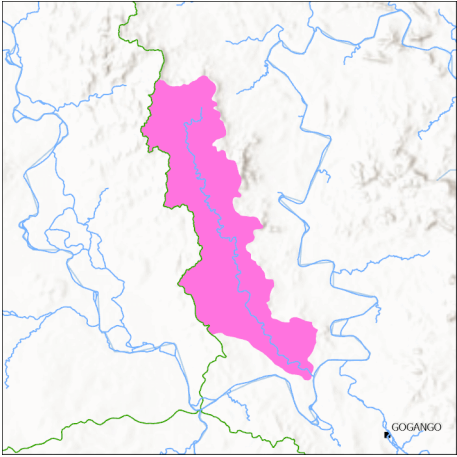
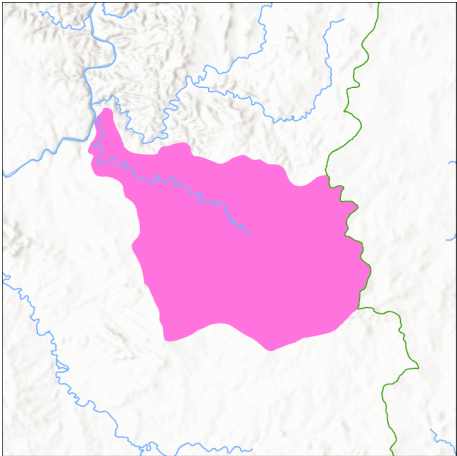
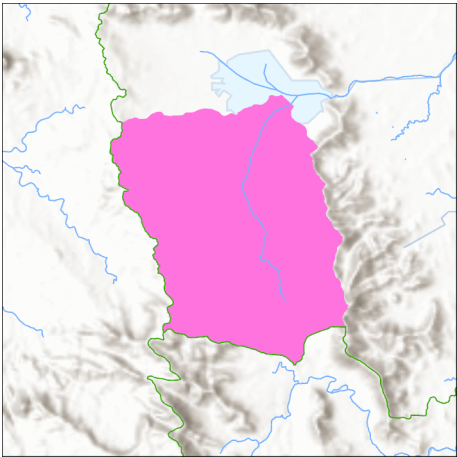
Riverine fauna decisions	Ratings and values
Raglan Creek and Twelve Mile Creek 	Decision codes: fi_r_fa_01 CIM 6.3.1 with a rating of 4; 6.3.3 with a rating of 4. These creeks are very well connected perennial systems which are very important for catadromous fish species. The area is the most important fresh water riverine habitat in the central Queensland coast bioregion. A significant population of the southern snapping turtle (<i>Elseya albagula</i>) is known to occur in Raglan Creek.

Table 24. Special Features - Riverine Flora decisions

Riverine flora decisions	Ratings and values
Blackdown Tableland 	Decision codes: ma_r_fl_01; ct_r_fl_01; dn_r_fl_01 CIM 6.3.1 with a rating of 4. The entire sandstone tableland area including the creeks flowing through and from it are habitat for numerous endemic, rare and threatened species as well as containing significant indigenous cultural values including rock art sites. Planet Creek is particularly high in all of these values including the section on Planet Downs south of Blackdown National Park. The area is fairly dry and highly phosphorous deficient. Also an important habitat for frogs. Note: This decision straddles the Comet, Dawson and Mackenzie study areas.
Blacks Creek below the dam 	Decision codes: pi_r_fl_01 CIM 6.3.1 with a rating of 3; 6.3.3 with a rating of 3. This area has an abundance of black ironbox (<i>Eucalyptus raveretiana</i>) which is in good condition with minimal disturbance and only lightly grazing.

Riverine flora decisions	Ratings and values
Creeks draining from Castle Tower granites (Many Peaks Range including the eastern Boyne River) 	Decision codes: bo_r_fl_02 CIM 6.3.1 with a rating of 3. Contained mostly within National Park this area is in good condition and contains rare, threatened and endemic species. Note: This decision straddles the Boyne and Baffle study areas.
Creeks flowing off Mt Larcom 	Decision codes: ca_r_fl_01 CIM 6.3.1 with a rating of 3. Cherry Creek contains rare and threatened species including <i>Actephila sessilifolia</i>, <i>Atalaya rigida</i>, <i>Cupaniopsis shirleyana</i> and also has patches of rainforest dominated by Mueller's redheart (<i>Dissiliaria muelleri</i>). Mueller's redheart (<i>Dissiliaria muelleri</i>) is not currently listed as rare or threatened but has a very restricted distribution. The vegetation along these creeks is part of a large remnant area that contains significant patches of dry rainforest as well as the rocky outcrops of Mt Larcom that are habitat to rare and endemic species. This area was previously a national park proposal and is currently under threat from industrial development and lack of appropriate ecological management.
Koolkooroom Creek 	Decision codes: bo_r_fl_01 CIM 6.3.1 with a rating of 4. Koolkooroom Creek is habitat for a number of rare and threatened species including <i>Cycas megacarpa</i>, <i>Fontainea venosa</i>, <i>Sophora fraseri</i> (brush sophora), <i>Macropteranthes leiocaulis</i>, <i>Atalaya rigida</i>, <i>Senna acclinis</i> and <i>Alyxia sharpei</i>.

Riverine flora decisions	Ratings and values
Melaleuca Creek & Goodedulla National Park 	Decision codes: fl_r_fl_01 CIM 6.3.1 with a rating of 4. This area is one of the best examples of black ironbox (<i>Eucalyptus raveretiana</i>) habitat in the region.
Nathan Gorge (flora) 	Decision codes: dn_r_fl_02 CIM 6.1.1 with a rating of 4; 6.4.1 with a rating of 4. The gorge has been reserved since the 1920s. It is remote with mesic species. It has a high cultural significance. There are springs and the rivers are likely to be spring fed. <i>Livistona nitida</i> (Dawson River Fan Palm) is present along the downstream sections of the gorge.
Quandong Creek 	Decision codes: pr_r_fl_01 CIM 6.3.1 with a rating of 3; 6.3.3 with a rating of 3. This area has an abundance of black ironbox (<i>Eucalyptus raveretiana</i>) which is in good condition with minimal disturbance and only lightly grazing.

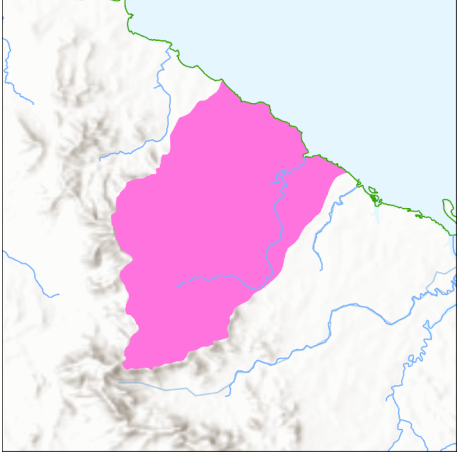
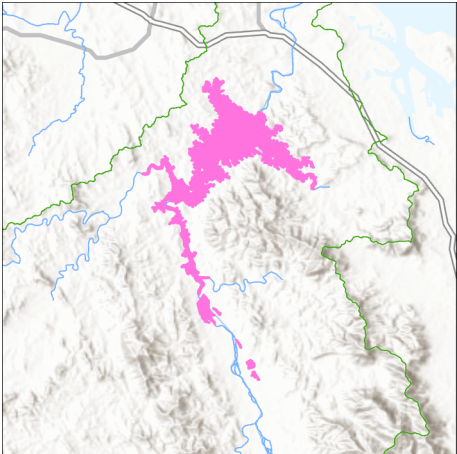
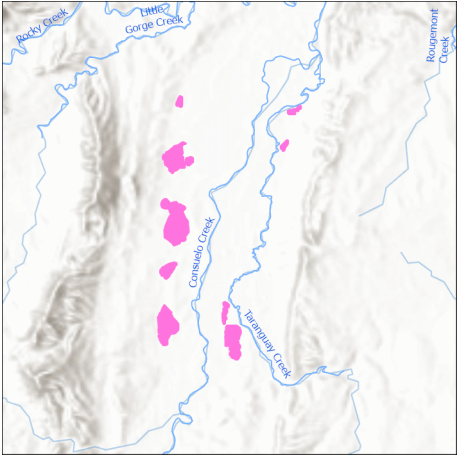
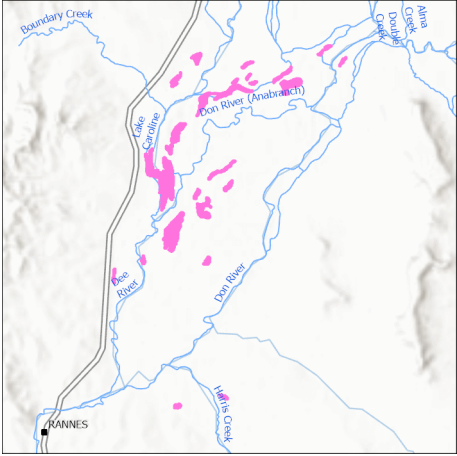
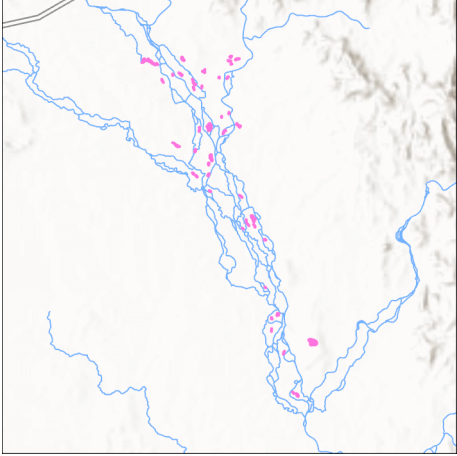
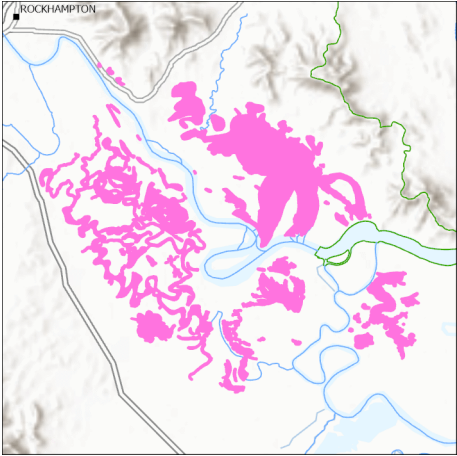
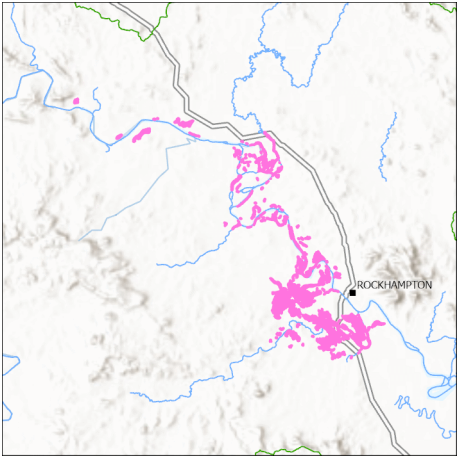
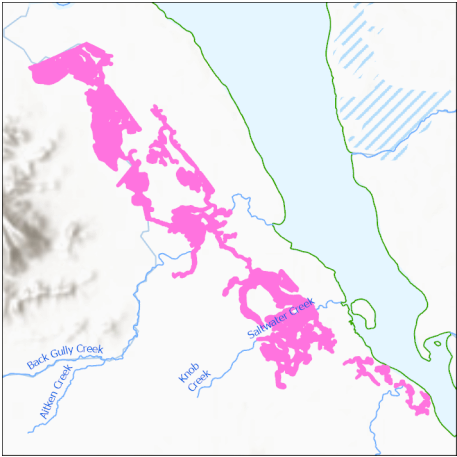
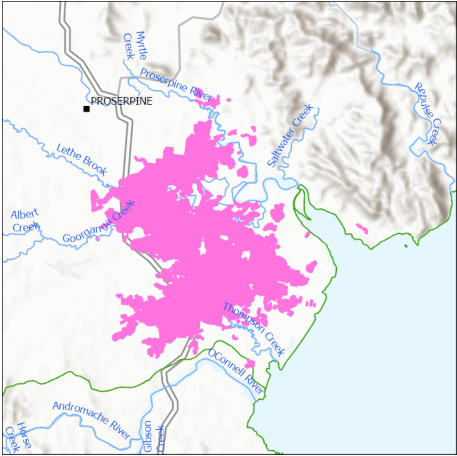
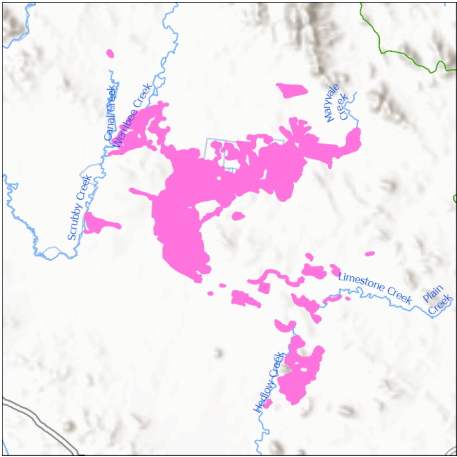
Riverine flora decisions	Ratings and values
Raspberry Creek 	Decision codes: sh_r_fl_01 CIM 6.3.1 with a rating of 3. This stream contains alluvial rainforest classified as regional ecosystem 11.3.11 which is under threat from fire and guinea grass (<i>Megathyrsus maximus</i> var. <i>maximus</i>) invasion.

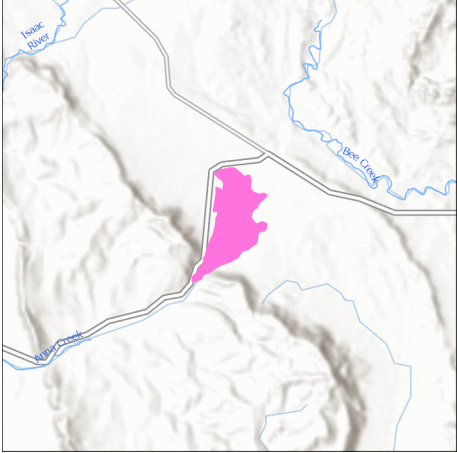
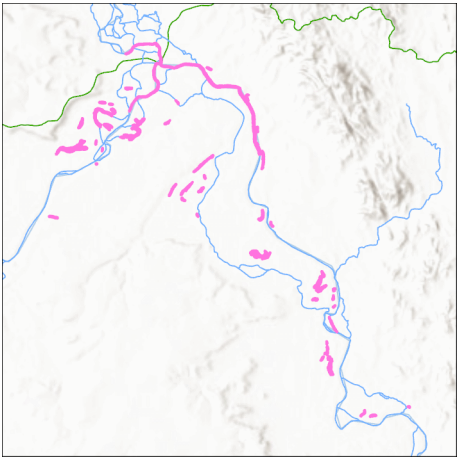
Table 25. Special Features - Non-Riverine Ecology decisions

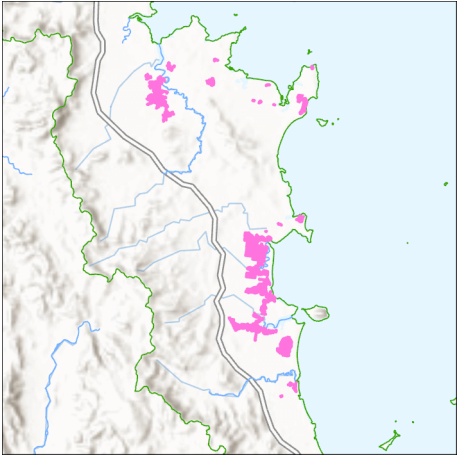
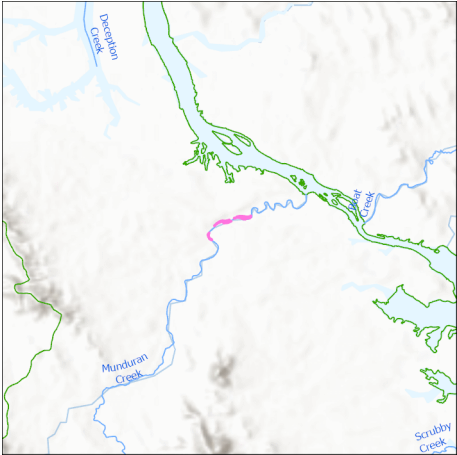
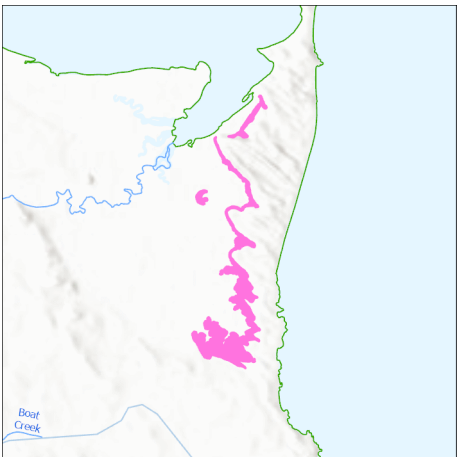
Non-Riverine ecology decisions	Ratings and values
Bar plains 	Decision codes: st_nr_ec_01 CIM 6.3.1 with a rating of 3. This wetland is similar to Torilla Plain (sh_nr_ec_02) in the Shoalwater catchment. It has a large area of regional ecosystem 11.3.27 and provides habitat for waterbirds.
Boyne Crossing (non-riverine) 	Decision codes: bo_nr_ec_01 CIM 6.3.1 with a rating of 4. The Boyne crossing (approximately 15km south of Calliope) provides excellent habitat for waterplants with 22 species of waterplants being recorded from this locality. With crystal clear waters, there is high fish diversity and is considered to be only one of five sites like this in the entire region. However, this area is above the impoundment of Awoonga Reservoir and may be affected by clearing of the riparian zone.

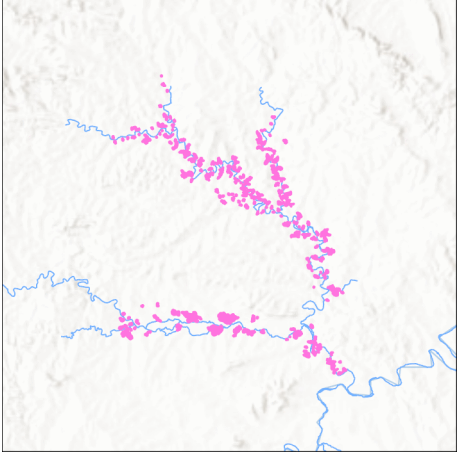
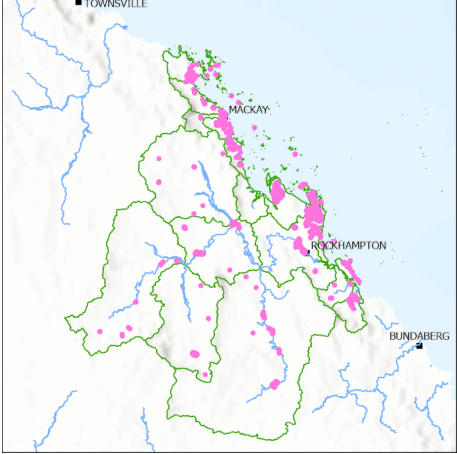
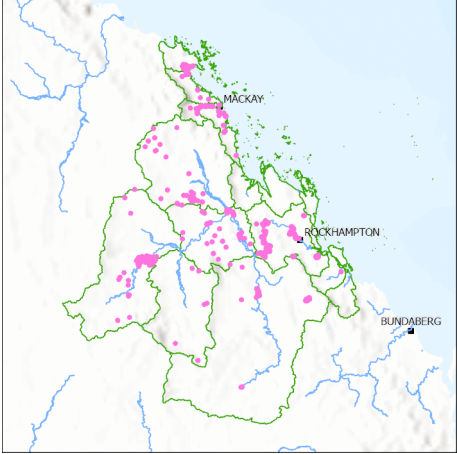
Non-Riverine ecology decisions	Ratings and values
Consuelo Creek wetlands 	Decision codes: ct_nr_ec_02 CIM 6.1.1 with a rating of 3; 6.3.1 with a rating of 3. The Consuelo Creek wetlands contain sandstone geomorphology, good water quality and are important as drought refugia. The area supports extensive <i>Eleocharis</i> swamps and is habitat for <i>Livistona nitida</i>. There are rare and threatened species recorded from the area and high waterbird diversity. It is also the southern most habitat of the cotton pygmy-goose (<i>Nettapus coromandelianus</i>).
Dee and Don wetlands 	Decision codes: dn_nr_ec_03 CIM 6.3.1 with a rating of 3. The Dee and Don wetlands are within semi cleared blue gum grazing country where the Dee and the Don meander together through multichannels. The area includes imbedded lakes and sedge systems, extensively connect during very wet times providing good connectivity between channels. The area is thought to support about 20 macroinvertebrate taxa and about 12 to 15 aquatic flora species.
Denison Creek and Funnel Creek 	Decision codes: is_nr_ec_01 CIM 6.3.1 with a rating of 4. The long, deep waterholes with paperbarks in this area support large numbers of platypus (<i>Ornithorhynchus anatinus</i>) and a mixture of fish species. Note: This decision was also included in the riverine assessment (is_r_ec_02).

Non-Riverine ecology decisions	Ratings and values
Fitzroy Delta (freshwater component) 	Decision codes: fi_nr_ec_03 CIM 6.3.1 with a rating of 4. The Fitzroy Delta is listed separately on the DIWA from the Fitzroy Floodplain. The area has large sedge swamps, very important nursery habitat for fish as well as good waterbird habitat. Note: This decision was also included in the riverine assessment (fi_r_ec_03).
Fitzroy Floodplain 	Decision codes: fi_nr_ec_02 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4. The Fitzroy Floodplain is listed separately on the Directory of Important Wetlands (DIWA) from the Fitzroy Delta. The floodplain contains deep water lagoon systems and is a very important nursery habitat for fish. The area has unique geomorphology and is one of the least modified large floodplains on the eastern seaboard. Other areas like this have been cleared for agriculture. The area provides good waterbird habitat with over 30,000 waterbirds recorded here in a recent survey (as part of the national waterbird inventory). Note: This decision was also included in the riverine assessment (fi_r_ec_02).
Glen Prairie 	Decision codes: sh_nr_ec_01 CIM 6.3.1 with a rating of 3. Overall the Glen Prairie is a good wetland complex with significant reed beds that provide excellent waterbird habitat and is a known habitat of the yellow chat (Dawson) (<i>Epthianura crocea macgregori</i>). It has been mismanaged in the past and contains a fish tidal exclusion barrier. Glen Prairie is now part of the Shoalwater Bay Training Area and owned by the Department of Defence.

Non-Riverine ecology decisions	Ratings and values
Goorganga Plain 	Decision codes: pr_nr_ec_01 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4. Though heavily weed invaded in places, this wetland complex remains the largest naturally treeless plain that has not been converted to cultivation in the northern high rainfall coasts (Wet Tropics and Central Queensland Coast bioregions). It contains the best and largest example of intact native sorghum-dominated grassland in the central Queensland coast bioregion and contains some of the last stands of the endangered regional ecosystem 8.3.11. The area includes a range of wetland types with good connectivity between estuarine to riverine to non-riverine wetlands. There are both wooded and non-wooded wetlands and the biggest area of regional ecosystem 8.3.12 in the region. The site also provides good waterbird habitat, is one of the largest crocodile breeding sites south of Hinchinbrook and is important for fish. It has unique hydrological values including good hydrological persistence and although it is mainly non-riverine it also has minor stream segments running through it that are important.
Hedlow Basin & Creek 	Decision codes: fi_nr_ec_01 CIM 6.3.1 with a rating of 4. This area contains remnants of regional ecosystem 8.3.13a and includes Serpentine Lagoon, Lake Mary and Green Lake. It is geomorphologically and hydrologically unique having a high water table and a basin area that floods out regularly and picks up backwater floodwater off the Fitzroy River. The water also often builds up and overflows into Alligator Creek. The creek has been stocked with barramundi (<i>Lates calcarifer</i>) because fish passage has been impeded by a barrage. The area is also important for waterbirds despite being quite modified. Note: This decision was also included in the riverine assessment (fi_r_ec_01).

Non-Riverine ecology decisions	Ratings and values
Lake Elphinstone 	Decision codes: is_nr_ec_02 CIM 6.1.1 with a rating of 3; 6.3.1 with a rating of 3. This site has unique geomorphology and is a good example of a sub-coastal lake that provides important habitat in the Fitzroy region. The lake provides important waterbird habitat and has repeated seasonal cyanobacteria blooms. It is on the registry of wetlands of national importance. The headwaters of the catchment often dry out and studies have indicated the presence of macroinvertebrates. The lake has unique water quality values including high toxin levels and possibly sediments that contain natural levels of phosphorus and nitrogen contributed to by the surrounding land uses.
Lake Nuga Nuga 	Decision codes: ct_nr_ec_01 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4. Lake Nuga Nuga is listed as a wetland of national significance because of its significance for waterbirds. It is an ephemeral system that has geomorphic values of interest and habitat for numerous macrophytes. Note: This decision was also a fauna decision under the Brigalow Belt Biodiversity Planning Assessment (decision number brbs_fa_56).
Mackenzie River where it joins Isaac River down to Coolmaringa 	Decision codes: ma_nr_ec_01 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4. This site has unique geomorphology and provides good habitat for saratoga. Note: This decision was also included in the riverine assessment (ma_r_ec_01).

Non-Riverine ecology decisions	Ratings and values
Marion, West Hill & Basin Creeks 	Decision codes: pl_nr_ec_01 CIM 6.3.1 with a rating of 3. The wetlands in this area support a diversity of fish and provide good habitat for diadromous fish in particular. This area includes a large stand of the regional ecosystem 8.3.11 at Notch Point as well as coastal swamps at Cape Palmerston that contains a large intact example of the regional ecosystem 8.3.4 and significant examples of the highly restricted regional ecosystem 8.2.11. This decision includes the Tedlands wetland which is an important waterbird habitat. Note: This decision was also included in the riverine assessment (pl_r_ec_01).
Monduran Creek 	Decision codes: ca_nr_ec_02 CIM 6.3.1 with a rating of 2. Monduran Creek is an important barramundi (<i>Lates calcarifer</i>) and other fish nursery area. Note: This decision was also included in the riverine assessment (ca_r_ec_02).
North Curtis (western edge of parabolic dunes) 	Decision codes: ci_nr_ec_01 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4. This area is an interface between dunes and marine plain wetlands including rainforest on the dunes abutting marine plain swamps. The area provides good yellow chat (<i>Epthianura crocea macgregori</i>) habitat and generally very diverse particularly in the zone between rainforest and Melaleuca forest. All wetlands here have fish values including barramundi (<i>Lates calcarifer</i>) habitat and are thought to be important lowland frog habitat. Wetlands in between the dunes contain freshwater and support Melaleuca swamp ecosystems.

Non-Riverine ecology decisions	Ratings and values
Palm Tree and Robinson Creek 	Decision codes: dn_nr_ec_01 CIM 6.1.1 with a rating of 4; 6.3.1 with a rating of 4. The wetlands in this area contain sandstone geomorphology that provides good habitat for <i>Livistona nitida</i> and supports extensive <i>Eleocharis</i> swamps. The area contains rare and threatened species and a high waterbird diversity including magpie goose (<i>Anseranas semipalmata</i>) and cotton pygmy-goose (<i>Nettapus coromandelianus</i>). Note: This decision was also included in the riverine assessment (dn_r_ec_01).
Permanently wet wetlands that are natural or semi-modified on a river channel or occur on an island. 	Decision codes: fi_nr_ec_04; ig_nr_ec_01; ma_nr_ec_02; ci_nr_ec_02; is_nr_ec_03; wa_nr_ec_02; ct_nr_ec_03; pl_nr_ec_02; bo_nr_ec_02; wi_nr_ec_01; ca_nr_ec_03; oc_nr_ec_01; sh_nr_ec_03; no_nr_ec_01; dn_nr_ec_04; pi_nr_ec_01; pr_nr_ec_02 CIM 6.3.1 with a rating of 4; 6.3.4 with a rating of 4. These wetlands are refugia in an otherwise relatively dry landscape. These wetlands are permanent or near-permanent and are either: i) occur on an island; or ii) natural wetlands on landzone 3; or iii) semi-modified wetlands that are within 100 meters of a watercourse centreline (stream order >3) and on landzone 3.
Permanently wet wetlands that are either semi-modified outside of a river channel or highly-modified within a river channel. 	Decision codes: dn_nr_ec_05; fi_nr_ec_05; is_nr_ec_04; ca_nr_ec_04; pl_nr_ec_03; pr_nr_ec_03; oc_nr_ec_02; ma_nr_ec_03; ct_nr_ec_04; no_nr_ec_02; pi_nr_ec_02 CIM 6.3.1 with a rating of 3; 6.3.4 with a rating of 3. These wetlands are refugia in an otherwise relatively dry landscape. These wetlands are permanent or near-permanent and are either: i) semi-modified wetlands that are further than 100 meters from a watercourse centreline (stream order >3) and on landzone 3; or ii) highly-modified wetlands that are within 100 meters of a watercourse centreline (stream order >3) and on landzone 3.

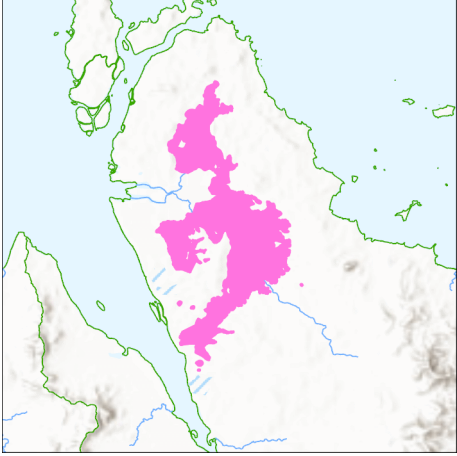
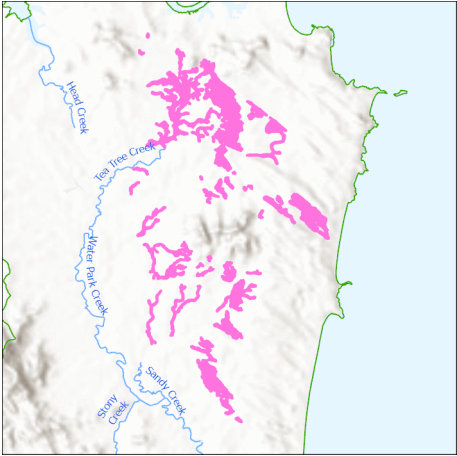
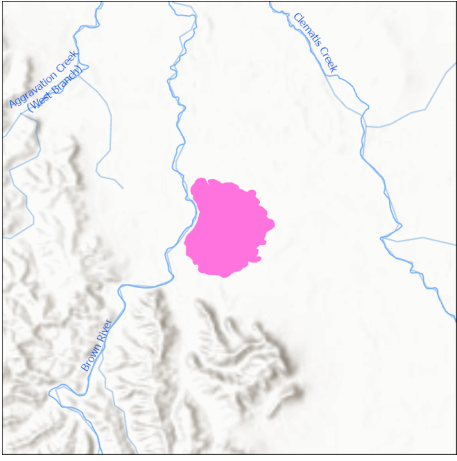
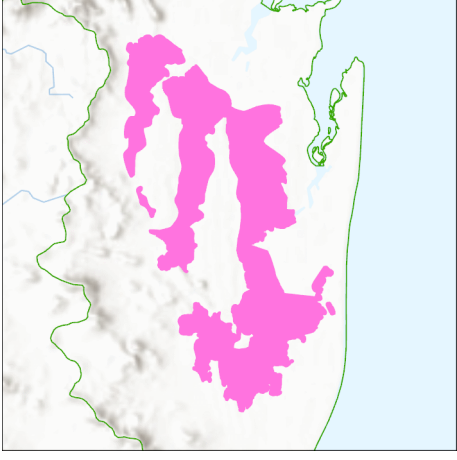
Non-Riverine ecology decisions	Ratings and values
Permanently wet wetlands that are highly-modified wetlands outside of a river channel. 	Decision codes: bo_nr_ec_04; fi_nr_ec_06; pl_nr_ec_04; no_nr_ec_03; sh_nr_ec_05; oc_nr_ec_03; pi_nr_ec_03; pr_nr_ec_04; wa_nr_ec_04; dn_nr_ec_06; CIM 6.3.1 with a rating of 2; 6.3.4 with a rating of 2. These wetlands are refugia in an otherwise relatively dry landscape. These wetlands are permanent or near-permanent and are: i) highly-modified wetlands that are further than 100 meters from a watercourse centreline (stream order > 3) and on landzone 3.
Torilla Plain 	Decision codes: sh_nr_ec_02 CIM 6.3.1 with a rating of 4. The Torilla Plain is a large wetland complex that includes a range of different wetland types with good connectivity between estuarine to riverine to non-riverine wetlands. It is the least disturbed wetland on the coast south of the cape. Freshwater and saline water flow both ways into the wetland which contains both wooded and non-wooded wetlands and the largest area of regional ecosystem 11.3.27 and its various subtypes. The area supports extensive areas of good condition grass sedge wetland and is a hot spot for biodiversity. The site provides good waterbird habitat with 30,000 to 40,000 waterbirds observed during the wet season. Yellow chat (Dawson) (<i>Epthianura crocea macgregori</i>) and an array of other waterbirds thrive in the area despite some parts being slightly modified.
Waterpark Creek catchment 	Decision codes: wa_nr_ec_01 CIM 6.3.1 with a rating of 4; 6.4.1 with a rating of 4. This area is derived from coastal sands and granite and has unique drainage. It has a very low pH of about 5.5 with clear deep pools and contains excellent water quality. There are large numbers of mullet (<i>Myxus petardi</i>) and tarpon (<i>Megalops cyprinoides</i>) and the area may provide habitat for jungle perch (<i>Kuhlia rupestris</i>) as well. The area supports alluvial rainforest and palm swamps and feather palm rainforest as well as rare and threatened species such as Sowerbaea, <i>Phaius australis</i> and the endemic Byfield fern (<i>Bowenia serrulata</i>). Note: This decision was also included in the riverine assessment (wa_r_ec_01).

Table 26. Special Features - Non-Riverine Fauna decisions

Non-Riverine fauna decisions	Ratings and values
Brown Lake 	Decision codes: ct_nr_fa_01 CIM 6.3.1 with a rating of 3. This lake has similar value to the Pink Lily lagoons and Nugga Nugga. The lake is ephemeral but when wet it provides good habitat for many birds.
Iwasaki Wetlands 	Decision codes: wa_nr_fa_01 CIM 6.3.1 with a rating of 4. The Iwasaki wetlands provide important waterbird habitat and nursery area for fish. Although the site covers a larger area than its natural extent (due to bunding) it is still fairly natural.
Shoal Point 	Decision codes: oc_nr_fa_01 CIM 6.3.1 with a rating of 3. The wetlands near Shoal Point provide good fish habitat, good connectivity and good fish passage. The Orphanage Swamp wetlands contained within this area contains pockets of good fish habitat but there is connectivity issues associated with low bunds.

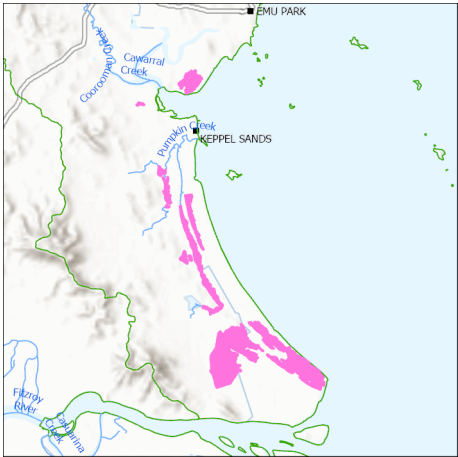
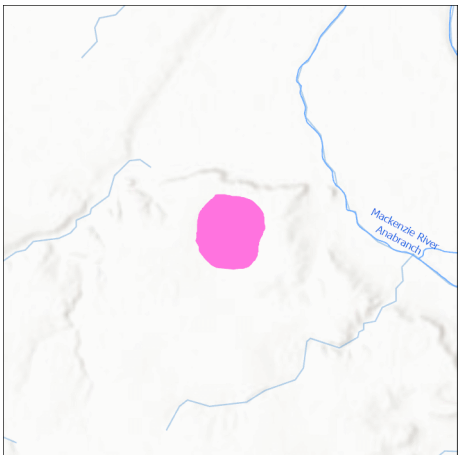
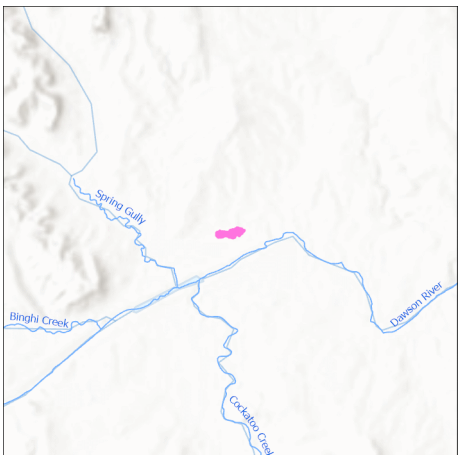
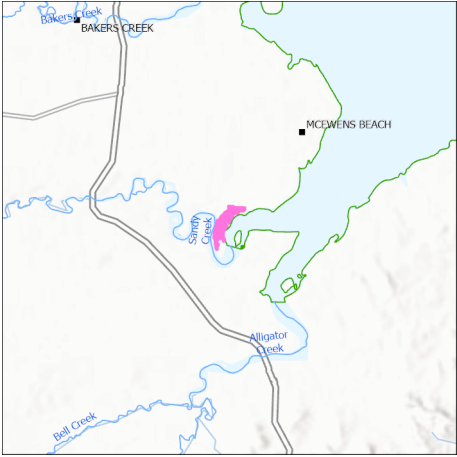
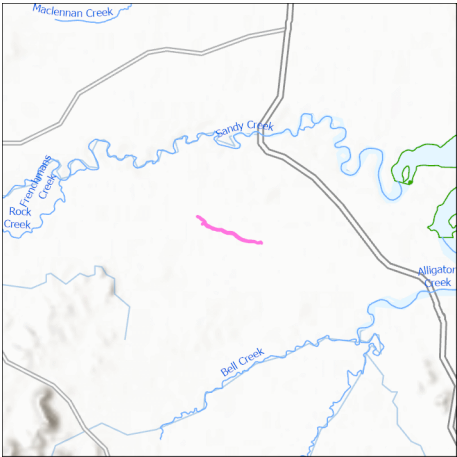
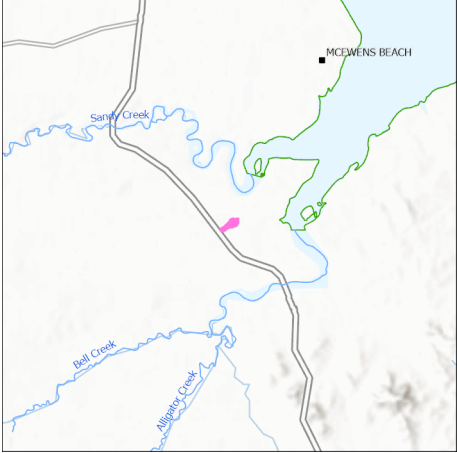
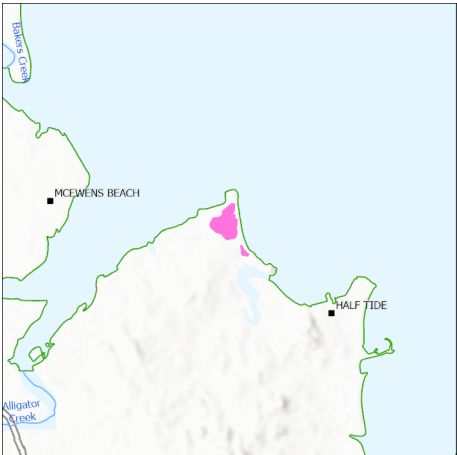
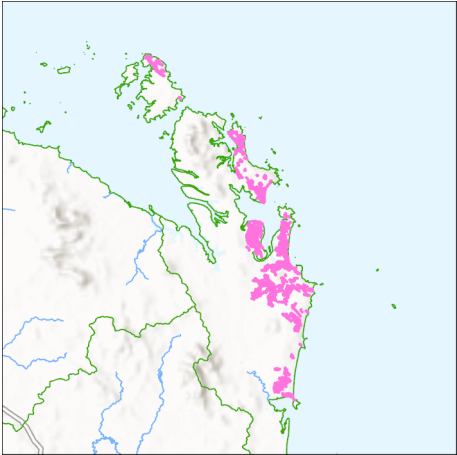
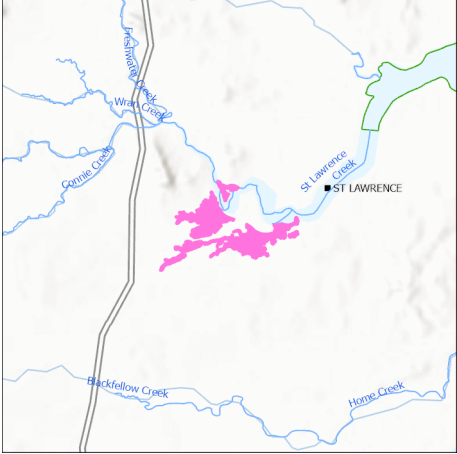
Non-Riverine fauna decisions	Ratings and values
Wetlands along coast near mouth of Fitzroy 	Decision codes: wa_nr_fa_02 CIM 6.1.1 with a rating of 3; 6.3.1 with a rating of 3. The Pleistocene dune swales in this area provide good waterbird and fish habitat. The area has a history of clearing for grazing but is in good condition now. The area supports significant barramundi (<i>Lates calcarifer</i>) populations.

Table 27. Special Features - Non-Riverine Flora decisions

Non-Riverine flora decisions	Ratings and values
Kaiuroo Reserve 	Decision codes: ma_nr_fl_01 CIM 6.3.1 with a rating of 3. The Kaiuroo Reserve contains a disjunct population of the rare species <i>Eleocharis blakeana</i> as well as large <i>Melaleuca</i> sp. remnants.
Mound springs of boggomoss 	Decision codes: dn_nr_fl_01 CIM 6.3.1 with a rating of 4. Boggomoss mound springs contain endemic, rare and threatened species. The springs range from small muddy puddles, to elevated peat bogs. They are scattered among dry woodland communities and are a vital source of moisture within a dry landscape. Note: Many of the springs are mapped as sub-dominant wetlands (less than 50% of the area contains a lacustrine or palustrine wetland) so are not picked up through the AquaBAMM methodology.

Non-Riverine flora decisions	Ratings and values
Sandringham Bay Conservation Park Dunrock section 	Decision codes: pl_nr_fl_06 CIM 5.2.1 with a rating of 4; 6.3.1 with a rating of 4; 6.3.3 with a rating of 3. This section of the park contains <i>Melaleuca viridiflora</i> and many other priority species. There are also debil debil micro-relief patterns within the landscape.
Sandringham Bay Conservation Park north of Sandringham Creek 	Decision codes: pl_nr_fl_07 CIM 6.3.1 with a rating of 3. This section of the park contains good quality salt marshes for waterbird and shorebird habitat. Pressures from invasive weeds are being controlled.
Sandringham Lagoon 	Decision codes: pl_nr_fl_04 CIM 6.3.3 with a rating of 3; 6.4.1 with a rating of 3. The Sandringham lagoon was picked as part of the Catchment Story (Walking the Landscape). The lagoon is spring fed and habitat for many species. This is one of few lagoons on the floodplains and is receiving better land management practices.

Non-Riverine flora decisions	Ratings and values
Sandringham wetland complex 	Decision codes: pl_nr_fl_05 CIM 6.3.1 with a rating of 2. The Sandringham wetland complex has shallow and deep areas of water which is important for waterbirds and fish habitats. The water weed <i>Hymenachne</i> has been controlled through grazing.
Slade Point Andergrove 	Decision codes: oc_nr_fl_01; pi_nr_fl_01 CIM 6.3.1 with a rating of 3. This area is a large complex of estuarine and freshwater treeless and paperbark wetlands that includes small remnants of the grassland regional ecosystem 8.3.12, and 8.2.7a. The area also has unusually extensive and tall stands of the broad-leaved tea-tree (<i>Melaleuca leucadendra</i>). Note: This decision straddles the O'Connell and Pioneer study areas.
The freshwater swamps at Dudgeon Point 	Decision codes: pl_nr_fl_01 CIM 6.3.3 with a rating of 4; 6.3.1 with a rating of 4. The freshwater swamps at Dudgeon Point and McEwens Beach are possibly the most diverse natural freshwater plant communities between Shoal Point and Salonika Beach. The vegetation associated with wetlands has very high value for wildlife refugia consisting of regional ecosystems 8.3.13a, 8.1.2. This particular area is an exemplary example of this type of habitat. It has flooded pasture and dune swales, with large numbers of roosting shorebirds.

Non-Riverine flora decisions	Ratings and values
Townsend Island to Corio Bay sandplain swamps  The map shows a coastal area with several pink-shaded regions representing wetlands. The area is bounded by the ocean to the east and south, and by land to the west and north. The pink areas are concentrated along the coastline and in some inland patches.	Decision codes: wa_nr_fl_01; ig_nr_fl_02 CIM 6.3.1 with a rating of 4. This area is mostly contained within defence lands or national park and has excellent water quality. The site contains a high diversity of sedges, is at the northern most limit of the swamp mahogany (<i>Eucalyptus robusta</i>) and contains coastal sandy swamps including sinkholes in the dunes.
Wetland complex west of St Lawrence  The map shows a wetland complex (pink-shaded area) located west of St Lawrence. The area is bounded by a road to the west and a creek to the east. The pink area is situated between the road and the creek, with some smaller patches further west. The creek is labeled 'St Lawrence Creek' and the road is labeled 'ST LAWRENCE'.	Decision codes: st_nr_fl_01 CIM 6.3.1 with a rating of 3. This wetland contains sedge swamps and areas of unmapped Melaleuca woodland. It is also potential habitat for Yellow chat (Dawson) (<i>Epthianura crocea macgregori</i>).

Connectivity

Aquatic ecosystem connectivity refers to the connections between and within aquatic ecosystems. An understanding of the connections between wetlands and broader catchment processes and functioning is important for effective management decisions (DEHP 2017).

The principles for measuring AquaBAMM aquatic connectivity were originally developed by the Burnett River Aquatic Conservation Assessment ecology expert panel (Clayton et al. 2006). Subsequent ecology expert panels have discussed the importance of connectivity, and the principals and approach concepts that could be used to determine wetland connectivity.

Importance of connectivity

The importance of connectivity processes to the health and functioning of wetlands is well understood. An inherent connectivity (or lack of connectivity in drier periods) is a significant feature of Queensland's riverine and non-riverine wetlands. For example, in arid-zones and most riverine floodplains, an irregular flow regime resulting in sporadic wetland connectivity events underpins the conservation of instream and floodplain wetland biota such as invertebrate assemblages (Sheldon et al. 2002). Similarly, this relationship is evident for maintaining the health and productivity of end-of-river estuarine systems (Cullen 2003). A largely unknown and unseen linkage can also occur within the hyporheic zone between surface waters and groundwater ecosystems sustaining many endemic or relictual invertebrate fauna (Boulton et al. 2003). The expert panel made the following general comments regarding wetland connectivity across the study areas:

1. Connectivity can occur at different temporal and spatial scales within and between study area catchments.
2. Flow intermittency is a key process in all rivers especially in the west.
3. Under natural conditions opportunities for fish movement and dispersal is frequently constrained by flow intermittency (e.g., on average less than 44% of the time (Marshall et al., 2016)).
4. Lateral connectivity between the riverine systems and adjacent floodplain wetland ecosystems was recognised by the panel as an important value.
5. Instream connectivity between freshwater systems and adjacent intertidal systems was recognised as a very important value.
6. During low or no-flow periods, persistent waterholes provide reach scale refugia habitat for fish and other aquatic/semi-aquatic species (i.e., birds, reptiles, amphibians, invertebrates).
7. To assess connectivity appropriately, the components of an ecosystem, and the processes affecting them, must be considered.

Applying principles for measuring connectivity

The ecology expert panel agreed that aquatic connectivity should be considered as part of this ACA. Experts also noted that the practicalities of measuring connectivity for aquatic environments are complex, making general principles and spatially explicit models difficult to develop and implement.

Connectivity in its broadest meaning incorporates hydrological processes (quantity and quality, temporal and spatial variability), organism dispersal (barriers) and disturbances from natural conditions. Connectivity can be bi-directional movements within a stream (e.g., fish passage), unidirectional contributions to downstream areas, or lateral connectivity between instream areas and non-riverine floodplain wetlands or groundwater ecosystems. These aspects of connectivity combine to provide a matrix of competing and differing values from an ecological conservation viewpoint.

Connectivity Indicators and Measures

Significant species or populations – AquaBAMM Indicator 7.1

The measures under this indicator were identified by the panel as not being scientifically rigorous or suitable for measuring the connectivity within the landscape for species populations. As advised by the panel further research and development was required.

For Indicator 7.1 'Significant species or populations', the AquaBAMM project team have developed two new measures, for application in the current and future ACAs, that have been endorsed by the expert panel. One of the measures is 7.1.4 (Instream fragmentation due to anthropogenic barriers within a sub-catchment, based on an acknowledged metric) which identifies an instream fragmentation index within the wider sub-catchment scale. The index is based on the CAFI (Catchment Area Fragmentation Index) metric developed by Jumani et al. (2022). The calculation identifies fauna pass-ability of anthropogenic instream barriers and the cumulative catchment area above each barrier. Future research and development on this index will include incorporating additional hydrological and ecological attributes like average rainfall and barrier pass-ability for different taxa groups dispersing upstream and/or downstream within the river system.

The second measure is 7.1.5 (Feasibility of terrestrial or aquatic movement for amphibian biological connectivity) which looks at the distance between wetlands and also how well a frog taxa group can move across the landscape to reach another wetland. The index was adapted from the Arthur Rylah Institute for Environmental Research Wetland connectivity models (Morris, et. al., 2012) and the National Connectivity Index (Giljohann, et. al. 2022). The measure 7.1.5 index uses a combination of neighbourhood analysis (at 200, 300, 500 and 700 meters) and cost-distance analysis. Future research and development will aim to create measures that model the movement between wetlands for other taxonomic groups.

One special feature was identified by experts for the measure 7.1.1 (The contribution (upstream or downstream) of the spatial unit to the maintenance of significant species or populations) and given a conservation rating of 4. This special feature is named Shoalwater Creek (sh_r_ec_01).

A second special feature was identified by experts and given a conservation rating of 4 for the measure 7.1.2 (Migratory or routine 'passage' of fish and other fully aquatic species (upstream, lateral or downstream movement) within the spatial unit). This special feature is named Granite Creek and Tooloomba Creek (st_r_fa_01).

Groundwater dependent ecosystems – AquaBAMM Indicator 7.2

Measure 7.2.1 (The contribution (upstream or downstream) of the spatial unit to the maintenance of groundwater ecosystems with significant biodiversity values) assesses the extent to which each spatial unit retains critical ecological and hydrological connectivity, where it should exist, with groundwater systems.

No areas were identified by the experts for this measure. Further research and development will aim to create one or measures modelling the hydrological connectivity between wetlands and groundwater systems.

Floodplain and wetland ecosystems – AquaBAMM Indicator 7.3

Measure 7.3.2 (Extent to which the wetland retains critical ecological and hydrological connectivity, where it should exist, with floodplains, rivers, etc.) assesses the extent to which each spatial unit retains critical ecological and hydrological connectivity, where it should exist, with floodplains, rivers, etc.

No areas were identified by the experts for this measure. Further research and development will aim to create one or measures modelling the hydrological connectivity between wetlands and floodplains.

Terrestrial ecosystems – AquaBAMM Indicator 7.4

Measure 7.4.2 (Terrestrial natural area connectivity within a subsection, based on an acknowledged metric) is a new measure recently developed. It looks at the connectivity between terrestrial natural areas for the migration or dispersal of fauna species between wetlands.

The index was originally developed by the Australian Government Department of Climate Change, Energy, the Environment and Water as the National Connectivity Index (Giljohann et. al. 2022, DCCEEW 2023). It was created to assist in the monitoring and prioritising the maintenance and restoration of Australia's heavily modified landscapes.

For measure 7.4.2, the index has been adapted to include the Regional Ecosystem remnant and regrowth mapping and uses a combination of neighbourhood analysis (at 0.5, 1, 2, 4, 8, 16, 32 km) and Euclidian distance analysis.

Estuarine and marine ecosystems – AquaBAMM Indicator 7.5

Measure 7.5.1 (The contribution of the spatial unit to the maintenance of estuarine and marine ecosystems with significant biodiversity values) assess the contribution of each spatial unit to the maintenance of an intertidal and/or marine ecosystem. The expert panel assigned this measure to one riverine expert panel decision within the Styx study area, with a conservation rating of 4. The decision is named Granite Creek and Tooloomba Creek (st_r_fa_01).

Further research and development on additional measures which consider a broader landscape view are under consideration.

Stratification

AquaBAMM stratification attempts to mitigate the effect of data averaging across large study areas. Stratification is particularly useful when ecological diversity is high. For example, in the Wet Tropics bioregion, stratification of measure 3.1.1 (Richness of native amphibians (riverine wetland breeders)) would be appropriate because higher numbers of native frog species are known to inhabit wetlands in the rainforest upland areas compared to adjacent lowland floodplains. Stratification is unwarranted for measures where there is an equal probability of species throughout the study area.

Study area stratification is not mandatory for a successful assessment. In fact, the AquaBAMM makes provision for one or more measures to be stratified in any manner determined to be ecologically appropriate. Decisions concerning how to stratify are typically considered by the ecology expert panel. To date, assessments have been stratified based on elevation (e.g., 150m ASL for coastal catchments and 400 m ASL for catchments west of the Great Dividing Range in the Murray-Darling Basin) or bioregional boundaries.

Stratification was considered by the ecology panel at the April workshops, and various ways to stratify the landscape for different purposes were suggested. These included cleared areas versus non-cleared areas, geological types, as the mining of coal affects ground water chemistry which in turn influences biodiversity, and altitude, where rapid change is known to affect instream species diversity.

The experts recommended to stratify six of the eighteen study areas by elevation. This included 130m ASL for the Boyne, Pioneer, O'Connell, Plane, and Proserpine study areas, and 250m ASL for the Dawson study area. The experts recommended stratification be applied to measures 3.1.1 (Richness of native amphibians (riverine wetland breeders)), 3.1.2 (Richness of native fish) and 3.1.6 (Richness of native amphibians (non-riverine wetland breeders)). Investigation after the workshops found that the 130m ASL threshold would result in too few spatial units in the upland stratum for meaningful normalisation of measure results when thresholding and therefore stratification was not used for the Proserpine, O'Connell and Plane study areas.

Figure 2 illustrates the study areas and subsections that have been stratified within the FGBRCC.

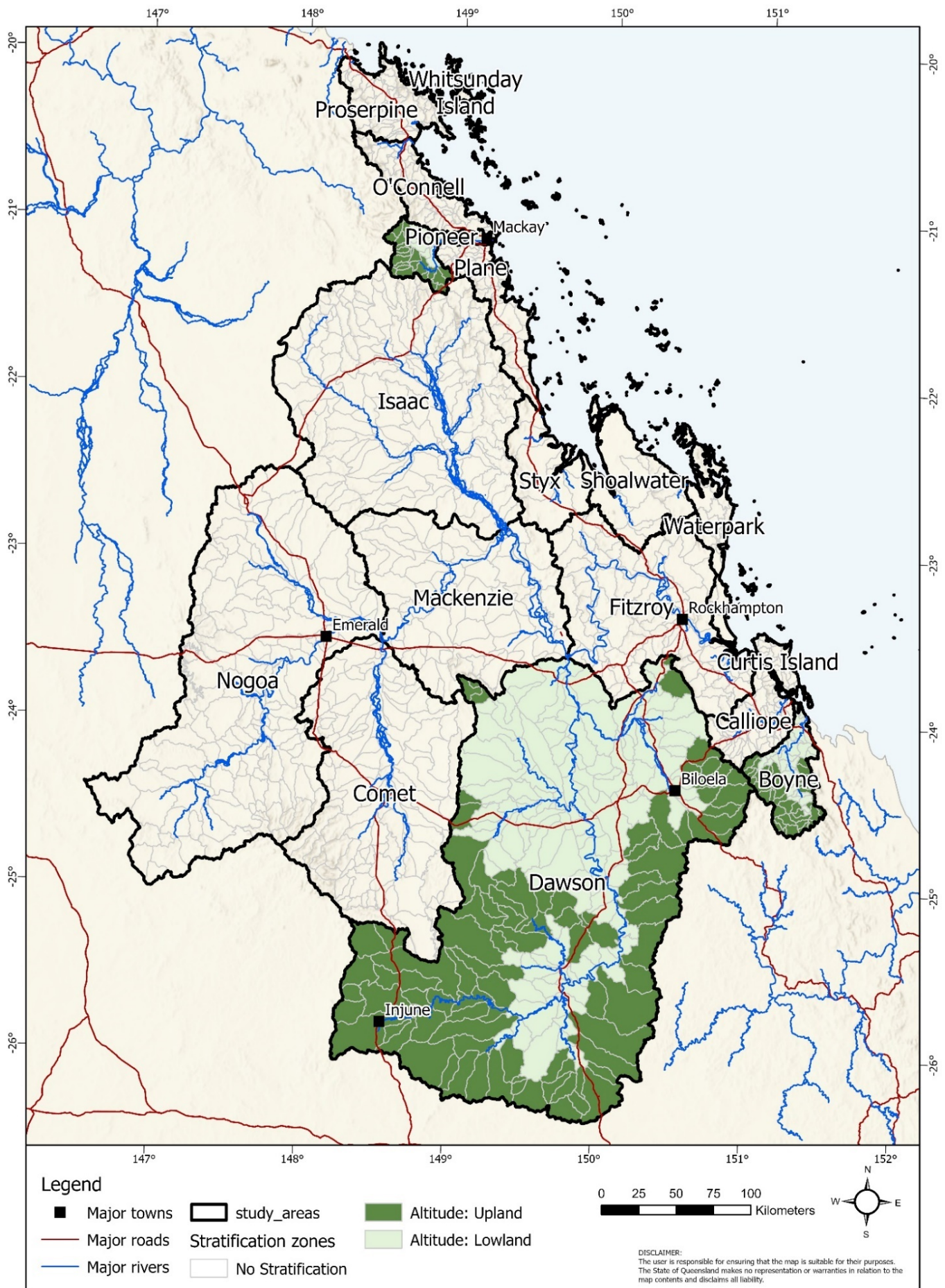


Figure 2 Stratification of study area subsections based on 130m ASL and 250m ASL.

Caveats, limitations and recommendations

Aquatic Conservation Assessments involve a non-social, non-economic and tenure blind assessment of wetland ecological values based on the Aquatic Biodiversity Assessment and Mapping Method (AquaBAMM; Clayton et al. 2006). They incorporate a comprehensive set of criteria, indicators and measures founded upon a large body of national and international literature.

AquaBAMM expert panel processes aim to add flexibility and a reality check to the assessment process. For example, the expert panel processes are used to acquire data for several criterion measures (Clayton et al. 2006). This data is elicited during workshops comprised of individuals with knowledge and expertise in local wetland dependent species, wetland ecology, water quality, hydrology, geomorphology and vegetation. AquaBAMM expert panel processes are based on the premise of scientific reasoning, multiple lines of evidence, and consensus building allowing the incorporation of unpublished or anecdotal data.

This report describes the results and recommendations from the expert panels held as part of a review and update of the previous ACAs. This report should be read in conjunction with the accompanying summary report – Aquatic Conservation Assessment using AquaBAMM for the riverine and non-riverine wetlands of the Queensland Fitzroy Great Barrier Reef Connecting Catchments Summary Report Version 2.1 (DETSI 2026).

Unlike the non-riverine assessment, which uses spatial units based on the Queensland Wetlands Mapping, the riverine assessments use fine-scale catchments representing specific riverine reaches or groups of reaches. As such, the riverine special features described in this report may only apply to a discrete location (e.g., a specific reach or waterhole), group of locations (e.g., group of reaches) within one or more riverine spatial units. When this occurs, the special feature values descriptions include additional descriptive information to help interpret the location and/or spatial extent of the special feature.

The spatial scale of the Queensland Wetlands Mapping means small or linear non-riverine wetlands, such as instream waterholes, oxbows etc., may not be represented well in the assessments. For example, wetland systems below the scale or minimum threshold size of the Queensland Wetlands Mapping are not mapped by the Queensland Herbarium and Biodiversity Science and are therefore not assessed as part of the assessments. Springs are also poorly mapped in the region and could not be explicitly assessed as part of these assessments.

The species lists in this report are based on a combination of the sighting's records compiled for the assessments and the knowledge of the experts who participated in the expert panel process. As such, there may be additional aquatic taxa frequenting the area that are not contained within our lists. The sightings records are also subject to survey bias or sampling effort. We haven't used Atlas of Living Australia or Birdlife Australia data due to data quality concerns and the associated overhead with checking and processing these records.

The AquaBAMM provides the scope and flexibility for inclusion of comprehensive connectivity models. However, comprehensive modelling of ecological connectivity of aquatic ecosystems do not exist for the region and was not undertaken as part of this review. In the absence of this, spatial units providing ecological or hydrological connectivity known to support key aquatic components or processes may have been flagged by experts as part of the special feature delineation process.

Future research and development work completed by the project team will aim to create new measures of connectivity for each of the Criterion 7 Indicators. The 'Walking the landscape' (DEHP, 2012) – a whole-of-system framework for understanding and mapping environmental processes and functioning – provides a useful framework for integrating existing data with expert knowledge to develop conceptual models of connectivity linked to real world components.

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Appendix I – Expert panel terms of reference

Flora expert panel

The role of the Flora Expert Panel is to provide expert advice on aquatic floristic values for the waterways and wetlands of the study area. This advice is a critical component of the Aquatic Conservation Assessment (ACA).

The panel membership will consist of experts in the field of aquatic flora values including species, communities and processes. The advice provided by the expert panel at the workshop will be incorporated into the ACA results where appropriate.

The tasks to be undertaken by the panel include, but without limitation, the following:

- Review relevant existing spatial data (species point records) and available information (reports etc.).
- Provide advice on wetland dependent rare or threatened flora species habitat and localities.
- Provide advice on wetland dependent priority flora species habitat and localities.
- Identify priority ecosystems or areas important for significant flora communities or species.
- Provide advice on wetland dependent exotic flora species localities and abundance.
- Weight Measures relative to their importance for an indicator. Due to time this was not considered by the panel.
- Rank Indicators relative to their importance for a Criterion. Due to time this was not considered by the panel.

Fauna expert panel

The role of the Fauna Expert Panel is to provide expert advice on aquatic fauna values for the waterways and wetlands of the study area. This advice is a critical component of the Aquatic Conservation Assessment (ACA).

The panel membership will consist of experts in the field of aquatic fauna values including species, communities and processes. The advice provided by the expert panel at the workshop will be incorporated into the ACA results where appropriate.

The tasks to be undertaken by the panel include the following:

- Review relevant existing spatial data (species point records) and available information (reports etc.).
- Provide advice on wetland dependent rare or threatened fauna species habitat and localities.
- Provide advice on wetland dependent priority fauna species habitat and localities.
- Identify priority ecosystems or areas important for significant faunal communities or species.
- Provide advice on wetland dependent exotic fauna species localities and abundance.
- Weight measures relative to their importance for an indicator. Due to time this was not considered by the panel.
- Rank indicators relative to their importance for a Criterion. Due to time this was not considered by the panel.

Ecology expert panel

The role of the Ecology Expert Panel is to provide expert advice on aquatic values for the freshwater wetlands and waterways of the study area. This advice is a critical component of the Aquatic Conservation Assessment (ACA) and is based on experience and demonstrated scientific theory on natural geological, geomorphological and hydrological processes as well as identifying connectivity within and between aquatic systems.

The panel membership consists of experts in the fields of ecological and hydrological processes, geomorphology, connectivity, water quality and river health assessment. The advice provided by the expert panel at the workshop will be incorporated into the ACA results where appropriate.

The tasks to be undertaken by the panel include the following:

- Identify areas of significant geomorphological, ecological or hydrological values (Special Features).
- Provide advice on biodiversity areas of particular significance for species or communities.
- Provide advice on identifying and applying the Connectivity Criterion for the study area.
- Provide advice on whether to stratify the study area.
- Weight measures relative to their importance for an indicator. Due to time this was not considered by the panel.
- Rank indicators relative to their importance for a Criterion. Due to time this was not considered by the panel.

Appendix II – Expert panel definitions

General

Aquatic

(Qld Herbarium and Biodiversity Science. definition)

Of or relating to water or living or growing in water.

Channel

(Qld Herbarium and Biodiversity Science. definition)

Linear, generally sinuous open depression in parts eroded, excavated, or built up by channelled stream flow. Comprises stream bed and banks.

Riverine wetland

(Qld Herbarium and Biodiversity Science. definition adapted from Cowardin et al. 1979)

The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions:

1. wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and
2. habitats with water containing ocean-derived salts in excess of 0.5%. A channel is 'an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water' (Langbein and Iseri 1960).

Non-Riverine wetland

Non-riverine wetlands are made up of lacustrine and palustrine wetlands as defined by the Queensland Herbarium and Biodiversity Science (adapted from Cowardin et al. 1979).

Lacustrine wetland

The Lacustrine System includes wetlands and deepwater habitats with all of the following characteristics:

1. situated in a topographic depression, natural channel constriction that acts as a dam, or a dammed river channel.
2. lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30% areal coverage.
3. total area exceeds 8 ha. Similar wetland and deepwater habitats totalling less than 8 ha are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds 2 m at low water. Lacustrine waters may be tidal or nontidal, but ocean-derived salinity is always less than 0.5%.

Palustrine wetland

The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5%. It also includes wetlands lacking such vegetation, but with all the following three characteristics:

1. where active waves are formed or bedrock features are lacking.
2. where the water depth in the deepest part of basin less than 2 m at low water; and

3. the salinity due to ocean-derived salts is still less than 0.5%.

Estuarine wetland

(Queensland Herbarium and Biodiversity Science definition)

Estuarine Systems consist of wetlands with oceanic water that is at least occasionally diluted with freshwater run-off from the land (adapted from Cowardin et al. 1979).

Coastal wetlands

(Coastal Protection and Management Act 1995 (QLD))

Coastal wetlands include tidal wetlands, estuaries, salt marshes, Melaleuca swamps (and any other coastal swamps), mangrove areas, marshes, lakes or minor coastal streams regardless of whether they are of a saline, freshwater or brackish nature.

Adapted

(Queensland Herbarium and Biodiversity Science definition)

Possessing a feature that fits the organism to the environment. EPA (1999) comments that 'typically, wetlands include areas which show evidence of adaptation of soil or vegetation to periodic water logging', and it is this adaptation that differentiates wetland soils, vegetation and also wetland animals from the terrestrial soils and species.

Dependent

(Queensland Herbarium and Biodiversity Science definition)

Relies on the provision of essential resources required to support critical life cycle functions including reproduction, certain (even all) life stages, water, food, shelter, refuge and so on.

Life cycle

The cyclic events of life through which individuals pass, including seed/egg, fertilisation/birth, propagation/growth, survival to maturity, producing of offspring (reproduction) and death.

Wet conditions

(Queensland Herbarium and Biodiversity Science definition)

Defined as areas where the root zone becomes periodically saturated or inundated during the growing season.

Flora expert panel

Wetland indicator flora species (WIS)

Flora wetland indicator species are those species that are adapted to and dependent on living in wet conditions for all (aquatic species) or part (semi-aquatic species) of their life cycle and are found either within or immediately adjoining a riverine or non-riverine wetland.

This definition of a flora wetland indicator species extends beyond the more traditional definition of submerged and floating aquatic plants to include plants inhabiting the littoral zone (water's edge) and plants that usually have 'wet feet' on the toe of the bank and other ground-water dependent species. The definition is designed to depict floristic richness at a given location.

More information on flora wetland indicator species can be found online at

<https://wetlandinfo.des.qld.gov.au/wetlands/ecology/components/biota/flora/flora-indicator-species/>

Aquatic species

(Qld Herbarium and Biodiversity Science definition)

Aquatic flora species are defined as those growing in or on permanent water (obligate).

Semi-aquatic species

(Qld Herbarium and Biodiversity Science definition)

Semi-aquatic flora species are defined as those that can withstand near-permanent shallow water and require only periodic temporary inundation – bordering permanent water, in bogs and shallow swamps.

Priority species (flora)

A priority species is not listed as Endangered, Vulnerable or Near-threatened and exhibits one or more of the following significant values:

1. It forms significant macrophyte beds (in shallow or deep water).
2. It is an important/critical food source.
3. It is important/critical habitat.
4. It is implicated in spawning or reproduction for other fauna and/or flora species.
5. It is at its distributional limit or is a disjunct population.
6. It provides stream bank or bed stabilisation or has soil-binding properties.
7. It is a small population and subject to threatening processes.
8. Taxa vulnerable to impacts of climate change - Species that are considered to be adversely affected by the predicted changes in climate, e.g. increasing temperatures, sea level rise and increasing frequency of extreme weather events (drought, flood & cyclones).
9. It is an important source of food or medicine for traditional owners.
10. It is associated one or more of five core Aboriginal values: language, song lines, creation stories, trading routes and lore.

Exotic flora

Exotic flora species are defined as plants that cause, or have the potential to cause, significant detrimental impact on wetland ecosystems. Impact examples include outcompeting native species for light, air, space, nutrients; production of toxic substances; hybridisation with native plants; fouling of water and altering water flows etc.

For measure 1.1.2 (aquatic and semi-aquatic exotic flora species), these exotic species significantly impact wetland ecology and are adapted to and dependent on wet conditions for all or part of their life cycle. They are generally found within or adjacent to riverine or non-riverine wetlands.

For measure 2.1.1 (terrestrial exotic flora species), these species are not necessarily restricted to wetland indicator species. They may also include plants that are not adapted to or dependent on wet conditions for all or part of their life cycle, but nevertheless, significantly affect wetland ecology. Examples include rubber vine, Cats claw creeper and Leucaena.

Aquatic Conservation Assessment – Flora species measures

Measure 1.1.2 – Presence of exotic aquatic and semi-aquatic plants within the wetland

Measure 2.1.1 – Presence of exotic terrestrial plants in the assessment unit

Measure 3.1.5 – Richness of native aquatic plants

Measure 4.1.2 – Presence of rare or threatened aquatic ecosystem dependent flora species – NC Act, EPBC Act

Aquatic Conservation Assessment – Flora priority ecosystems measures

Measure 5.1.2 – Presence of aquatic ecosystem dependent 'priority' flora species

Measure 5.2.1 – Presence of priority Aquatic Ecosystem

Aquatic Conservation Assessment – Flora special feature measures

Measure 6.1.1 – Presence of distinct, unique or special geomorphic features

Measure 6.2.1 – Presence of (or requirement for) distinct, unique or special ecological processes

Measure 6.3.1 – Presence of distinct, unique or special habitat

Measure 6.3.3 – Ecologically significant wetlands identified through expert opinion and/or documented study

Measure 6.3.4 – Areas important as refugia from the predicted effects of climate change (e.g. source of species re-population)

Measure 6.4.1 – Presence of distinct, unique or special hydrological regimes (e.g. spring fed stream, ephemeral stream, boggomoss)

Fauna expert panel

Wetland indicator fauna species (WIS)

Fauna wetland indicator species are species that are adapted to, and dependent on, living in wetlands for all, or part of their life cycle.

Wetland ecosystems tend to include species evolved for wet conditions. Some of these species are dependent on the presence of water for every stage of their life cycle, and need to be immersed in water, while others require water for most of their life cycle stages or for a critical stage in their development. For example, these species include those that are highly mobile moving from wetland to wetland, less mobile species that are able to wait for water to return or those fauna that inhabit non-vegetation ecosystems like shoals and mudflats. These species are considered as WIS unlike those that may only access a wetland to drink.

The WIS includes the more common fauna species. Most rare species and all vagrant fauna species have not been included as they are considered too poorly known or erratic. Species, other than those listed, may be accepted as a wetland indicator for a certain locality given expert recommendation and reliable site-specific data.

Waterbirds

Bird species that are dependent on freshwater wetland environments. As a rule of thumb, if the wetland disappeared so too would the waterbird species.

Significant waterbird habitat area (M5.1.4)

Past panels have used the following two criteria for a wetland to be considered habitat for a significant number of waterbirds:

1. a significant proportion of the single species breeding population (1% for waterbirds) occurs in the waterbody (Ramsar criterion 6 for waterbirds).
2. high density concentrations of non-breeding waterbirds (multiple species) in the hundreds of thousands for identified wetland habitats (e.g. 1% of global population).

Priority species (fauna)

A priority species is NOT currently listed as Critically Endangered, Endangered, Vulnerable or Near-threatened and exhibits one or more of the following significant values:

1. It is endemic to the study area (75% of its distribution is in the study area/catchment).
2. It has experienced, or is suspected of experiencing, a serious population decline.
3. It has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area/catchment.
4. It is currently a small population and threatened by loss of habitat.
5. It is a significant disjunct population.
6. It is a migratory species (other than birds).
7. A significant proportion of the breeding population (1% for waterbirds, 75% other species) occurs in the waterbody (see Ramsar Criterion 6 for waterbirds).
8. Taxa vulnerable to impacts of climate change - Species that are considered to be adversely affected by the predicted changes in climate e.g. increasing temperatures, sea level rise and increasing frequency of extreme weather events (drought, flood & cyclones). Species can only be listed under this reason if there is sufficient knowledge of species' biology and its interaction with climate that would support an assessed impact under climate change scenarios.
9. It is an important source of food or medicine for traditional owners.
10. It is associated one or more of five core Aboriginal values: language, song lines, creation stories, trading routes and lore.

Migratory species

Taxa that are dependent on wetland environments whose entire population or any geographically separate part of the population cyclically and predictably cross one or more national jurisdictional boundaries. This definition excludes those species listed as "nomadising" or "range extensions" and those travelling less than 100 km.

(Based on Convention on Migratory Species; use JAMBA, CAMBA and ROKAMBA lists as a starting list)

Exotic fauna species

Exotic fauna species are defined as animals that cause, or have the potential to cause, significant detrimental impact on wetland ecosystems. Impact examples include outcompeting native species for light, air, space, nutrients; production of toxic substances; fouling of water and altering water flows etc.

Aquatic Conservation Assessment – Fauna species measures

Measure 1.1.1 – Presence of 'alien' fish species within the wetland

Measure 1.1.3 – Presence of exotic invertebrate fauna within the wetland

Measure 1.1.4 – Presence of feral/exotic vertebrate fauna (other than fish) within the wetland

Measure 3.1.1 – Richness of native amphibians (riverine wetland breeders)

Measure 3.1.2 – Richness of native fish

Measure 3.1.3 – Richness of native wetland dependent reptiles

Measure 3.1.4 – Richness of native waterbirds

Measure 3.1.6 – Richness of native amphibians (non-riverine wetland breeders)

Measure 3.1.7 – Richness of native wetland dependent mammals

Measure 3.2.1 – Richness of macroinvertebrate species

Measure 4.1.1 – Presence of rare or threatened aquatic ecosystem dependent fauna species – NCA, EPBC

Aquatic Conservation Assessment – Fauna priority ecosystems measures

Measure 5.1.1 – Presence of aquatic ecosystem dependent 'priority' fauna species (expert panel list/discussion or other lists such as ASFB, WWF, etc)

Measure 5.1.3 – Habitat for, or presence of, migratory species (Expert Panel list/discussion and/or JAMBA / CAMBA agreement lists and/or Bonn Convention)

Measure 5.1.4 – Significant waterbird habitat areas

Measure 5.2.1 – Priority ecosystems

Aquatic Conservation Assessment – Fauna special feature measures

Measure 6.1.1 – Presence of distinct, unique, or special geomorphic features

Measure 6.2.1 – Presence of (or requirement for) distinct, unique, or special ecological processes

Measure 6.3.1 – Presence of distinct, unique, or special habitat

Measure 6.3.4 – Areas important as refugia from the predicted effects of climate change (e.g. source of species re-population)

Measure 6.4.1 – Presence of distinct, unique, or special hydrological regimes (e.g. spring fed stream, ephemeral stream, boggomoss)