

Port of Mackay

▶ Appendix G

Environmental Values Assessment Addendum Report

Port of Hay Point Environmental Values Assessment

2021 Addendum

North Queensland Bulk Ports

13/12/2021

DOCUMENT CONTROL

Project name: Port of Mackay Environmental Values Assessment
Report name 2021 Addendum
Date 13/12/2021 Version v3 Status Final
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Reviewed by Dr Ailsa Kerswell
Approved by Dr Ailsa Kerswell

Version	Date	Description	Reviewed by	Approved by
1	12/11/2021	Draft	Ailsa Kerswell	Ailsa Kerswell
2	10/12/2021	Draft	Ailsa Kerswell	Ailsa Kerswell
3	13/12/2021	Final	Ailsa Kerswell	Ailsa Kerswell

ACKNOWLEDGEMENTS

This report has been prepared with the support of NQBP.

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INTRODUCTION TO THIS ADDENDUM

North Queensland Bulk Ports (NQBPs) is undertaking the Sustainable Sediment Management (SSM) Assessment for the Port of Mackay in order to determine the most effective long-term management strategy to deal with sediment accumulation within the Port areas. NQBPs has previously developed an SSM framework, which has successfully been applied at the Port of Hay Point and the Port of Weipa.

As a component of the current SSM Assessment for the Port of Mackay, NQBPs contracted 2rog Consulting to assist with the review and update of the Port of Hay Point Environmental Values Assessment (EVA) prepared by Jacobs in 2016, for the Port of Mackay. The 2016 EVA is referred to herein as the Jacobs report. The Jacobs report supported environmentally sustainable management of the Ports of Hay Point and Mackay. This was achieved through the compilation of information pertaining to the environmental values in these ports to form a comprehensive resource for decision making. The report also provided context for ports that need to be considered during port management.

The Jacobs report covers the study area for the Port of Mackay where the majority of values from 2016 remain relevant today. Since 2016 there have been a number of policy updates and changes in environmental values relating to threatened status of species, public amenity and to industry within the study area. This report identifies and updates these topics in order to inform NQBPs and stakeholders of the most up to date information.

This report serves as an addendum to the Jacobs report and is presented using the same structure. The contents of the Jacobs report has been reviewed and updated where values have changed, where policy has been amended and adds new values where applicable. Where information in the Jacobs report is still valid, no changes have been made and readers should refer to the original document, having confidence that the information is the best that is currently available.

This report is structured in the same format as the Jacobs report to assist with the cross reading of the original and the addendum. Sections that require no update refer the reader to the relevant section of the Jacobs report. Sections that have been updated are included in this report under the corresponding heading. Under each sub-heading and where only one topic has been updated, presume that all other information in that section remains consistent with the Jacobs report.

The main updates documented in this report include:

- Changes to the *Vegetation Management Act 1999*, reinstating High Value Regrowth, expanding regrowth vegetation in Great Barrier Reef catchments and applying associated clearing restrictions to the two aforementioned values.
- Reforms to the *Fisheries Act* to modernise objects, clarify responsibilities, implement harvesting strategies and to ban areas of fishing.
- Changes to the listing status of threatened species and communities; and introduction of new species to the study area based on updated database searches
- Values for 2019 ratings of ecosystem health given by Health Reef to Rivers Partnership report cards.

The extent and condition of environmental values between 2016 and 2021 remains largely consistent. The minor changes in extent of mapped vegetation is driven by the changes in vegetation categories and updates to State mapping and not assumed to be the results of any increased threats to these values from port based activities.

Changes in threatened terrestrial and marine fauna were identified by species being present in 2021 database searches that were not present in 2016 assessments. The records of these species on the database searches is likely due to updated understanding of habitat for the species as well as the result of further survey effort undertaken between 2016 and now, as opposed to habitats in the study area increasing

in importance. The inclusion of these species on the database searches does not represent an increase in the vulnerability of the threatened species to identified impacts and does not change the conclusions Jacobs identified in respect to vulnerability of the species to activities. Management measures for port base activities that have been in place in between 2016 and 2021 remain appropriate for the environmental values present.

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ABBREVIATIONS

Abbreviation	Description
ABS	Australian Bureau of Statistics
ANZECC	Australian and New Zealand Environment and Conservation Council
EVA	Environmental Values Assessment
EPBC Act	Environment Protection and Biodiversity Conservation Act
GBRWHA	Great Barrier Reef World Heritage Area
GBR	Great Barrier Reef
GVP	gross value product
HRRP	Health Rivers to Reef Partnership
LGA	Local Government Area
MSES	Matters of State Environmental Significance
NQBP	North Queensland Bulk Ports
OUV	Outstanding Universal Value
PAR	photosynthetically active radiation
SSM	Sustainable Sediment Management
TEC	threatened ecological community
TORG	Traditional Owner Reference Group
VM Act	Vegetation Management Act

01 INTRODUCTION

Refer to Jacobs report 2016 and Introduction to this addendum (above).

02 METHODS

The Jacobs report was reviewed in its entirety, and required updates were identified. Relevant information added in this addendum includes:

- Changes to the listing status for species and ecological communities under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Queensland *Nature Conservation Act 1992*
- Amendments and updated legislation/policies concerning environmental values in the study area
- Updates from any available data published in the last five years concerning environmental values in the study area, such as monitoring reports, fisheries data and population census data.

02.1 Study area

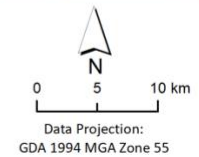
The study area remains the same as the Jacobs report. Slight alterations¹ to the area used for database searches have been identified in the relevant sections of this report.

The study area is shown in Figure 02-1.

¹ The Jacobs report did not record parameters used for EPBC and NC database searches. In this report we assume that the study area we have defined does not match exactly those used in the Jacobs report, but difference will be only minor.



Project Area
 Ocean Project Extent
 Landmass Project Extent



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 02-1: Port of Mackay study area

02.2 Information sources

The majority of the information sources listed in the Jacobs reports remain applicable. Updated information from the same sources has been included in this report. Any additional sources have been included in the References section of this report.

02.3 Outstanding Universal Values of the World Heritage Area

In assessing the attributes of the study area that contribute to the Outstanding Universal Value (OUV) for the Great Barrier Reef World Heritage Area (GBRWHA), Jacobs referred to the Great Barrier Reef Outlook Report 2014, which is now superseded by the Great Barrier Reef Outlook Report 2019 (hereafter 'the Outlook Report (2019)').

Jacobs classified the overall Great Barrier Reef (GBR) attributes that contribute to OUV according to their presence and importance in the study areas and these values remain similar in the newer report. The Outlook Report (2019) included the addition of a component of the assessment of the Region's world heritage and national heritage value which is 'Integrity'. The Integrity component relates to wholeness and intactness of the GBR.

02.4 Structure of this document

This document is structured in the same format as the Jacobs report to assist with the cross reading of the original and the addendum. Sections that require no update refer the reader to the Jacobs report. Sections that have been updated are included in this report under the corresponding heading.

03 ENVIRONMENTAL VALUES

03.1 Outstanding Universal Value

The most significant environmental value in relation to the study area is the GBR. The Great Barrier Reef Region Strategic Assessment (GBRMPA, 2014) introduced 38 attributes to assess outstanding universal value of the GBR. Majority of the attributes have been assessed for the study area by Jacobs in 2016.

The newer attributes that were not included in the Jacobs report and their classification in this EVA include:

- Natural beauty and natural phenomena
 - Some of the most spectacular scenery on Earth – minor/incremental contribution
 - Unparalleled aerial panorama of seascapes comprising diverse shapes and sizes – not present
- Major stages of Earth’s evolutionary history
 - Area has been exposed and flooded by at least four glacial and interglacial cycles, and over the past 18,000 years reefs have grown on the continental shelf – minor/incremental contribution
 - The varied seascapes and landscapes that occur today have been moulded by changing climates and sea levels, and the erosive power of wind and water, over long time periods – minor/incremental contribution
 - One-third of the GBR lies beyond the seaward edge of the shallower reefs (and) comprises continental slope and deep oceanic waters and abyssal plains – not present
- Habitats for conservation of biodiversity
 - Large ecologically important inter-reefal areas. The shallower marine areas support many seagrass species – minor/incremental contribution

The Outlook Report (2019) documented an overall decline in ecosystem condition as both ecological and physical processes deteriorated over the course of five years from 2014 to 2019. Climate change has caused recent temperature extremes and has changed the World Heritage Area characteristics as the GBR’s integrity deteriorates. The GBR’s outstanding universal value will continue to be impacted as the ocean trends along its rapid warming trajectory (GBRMPA, 2019).

03.2 Landform and biota

03.2.1 Soil quality, erosion and sedimentation

The majority of information on soil quality, erosion and sedimentation presented in the Jacobs report remains current. Updated statistics include:

- In 2018-2019 the value of the sugarcane sector in the Mackay-Isaac-Whitsunday region was \$362 million.
- The sugarcane industry accounts for 54% of agriculture in this region and comprises 33.5% of total sugarcane production in QLD.
- In the same period, specialised beef cattle farming was valued at \$622 million accounting for 35% of agriculture in the region and 7.3% of specialised cattle farming in QLD (ABARES, 2021).

03.2.2 Terrestrial vegetation communities

Amendments to the *Vegetation Management Act 1999* (VM Act) were made in 2018. The key purpose of the amendments was to reinstate the management framework that was in place before 2013. The key changes included:

- Reinstating high-value regrowth vegetation (Category C) and associated restrictions on the clearing of the vegetation on freehold and Indigenous land. The definition of ‘high value regrowth vegetation’ has changed to include:

- vegetation in an area that has not been cleared for at least 15 years, rather than since 31 December 1989;
- regrowth vegetation located on freehold land, indigenous land and land the subject of an occupational licence, in addition to leasehold land for agriculture and grazing.
- Extending the protection of regrowth watercourse vegetation (Category R) to include all GBR Catchments and prohibiting the clearing of this vegetation
 - Category R vegetation is native vegetation that is located within 50 m of a regrowth watercourse or drainage feature area
- Applying restrictions to clearing of native vegetation that is ‘essential habitat’ for protected wildlife that is near threatened (in addition to endangered and vulnerable).
- These changes increased the level of control on clearing by changing unregulated categories to regulated categories for regrowth vegetation (e.g. Category X to Categories C and R).

Table 03-1 lists the regional ecosystems (REs) present in the study area, as per the most current State published mapping (version 11, 2020). The majority of REs correspond to those mentioned in the Jacobs report, with the extent of REs having changed across the area as a result of the updated mapping. Other changes also include:

- RE 8.3.4 downgraded from ‘Endangered’ to ‘Of Concern’ for both VM Act and Biodiversity Status
- RE 8.3.13 up-listed from ‘Of Concern’ to ‘Endangered’ for Biodiversity Status
- RE 8.12.6 is now mapped as being present in the area

The change in status for both RE 8.3.4 and RE 8.3.13 has not changed the special values of these ecosystems as identified in Appendix A of the Jacobs report. The inclusion of RE 8.12.6 is very minor with only 0.4 ha mapped in the study area. The vegetation is least concern and does not provide any unique value for EVNT species that may occur in the study area. The inclusion of this RE is not considered significant.

Threatened ecological communities (TECs) are shown in Table 03-1 and remain the same as those listed in the Jacobs report.

Figure 03-1 outlines 14,789 ha of native vegetation communities that have been mapped within the study area. This includes:

- 2,547 ha of ‘Endangered’ vegetation (VM Act: 2,049 ha Dominant, 408 sub-dominant)
- 5,571 ha of ‘Of Concern’ vegetation (VM Act: 4,433 ha Dominant, 1,137 sub-dominant)
- 6,761 ha of ‘Least Concern’ vegetation

Figure 03-2 shows the category classification of REs under the VM Act.

Table 03-1: Summary of Regional Ecosystems and Threatened Ecological Communities in the study area

RE	Short description	VMA Status	Biodiversity Status	HVR (ha)	Total within study area (ha) ²	Corresponding TEC
8.1.1	Mangrove closed forest of marine clay plains and estuaries	Least concern	No concern at present	80.5	4,502.0	No
8.1.2	Samphire open forbland on salt pans and plains adjacent to mangroves	Least concern	Of concern	2.1	7,17.6	No
8.1.3	Sporobolus virginicus tussock grassland on marine sediments	Of concern	Of concern	69.2	559.7	No
8.1.4	Schoenoplectus subulatus and/or Eleocharis dulcis sedgeland or Paspalum vaginatum tussock grassland	Of concern	Endangered	39.2	271.0	No
8.1.5	Melaleuca spp. And/or Eucalyptus tereticornis and/or Corymbia tessellaris woodland with a ground stratum of salt tolerant grasses and sedges, usually in a narrow zone adjoining tidal ecosystems	Of concern	Endangered	35.7	123.1	No
8.2.1	Casuarina equisetifolia woodland and/or sparse herbland to open scrub on foredunes and beaches	Of concern	Of concern	14.1	71.1	No
8.2.2	Semi-evergreen microphyll vine thicket to vine forest on coastal dunes	Of concern	Endangered	0	31.4	Littoral Rainforest and Coastal Vine Thickets of Eastern Australia
8.2.6	Corymbia tessellaris +/- Acacia leptocarpa +/- Allocasuarina littoralis +/- Banksia integrifolia +/- rainforest species open forest on parallel dunes	Of concern	Of concern	27.3	480.7	No
8.2.7	Melaleuca spp. And/or Lophostemon suaveolens and/or Eucalyptus robusta open forest in wetlands associated with parabolic dunes	Of concern	Endangered	0.1	158.0	No
8.2.9	Tussock grassland on coastal dunes	Of concern	Endangered	6.4	32.4	No
8.2.13	Melaleuca spp. And/or Corymbia spp. And/or Lophostemon suaveolens and/or Acacia spp. Open forest on dune sands mixed with alluvial material +/- marine sediments	Endangered	Endangered	25.4	166.4	No
8.3.1	Semi-deciduous to evergreen notophyll to mesophyll vine forest, +/- sclerophyll emergents, fringing or in the vicinity of watercourses	Of concern	Of concern	14.1	2.3	No
8.3.2	Melaleuca viridiflora woodland on seasonally inundated alluvial plains with impeded drainage	Endangered	Endangered	96.3	226.7	Broad Leaf Tea-tree Woodlands

² Includes HVR area

RE	Short description	VMA Status	Biodiversity Status	HVR (ha)	Total within study area (ha) ²	Corresponding TEC
						in High Rainfall Coastal North Queensland
8.3.3	Melaleuca leucadendra and/or M. fluviatilis and/or Casuarina cunninghamiana +/- Syncarpia glomulifera open forest on creek banks	Least concern	Of concern	0.6	19.1	No
8.3.4	Freshwater wetlands with permanent water and aquatic vegetation	Of concern (was Endangered)	Of concern (Was endangered)	-	10.4	No
8.3.5	Eucalyptus platyphylla and/or Lophostemon suaveolens and/or Corymbia clarksoniana woodland on alluvial plains	Of concern	Endangered	730.7	996.5	No
8.3.6	Eucalyptus tereticornis and/or Corymbia intermedia (or C. clarksoniana) and/or C. tessellaris +/- Lophostemon suaveolens open forest on alluvial levees and lower terraces	Of concern	Endangered (Was of concern)	6.1	13.2	No
8.3.10	Semi-evergreen to evergreen notophyll vine forest on gently to moderately sloping alluvial fans adjacent to ranges	Of concern	Of concern	-	33.5	No
8.3.11 ³	Melaleuca viridiflora var. attenuata open forest in broad drainage areas	Endangered	Endangered	33.5	151.6	No
8.3.12	mperata cylindrica and/or Sorghum nitidum forma aristatum and/or Ischaemum australe tussock grassland on alluvial and old marine plains	Endangered	Endangered	3.7	121.0	No
8.3.13	Eucalyptus tereticornis and/or Corymbia tessellaris and/or Melaleuca spp. Woodland on alluvial and marine plains, often adjacent to estuarine areas	Of concern	Endangered (Was of concern)	13.6	23.5	No
8.12.3	Evergreen to semi-evergreen, notophyll to microphyll, vine forest to vine thicket of foothills and uplands on Mesozoic to Proterozoic igneous rocks	Least concern	No concern at present	1.8	146.2	No
8.12.6	Eucalyptus drepanophylla +/- E. platyphylla +/- Corymbia clarksoniana woodland to open forest on low to medium hills on Mesozoic to Proterozoic igneous rocks	Least concern	No concern at present	-	0.4	No
8.12.11	Semi-evergreen microphyll vine thicket +/- Araucaria cunninghamii on islands and coastal headlands on Mesozoic to Proterozoic igneous rocks and Tertiary volcanics	Least concern	No concern at present	-	595.4	No

³ This RE was inadvertently omitted from Table 3-2 in the body of the Jacobs report. It is included in the Jacobs report appendix and as such, it not classified as 'new' to the study area for the purposes of this addendum

RE	Short description	VMA Status	Biodiversity Status	HVR (ha)	Total within study area (ha) ²	Corresponding TEC
8.12.12	Eucalyptus tereticornis and/or Corymbia spp. And/or E. platyphylla and/or Lophostemon suaveolens woodland to open forest on hill slopes on Mesozoic to Proterozoic igneous rock	Least concern	No concern at present	-	750.7	No
8.12.13	Tussock grassland, or Xanthorrhoea latifolia shrubland, including areas recently colonised by Timonius timon var. timon shrubland, on slopes of islands and headlands, on Mesozoic to Proterozoic igneous rocks and Tertiary acid to intermediate volcanics	Of concern	Of concern	-	1141.0	No
8.12.14	Eucalyptus drepanophylla and/or E. crebra and/or E. exserta and/or Acacia spirorbis subsp. Solandri and/or Lophostemon confertus low woodland on islands and headlands, on Mesozoic to Proterozoic igneous rocks, and Tertiary acid to intermediate volcanics	Least concern	No concern at present	-	78.8	No
8.12.18	Semi-evergreen notophyll/microphyll to complex notophyll Argrodendron spp. Vine forest.	Least concern	No concern at present	-	49.1	No
8.12.20	Eucalyptus drepanophylla and/or E. platyphylla +/- Corymbia spp. +/- E. crebra woodland on low gently undulating landscapes on Mesozoic to Proterozoic igneous rocks	Least concern	No concern at present	0.1	1.5	No
8.12.22	Eucalyptus drepanophylla and/or Corymbia clarksoniana woodland to open forest.	Least concern	No concern at present	291.2	1571.4	No
8.12.25	Eucalyptus tereticornis woodland to open forest. E. tereticornis x platyphylla is a common associated species in the canopy.	Of concern	Of concern		178.8	No
8.12.26	Corymbia tessellaris and/or Eucalyptus tereticornis open forest on hillslopes of islands and near coastal areas on Mesozoic to Proterozoic igneous rocks and Tertiary acid to intermediate volcanics	Of concern	Endangered	2.0	7.2	No
8.12.27	Corymbia tessellaris and/or Eucalyptus tereticornis +/- C. intermedia +/- C. clarksoniana open forest with a secondary tree layer of Livistona decora on low hills on Mesozoic to Proterozoic igneous rocks	Endangered	Endangered	697.5	1570.8	No
8.12.29	Allocasuarina littoralis and/or Lophostemon confertus and/or Acacia spp. And/or Grevillea banksii open shrubland on islands and headlands on Mesozoic to Proterozoic igneous and Tertiary acid to intermediate rocks	Of concern	Of concern	-	467.8	No

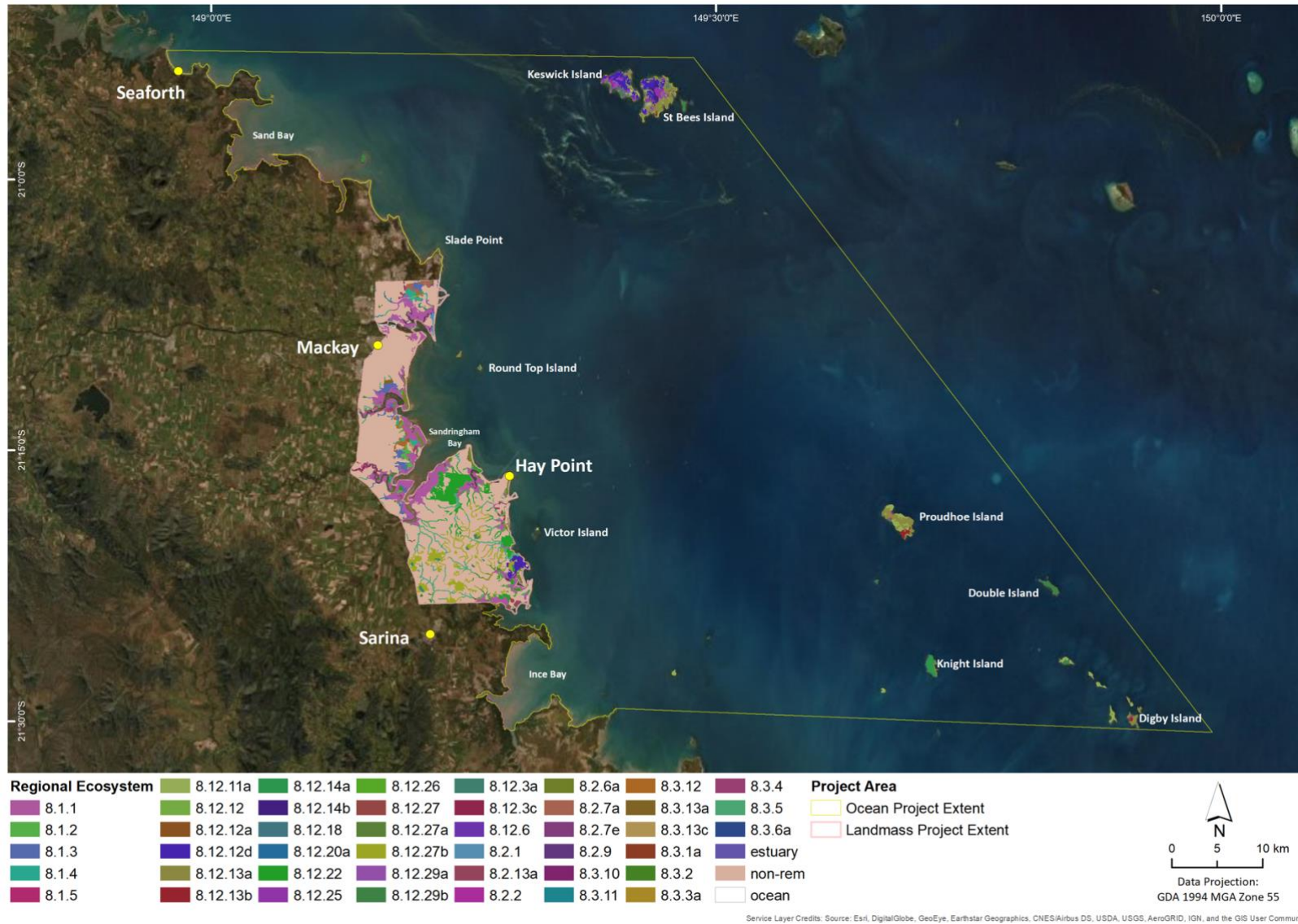
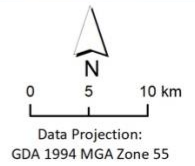
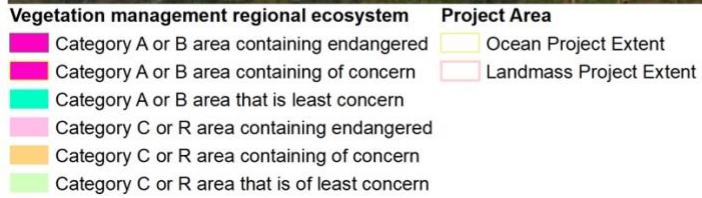
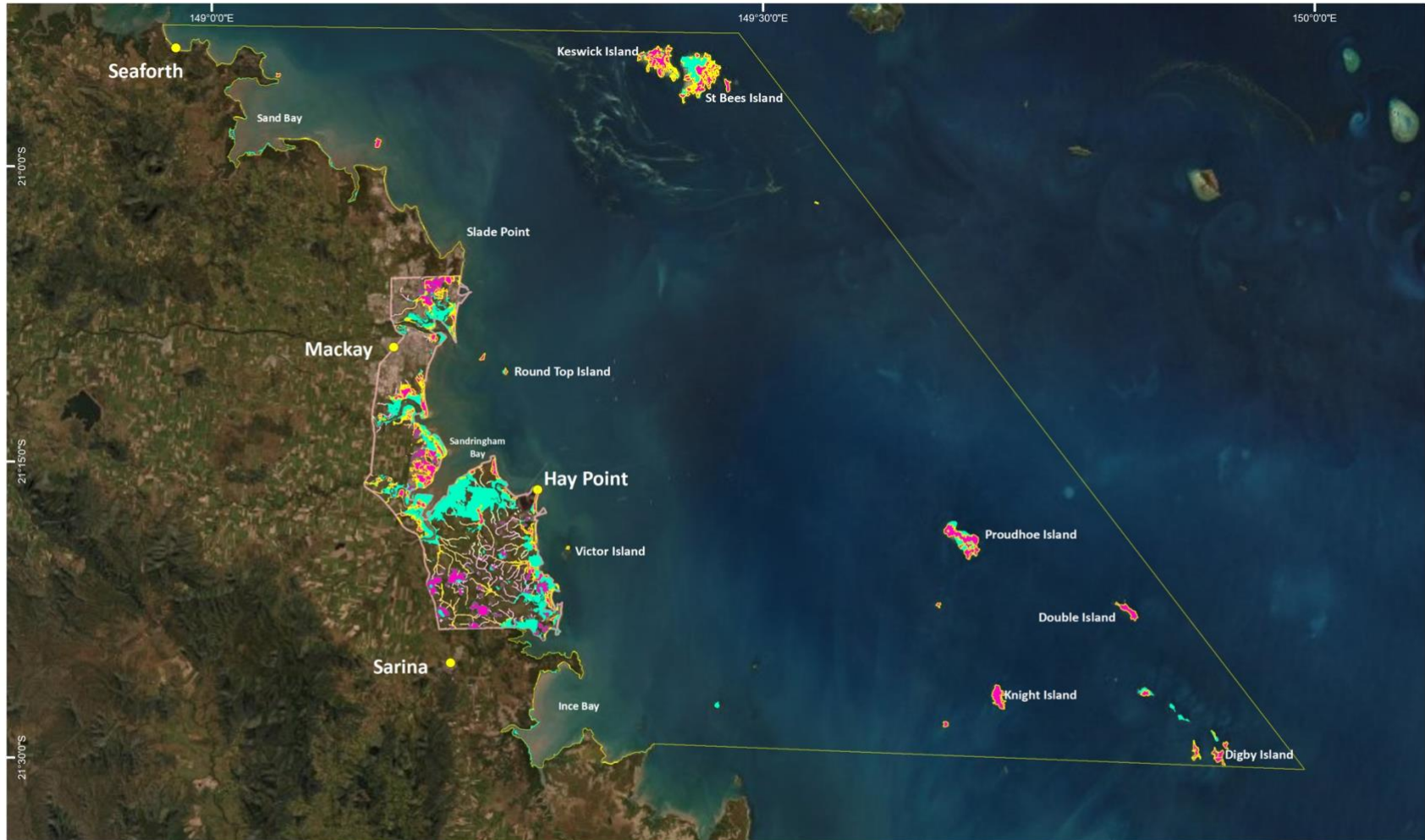


Figure 03-1: Regional Ecosystem classification under the VM Act



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 03-2: Regional ecosystems VM Act category classifications

03.2.3 Threatened terrestrial flora

Updated Commonwealth and State database searches were completed for the study area.

Commonwealth Protected Matters Search Tool (Appendix A) used the following coordinates:

- -21.5149, 149.2426
- -20.8865, 148.8882
- -20.8718, 149.4622
- -21.52415, 149.9490

State Wildlife Online (Appendix A) used the following coordinates:

- Latitude: -21.193
- Longitude: 149.3891
- Buffer: 60 km

Table 03-2 presents Commonwealth and State listed flora from updated database searches that are considered likely or potential to occur in the study area. Species considered unlikely to occur (due to study area being outside of distribution and/or not having suitable habitat) have not been included.

Of the four threatened flora species listed as present in the Jacobs report, two remain under the same Commonwealth and State threatened status listings. These are:

- Black Ironbox (*Eucalyptus raveretiana*), listed vulnerable under the EPBC Act and least-concern under the NC Act
- Holly-leaved graptophyllum (*Graptophyllum ilicifolium*), listed vulnerable under the EPBC Act and the NC Act

Two of the threatened flora species recorded by Jacob were not recorded on the updated database searches are:

- Lesser swamp orchid (*Phaius australis*), listed endangered under the EPBC Act and NC Act
- *Omphalea celata*, listed as vulnerable under the EPBC Act and the NC Act

Both of these species were reported by Jacobs as having records within the study area. Consequently these records should be accepted despite the updated database searches.

Table 03-2: Changes to threatened fauna species known or likely to occur in study area

Species	EPBC Act Status	NC Act Status	Distribution	Habitat	Likelihood of occurrence	Change from 2016 report
<i>Xylosma ovata</i>	-	NT	Occurs in Central East Queensland (south of Townsville to north of Rockhampton), in coastal areas between the Whitsunday Islands and Agnes Waters.	Grows in littoral rainforest and vine thickets.	Potential	New to study area as per updated database search

Note. CE= Critically Endangered, E= Endangered, V= Vulnerable, LC = Least Concern, CR = Critically Endangered, NR= Near Threatened, NT= Near Threatened

03.2.4 Threatened terrestrial fauna

Sites in the study area provide important habitat for a range of threatened species. The Jacobs report highlights the study area as host to various nationally significant shorebird nesting sites. However, the Outlook Report (2019) has highlighted that in recent years, the Mackay area appeared to be losing large numbers of multiple shorebird species, whereas other GBR regions have retained populations.

Table 03-3 presents Commonwealth and State listed flora from updated database searches that are known or considered likely or potential to occur in the study area. Species considered unlikely to occur (due to study area being outside of distribution and/or not having suitable habitat) have not been included.

One species, the Bare-rumped Sheath-tailed Bat, recorded by Jacobs as known to occur within the study area, was no longer recorded on the updated database search. However, the previous known record should be accepted despite the updated database search. One additional known species, the Eastern Curlew has been uplisted from Vulnerable to Endangered under the NC Act. The species EPBC Act listing has remained the same, as Critically Endangered.

Four species recorded on the updated database search (that weren't previously included in the Jacobs report) have been assessed as having the potential to occur within the study area:

- Central greater glider (*Petauroides armilatus*), listed as Vulnerable under the EPBC Act and Endangered under the NC Act
- Greater glider (*Petauroides volans*), listed as Vulnerable under both the EPBC Act and NC Act
- Red Goshawk (*Erythrotriorchis radiatus*), listed as Vulnerable under the EPBC Act and Endangered under the NC Act
- White-throated Needletail (*Hirundapus caudacutus*), Listed as Vulnerable / Migratory under the EPBC Act and Vulnerable under the NC Act

Jacobs acknowledged that vegetation within the study area may provide a food source for gliders (pg 21 Jacobs 2016) and assessed the study area as providing habitat for a number of bird species. The records of these species on the database searches is likely due to updated understanding of habitat for the species as well as the result of further survey effort undertaken between 2016 and now.

Threats to terrestrial fauna species previously identified by Jacobs include habitat degradation, weed and pest fauna invasion, and inappropriate and altered fire regimes. These threats remain relevant for the four species above that now appear on the database searches. As noted by Jacobs, future development within the study area may be restricted by remaining areas of known habitat for threatened species. Consequently, the inclusion of these species on the database searches does not represent an increase in the vulnerability of the terrestrial fauna values to identified impacts and does not change the conclusions Jacobs identified in respect to vulnerability and summary of importance.

Table 03-3: Changes to threatened terrestrial fauna in the study area

Species	Species	EPBC Act Status	EPBC Migratory	EPBC Marine	NC Act Status	Distribution	Habitat	Likelihood of Occurrence	Change from 2016 report
<i>Saccolaimus saccolaimus</i>	Bare-rumped Sheath-tailed Bat	V	No	No	-	The type locality is Babinda Creek near Cardwell, North Queensland.	Occurs mostly in lowland areas, typically in a range of woodland, forest and open environments. Poplar Gum (<i>Eucalyptus platyphylla</i>) woodland, typical of the alluvial plains adjacent to the lower Burdekin and Houghton Rivers, near Townsville	Known	No longer listed on database search
<i>Petauroides armillatus</i>	Central greater glider	V	No	No	E	Occurs down the east coast of Australia in Queensland.	Tall open woodland, eucalypt forests and low woodlands.	Potential	New to study area as per updated database search
<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	CE	Yes	Yes	E	Widespread in coastal regions in the north-east and south of Australia	Intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons.	Known	Uplisted to Endangered (NC Act)
<i>Petauroides volans</i>	Greater Glider	V	No	No	V	Eastern coast of the Australian mainland, from eastern QLD to southern Victoria	Forests and woodlands require large patches of old growth habitat Restricted to expansive tall eucalypt forest	Potential	New to study area as per updated database search
<i>Erythrotriorchis radiatus</i>	Red Goshawk	V	Yes	No	E	Very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia, from western Kimberley Division to northeastern NSW and occasionally on continental islands	Prefers coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. Favours a mix of subtropical rainforest and Melaleuca forest along coastal rivers, nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within one km of permanent water. Avoids the densest and most open forest types	Potential	New to study area as per updated database search

Species	Species	EPBC Act Status	EPBC Migratory	EPBC Marine	NC Act Status	Distribution	Habitat	Likelihood of Occurrence	Change from 2016 report
<i>Hirundapus caudacutus</i>	White-throated Needletail	V	Yes	Yes	V	Recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains.	As this species is aerial has been stated that conventional habitat descriptions are inapplicable. They are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland	Potential – aerial flyover	New to study area as per updated database search

Note. CE= Critically Endangered, E= Endangered, V= Vulnerable, LC = Least Concern, CR = Critically Endangered, NR= Near Threatened

03.2.5 Flooding

The Outlook Report (2019) notes that below average rainfall has led to decreased annual freshwater discharge on to the GBR, lower than the long-term median and lower than in previous reporting periods for the region. However, extreme rainfall and flooding occurred between Cape York and Mackay-Whitsunday regions in February 2019, associated with a slow-moving tropical low that extended across a very large area of northern Queensland.

03.3 Air quality

The Environmental Protection (Air) Policy 2008 has been superseded by the Environmental Protection (Air) Policy 2019. There are no significant policy changes between the 2019 and 2008 version. Air quality protects the health and the biodiversity of ecosystems as well as human health.

03.3.1 Dust emissions

NQBP commissioned air quality monitoring at the Port of Mackay for the Mackay Dust Monitoring Program. Two monitoring stations were installed in July 2016 and are continuous. In July 2021 data has shown air quality was classed as majority 'very good' for 87% and 71% and otherwise 'good' for 12% and 28% for each monitoring station respectively (ACOEM, 2021).

During this month The PM₁₀ monthly average for Southern station was 12 µg/m³ with a standard deviation of 9 µg/m³. The PM₁₀ monthly average for Northern station was 15 µg/m³ with a standard deviation of 14 µg/m³ (ACOEM, 2021).

Supporting the NQBP results for the 2020 year, the Ambient Air Quality, National Environment Protection Measure monitoring showed results for West Mackay that allowable exceedances of air quality standards during 2020 were met (Queensland Government, 2020).

03.3.2 Noise

Occasional noise complaints have been received from residents in close proximity to the Mackay Marina, generally in relation to shipping activities, such as loading or unloading of cargo during the night or short term construction works (pers.comms. NQBP).

Noise complaints are responded to via an investigation and implementation of any corrective action as needed. Residents adjacent to the Mackay Marina are notified of upcoming activities that are not consistent with standard port operations such as construction work (pers. comms. NQBP).

03.3.3 Lighting

Refer to Jacobs report 2016.

The Mackay and District Turtle Watch Association is working with Mackay Regional Council to install appropriate 'turtle-friendly' lighting at residential beaches.

03.4 Aquatic ecosystems – freshwater

03.4.1 Catchments

The Pioneer Basin and the Plane Basin are the two major catchments of the study area which support aquatic and terrestrial communities.

The Healthy Rivers to Reef Partnership produce Report Cards that uses the best independent science and integrates regional monitoring programs to measure the health of the Mackay Whitsunday waterway health. Indicators of freshwater and marine waterway health include water quality, coral health, seagrass health and fish health and habitat hydrology. These report cards are completed for The Inshore Marine, Plane Basin and Pioneer Basin catchments all of which are directly related to the study area.

The 2020 Healthy Rivers to Reef Partnership Mackay-Whitsunday Report Card (HRRP, 2020) rated the condition of the Pioneer Basin and Plane Basin catchments as 'Moderate' to 'Very Good'. Jacobs reported that the Mackay City sub-catchment had an ecosystem health rating of 'Moderate' in 2014.

The 2020 Report Card (HRRP, 2020) rated the freshwater ecosystem health of Pioneer River to be 'Moderate' ('Very Poor'- 'Poor' in 2016).

The Jacob report states that land use pressures in the catchment result from high intensity lands uses such as sugar cane production, urban and industrial development, grazing/forestry and horticulture/cropping. The Reef 2050 Water Quality Improvement Plan (2019) refers to the same industries as being the largest within the Pioneer and Plane Catchments. No additional industries or land use pressures were highlighted.

03.4.2 Waterways and ephemeral water bodies

Waterways provide freshwater inputs to estuaries and to habitat that supports flora and fauna.

Queensland's Environmental Protection Policy (Water) 2009 has been replaced with the Environmental Protection (Water and Wetland Biodiversity) Policy 2019. The updated policy includes the same Environmental Values for protection or enhancement (Queensland Government, 2019).

The 2020 Report Card (HRRP, 2020) rated Estuarine Water Quality in the Pioneer Basin for Vines Creek as 'Good' and in the Plane Basin for:

- Sandy Creek as 'Moderate' ('Very Poor' in 2014)
- Plane Creek as 'Good' ('Moderate' in 2014)
- Rocky Dam Creek as 'Good' ('Moderate' in 2014)
- Carmila Creek as 'Good' (No value for 2014)

03.4.3 Surface water quality

Inshore water quality of the GBR region is improving at scale, yet poor water quality continues to affect many inshore areas of the reef (GBRMPA, 2019).

The Outlook Report (2019) details the following for the Mackay-Whitsunday Region:

- Chlorophyll-a (an indicator of nutrient enrichment) concentrations have exceeded guideline values since monitoring began in 2005
- Water clarity has decreased since monitoring began in 2005
- Concentrations of total suspended solids are slightly above guideline values.
- The highest pesticide concentrations for the GBR region are present.

The 2020 Report Card (HRRP 2020) recorded the following key findings for the Pioneer Basin and Plane Basin:

- Overall water quality was 'moderate' for both basins, which was an increase in the Plane Basin (from poor the year before)
- Total suspended solids remained consistent with previous years at 'good' for Pioneer and 'moderate' for Plane Basins. Sediment continues to be a key issue for the region, with the Plane Basin now recording five consecutive years of 'moderate' condition
- Pesticide continues to remain the poorest scoring indicators with both basins being graded as 'very poor'.
- Nitrogen and phosphorous levels were 'moderate' across the basins, reflective of the conditions of previous years.

Jacobs (2016) identified that adjacent and upstream land uses heavily influence water quality, with activities in these areas being a major source of nutrient, sediment and pesticide inputs into the GBR. Soil disturbance, erosion and runoff from agricultural areas continue to be a major driver of surface water quality, which is clearly reflected in the quality scores of the Pioneer Basin and Plane Basin in the years between 2016 and 2021. Reduction of nutrient, sediment and pesticide inputs in freshwater runoff was identified by Jacobs (2016) as the top priority for improved health of the GBR and this is appropriate to remain as the top priority within the study area.

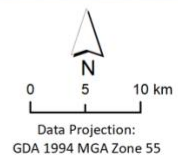
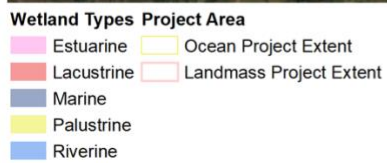
03.4.4 Groundwater quality

Refer to the Jacobs report.

03.4.5 Wetlands

Wetland water quality relates to the health and resilience of the GBR. Wetlands also provide significant habitat to shorebirds. Wetlands by type are shown on Figure 03-3, with Figure 03-4 displaying regulated wetlands (e.g. MSES and Nationally Important).

The Environmental Protection (Water) Policy 2009 has been superseded by the Environmental Protection (Water and Wetland Biodiversity) Policy 2019. There are no significant policy changes between the 2019 and 2009 version.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 03-3: Wetlands in study area by type

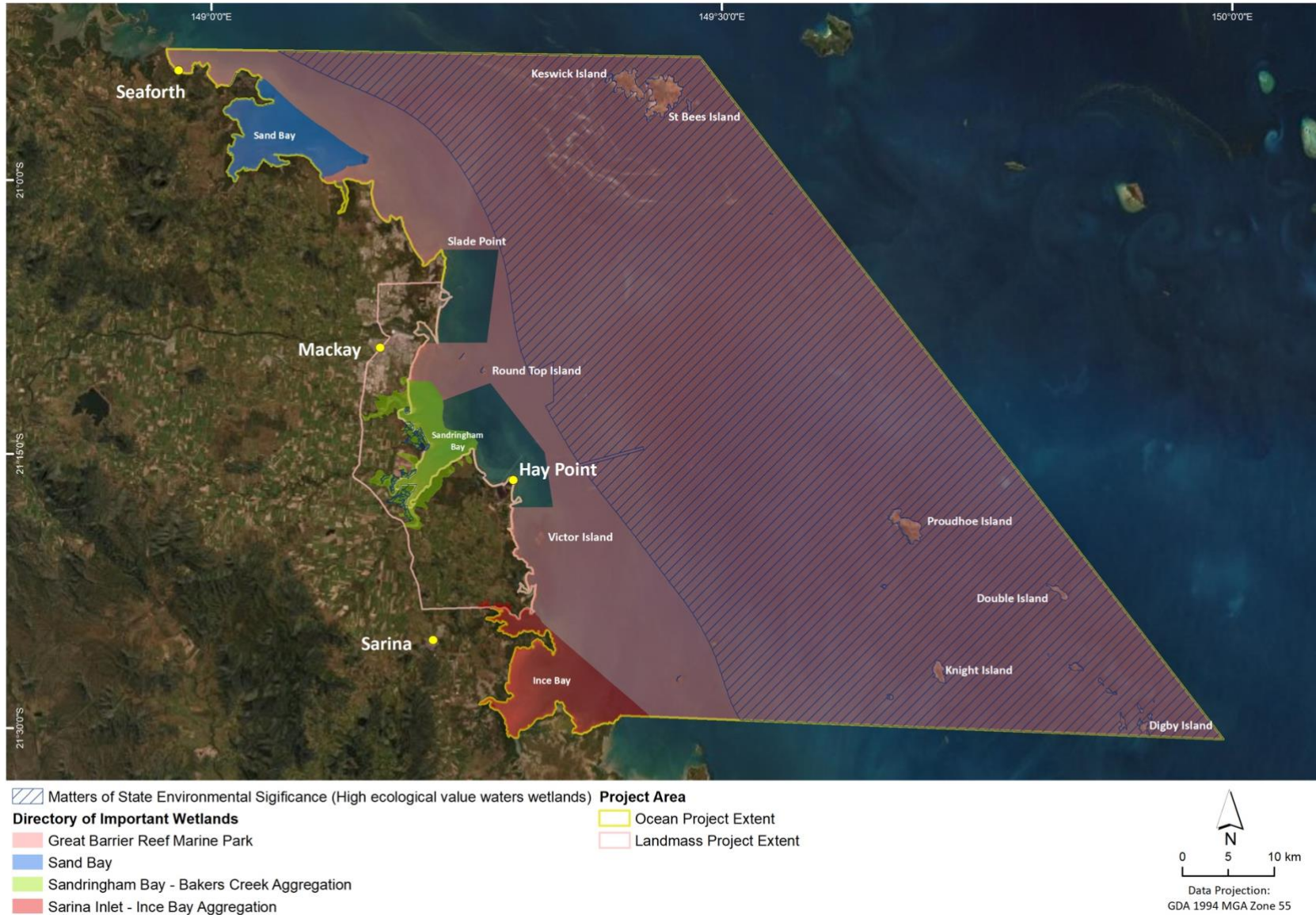


Figure 03-4: MSES and nationally important wetlands

03.4.6 Mangroves

Mangroves and estuarine wetlands are a dominant feature along the Mackay/Whitsunday coast. The Outlook Report (2019) states that mangroves continue to be graded in very good condition.

Species diversity and listing status for each mangrove RE remain the same as the Jacobs report. Changes are summarised in Table 03-4, showing increase in mangrove extent and classification as High Value Regrowth. The general spatial distribution of the mangrove communities remained consistent with Figure 3-11 of the Jacobs report.

Table 03-4: Summary of mangrove communities in the study area

RE	Short description	VMA Status	Biodiversity Status	HVR (ha)	Total within study area (ha)	Increase from 2016 report ⁴
8.1.1	Mangrove closed forest of marine clay plains and estuaries	LC	NCAP	80.5	4,502.0	559 ha
8.1.2	Samphire open forbland on salt pans and plains adjacent to mangroves	LC	OC	2.1	717.6	253.5 ha
8.1.3	Sporobolus virginicus tussock grassland on marine sediments	OC	OC	69.2	559.7	36.8 ha
8.1.4	Schoenoplectus subulatus and/or Eleocharis dulcis sedgeland or Paspalum vaginatum tussock grassland	OC	E	39.2	271.0	73.8 ha
8.1.5	Melaleuca spp. and/or Eucalyptus tereticornis and/or Corymbia tessellaris woodland with a ground stratum of salt tolerant grasses and sedges, usually in a narrow zone adjoining tidal ecosystems	OC	E	35.7	123.1	52.8 ha

Note. CE= Critically Endangered, E= Endangered, V= Vulnerable, LC = Least Concern, CR = Critically Endangered, NR= Near Threatened, NCAP = No Concern At Present

Mangroves provide important habitat for a number of fish species, with mangrove areas often overlapping with declared Fish Habitat Areas (FHA). The FHA within the study area are shown in Figure 03-5 and include:

- Bassett Basin Fish Habitat Area (Management B), which is an estuary of the Pioneer River and provides important nurseries. The boundaries and management level remain the same as reported in the Jacobs report
- Sand Bay Fish Habitat Area (Management A). The boundaries and management level remain the same as reported in the Jacobs report
- Cape Palmerston - Rocky Dam Fish Habitat Area (Management A and B) located on the southern edge of the study site. This area was not originally documented in the Jacobs report

⁴ The 'increase' is likely to be due to two factors; updated State published mapping which has provided better understanding of the communities present and the variance in the study areas between the 2016 report and the 2021 addendum.



Figure 03-5: Fish Habitat Areas within the study area

03.4.7 Freshwater fish

As some species move between freshwater systems and the GBR World Heritage Area (GBRWHA) freshwater waterways in the study area contribute to the OUV of ecological processes and biodiversity conservation.

Fish barriers affect the vulnerability of freshwater fish in the study area. Freshwater fish data in the Jacobs report remains up to date.

03.5 Aquatic ecosystems – marine

03.5.1 Oceanographic processes

Refer to the Jacobs report.

03.5.2 Marine Water Quality

The 2020 Report Card (HRRP 2020) recorded the following key findings for the Central Inshore Zone, which encompasses Port of Mackay and Port of Hay Point:

- Water quality was graded as poor, with the Central Zone being the only zone to received a ‘poor’ grade. All other inshore marine zones in the region had ‘moderate’ water quality.
 - The score within the Central Zone was also ‘poor’ in 2019.
- Chlorophyll-a declined in grade from ‘poor’ to ‘very poor’
 - The change in score was attributed to the removal of the Ports monitoring site from the score calculations for the 2020 Report Card. The monitoring site was located within the Mackay Harbour and was removed as it was thought to not truly represent the inshore marine condition of the region.
- The pesticide risk grade in the Central Zone improved from three consecutive years of ‘moderate’ condition to a grade of ‘good’ for the first time.
 - This was a result of low rainfall, which reduced freshwater discharge into the marine environment.
- Water clarity was ‘poor’, an improvement to the score of ‘very poor’ in 2019. However clarity is still an issue in the region with three of the past four years having resulted in a score of ‘poor’.

Healthy Rivers to Reef produced The Mackay-Whitsunday Water Quality Improvement Plan 2014-21, which sets ecosystem health targets and outlines management interventions for improving water quality in the region.

The Port of Mackay (and Hay Point) Ambient Marine Water Quality Program has been implemented since July 2014 to identify potential impacts of the port and its operations on water quality and to characterise the natural variability in key water parameters within the adjacent sensitive habitats. The program incorporates a combination of spot field measurements and high frequency continuous data loggers, laboratory analysis for a range of nutrients, herbicides and heavy metals. In the 2019-2020 monitoring period, surveys for water quality were taken on a 6 weekly basis. In the 2019-2020 monitoring period the following observations were made:

- There are minor seasonal differences in water quality, except that temperature is highest in summer months
- The water column is well mixed
- Particulate Nitrogen concentrations exceeded guidelines for the majority of the monitoring period
- Chlorophyll-a concentrations exceeded GBRMPA guidelines at all surveys except one.
- All metals, except for copper were not detected above the 95% level of protection trigger values.
- Lead was detected below guideline values at Dugeon and Slade Points. Arsenic was detected at low concentrations
- Pesticides targeted for analysis were not detected above trigger levels

Plankton surveys showed seasonal and inter-annual variation was observed, as was a weak relationship with available nutrients. Trichodesium blooms were noted in most surveys, primarily in the late spring and early summer.

03.5.3 Marine sediments

03.5.4 Coral reefs

The 2020 Report Card (HRRP, 2020) rated coral in the Central Queensland Bioregion as 'Poor', which is the same condition as reported in 2016 (no 2014 rating).

The 2019 Outlook Report (2019) describes the coral condition having improved significantly in 2015-2016, showing the potential of these reefs to recover, before these improvements were reversed after Cyclone Debbie impacted in 2017. Coral recovery is likely to take several decades even if agricultural inputs were eliminated. Jacobs report an overall decline in coral cover in the southern parts of the GBR (2016).

Ambient coral monitoring completed at Ports of Mackay and Hay Point in 2019/2020 (Ayling, Ayling & Chartrand, 2020) found:

- Macroalgal cover has generally followed a gradual increase on the three inshore locations since the 2006 baseline and reached a peak of 47% in July 2018 but reduced to 46% in April 2020, possibly due to high water temperatures experienced in early 2020
- A mass bleaching event in April 2020 caused minimum mortality, yet there were signs it was starting to occur. Broad scale GBR monitoring confirmed bleaching at central and southern GBR regions.
- Cyclone Debbie impact caused a 40% decrease (from 2006 baseline) in hard coral
- Nil sustained recovery of soft and hard coral has been recorded since Cyclone Debbie, but new coral recruits have increased to more normal levels in 2019/2020
- Coral composition has only slightly changed in 14 years
- both the number of corals with sediment and sediment depth were at moderate to high levels, being high after cyclone Debbie and after bleaching events (yet not as high as previous levels)
- Main drivers of change appear to be sporadic cyclone events, and bleaching may have a significant future impact.

03.5.5 Seagrass

The 2020 Report Card (HRRP, 2020) identified the following for seagrass in the inshore marine Central Zone, which encompasses the Port areas:

- Overall seagrass health was 'moderate', which is consistent with the previous two years, having last been recorded as 'poor' in 2017
- Abundance was 'moderate', a result consistently recorded since 2015
- Reproduction was 'very poor', which has been the case for four consecutive years
- Biomass and area both have improvements from previous years with biomass being 'good' and area being 'very good'

The annual seagrass monitoring of the Mackay and Hay Point region in 2020 (York and Rasheed, 2021) as part of NQBP's ambient monitoring program found:

- Overall seagrass condition was classified as 'Satisfactory' down from 'Good' condition found in 2019
- Variable seagrass in Hay Point offshore deep water declined from 'Very Good' to 'Poor' (2020 spatial footprint of seagrass reduced to 17.1% of the 2019 footprint)
- Coastal meadows at Dudgeon Point shifted from a 'Good' to 'Satisfactory' condition
- Mackay offshore monitoring area recorded its largest area of deep-water seagrass since sampling began in 2017
- Meadows at offshore islands (Keswick and St Bees combine) maintained overall 'Good' condition with highest biomass recorded since 2014 despite loss of meadow area at St Bees Island.

The Jacobs report stated that 14 species of seagrass were identified in the Mackay-Whitsunday Region. The NQBP monitoring reports 5 species monitored in 2020, down from a previous 6 species monitored in 2019. The NQBP monitoring only covers the Mackay and Hay Point regions, not the Mackay-Whitsunday Region as a whole. Species composition scores in other areas of the region (Bowen) remained consistent with scores from previous years (HRRP 2020).

As identified by Jacobs (2016) the major threats affecting seagrass communities include poor water quality, habitat loss and modification from coastal development, increased storm intensity and frequency, rising sea surface temperatures and sea level rise. The 2020 Report card noted that the index score improved in the Central Zone, which is demonstrating a recovery from the impacts after TC Debbie in 2017. The lack of major flooding and cyclones in the area allowed seagrass meadows time to recover, combined with favourable climatic conditions.

Maximum wave height was above the long term average immediately prior to the survey which may have contribute to prolonged periods of sediment resuspension and resulting lower water quality. As mentioned in Section 03.5.2, water clarity has been consistently poor in the Central Zone and as such, seagrass communities are used to turbid conditions. Prolonged periods of this water quality may contribute to declines in seagrass condition within the study area, but this is yet to be seen (York and Radsheed, 2021).

03.5.6 Non-reefal benthic fauna

Refer to the Jacobs report.

03.5.7 Threatened marine species

In the Jacobs report this section was titled 'Megafauna'. For the purpose of including marine species that were not recorded in the Jacobs report, this section title has been changed.

Megafauna forms a significant component of the GBR's ecological, cultural and economic value. Table 03-5, Table 03-6 & Table 03-7 provide updates to threatened species since 2016 and also lists threatened species that were listed on the database searches but were not referred to in the Jacobs report.

The records of these species in the database searches is likely due to updated understanding of habitat for the species as well as the result of further survey effort undertaken between 2016 and now. It is not likely to be reflective of the study area having gained a higher level of 'importance' for any particular threatened marine species. Jacobs (2016) identified that the study area provides general habitat for megafauna, but is not recognised as a significant area (for breeding, feeding, critical habitat etc.) for any megafauna. This conclusion remains accurate.

The key threats to marine species identified by Jacobs (2016) can be associated with port activities including boat strike/disturbance, marine pollution, habitat loss and degradation, underwater noise, light pollution and dredging. These continue to remain as key threats within the study area, however there has been no significant impact on any marine fauna species since the Jacobs assessment and port activities have occurred consistently since then. Consequently, the inclusion of new species on the database searches does not represent an increase in the vulnerability of the marine fauna values to identified impacts and does not change the conclusions Jacobs identified in respect to vulnerability and summary of importance.

Marine birds

Table 03-5 Changes to marine birds in the study area

Species	EPBC Act Status	EPBC Migratory	EPBC Marine	NC Act Status	Change from 2016 report
Southern Giant-Petrel, Southern Giant Petrel	E	Yes	Yes	-	New to study area as per updated database search
White-bellied Storm-Petrel (Tasman Sea), Whitebellied Storm-Petrel (Australasian)	V	No	Yes	-	New to study area as per updated database search

Note. CE= Critically Endangered, E= Endangered, V= Vulnerable, LC = Least Concern, CR = Critically Endangered, NR= Near Threatened

Marine megafauna

Table 03-6: Changes to marine megafauna in study area

Species	EPBC Act Status	EPBC Migratory	EPBC Marine	NC Act Status	Change from 2016 report
Australian humpback dolphin	-	Yes	No	V	New to study area as per updated database search
Blue Whale	E	Yes	Yes	LC	New to study area as per updated database search
Humpback whale*	LC	Yes	Yes	V	New to study area as per updated database search

Note. CE= Critically Endangered, E= Endangered, V= Vulnerable, LC = Least Concern, CR = Critically Endangered, NR= Near Threatened

*Known to migrate through the study area the Humpback Whale (*Megaptera novaeangliae*) being considered for removal from the EPBC Act threatened species list in April 2021. DAWE (2021) details the strong recovery of this species over the last 5 decades following intense exploitation during the period of commercial whaling. At the time of writing this report, the species is still listed as vulnerable, with the threatened species assessment due on 30 Oct 2021 (SPRAT, 2021). Even if the species is removed from the threatened species list, the Humpback Whale will remain protected under the EPBC Act as a cetacean and as a listed migratory species (DAWE, 2021).

Reptiles, fishes and sharks

Table 03-7: Changes to Reptiles, fishes and sharks in the study area

Species	EPBC Act Status	EPBC Migratory	EPBC Marine	NC Act Status	Change from 2016 report
White Shark, Great White Shark	V	Yes	No	-	New to study area as per updated database search
Green Sawfish, Dindagubba, Narrownout Sawfish	V	Yes	No	-	New to study area as per updated database search
Whale Shark	V	Yes	No	-	New to study area as per updated database search
Estuary Stingray	-	No	No	NT	New to study area as per updated database search

Note. CE= Critically Endangered, E= Endangered, V= Vulnerable, LC = Least Concern, CR = Critically Endangered, NR= Near Threatened

03.5.8 Underwater noise

Refer to the Jacobs report.

03.6 Social values

03.6.1 Public amenity

Tourism and associated public amenities continue to be of key economic benefit to the Mackay region. Updated statistics from the 2016 Census⁵ (ABS, 2016) include:

- In Mackay, tourism supports an estimated 2,960 jobs, which is 6.2% of total employment (7,510 direct or indirect tourism jobs in 2011)
- 10.6% of Mackay Local Government Area (LGA) population are employed in the Coal Mining Industry (8% in 2011)
- Since 2013, Mackay LGA population has stayed relatively stable.

Table 03-8: 2016 Community profile and demographic indicators

Indicator	Mackay Harbour (gazetted locality)	Hay Point (gazetted locality)	Mackay Regional Council LGA	Queensland
Total area (km ²)	16.5	24.2	7,601.2	1,729,958.1
Population	555	1,348	114,969	4,703,193
Population density (person/km ²)	33.6	55.7	15.1	2.7
Indigenous population (% of population)	1.6	4.3	5.1	4
Predominant country of birth (Top 3)	Aust (64%) England (4.3%) NZ (3.7%)	Aust (82.3%) NZ (2.6%) England (1.4%)	Aust (79.7%) NZ (2.5%) England (1.9%)	Aust (71.1%) NZ (4.3%) England (3.8%)
Gender ratio (female:male)	0.9:1	0.9:1	1:1	1:1
Median age	49	41	37	37
Predominant age group	50-54 years	55-59 years	45-49 years 50-54 years	30-34 years 40-44 years 45-49 years
Unemployment (%)	8.4	9.7	8.6	7.6
Industries of employment (Top 3)	Coal Mining (14%) Hospitals (except psychiatric hospitals) (6.8%) Real estate services (5.5%)	Coal mining (15.5%) Accommodation (3.9%) Port and Water Transport Terminal Operations (3.7%)	Coal Mining (10.6) Hospitals (except psychiatric hospitals) (3.7%) Primary education (3%)	Hospitals (except psychiatric hospitals) (4.3%) Primary education (2.5%) Supermarket and Grocery Stores (2.4%)
Median household income (\$/weekly)	2098	1491	1232	1402
Average household size (people)	2	2.6	2.5	2.6

⁵ As 2021 Census data is not yet available, this report has been updated using the most recent data census data from 2016

Indicator	Mackay Harbour (gazetted locality)	Hay Point (gazetted locality)	Mackay Regional Council LGA	Queensland
Family characteristics				
• Total families	137	368	30,330	1,221,148
• Couples without children	95	167	12,200	481,451
• Couples with children	29	133	13,150	518,494
• One parent families	18	54	4,573	201,308
• Other families	0	7	388	19,838

03.6.2 Tourism and recreation

Updated tourism statistics reflect the following:

- Areas adjacent to the reef directly contributed \$3.2 billion to the state economy which contributed \$11.7 billion in 2019 (GBRMPA, 2019)
- All GBR regions, except Mackay-Whitsunday increased in number of visitors, which decreased by 26% from 2006 to 2016. This was attributed to a decline in domestic visitors with tourism expenditure being higher in the Wet Tropics compared to any other region (GBRMPA, 2019).
- Covid-19 had unprecedented impacts to the QLD tourism industry (Tourism and Events Queensland, 2021).
- Prior to covid in 2018-2019 tourism accounted for 9.3% of employment in the state whereas in 2019-2020 tourism accounted directly and indirectly to 8.2% of employment in the state
- Prior to covid in 2019, overnight visitors spent \$69.9 million per day and in the year ended June 2021 overnight visitors spent \$61.1 million per day.

03.6.3 Traffic

Refer to the Jacobs report.

03.6.4 Waste generation

Refer to the Jacobs report.

03.6.5 Fisheries

Commercial and recreational fishing are two important industries of the study area and of QLD. While Fisheries do not directly contribute to the WHA's OUV, they do generate financial incentive and support for the health of the GBR.

Policy

A number of reforms have been made to the Fisheries Act enabling the legislation to deliver upon commitments made under the Queensland Sustainable Fisheries Strategy 2017-2027 (DAF, 2017). Changes have occurred over the past few years and include (Queensland Government, 2021):

- Modernised objectives of the Fisheries Act
- Introduction of harvest strategies for key fisheries by 2020. These provided clearer and more responsive decision making by outlining the pre-determined actions that will be taken based on the performance of the fish stock
- Reform of management strategy to establish quotas or total allowable commercial catches that can be adjusted over time
- Strengthened enforcement powers and penalties to address serious fishing offences
- Reduced complexity and removal of redundant provisions in the Fisheries Act

- Identification of reforms needed for crab, trawl and east coast inshore fisheries as a priority
- Some areas were closed to all fishing such as Dalrymple Bay and Hay Point
- Fisheries Act and Regulation amended to clarify roles of responsible minister and Fisheries Queensland to ensure decision making is at the appropriate level and is evidence based and timely (DAF, 2017)
- Administrative amendments to provide consistency across all fishing sectors
- Changes to rebuild snapper, pearl perch and scallop stocks
- Changes to commercial fishing such as crab fishery, east coast trawl fishery, east coast inshore fishery & Gulf of Carpentaria inshore fishery, harvest fishery (tropical rock lobster, sea cucumber, coral and aquarium) and reef line fishery.
- Streamlined measures to support economic recovery of commercial fishing business following the impacts of the Covid-19 pandemic

Stock specific changes can be found here: <https://www.daf.qld.gov.au/business/priorities/fisheries/sustainable/fisheries-reforms>.

Commercial

In 2017–18 the total gross value product (GVP) of Queensland’s fisheries production was \$294.4 million, a decrease of 5% (\$14.9 million) from 2016–17. (\$4 million in 2009-2010: Jacobs, 2016) (ABARES, 2020).

Recreation

State-wide recreational fishing surveys found the 64,000 people in the Mackay region had been fishing in 2018/2019. Table 03-8Table 03-9 shows the number of fish caught and released in the Mackay Coastal Waters between 2000 and 2019. In 2018/2019 recreational fishing expenditure for the Mackay Whitsunday region was \$56,227,000. In that region, the most caught fish types were Prawns and Yabbies (48%), followed by finfish (45%) and then small baitfish (5%).

Table 03-9: Recreational fishing data in the Mackay Coastal Waters 2000-2019 (DAF, 2020)

Year	2000	2010	2013	2019
Caught (individuals)	1,753,000	748,000	712,000	763,000
Released (individuals)	627,000	352,000	337,000	411,000

03.6.6 Non-indigenous heritage

Many of the Region’s heritage values are closely tied to the condition of the ecosystem. Generally natural heritage values are rated good by the Outlook Report (2019), which means that some loss of alteration of the elements necessary to maintain their OUV has occurred, but overall their condition is not causing substantial effects on this element of OUV. The Outlook Report (2019) states that Indigenous heritage and some aspects of historic heritage are assessed as being in poor condition.

The Outlook Report (2019) notes a historic light station – Pine Islet lighthouse, south East of Mackay, the original Pine Islet lighthouse was relocated to the Mackay Harbour and restored to full operational status in 1995. This lighthouse was also known as the Percy Isles Light as it is from a small islet belonging to the Percy Islet group of the North Cumberland Islands about 130km south East of Mackay (Pine Islet Lighthouse, n.d) This is an additional site to those listed in the Jacobs report.

At state level there are now 34 (32 in 2016) sites listed on the Queensland Heritage Register that are in the Mackay LGA. A number of these sites are in proximity to the Port of Mackay, located in the Mackay city centre.

03.6.7 Indigenous heritage

The Yuwi People are the Traditional Owners and Native Title holders of the land and sea country within the Port of Mackay and Port of Hay Point Areas. NQBP has a Cultural Heritage Management Plan with the Yuwi People which guides management of future development within the area.

Cultural heritage surveys of the Port of Mackay and Port of Hay Point strategic port lands has identified areas of high cultural heritage significance.

The Outlook Report (2019) found Indigenous heritage to be rated in poor condition due to the majority of Indigenous heritage values having not been systematically identified. Those values that are known are degrading and generally lack integrity.

Jacobs refers to cultural heritage surveys that were completed for the Port of Hay Point contracted by NQBP.

The Traditional Owner Reference Group (TORG) was formed in 2014 with representatives from nations within the Reef Catchments Mackay Whitsunday Isaac Region. The TORG Strategic plan has an objective to undertake comprehensive heritage and environmental value assessment for the Mackay Whitsunday Isaac region (TORG, 2017). In 2018 the TORG undertook an Indigenous cultural heritage assessment for the MWI area. Specific sites that were assessed to date lie outside of the study area (TORG, 2017).

04 GAP ANALYSIS

Refer to the Jacobs report.

05 FUTURE RISKS AND OPPORTUNITIES

05.1 Vulnerability of values to port activities

05.1.1 Land-based port activities

Undeveloped land surrounding the Port of Mackay continues to largely be mapped as of-concern or endangered remnant vegetation, with patches of endangered and of-concern regional ecosystems continuing to exist north and south of the Port of Hay Point. The changes in status of two regional ecosystems (RE 8.3.4 downgraded from 'Endangered' to 'Of Concern' and RE 8.3.13 up-listed from 'Of Concern' to 'Endangered') indicate there has been some change in the condition of terrestrial bioregion, both positive and negative.

These terrestrial ecosystems continue to be vulnerable to direct disturbance pressures, which can result in fragment and reduce in ecosystem functionality. The terrestrial vegetation extent and conditions remains largely similar to that identified in 2016, indicating that the vulnerability of these areas identified in 2016 is likely to also remain largely consistent. The minor changes in extent is assumed to be a result of updated mapping and different study area boundaries, as opposed to any substantial changes to the physical footprint as a result of human activities.

Changes in threatened terrestrial fauna were identified by species being present in 2021 database searches that were present in 2016 assessments. The records of these species on the database searches is likely due to updated understanding of habitat for the species as well as the result of further survey effort undertaken between 2016 and now, as opposed to habitats in the study area increasing in importance. The inclusion of these species on the database searches does not represent an increase in the vulnerability of the terrestrial fauna values to identified impacts and does not change the conclusions Jacobs identified in respect to vulnerability of the species to activities.

The social and economic factors of the study area also remain largely consistent between 2016 and 2021, indicating that the observation of future port activities (including expansion) having the potential to change the character of the communities and reduce their liveability remains applicable.

05.1.2 Marine-based port activities

The main marine activity of the ports is the disposal of maintenance dredge material, with direct disturbance by the placement dredge material having the potential to impact corals and seagrass. As identified by Jacobs, the environmental value of the GBR is well known and studied and the continued pressure that land based activities is having on the reef is recognised. Decreased water quality and increased sediment loads entering the reef from land based activities can directly impact the values of the reef. Water quality and the condition of seagrass and coral has remained consistent in the years between 2016 and 2021.

As with terrestrial values, the records of new marine species in the database searches in comparison to 2016 is likely due to updated understanding of habitat for the species as well as the result of further survey effort undertaken between 2016 and now. It is not likely to be reflective of the study area having gained a higher level of 'importance' for any particular threatened marine species. Jacobs (2016) identified that the study area provides general habitat for megafauna, but is not recognised as a significant area (for breeding, feeding, critical habitat etc.) for any megafauna. This conclusion remains accurate. The main threats to marine species from port activities remain consistent and there have been no significant impact on any marine fauna species since the Jacobs assessment despite consistent port operations. Consequently, the inclusion of new species on the database searches does not represent an increase in the vulnerability of the marine fauna values to identified impacts and does not change the conclusions Jacobs identified in respect to vulnerability and summary of importance.

05.2 Resilience

The Jacobs report identified that the main factor influencing the resilience of environmental values is the pressure these values face both in the present and in the future. Some values face numerous pressures,

which results in a lower resilience to the addition of new or increasing pressures. The high level pressures identified throughout the Jacobs report (land based activities and associated erosion, runoff, and pollution, port activities including dredging and material placement, and larger extreme weather events and climate change) remain consistent from 2016 to 2021.

Environmental values that are sensitive to a number of these pressures, such as coral, seagrass and water quality, have been monitored in the years between 2016 and 2021. Overall the health of these values remained largely consistent and declines have been in line with expected and identified pressures, including seagrass decline (and subsequent recovery) after tropical cyclones. This indicates that the assessment of resilience from 2016 is still appropriate in 2021.

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APPENDIX A: DATABASE SEARCHES

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