

Technical Memorandum

September 19, 2023



1. Introduction

1.1 Project overview

The Australian Department of Defence (DoD) is proposing to upgrade the Cocos (Keeling) Islands (CKI) airfield (referred to as 'the Project'). The airfield is a Commonwealth of Australia (Commonwealth) asset falling under the jurisdiction of the Department of Infrastructure, Transport, Regional Development and Communications and the Arts (DITRDCA) and managed by Toll Remote Logistics Pty Ltd (Toll). The CKI airport is available for both civilian and DoD operations. Upgrades to the CKI airfield are required to enable the Royal Australian Air Force (RAAF) to support P-8A Poseidon capability on the runway, reduce the safety risks associated with operating Code D aircraft on the airfield and address non-compliances identified by the Civil Aviation Safety Authority (CASA).

To support the delivery of the Project, ground disturbing works are required at the CKI airfield, Rumah Baru Port Precinct (Rumah Baru), Q-Station Precinct (Q-Station), Lot 3003 and Coastal Protection Area (Coastal Protection) (Figure 1, Attachment 1).

Proposed ground disturbing works required for the Project include:

- CKI airfield access road:
 - Construction of minor access road to the existing CKI airfield to accommodate proposed site works.
- Rumah Baru, Q-Station, Lot 3003 and Coastal Protection:
 - Materials Offloading Facility (MOF)
 - Storage and transfer of bulk materials, aggregate stockpiling and storage
 - Asphalt batch plant
 - Bitumen blending and heating
 - Temporary accommodation camp
 - Seawalls.

GHD Pty Ltd (GHD) was engaged by Fulton Hogan Construction Pty Ltd (Fulton Hogan) acting as the principal party to the Integrated Managing Contractor (IMC) to prepare a native vegetation clearing permit (NVCP) application and supporting document for clearing of native vegetation associated with the Project. This memorandum will support the NVCP application.

Proposed works at Rumah Baru and the Q-Station will meet the definition of, and the threshold of production or design capacity, for prescribed premises (under Schedule 1, Parts 1 and 2 of the Western Australian (WA) Environmental Protection Regulations [EP Regulations]). Fulton Hogan and GHD have met with Department of Water and Environmental Regulation (DWER) (meeting held 5 July 2022) to discuss the proposed works and the requirements for a works approval application and license. The requirement for an NVCP for the Project was not discussed at this meeting, however all necessary licensing and permit applications under Part V *Environmental Protection Act 1986* (EP Act) for the Project are intended to occur concurrently.

1.2 Purpose of this Memorandum

GHD has been engaged by Fulton Hogan to prepare an NVCP application and supporting document for submission to the DWER. This memorandum will support the NVCP application. The memorandum provides a summary of proposed clearing, land tenure and ownership, a description of the existing environment, avoidance and mitigation measures and an assessment of Project clearing against the Ten Clearing Principles as defined in Schedule 5 of the EP Act (Attachment 2) to support an NVCP application.

1.3 Limitations

This memorandum has been prepared by GHD for Fulton Hogan and may only be used and relied on by Fulton Hogan for the purpose agreed between GHD and Fulton Hogan as set out in Section 1.2 of this memorandum.

GHD otherwise disclaims responsibility to any person other than Fulton Hogan arising in connection with this memorandum. GHD also excludes implied warranties and conditions, to the extent legally permissible. The services undertaken by GHD in connection with preparing this memorandum were limited to those specifically detailed in the memorandum and are subject to the scope limitations set out in the memorandum.

The opinions, conclusions and any recommendations in this memorandum are based on conditions encountered and information reviewed at the date of preparation of the memorandum. GHD has no responsibility or obligation to update this memorandum to account for events or changes occurring subsequent to the date that the memorandum was prepared. The opinions, conclusions and any recommendations in this memorandum are based on assumptions made by GHD described in this memorandum. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this memorandum on the basis of information provided by Fulton Hogan and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the memorandum which were caused by errors or omissions in that information.

2. Methodology

2.1 Desktop assessment

A desktop assessment was undertaken to identify relevant flora, vegetation and fauna information pertaining to the proposed application area. The desktop assessment involved a review of:

- Previous reports relevant to the application area including:
 - AECOM Australia Pty Ltd (AECOM) (2019). Cocos (Keeling) Islands Airfield Upgrade Environmental Report. Unpublished report prepared for Department of Defence.
 - GHD Pty Ltd (GHD) (2009). Cocos (Keeling) Islands Airport Runway Refurbishment Project, Ecology Report. Unpublished report prepared for Attorney General's Department.
 - GHD (2010). Report for Cocos (Keeling) Islands Quarantine Station: Outline Development Plan. Unpublished report prepared for the Attorney-General's Department, May 2010. Perth, Australia.

- GHD (2020a). Cocos (Keeling) Island Airfield Upgrade – IMC – Design: Detailed Site Investigation. Unpublished report prepared for Fulton Hogan Construction, Western Australia.
 - GHD (2020b). Cocos (Keeling) Island Airfield Upgrade Environmental Report. Unpublished report prepared for Fulton Hogan Construction, Western Australia.
 - GHD (2021a). Flora and Fauna Survey – Airfield. Unpublished memorandum prepared for Fulton Hogan Construction, Western Australia.
 - GHD (2021b). Flora and Fauna Survey – Enabling Works Areas. Unpublished memorandum prepared for Fulton Hogan Construction Pty Ltd.
 - GHD (2022). Flora and Fauna Survey – Lot 3003. Unpublished report prepared for Fulton Hogan Construction, Western Australia.
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022). Protected Matters Search Tool (PMST) to identify communities and species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) potentially occurring within the application area.
 - The Department of Biodiversity, Conservation and Attractions (DBCA) *NatureMap* database for Threatened and Priority Ecological Communities (TECs and PECs) and flora and fauna species (including those listed under the *WA Biodiversity Conservation Act 2016* (BC Act) or as a Priority by the DBCA) previously recorded from the investigation areas (DBCA 2007–).
 - Government of Western Australia (GoWA) ArcGIS DataWA Layers. Accessed online from: **Data WA**. Accessed November 2022.

2.2 Field surveys

GHD (2021a, 2021b, 2022) conducted flora, vegetation and fauna surveys of the application area as follows:

- **Flora and fauna survey for the Airfield and Enabling Works Areas:** GHD senior ecologist Jordan Tindiglia (Flora collection licence: FB62000201) completed surveys of the investigation areas on the 8-11 September 2020 and 19-22 June 2021. The surveys were undertaken to identify and describe the dominant vegetation types, fauna habitats and their condition. Inventories of vascular flora and terrestrial vertebrate fauna species were also recorded at the time of survey.
- **Flora and fauna survey for Lot 3003 West Island:** GHD senior ecologist Angela Benkovic (Flora collection licence: FB62000080-2) completed a survey of Lot 3003 on 30 July to 2 August 2022. The survey was undertaken to identify and describe the dominant vegetation types, fauna habitats and their condition. Inventories of vascular flora and terrestrial vertebrate fauna species were also recorded at the time of survey.

The survey methodology employed by GHD (2021a, 2021b, 2022) was undertaken with reference to the WA Environmental Protection Authority (EPA) *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016) and *Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA 2020).

3. Clearing details and tenure

A breakdown of proposed clearing of native vegetation is provided in Table 1. Land tenure and zoning is summarised in Table 2.

Table 1 Proposed clearing

Project site	Area (ha)	Proposed extent of native vegetation clearing (ha)
CKI airfield access road	0.21	0.16
Rumah Baru	2.89	0.19
Q-Station	10.44	4.68
Lot 3003	1.69	1.62
Coastal Protection	0.58	0.36
Total application area and clearing of native vegetation (ha)	15.81	7.01

Table 2 Land tenure and zoning

Development envelope	Lot No.	Plan No.	Tenure	Vesting authority / interest holders	Zoning	Other info
CKI airfield access road	100	P18500	Freehold Land	Cocos (Keeling) Islands Shire	Industrial	
Rumah Baru	100	P18500	Freehold Land	Cocos (Keeling) Islands Shire / DITRDCA	General Rural, Public Purpose: Marina	
Q-Station	327	P219651	Crown Land	Commonwealth of Australia	Special Use 1	
Lot 3003	3003	P044688	Freehold Land	Commonwealth of Australia	Special Use: Residential, Speical Use 9	Reserve 47378
Coastal Protection	342	P042274	Freehold Land	Cocos (Keeling) Islands Shire	General Rural	Reserve 47727




4. Existing environment




The application area is located on the West Island of CKI, approximately 2,175 km north-west of Australia. The main townsite on West Island is located 1.3 km south-east of the Q-Station and 3.2 km south of Rumah Baru. The Australian Exclusive Economic Zone (EEZ) is a Commonwealth Marine Area which surrounds West Island.

4.1 Vegetation types and condition

Six vegetation types have been mapped across the application area during the most recent flora and fauna surveys (Table 3, GHD 2021a, 2021b, 2022 and Figures 2 and 3, Attachment 1). Vegetation ranges in condition from Good to Completely Degraded. The vegetation largely lacked structural diversity and weed incursion was noted at most locations. Areas cleared of vegetation make up 2.90 ha of the application area.

Table 3 Vegetation types within the application area

Vegetation type	Description	Location	Area & status	Representative photograph
Mixed Trees	Sparsely spread <i>Cocos nucifera</i> and isolated clumps/stands of trees usually comprising only one or two species over grasslands.	CKI airfield access, Q Station.	4.71 ha Native vegetation	
Grasslands	Maintained lawn is prevalent across West Island. At the airport, the bitumen runway is buffered by lawn. This lawn grades from regularly mown to areas less maintained to adjacent native vegetation. Grassed areas at Q-Station, Rumah Baru and Mahoon Road are also maintained (although less frequently compared to the airport).	CKI airfield access, Q-Station, Rumah Baru.	5.86 ha Non-native	
Beach / Tidal zone	Areas devoid of vegetation and comprising bare sands and shingle.	Rumah Baru.	0.02 ha Non-native	

Vegetation type	Description	Location	Area & status	Representative photograph
Cocos closed to open forest	<i>Cocos nucifera</i> open forest over <i>Scaevola taccada</i> and <i>Morinda citrifolia</i> tall closed shrubland over * <i>Turnera ulmifolia</i> low open shrubland.	CKI airfield access, Rumah Baru, Lot 3003.	1.94 ha Native vegetation	
Occasional natives over weeds	Occasional isolated occurrences of <i>Cocos nucifera</i> and/ or <i>Casuarina equisetifolia</i> over various grassy and herbaceous weeds, however * <i>Tridax procumbens</i> , * <i>Cynodon arcuatus</i> and * <i>Cyanthillium cinereum</i> were dominant.	Lot 3003.	0.01 ha Native vegetation	
Shrubland (Disturbed)	<i>Pemphis acidula</i> , <i>Caesalpinia bonduc</i> tall to mid shrubland over <i>Fimbristylis cymosa</i> , <i>Ipomoea pes-caprae</i> and * <i>Stachytarpheta jamaicensis</i> .	Coastal Protection	0.36 ha Native vegetation	

4.2 Flora

Overall, species diversity on CKI is considered low and the isolated location of CKI is likely to contribute to reduced diversity (GHD 2021a, 2021b, 2022). Renvoize (1979) noted that low habitat diversity of CKI has led to a flora characterised by very low endemism with indigenous taxa of pantropical or Indo-Pacific distribution dominating. Only one endemic species of flora is recorded from CKI, *Pandanus tectorius* var. *cocosensis*; this species has not been recorded during any of the surveys (GHD 2021a, 2021b, 2022). No listed flora species were recorded within the application area.

Fifty one flora taxa were recorded from the application area (Table 4). This total included 31 introduced (weed) species and 20 native species. No EPBC Act, BC Act DBCA listed species were identified in the application area.

Table 4 Flora species recorded within the application area

Family	Taxon	Status
Aizoaceae	<i>Sesuvium portulacastrum</i>	
Amaranthaceae	<i>Alternanthera bettzichiana</i>	*
Arecaceae	<i>Cocos nucifera</i>	
Asteraceae	<i>Ageratum conyzoides</i>	*
Asteraceae	<i>Chromolaena odorata</i>	*, DP

Family	Taxon	Status
Asteraceae	<i>Cyanthillium cinereum</i>	*
Asteraceae	<i>Emilia sonchifolia</i>	*
Asteraceae	<i>Melanthera biflora</i>	
Asteraceae	<i>Tridax procumbens</i>	*
Boraginaceae	<i>Argusia argentea</i>	
Calophyllaceae	<i>Calophyllum inophyllum</i>	*
Casuarina	<i>Casuarina equisetifolia</i>	
Combretaceae	<i>Terminalia catappa</i>	
Convolvulaceae	<i>Ipomoea pes-caprae</i>	
Convolvulaceae	<i>Ipomoea violacea</i>	
Cyperaceae	<i>Cyperus javanicus</i>	
Cyperaceae	<i>Cyperus stolonifera</i>	
Cyperaceae	<i>Fimbristylis cymosa</i>	
Euphorbiaceae	<i>Euphorbia cyathophora</i>	*
Euphorbiaceae	<i>Euphorbia hirta</i>	*
Fabaceae	<i>Caesalpinia bonduc</i>	
Fabaceae	<i>Desmodium triflorum</i>	*
Fabaceae	<i>Macroptilium atropurpureum</i>	*
Fabaceae	<i>Stylosanthes</i> sp.	*
Goodeniaceae	<i>Scaevola taccada</i>	
Hernandiaceae	<i>Hemandia nymphaefolia</i>	
Lauraceae	<i>Cassytha filiformis</i>	
Lythraceae	<i>Pemphis acidula</i>	
Malvaceae	<i>Triumfetta repens</i>	*
Nyctaginaceae	<i>Boerhavia diffusa</i>	*
Passifloraceae	<i>Turnera ulmifolia</i>	*
Plantaginaceae	<i>Veronia cinerea</i>	*
Poaceae	<i>Cenchrus ciliaris</i>	*
Poaceae	<i>Cenchrus echinatus</i>	*
Poaceae	<i>Chloris barbata</i>	*
Poaceae	<i>Cynodon arcuatus</i>	*
Poaceae	<i>Cynodon dactylon</i>	*
Poaceae	<i>Cynodon radiates</i>	*
Poaceae	<i>Digitaria mariannensis</i>	*
Poaceae	<i>Eleusine indica</i>	*
Poaceae	<i>Eragrostis amabilis</i>	*
Poaceae	<i>Eragrostis elongata</i>	*
Poaceae	<i>Stenotaphrum micranthum</i>	*
Rhizophoraceae	<i>Rhizophora apiculata</i>	
Rubiaceae	<i>Morinda citrifolia</i>	
Rubiaceae	<i>Oldenlandia corymbosa</i>	*




Family	Taxon	Status
Rubiaceae	<i>Spermacoce assurgens</i>	*
Rubiaceae	<i>Spermacoce remota</i>	*
Sapindaceae	<i>Dodonaea viscosa</i>	
Surianaceae	<i>Suriana maritima</i>	
Verbenaceae	<i>Stachytarpheta jamaicensis</i>	*



* indicates introduced species, DP= Declared Plant under the *Biosecurity and Agriculture Management Act 2007*

4.3 Fauna habitats

Five fauna habitat types were identified within the application area during the most recent flora and fauna surveys (Table 5, GHD 2021a, 2021b, 2022 and Figure 4). Overall, the fauna habitat types recorded from the application area are well represented across West Island.

Table 5 Fauna habitats within the application area

Fauna habitat	Value	Location	Area & Status	Representative photograph
Grasslands	<p>This habitat has been cleared, is highly modified and comprises introduced grasses and herbs. The habitat provides low value to fauna as no structural diversity and limited cover.</p> <p>This habitat may provide foraging habitat for listed species including Barn Swallow (<i>Hirundo rustica</i>), Yellow Wagtail (<i>Motacilla flava</i>) and Grey Wagtail (<i>Motacilla cinerea</i>).</p>	CKI airfield, Q Station, Rumah Baru,	5.86 ha Non-native	
Beach	<p>This habitat is a narrow strip of sand that lies between other vegetated areas and lagoon/marine areas. It contains scattered vegetation (shrubs and palms), with vegetative debris, (e.g. branches coconuts etc.).</p> <p>This habitat has low value due to the adjacent anthropogenic usage (e.g. public boat ramp, passenger ferry terminal).</p> <p>This habitat may provide foraging habitat for listed species including Barn Swallow and Yellow Wagtail.</p>	Rumah Baru.	0.02 ha Non-native	
Mixed Shrublands and Trees	<p>This habitat contains areas of shrubland and trees (e.g. Coconut Palms). This habitat is varied and can range from monocultures of Coconut Palms to closed forest with increased structural layers and diversity. Canopy cover is generally high and this habitat tends to open up beneath the canopy, comprising a tangle of branches and trunks. Abundant leaf litter is present, with fallen branches and occasional small hollows.</p> <p>This habitat may provide nesting habitat for listed species including Lesser Frigatebird (<i>Fregata ariel</i>), Great Frigatebird (<i>Fregata minor</i>), Oriental Cuckoo (<i>Cuculus saturatus</i>).</p> <p>This habitat may provide foraging habitat for listed species including Barn</p>	CKI airfield, Rumah Baru, Lot 3003.	1.94 ha Native vegetation	

Fauna habitat	Value	Location	Area & Status	Representative photograph
	Swallow, Yellow Wagtail and Grey Wagtail			
Isolated mixed trees over grasslands	This habitat is highly modified and comprises scattered or isolated stands of trees with minimal to no understorey. Leaf litter and branches may be present at the base of some tree stands. The habitat provides low value to fauna. It may be used by bird species for foraging and may also provide some nest habitat. This habitat is unlikely to be used by significant fauna.	CKI airfield, Q Station, Lot 3003.	4.72 ha Native vegetation	
Shrubland	This habitat contains areas of shrubland with isolated/scattered trees. The habitat provides low value to fauna as it has limited structural diversity, but provides cover (i.e. leaf litter and understorey vegetation). The habitat may be used by avian and ground dwelling species for foraging and nesting. This habitat may provide foraging habitat for listed species including Barn Swallow, Yellow Wagtail and Grey Wagtail.	Coastal Protection	0.36 ha Native vegetation	

4.4 Fauna

The diversity of terrestrial fauna on West Island is limited, largely due to the lack of diversity in habitats as well as human impact. While there was a lack of habitat diversity recorded from the application area, the habitats present provide likely foraging habitat for the fauna species recorded during the survey. Eleven fauna species were recorded across the application area (Table 6). No significant fauna species were recorded within the application area during the surveys (GHD 2021a, 2021b, 2022). However, the habitats present within the application area may provide nesting and foraging habitat for a number of listed species.

Table 6 Fauna species recorded within the application area

Species	Common name
<i>Gygis alba</i>	White tern
<i>Egretta sacra</i>	Eastern reef egret
<i>Nycticorax caledonicus</i>	Nankeen night heron
<i>Gallus varius</i>	Green jungle fowl
<i>Cardisoma carnifex</i>	Land crab
<i>Ocypode ceratophthalma</i>	Horn-eyed ghost crab
<i>Coenobita perlatus</i>	Red hermit crab
<i>Coenobita rugosa</i>	Tawny hermit crab
<i>Geograpsus crinipes</i>	Yellow nipper
<i>Grapsus tenuicrustatis</i>	Thin-shelled rock crab / Natal lightfoot crab
<i>Uca</i> sp.	Fiddler crab

5. Measures to avoid, minimise, reduce clearing impacts

Ground disturbing works for the Project will be undertaken using heavy machinery, graders and excavators. The Project design has sought to reduce earthworks and minimise clearing of native vegetation as much as possible. Where possible, the application area is located in areas that have been previously cleared or have sparse vegetation. Temporary access tracks, construction storage, and storage/stockpile locations have been contained within the application area, away from native vegetation as much as possible.

5.1 Environmental management

Fulton Hogan have prepared an Environmental Management Plan (EMP) to ensure the environmental performance of the Project, which includes managing any potential impacts at Rumah Baru, Q-Station, Lot 3003, Coastal Protection, and the airfield access road (Fulton Hogan 2021).

The EMP outlines overall management measures for the Project and contains environmental risk control plans for:

- Flora and fauna (terrestrial and marine)
- Erosion and sediment control
- Water quality resources (surface water and groundwater management, dewatering management)
- Hazardous substances (hydrocarbon and chemical storage, handling and spills)
- Contaminated land
- Asbestos
- Noise and vibration
- Dust, noise, vibration and odour
- Heritage and archaeological
- Poly-fluoroalkyl substances (PFAS) contamination
- Biosecurity
- Waste
- Plant and equipment.

6. Assessment outcomes and discussion

To support the NVCP application, GHD has completed an assessment of the Project against the Ten Clearing Principles as defined in Schedule 5 of the EP Act (Attachment 2). The assessment of clearing was undertaken in accordance with *A Guide to the Assessment of Application to Clear Native Vegetation Under Part V Division 2 of the Environmental Protection Act 1986* (DER 2014).

7. References

AECOM Australia Pty Ltd (AECOM) (2019). Cocos (Keeling) Islands Airfield Upgrade Environmental Report. Unpublished report prepared for Department of Defence.

Australian Marine Parks (2022). Cocos (Keeling) Islands Marine Park. Retrieved November 2022, available at [amp-iot-cki-values-statements-web.pdf \(parksaustralia.gov.au\)](#)

Department of Biodiversity, Conservation and Attractions (DBCA) (2007–). NatureMap: Mapping WA's Biodiversity, retrieved November 2022, from <http://naturemap.dpaw.wa.gov.au/default.aspx/>.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022). Environmental Protection and Biodiversity Conservation Act 1999 Protected Matters Search Tool Results, retrieved July 2022, from <https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool>

Department of Water and Environmental Regulation (2014). A Guide to the Assessment of Application to Clear Native Vegetation Under Part V Division 2 of the Environmental Protection Act 1986. Department of Environment Regulation, WA.

Environmental Protection Authority (EPA) (2016). Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment, EPA, WA.

EPA (2020). Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment, EPA, WA.

Falkland, A. C (1994). Climate, Hydrology and Water Resources of the Cocos (Keeling) Islands. Accessed on 13 June 2018: <https://pdfs.semanticscholar.org/c9c0/b5eb24614d0e156158ce26b5eacdb2cac684.pdf>

Fulton Hogan (2021). Environmental Management Plan Delivery Phase R8129 – Cocos (Keeling) Islands Airfield Upgrade Project. Report prepared for Department of Defence, Australia.

GHD Pty Ltd (GHD) (2009). Cocos (Keeling) Islands Airport Runway Refurbishment Project, Ecology Report. Unpublished report prepared for Attorney General's Department.

GHD (2010). Report for Cocos (Keeling) Islands Quarantine Station: Outline Development Plan. Unpublished report prepared for the Attorney-General's Department, May 2010. Perth, Australia.

GHD (2020a). Cocos (Keeling) Island Airfield Upgrade – IMC – Design: Detailed Site Investigation. Unpublished report prepared for Fulton Hogan Construction, Western Australia.

GHD (2020b). Cocos (Keeling) Island Airfield Upgrade Environmental Report. Unpublished report prepared for Fulton Hogan Construction, Western Australia.

GHD (2021a). Flora and Fauna Survey – Airfield. Unpublished memorandum prepared for Fulton Hogan Construction, Western Australia.

GHD (2021b). Flora and Fauna Survey – Enabling Works Areas. Unpublished memorandum prepared for Fulton Hogan Construction, Western Australia.

GHD (2022). Flora and Fauna Survey – Lot 3003. Unpublished report prepared for Fulton Hogan Construction, Western Australia.

GoWA (2022). ArcGIS DataWA Layers. Accessed online from: [Data WA](#). Accessed November 2022.

Jacobson, G (1976). The freshwater lens on Home Island in the Cocos (Keeling) Islands, BMR Journal of Australian Geology and Geophysics (1976) pages 335-343.

O2 Marine (2020). GHD Cocos Island Benthic Habitat Survey. Unpublished report prepared for GHD on behalf of Fulton Hogan, 2020. Perth, Australia.

Renvoize SA 1979, The origins of Indian Ocean floras, in Plants and Islands (ed. D Bramwell), pp 107-129, Academic Press, London.

Williams DG 1994, Vegetation and Flora of the Cocos (Keeling) Islands. National Museum of Natural History, Smithsonian Institution, Washington DC, USA.

Woodroffe CD and Berry PF 1994, *Scientific Studies in the Cocos (Keeling) Islands: An Introduction*.
National Museum of Natural History, Smithsonian Institution, Washington DC, USA.

Attachment 1

Figures

- Figure 1* *NVCP application area*
- Figure 2* *Vegetation types and condition*
- Figure 3* *Native vegetation*
- Figure 4* *Fauna habitats*
- Figure 5* *Australia's EEZ and Territorial Sea*
- Figure 6* *CKI Marine Park*



Paper Size ISO A3
 at Scale: 1:4,000
 0 100
 Meters



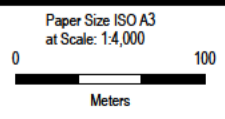
Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: CKIG94 KJ

Fulton Hogan
 Cocos Keeling Island Airfield Project

Project No. 12525136
 Revision No. 2
 Date 7/09/2023

NVCP Application Area

FIGURE 1



Fulton Hogan
Cocos Keeling Island Airfield Project

Project No. 12525136
Revision No. 2
Date 8/09/2023

Vegetation Type and Condition

FIGURE 2





- Legend**
- NVCP Application Boundary
 - Fauna Habitat**
 - Beach
 - Grasslands
 - Isolated mixed trees over grasslands
 - Mixed shrublands and trees
 - Shrubland
 - Cleared

Paper Size ISO A3
at Scale: 1:4,000

0 100
Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: CKIG94 KJ

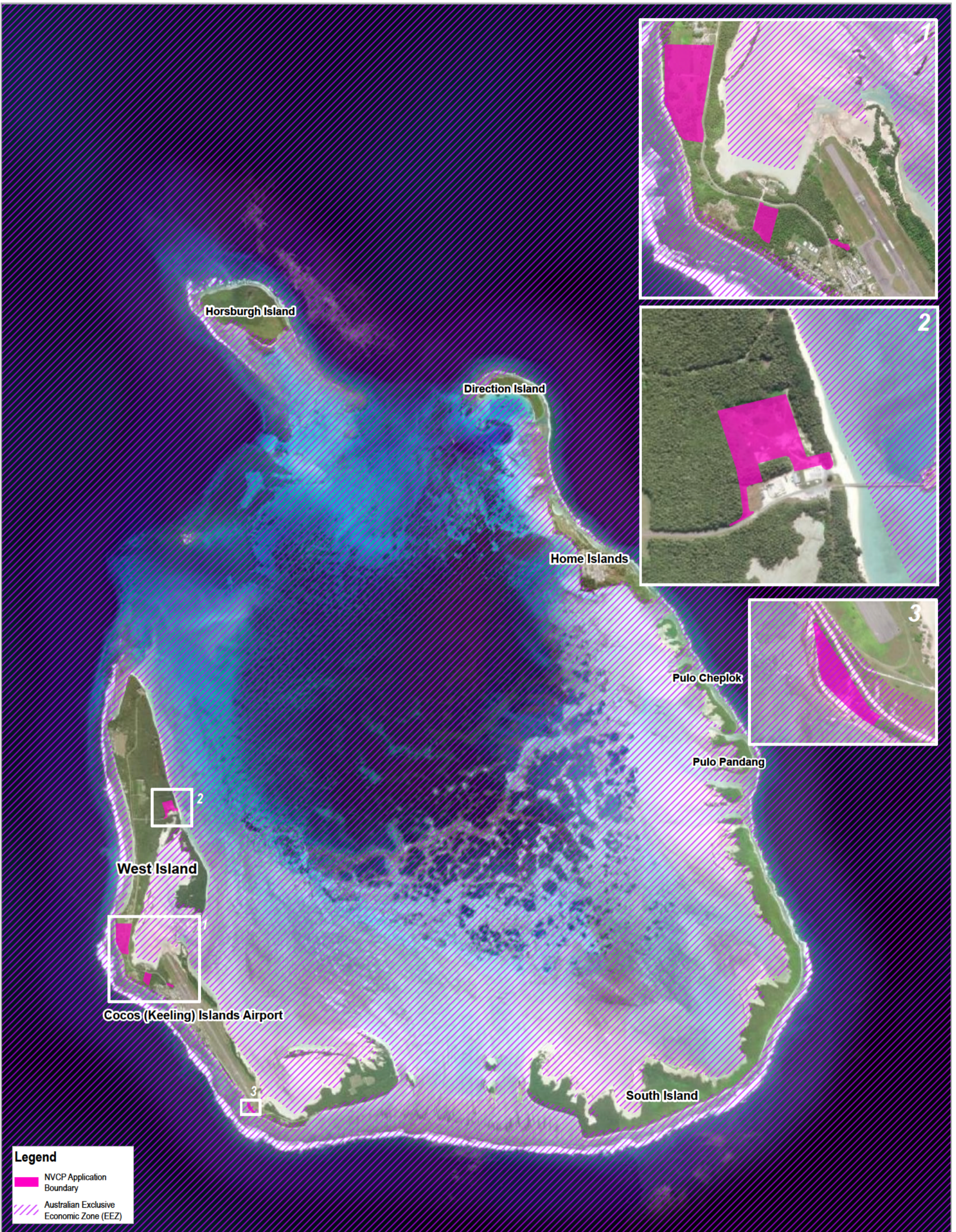


Fulton Hogan
Cocos Keeling Island Airfield Project

Project No. 12525136
Revision No. 2
Date 8/09/2023

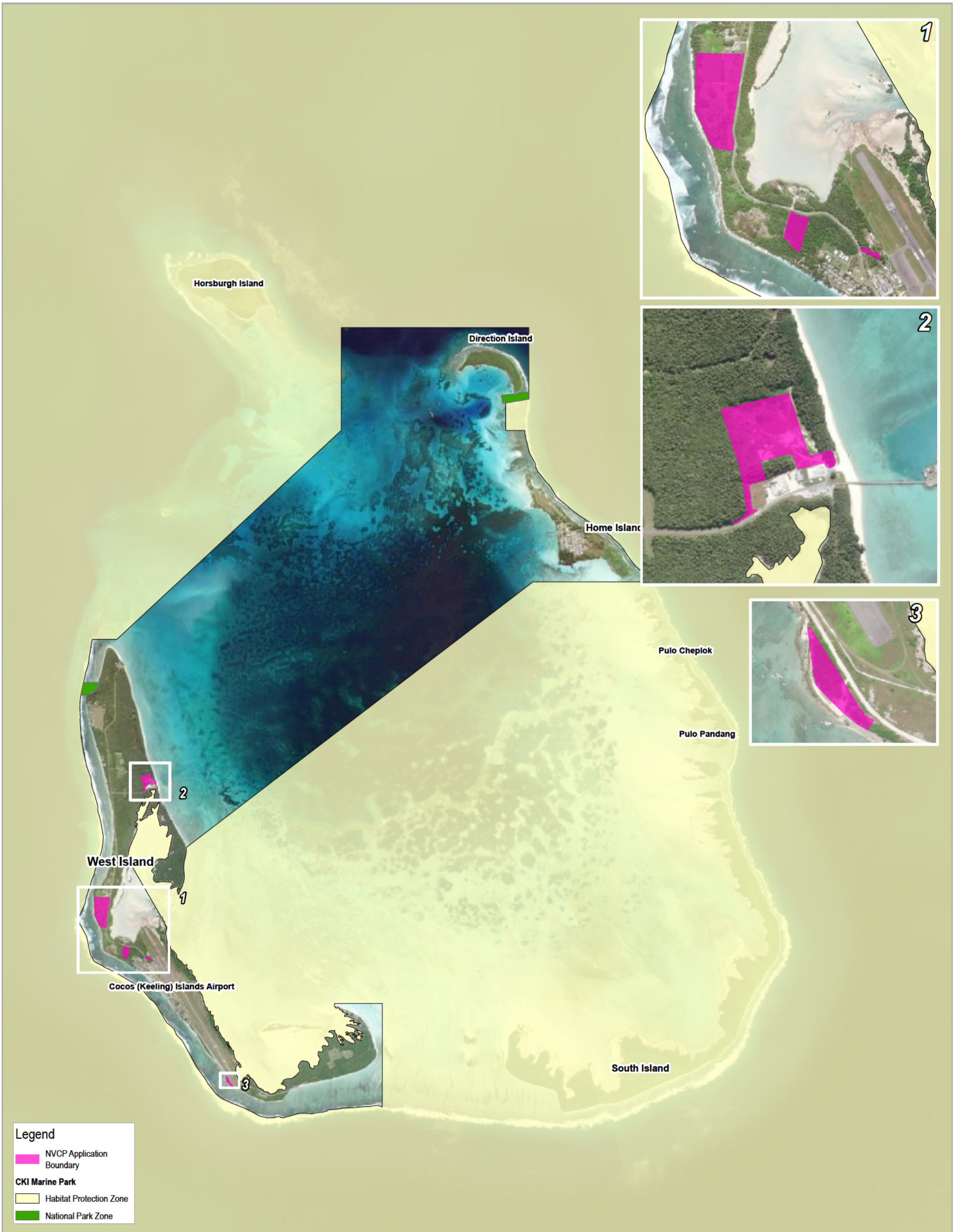
Fauna Habitats

FIGURE 4



Australia's EEZ and Territorial Sea

FIGURE 5



Legend

- NVCP Application Boundary
- CKI Marine Park**
- Habitat Protection Zone
- National Park Zone

Paper Size ISO A3
at Scale: 1:50,000
0 0.6 1.2 1.8
Kilometers



Fulton Hogan
Cocos Keeling Island Airfield Project

Project No. 12525136
Revision No. 0
Date 8/09/2023

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: CKIG94 KJ

Cocos Keeling Islands Marine Park

FIGURE 6

Attachment 2

Ten Clearing Principles Assessment

Table 7 Ten Clearing Principle Assessment

Clearing principle	Assessment of impacts	Outcomes
<p>(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.</p>	<p>The application area comprises up to 7.01 ha of native vegetation ranging in condition from Very Good to Completely Degraded. The vegetation largely lacked structural diversity and weed incursion was noted at most locations (GHD 2021a, 2021b, 2022).</p> <p>Six vegetation types have been mapped across the application area during the most recent flora and fauna surveys (GHD 2021a, 2021b, 2022). Overall, the vegetation types mapped within the application area are representative of the vegetation across West Island and align with those previously identified and described by AECOM (2019) and GHD (2010). Woodroffe and Berry (1994) state that the 'human impact on the CKI has been most devastating on the South Keeling Islands (the southern atoll), where the vegetation has been almost totally altered to coconut plantation.' This is also supported by Williams (1994) who stated that CKI 'pre-settlement vegetation has been extensively modified for coconut plantations, except for certain parts of North Keeling'. Based on these statements, it could be suggested that much of the vegetation recorded during the surveys is representative of highly modified vegetation as <i>Cocos nucifera</i> was a common species, recorded from the application area.</p> <p>Desktop searches of EPBC PMST and <i>NatureMap</i> (Attachment 3) identified the presence/potential presence of 302 flora taxa and 527 fauna species within 10 km of the application area. Only three DBCA listed Priority flora species were identified from desktop searches (EPBC PMST, <i>NatureMap</i>) as present/potentially present within the application area. Fifty one flora taxa were recorded from the application area (2021a, 2021b, 2022). This total included 31 introduced (weed) species and 20 native species. No EPBC Act, BC Act or DBCA listed flora species were identified in the application area.</p> <p>Five fauna habitat types were identified during surveys (GHD 2021a, 2021b, 2022). The fauna habitats recorded during the surveys align closely with the vegetation types described, as well as those previously identified and described by AECOM (2019) and GHD (2009).</p> <p>Desktop searches (EPBC PMST, <i>NatureMap</i>) identified the presence/potential presence of 19 significant fauna taxa within 10 km of the application area. No significant fauna species were recorded within the application area during GHD (2021a, 2021b, 2022) surveys. However, the habitats present within the application area may provide nesting and foraging habitat for a number of listed species.</p> <p>Overall, species diversity on CKI is considered low and the isolated location of CKI is likely to contribute to reduced diversity. Vegetation within the application area is highly modified and well represented across the West Island. Native vegetation proposed to be cleared for the Project does not comprise a high level of biological diversity.</p>	<p>Proposed clearing is not at variance to this Principle.</p>
<p>(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.</p>	<p>The application area comprises up to 7.01 ha of native vegetation which is considered suitable as fauna habitat ranging in condition from Very Good to Completely Degraded. Five fauna habitats were recorded across the application area. Overall, the fauna habitat types recorded are representative of the habitats across West Island.</p> <p>Eleven fauna species were recorded across the application area. No significant fauna species were recorded within the application area during the surveys (GHD 2021a, 2021b, 2022). However, the habitats present within the application area may provide nesting and foraging habitat for significant species.</p> <p>The vegetation proposed to be cleared is not considered to represent fauna habitat necessary for the maintenance of significant fauna species. The fauna habitat types recorded within the application area are not exclusive to the area and are well represented across the West Island. Significant fauna species may infrequently visit the application area, however would unlikely be reliant on any of the habitat that occurs within the area. It is considered unlikely that the application area represents key habitat for any significant fauna species.</p>	<p>Proposed clearing is not at variance to this Principle.</p>

<p>(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.</p>	<p>No EPBC Act or WA BC Act were identified from desktop searches (EPBC PMST, <i>NatureMap</i>) as present/potentially present within the application area. No listed flora species were recorded within the application area during surveys (GHD 2021 a, 2021 b, 2022). Native vegetation proposed to be cleared for the Project is not necessary for the continued existence of rare flora.</p>	<p>Proposed clearing is not at variance to this Principle.</p>
<p>(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.</p>	<p>The application area does not impact any State or Commonwealth listed Threatened Ecological Communities. Vegetation proposed to be cleared for the Project is not representative of a significant ecological community.</p>	<p>Proposed clearing is not at variance to this Principle.</p>
<p>(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.</p>	<p>Overall, the vegetation types recorded in the application area are representative of the vegetation across West Island. Woodroffe and Berry (1994) state that the 'human impact on the CKI has been most devastating on the South Keeling Islands (the southern atoll), where the vegetation has been almost totally altered to coconut plantation.' This is also supported by Williams (1994) who stated that CKI 'pre-settlement vegetation has been extensively modified for coconut plantations, except for certain parts of North Keeling'. Based on these statements, it could be suggested that much of the vegetation recorded during the survey is representative of highly modified vegetation as <i>Cocos nucifera</i> was a common species, recorded from both investigation areas.</p> <p>Vegetation proposed to be cleared for the Project is not considered significant as a remnant in an area that has been extensively cleared.</p>	<p>Proposed clearing is not at variance to this Principle.</p>
<p>(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.</p>	<p>A search of the EPBC Act PMST did not identify any Wetlands of International Importance (i.e. Ramsar wetlands) within the application area. The closest Ramsar site is the Pulu Keeling National Park, on the uninhabited Northern atoll the North Keeling Island. It is not expected that the Project will have any impact on the Pulu Keeling National Park.</p> <p>No Nationally Important Wetlands are located within or in the vicinity of the application area.</p> <p>The native vegetation units mapped within the application area are not representative of vegetation growing in, or in association with, an environment associated with a watercourse or wetland.</p>	<p>Proposed clearing is not at variance to this Principle.</p>
<p>(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.</p>	<p>Investigations on CKI have determined that greater than 79% of the island's soil comprises sand, therefore acid generation is not considered to be likely (GHD 2010) and Acid Sulphate Soil (ASS) presence is considered to be very low risk of occurrence within the application area.</p> <p>Three contaminated sites are registered on the West Island:</p> <ul style="list-style-type: none"> — Lot 345 on Deposited Plan 42274 (site no. 76321) classified as 'Remediated for restricted use' adjacent to the CKI Airfield — Lot 336 on Plan 27316 (site no. 75537) classified as 'Contaminated – remediation required' located within the West Island settlement area — Lot 337 on Deposited Plan 27316 (site no. 75893) classified as 'Remediated for restricted use' located within the West Island settlement area <p>At Lot 345 a contamination assessment was carried out in preparation for the removal of site infrastructure and planned construction. The assessment found fragments of asbestos containing material (ACM) to be present in soils at quantities in excess of those specified in 'Guidelines for</p>	<p>Proposed clearing is not likely to be at variance to this Principle.</p>

	<p>the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia' (GHD 2020b).</p> <p>Part of the application area is located approximately 100 m north of Lot 345. Prior to construction a contaminated sites management plan will be developed to manage any potential risks associated with contamination.</p> <p>Clearing of native vegetation in the application area may result in localised soil erosion and sedimentation. Standard erosion and dust management control measures will be implemented during construction to reduce the incidence of wind erosion and sedimentation.</p> <p>With appropriate management controls in place, the Project is unlikely to cause an appreciable increase in land degradation.</p>	
(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	<p>The application area is not located within any DBCA managed lands or conservation areas. The EPBC Act PMST report identified one Commonwealth Marine Area, Australia's Exclusive Economic Zone (EEZ) and Territorial Sea, which surrounds the CKI. The Commonwealth Marine Area stretches from 3 to 200 nautical miles from the coast. The application area does not intersect the boundary of the EEZ and Territorial Sea (refer Figure 5 Attachment 1).</p> <p>The CKI Marine Park extends from most of the islands' shoreline to the limit of Australia's EEZ, approximately 200 nautical miles from shore. Within the Southern Atoll, the CKI Marine Park contains two zones, the National Park Zone and the Habitat Protection Zone, as well as areas not part of the marine park and areas associated with the Port of CKI. The application area does not intersect the CKI Marine Park (Figure 6, Attachment 1).</p> <p>Any potential indirect impacts to the Commonwealth Marine Area and the CKI Marine Park can be appropriately managed via the Project EMP.</p>	Proposed clearing is not likely to be at variance to this Principle.
(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	<p>The CKI consists of a dual-aquifer system with the upper coral sediments of primary importance where freshwater lenses are found to occur (Falkland 1994). CKI West Island comprises one freshwater lens located at the south end of the island below the Airport (West Island Airfield Lens) and another located in the central to northern portion of the island below the Q-Station (Falkland 1994). Rumah Baru is not located over a freshwater lens (Falkland 1994).</p> <p>Freshwater lenses are the main source of potable water on the CKI and are pumped through a series of water galleries within the Airfield to feed Water Corporation's municipal supply network (GHD 2020b). Measurements of water-levels in existing wells, and levelling with respect to mean tide-level, indicate that theoretically the freshwater lens is up to 15 m thick, and averages about 10 m over the island (Falkland 1994). The estimated recharge rate at the West Island Airfield Lens is around 950 mm/year, which is around 49 percent of the average annual rainfall.</p> <p>Within the airfield groundwater was encountered between 0.57 to 2.4 m bgl in fine to medium grained sands (GHD 2020a). Groundwater flow direction under post wet season conditions (July 2020), was interpreted to radially flow outward from the runway apron of the site towards the CKI Lagoon (north-east) and the shoreline (south-west). The groundwater flow direction is likely to be variable and tidally influenced (GHD 2020a).</p> <p>Clearing associated with the Project has the potential to reduce the quality of groundwater, specifically the freshwater lens as a result of accidental release of hazardous materials and subsequent contamination. Typically, surface runoff is not experienced on CKI due to the porous nature of the substrate and the rate of infiltration. Runoff is generally confined to areas of pavement or hardstand, which infiltrates into the groundwater lens once it reaches a natural surface. Erosion and sediment controls will be limited to areas where there is an impervious surface, stockpiles or risk of aeolian erosion and dust generation (Fulton Hogan 2021).</p> <p>A Project EMP has been prepared to ensure potential impacts to surface or underground water are managed in compliance with contractual and legislative requirements to protect the existing water quality of the freshwater lens.</p>	Proposed clearing is not likely to be at variance to this Principle.
(j) Native vegetation should not be cleared if	Surface water management measures will be implemented as part of Project design to maintain existing drainage in the application area and to avoid impact to adjacent native vegetation through waterlogging.	Proposed clearing is not likely to be at

<p>clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.</p>	<p>Road runoff and storm water will be managed via the EMP with the objective of maintaining local hydrological regimes through enabling infiltration close to the point of collection. An Erosion and Sediment Control Plan will be prepared in accordance with International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control Manual 2008 and local context to manage potential erosion and sedimentation.</p>	<p>variance to this Principle.</p>
---	---	------------------------------------

Attachment 3

Desktop searches



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Nov-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	15
Listed Migratory Species:	27

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	19
Commonwealth Heritage Places:	10
Listed Marine Species:	26
Whales and Other Cetaceans:	24
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	2
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	16
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area

[\[Resource Information \]](#)

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name

EEZ and Territorial Sea

Listed Threatened Species

[\[Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name

Threatened Category

Presence Text

BIRD

[Charadrius leschenaultii](#)

Greater Sand Plover, Large Sand Plover
[877]

Vulnerable

Species or species
habitat known to
occur within area

[Hypotaenidia philippensis andrewsi](#)

Buff-banded Rail (Cocos (Keeling)
Islands), Ayam Hutan [88994]

Endangered

Species or species
habitat known to
occur within area

[Phaethon lepturus fulvus](#)

Christmas Island White-tailed Tropicbird,
Golden Bosunbird [26021]

Endangered

Species or species
habitat may occur
within area

[Pterodroma arminjoniana](#)

Round Island Petrel, Trinidad Petrel
[89284]

Critically Endangered

Species or species
habitat may occur
within area

MAMMAL

[Balaenoptera borealis](#)

Sei Whale [34]

Vulnerable

Species or species
habitat likely to occur
within area

[Balaenoptera musculus](#)

Blue Whale [36]

Endangered

Species or species
habitat likely to occur
within area

Scientific Name	Threatened Category	Presence Text
-----------------	---------------------	---------------

[Balaenoptera physalus](#)

Fin Whale [37]

Vulnerable

Species or species habitat likely to occur within area

REPTILE

[Caretta caretta](#)

Loggerhead Turtle [1763]

Endangered

Species or species habitat likely to occur within area

[Chelonia mydas](#)

Green Turtle [1765]

Vulnerable

Species or species habitat likely to occur within area

[Dermochelys coriacea](#)

Leatherback Turtle, Leathery Turtle, Luth [1768]

Endangered

Species or species habitat likely to occur within area

[Eretmochelys imbricata](#)

Hawksbill Turtle [1766]

Vulnerable

Species or species habitat likely to occur within area

[Lepidochelys olivacea](#)

Olive Ridley Turtle, Pacific Ridley Turtle [1767]

Endangered

Species or species habitat likely to occur within area

[Natator depressus](#)

Flatback Turtle [59257]

Vulnerable

Species or species habitat likely to occur within area

SHARK

[Carcharodon carcharias](#)

White Shark, Great White Shark [64470]

Vulnerable

Species or species habitat may occur within area

[Sphyrna lewini](#)

Scalloped Hammerhead [85267]

Conservation Dependent

Species or species habitat likely to occur within area

Listed Migratory Species

[[Resource Information](#)]

Scientific Name

Threatened Category

Presence Text

Migratory Marine Birds

[Anous stolidus](#)

Common Noddy [825]

Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Breeding known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Breeding known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area
Sula dactylatra Masked Booby [1021]		Breeding known to occur within area
Sula leucogaster Brown Booby [1022]		Breeding known to occur within area
Sula sula Red-footed Booby [1023]		Breeding known to occur within area
Migratory Marine Species		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat likely to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Motacilla cinerea Grey Wagtail [642]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Unknown	
Commonwealth Land - [96003]	CKI
Commonwealth Land - [96004]	CKI
Commonwealth Land - [96005]	CKI
Commonwealth Land - [96008]	CKI
Commonwealth Land - [96020]	CKI
Commonwealth Land - [96002]	CKI
Commonwealth Land - [96009]	CKI
Commonwealth Land - [96015]	CKI
Commonwealth Land - [96016]	CKI
Commonwealth Land - [96014]	CKI
Commonwealth Land - [96010]	CKI
Commonwealth Land - [96017]	CKI
Commonwealth Land - [96011]	CKI
Commonwealth Land - [96012]	CKI

Commonwealth Land Name	State
Commonwealth Land - [96013]	CKI
Commonwealth Land - [96018]	CKI
Commonwealth Land - [96019]	CKI
Commonwealth Land - [96007]	CKI
Commonwealth Land - [96006]	CKI

Commonwealth Heritage Places [[Resource Information](#)]

Name	State	Status
Historic		
Administration Building Forecourt	EXT	Listed place
Direction Island (DI) Houses	EXT	Listed place
Government House	EXT	Listed place
Qantas Huts (former)	EXT	Listed place
RAAF Memorial	EXT	Listed place
Type 2 Residences	EXT	Listed place
Type T Houses Precinct	EXT	Listed place
West Island Elevated Houses	EXT	Listed place
West Island Housing Precinct	EXT	Listed place
West Island Mosque	EXT	Listed place

Listed Marine Species [[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text
Bird		
Anous stolidus		
Common Noddy [825]		Species or species habitat likely to occur within area
Ardenna pacifica as Puffinus pacificus		
Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Charadrius leschenaultii		
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Breeding known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Breeding known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area overfly marine area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat known to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area overfly marine area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Endangered Golden Bosunbird [26021]		Species or species habitat may occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area
Sula dactylatra Masked Booby [1021]		Breeding known to occur within area
Sula leucogaster Brown Booby [1022]		Breeding known to occur within area
Sula sula Red-footed Booby [1023]		Breeding known to occur within area
Fish		
Choeroichthys sculptus Sculptured Pipefish [66197]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Cosmocampus banneri Roughridge Pipefish [66206]		Species or species habitat may occur within area
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Micrognathus brevis thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
Phoxocampus belcheri Black Rock Pipefish [66719]		Species or species habitat may occur within area

Reptile

Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat likely to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Feresa attenuata Pygmy Killer Whale [61]		Species or species habitat may occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Indopacetus pacificus Longman's Beaked Whale [72]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima as Kogia simus Dwarf Sperm Whale [85043]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Lagenodelphis hosei Fraser's Dolphin, Sarawak Dolphin [41]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon ginkgodens Ginkgo-toothed Beaked Whale, Ginkgo-toothed Whale, Ginkgo Beaked Whale [59564]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Peponocephala electra Melon-headed Whale [47]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Stenella coeruleoalba Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area
Stenella longirostris Long-snouted Spinner Dolphin [29]		Species or species habitat may occur within area
Steno bredanensis Rough-toothed Dolphin [30]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Australian Marine Parks [\[Resource Information \]](#)

Park Name	Zone & IUCN Categories
Cocos (Keeling) Islands	Habitat Protection Zone (IUCN IV)
Cocos (Keeling) Islands	National Park Zone (IUCN II)

Extra Information

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Breeding, husbandry, slaughter and sale of goats	2004/1895	Controlled Action	Completed
Eco quad tours for West Island visitors and tourists	2010/5749	Controlled Action	Completed
Not controlled action			
Buffett Close Residential Development	2004/1887	Not Controlled Action	Completed
External Upgrade of House	2010/5387	Not Controlled Action	Completed
Infrasound Monitoring Station	2007/3390	Not Controlled Action	Completed
Oman Australia Cable Installation, WA	2021/8922	Not Controlled Action	Completed
Oman Australia Cable - Marine Route Survey	2020/8731	Not Controlled Action	Completed
Proposed Community Centre	2010/5306	Not Controlled Action	Completed
upgrade of House 11, William Keeling Crescent	2005/2447	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Upgrade of House 16 on William Keeling Crescent, a Cwlth owned house in Type T H	2006/2903	Not Controlled Action	Completed
Not controlled action (particular manner)			
Asbestos Removal from Various Buildings and Sites	2009/4887	Not Controlled Action (Particular Manner)	Post-Approval
Construction of a Power Station	2003/1177	Not Controlled Action (Particular Manner)	Post-Approval
Development of a small 25 bed, tented Eco Resort	2012/6284	Not Controlled Action (Particular Manner)	Post-Approval
Residential Development, Lot 101 Cocos (Keeling) Island	2011/5856	Not Controlled Action (Particular Manner)	Post-Approval
Translocation of T.gigas for breeding and release	2005/1958	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
Cocos West Island Seawater Desalination Plant	2022/9153	Referral Decision	Referral Publication

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact us](#) page.

[© Commonwealth of Australia](#)

Department of Climate Change, Energy, the Environment and Water

GPO Box 3090

Canberra ACT 2601 Australia

+61 2 6274 1111

TAXON	CLASS	CONS	KINGDOM
Tursiops aduncus	MAMMAL	MI	Animalia
Tursiops aduncus	MAMMAL	MI	Animalia
Tursiops aduncus	MAMMAL	MI	Animalia
Tursiops aduncus	MAMMAL	MI	Animalia
Tursiops aduncus	MAMMAL	MI	Animalia
Tursiops aduncus	MAMMAL	MI	Animalia
Cenchrus echinatus	MONOCOT		Plantae
Cenchrus echinatus	MONOCOT		Plantae
Sporobolus fertilis	MONOCOT		Plantae
Sonchus oleraceus	DICOT		Plantae
Oldenlandia corymbosa	DICOT		Plantae
Euphorbia hirta	DICOT		Plantae
Euphorbia prostrata	DICOT		Plantae
Cyanthillium cinereum	DICOT		Plantae
Breynia disticha	DICOT		Plantae
Leucaena leucocephala	DICOT		Plantae
Scoparia dulcis	DICOT		Plantae
Cenchrus ciliaris	MONOCOT		Plantae
Cynodon arcuatus	MONOCOT		Plantae
Casuarina equisetifolia subsp. equisetifolia	DICOT		Plantae
Macroptilium atropurpureum	DICOT		Plantae
Cyanthillium cinereum	DICOT		Plantae
Desmanthus virgatus	DICOT		Plantae
Lepidium virginicum	DICOT		Plantae
Macroptilium atropurpureum	DICOT		Plantae
Physalis angulata	DICOT		Plantae
Sauropus androgynus	DICOT		Plantae
Acalypha lanceolata var. lanceolata	DICOT	P1	Plantae
Cyanthillium cinereum	DICOT		Plantae
Megathyrsus maximus	MONOCOT		Plantae
Tridax procumbens	DICOT		Plantae
Crotalaria retusa	DICOT		Plantae
Turnera ulmifolia	DICOT		Plantae
Boerhavia diffusa	DICOT		Plantae
Boerhavia diffusa	DICOT		Plantae
Cyperus polystachyos	MONOCOT		Plantae
Eriochloa meyeriana	MONOCOT		Plantae
Ischaemum muticum	MONOCOT		Plantae
Sorghum bicolor	MONOCOT		Plantae
Cenchrus ciliaris	MONOCOT		Plantae
Ricinus communis	DICOT		Plantae
Digitaria setigera	MONOCOT		Plantae
Digitaria setigera	MONOCOT		Plantae
Spermacoce remota	DICOT		Plantae
Euphorbia hirta	DICOT		Plantae
Turnera ulmifolia	DICOT		Plantae
Vitex trifolia	DICOT		Plantae
Senna occidentalis	DICOT		Plantae
Passiflora foetida	DICOT		Plantae
Euphorbia prostrata	DICOT		Plantae
Dactyloctenium aegyptium	MONOCOT		Plantae
Phyla nodiflora	DICOT		Plantae
Dactyloctenium aegyptium	MONOCOT		Plantae
Sorghum bicolor	MONOCOT		Plantae
Sporobolus fertilis	MONOCOT		Plantae
Oldenlandia corymbosa	DICOT		Plantae
Chloris barbata	MONOCOT		Plantae

<i>Leucaena leucocephala</i>	DICOT	Plantae
<i>Phyllanthus debilis</i>	DICOT	Plantae
<i>Cenchrus ciliaris</i>	MONOCOT	Plantae
<i>Tridax procumbens</i>	DICOT	Plantae
<i>Casuarina equisetifolia</i>	DICOT	Plantae
<i>Eragrostis amabilis</i>	MONOCOT	Plantae
<i>Physalis angulata</i>	DICOT	Plantae
<i>Spermacoce remota</i>	DICOT	Plantae
<i>Cynodon dactylon</i>	MONOCOT	Plantae
<i>Stachytarpheta jamaicensis</i>	DICOT	Plantae
<i>Turnera ulmifolia</i>	DICOT	Plantae
<i>Desmanthus virgatus</i>	DICOT	Plantae
<i>Cynodon dactylon</i>	MONOCOT	Plantae
<i>Physalis angulata</i>	DICOT	Plantae
<i>Turnera ulmifolia</i>	DICOT	Plantae
<i>Oldenlandia corymbosa</i>	DICOT	Plantae
<i>Spermacoce remota</i>	DICOT	Plantae
<i>Imperata cylindrica</i>	MONOCOT	Plantae
<i>Euphorbia cyathophora</i>	DICOT	Plantae
<i>Eragrostis amabilis</i>	MONOCOT	Plantae
<i>Scoparia dulcis</i>	DICOT	Plantae
<i>Emilia sonchifolia</i>	DICOT	Plantae
<i>Ricinus communis</i>	DICOT	Plantae
<i>Chloris barbata</i>	MONOCOT	Plantae
<i>Tridax procumbens</i>	DICOT	Plantae
<i>Turnera ulmifolia</i>	DICOT	Plantae
<i>Senna occidentalis</i>	DICOT	Plantae
<i>Imperata cylindrica</i>	MONOCOT	Plantae
<i>Urochloa mutica</i>	MONOCOT	Plantae
<i>Cyanthillium cinereum</i>	DICOT	Plantae
<i>Stachytarpheta jamaicensis</i>	DICOT	Plantae
<i>Ricinus communis</i>	DICOT	Plantae
<i>Sesbania cannabina</i>	DICOT	Plantae
<i>Portulaca oleracea</i>	DICOT	Plantae
<i>Eleusine indica</i>	MONOCOT	Plantae
<i>Cynodon dactylon</i>	MONOCOT	Plantae
<i>Euphorbia hirta</i>	DICOT	Plantae
<i>Conyza bonariensis</i>	DICOT	Plantae
<i>Turnera ulmifolia</i>	DICOT	Plantae
<i>Tridax procumbens</i>	DICOT	Plantae
<i>Phyla nodiflora</i>	DICOT	Plantae
<i>Conyza bonariensis</i>	DICOT	Plantae
<i>Alysicarpus vaginalis</i>	DICOT	Plantae
<i>Dactyloctenium aegyptium</i>	MONOCOT	Plantae
<i>Stachytarpheta jamaicensis</i>	DICOT	Plantae
<i>Acalypha indica</i>	DICOT	Plantae
<i>Digitaria setigera</i>	MONOCOT	Plantae
<i>Cynodon arcuatus</i>	MONOCOT	Plantae
<i>Eriochloa meyeriana</i>	MONOCOT	Plantae
<i>Spermacoce remota</i>	DICOT	Plantae
<i>Boerhavia diffusa</i>	DICOT	Plantae
<i>Turnera ulmifolia</i>	DICOT	Plantae
<i>Digitaria milanjiana</i>	MONOCOT	Plantae
<i>Scoparia dulcis</i>	DICOT	Plantae
<i>Chrysopogon aciculatus</i>	MONOCOT	Plantae
<i>Euphorbia hirta</i>	DICOT	Plantae
<i>Striga asiatica</i>	DICOT	Plantae
<i>Solanum americanum</i>	DICOT	Plantae

<i>Phyllanthus amarus</i>	DICOT	Plantae
<i>Synedrella nodiflora</i>	DICOT	Plantae
<i>Bothriochloa bladhii</i>	MONOCOT	Plantae
<i>Leucaena leucocephala</i>	DICOT	Plantae
<i>Lepidium virginicum</i>	DICOT	Plantae
<i>Turnera ulmifolia</i>	DICOT	Plantae
<i>Boerhavia diffusa</i>	DICOT	Plantae
<i>Eragrostis amabilis</i>	MONOCOT	Plantae
<i>Turnera ulmifolia</i>	DICOT	Plantae
<i>Chloris gayana</i>	MONOCOT	Plantae
<i>Urochloa brizantha</i>	MONOCOT	Plantae
<i>Sesbania cannabina</i>	DICOT	Plantae
<i>Cyanthillium cinereum</i>	DICOT	Plantae
<i>Desmodium triflorum</i>	DICOT	Plantae
<i>Lepidium virginicum</i>	DICOT	Plantae
<i>Sesbania grandiflora</i>	DICOT	Plantae
<i>Macroptilium atropurpureum</i>	DICOT	Plantae
<i>Oldenlandia corymbosa</i>	DICOT	Plantae
<i>Striga angustifolia</i>	DICOT	Plantae
<i>Turnera ulmifolia</i>	DICOT	Plantae
<i>Chrysopogon aciculatus</i>	MONOCOT	Plantae
<i>Boerhavia diffusa</i>	DICOT	Plantae
<i>Eleusine indica</i>	MONOCOT	Plantae
<i>Bryophyllum pinnatum</i>	DICOT	Plantae
<i>Euphorbia hirta</i>	DICOT	Plantae
<i>Urochloa brizantha</i>	MONOCOT	Plantae
<i>Stachytarpheta jamaicensis</i>	DICOT	Plantae
<i>Passiflora foetida</i>	DICOT	Plantae
<i>Turnera ulmifolia</i>	DICOT	Plantae
<i>Acalypha indica</i>	DICOT	Plantae
<i>Boerhavia coccinea</i>	DICOT	Plantae
<i>Desmodium triflorum</i>	DICOT	Plantae
<i>Breynia disticha</i>	DICOT	Plantae
<i>Euphorbia cyathophora</i>	DICOT	Plantae
<i>Ipomoea obscura</i>	DICOT	Plantae
<i>Cyanthillium cinereum</i>	DICOT	Plantae
<i>Spermacoce remota</i>	DICOT	Plantae
<i>Solanum americanum</i>	DICOT	Plantae
<i>Macroptilium atropurpureum</i>	DICOT	Plantae
<i>Euphorbia prostrata</i>	DICOT	Plantae
<i>Eleusine indica</i>	MONOCOT	Plantae
<i>Macroptilium atropurpureum</i>	DICOT	Plantae
<i>Stachytarpheta jamaicensis</i>	DICOT	Plantae
<i>Phyla nodiflora</i>	DICOT	Plantae
<i>Turnera ulmifolia</i>	DICOT	Plantae
<i>Cenchrus echinatus</i>	MONOCOT	Plantae
<i>Oldenlandia corymbosa</i>	DICOT	Plantae
<i>Physalis angulata</i>	DICOT	Plantae
<i>Urochloa humidicola</i>	MONOCOT	Plantae
<i>Urochloa humidicola</i>	MONOCOT	Plantae
<i>Cynodon dactylon</i>	MONOCOT	Plantae
<i>Euphorbia prostrata</i>	DICOT	Plantae
<i>Euphorbia cyathophora</i>	DICOT	Plantae
<i>Ricinus communis</i>	DICOT	Plantae
<i>Urochloa mosambicensis</i>	MONOCOT	Plantae
<i>Turnera ulmifolia</i>	DICOT	Plantae
<i>Bryophyllum pinnatum</i>	DICOT	Plantae
<i>Cyperus aromaticus</i>	MONOCOT	Plantae

<i>Cyanthillium cinereum</i>	DICOT		Plantae
<i>Acalypha lanceolata</i>	DICOT		Plantae
<i>Cynodon dactylon</i>	MONOCOT		Plantae
<i>Physalis angulata</i>	DICOT		Plantae
<i>Cynodon arcuatus</i>	MONOCOT		Plantae
<i>Ixobrychus flavicolis</i> subsp. <i>australis</i>	BIRD		Animalia
<i>Dugong dugon</i>	MAMMAL	MI	Animalia
<i>Dugong dugon</i>	MAMMAL	MI	Animalia
<i>Pertusaria</i> sp.	LICHEN		Fungi
<i>Dirinaria picta</i>	LICHEN		Fungi
<i>Dugong dugon</i>	MAMMAL	MI	Animalia
<i>Euphorbia</i> sp.	DICOT		Plantae
<i>Zephyranthes rosea</i>	MONOCOT		Plantae
<i>Halimeda</i> sp.	ALGA		Animalia
<i>Euphorbia heterophylla</i>	DICOT		Plantae
<i>Valonia aegagropila</i>	ALGA		Plantae
<i>Pyrenula</i> sp.	LICHEN		Fungi
<i>Caulerpa sertularioides</i>	ALGA		Plantae
<i>Caulerpa lentillifera</i>	ALGA		Plantae
<i>Syringodium isoetifolium</i>	MONOCOT		Plantae
<i>Dictyota</i> sp.	ALGA		Animalia
<i>Galaxaura rugosa</i>	ALGA		Plantae
<i>Caulerpa racemosa</i>	ALGA		Plantae
<i>Caulerpa</i> sp.	ALGA		Animalia
<i>Boodlea composita</i>	ALGA		Plantae
<i>Lepidium virginicum</i>	DICOT		Plantae
<i>Boodlea composita</i>	ALGA		Plantae
<i>Caulerpa brachypus</i>	ALGA		Plantae
<i>Thuarea involuta</i>	MONOCOT		Plantae
<i>Caulerpa lentillifera</i>	ALGA		Plantae
<i>Caulerpa lentillifera</i>	ALGA		Plantae
<i>Acanthophora spicifera</i>	ALGA		Plantae
<i>Ulva</i> sp.	ALGA		Animalia
<i>Acanthophora</i> sp.	ALGA		Plantae
<i>Gracilaria arcuata</i>	ALGA		Plantae
<i>Zoysia matrella</i>	MONOCOT		Plantae
<i>Gracilaria</i> sp.	ALGA		Animalia
<i>Hydroclathrus clathratus</i>	ALGA		Protozoa
<i>Thalassia hemprichii</i>	MONOCOT		Plantae
<i>Chaetomorpha crassa</i>	ALGA		Plantae
<i>Zoysia matrella</i>	MONOCOT		Plantae
<i>Spermacoce remota</i>	DICOT		Plantae
<i>Caulerpa racemosa</i>	ALGA		Plantae
<i>Gracilaria</i> sp.	ALGA		Animalia
<i>Acanthophora spicifera</i>	ALGA		Plantae
<i>Gracilaria</i> sp.	ALGA		Animalia
<i>Caulerpa lamourouxii</i>	ALGA		Plantae
<i>Rivina humilis</i>	DICOT		Plantae
<i>Padina</i> sp.	ALGA		Animalia
<i>Gracilaria</i> sp.	ALGA		Animalia
<i>Sphaeria borrieri</i>	FUNGUS		Fungi
<i>Dactyloctenium aegyptium</i>	MONOCOT		Plantae
<i>Boergesenia forbesii</i>	ALGA		Plantae
<i>Heteropogon contortus</i>	MONOCOT		Plantae
<i>Galaxaura rugosa</i>	ALGA		Plantae
<i>Triumfetta repens</i>	DICOT		Plantae
<i>Gracilaria</i> sp.	ALGA		Animalia
<i>Fimbristylis cymosa</i>	MONOCOT		Plantae

<i>Thalassia hemprichii</i>	MONOCOT	Plantae
<i>Caulerpa taxifolia</i>	ALGA	Plantae
<i>Cynodon arcuatus</i>	MONOCOT	Plantae
<i>Caulerpa lentillifera</i>	ALGA	Plantae
<i>Cyanthillium cinereum</i> var. <i>cinereum</i>	DICOT	Plantae
<i>Chromolaena odorata</i>	DICOT	Plantae
<i>Acanthophora</i> sp.	ALGA	Plantae
<i>Jania</i> sp.	ALGA	Animalia
<i>Pertusaria</i> sp.	LICHEN	Fungi
<i>Cyperus aromaticus</i>	MONOCOT	Plantae
<i>Dictyota</i> sp.	ALGA	Animalia
<i>Hypnea</i> sp.	ALGA	Animalia
<i>Urochloa mosambicensis</i>	MONOCOT	Plantae
<i>Caulerpa brachypus</i>	ALGA	Plantae
<i>Sargassum</i> sp.	ALGA	Animalia
<i>Gracilaria</i> sp.	ALGA	Animalia
<i>Cyanthillium cinereum</i> var. <i>cinereum</i>	DICOT	Plantae
<i>Halimeda</i> sp.	ALGA	Animalia
<i>Ischaemum muticum</i>	MONOCOT	Plantae
<i>Dictyota ciliolata</i>	ALGA	Protozoa
<i>Boodlea</i> sp.	ALGA	Animalia
<i>Caulerpa cupressoides</i>	ALGA	Plantae
<i>Gracilaria</i> sp.	ALGA	Animalia
<i>Syringodium isoetifolium</i>	MONOCOT	Plantae
<i>Desmanthus virgatus</i>	DICOT	Plantae
<i>Boergesenia</i> sp.	ALGA	Animalia
<i>Gracilaria</i> sp.	ALGA	Animalia
<i>Turbinaria ornata</i>	ALGA	Protozoa
<i>Dictyosphaeria cavernosa</i>	ALGA	Plantae
<i>Padina</i> sp.	ALGA	Animalia
<i>Hypnea</i> sp.	ALGA	Animalia
<i>Dictyota ciliolata</i>	ALGA	Protozoa
<i>Hormophysa cuneiformis</i>	ALGA	Protozoa
<i>Gracilaria</i> sp.	ALGA	Animalia
<i>Lagenaria siceraria</i>	DICOT	Plantae
<i>Acanthophora</i> sp.	ALGA	Plantae
<i>Thalassia hemprichii</i>	MONOCOT	Plantae
<i>Caulerpa</i> sp.	ALGA	Animalia
<i>Sargassum polycystum</i>	ALGA	Protozoa
<i>Boodlea composita</i>	ALGA	Plantae
<i>Ipomoea obscura</i>	DICOT	Plantae
<i>Boerhavia coccinea</i>	DICOT	Plantae
<i>Phyllanthus debilis</i>	DICOT	Plantae
<i>Parmotrema norsticticum</i>	LICHEN	Fungi
<i>Phyllanthus amarus</i>	DICOT	Plantae
<i>Hippobroma longiflora</i>	DICOT	Plantae
<i>Phyla nodiflora</i>	DICOT	Plantae
<i>Padina</i> sp.	ALGA	Animalia
<i>Caulerpa cupressoides</i>	ALGA	Plantae
<i>Breynia disticha</i>	DICOT	Plantae
<i>Abutilon asiaticum</i>	DICOT	Plantae
<i>Eleutheranthera ruderalis</i>	DICOT	Plantae
<i>Boerhavia tetrandra</i>	DICOT	Plantae
<i>Enicostema hyssopifolium</i>	DICOT	Plantae
<i>Halimeda</i> sp.	ALGA	Animalia
<i>Conyza bonariensis</i>	DICOT	Plantae
<i>Laurencia</i> sp.	ALGA	Animalia
<i>Melinis minutiflora</i>	MONOCOT	Plantae

<i>Tridax procumbens</i>	DICOT		Plantae
<i>Gracilaria</i> sp.	ALGA		Animalia
<i>Acanthophora spicifera</i>	ALGA		Plantae
<i>Collema leucocarpum</i>	LICHEN		Fungi
<i>Canistrocarpus cervicornis</i>	ALGA		Protozoa
<i>Halimeda</i> sp.	ALGA		Animalia
<i>Chrysopogon aciculatus</i>	MONOCOT		Plantae
<i>Eragrostis amabilis</i>	MONOCOT		Plantae
<i>Stenotaphrum micranthum</i>	MONOCOT		Plantae
<i>Dictyota</i> sp.	ALGA		Animalia
<i>Chaetomorpha crassa</i>	ALGA		Plantae
<i>Chromolaena odorata</i>	DICOT		Plantae
<i>Valonia aegagropila</i>	ALGA		Plantae
<i>Thalassia hemprichii</i>	MONOCOT		Plantae
<i>Syringodium isoetifolium</i>	MONOCOT		Plantae
<i>Caulerpa racemosa</i>	ALGA		Plantae
<i>Sargassum polycystum</i>	ALGA		Protozoa
<i>Caulerpa lentillifera</i>	ALGA		Plantae
<i>Clerodendrum</i> sp.	DICOT		Plantae
<i>Gracilaria</i> sp.	ALGA		Animalia
<i>Euphorbia hirta</i>	DICOT		Plantae
<i>Acalypha lanceolata</i> var. <i>lanceolata</i>	DICOT	P1	Plantae
<i>Rosenvingea</i> sp.	ALGA		Animalia
<i>Cynodon dactylon</i>	MONOCOT		Plantae
<i>Eleusine indica</i>	MONOCOT		Plantae
<i>Sporobolus fertilis</i>	MONOCOT		Plantae
<i>Conyza bonariensis</i>	DICOT		Plantae
<i>Caulerpa brachypus</i>	ALGA		Plantae
<i>Oldenlandia corymbosa</i> var. <i>corymbosa</i>	DICOT		Plantae
<i>Rivina humilis</i>	DICOT		Plantae
<i>Lepturus repens</i>	MONOCOT	P3	Plantae
<i>Urochloa humidicola</i>	MONOCOT		Plantae
<i>Cosmophasis lami</i>	INVERT		Animalia
<i>Ctenochaetus striatus</i>	FISH		Animalia
<i>Fowleria variegata</i>	FISH		Animalia
<i>Pterois antennata</i>	FISH		Animalia
<i>Chaetodon ephippium</i>	FISH		Animalia
<i>Latrodectus geometricus</i>	INVERT		Animalia
<i>Chrysiptera biocellata</i>	FISH		Animalia
<i>Dinematichthys trilobatus</i>	FISH		Animalia
<i>Myripristis berndti</i>	FISH		Animalia
<i>Entomacrodus striatus</i>	FISH		Animalia
<i>Nectamia fusca</i>	FISH		Animalia
<i>Scarus</i> sp.	FISH		Animalia
<i>Parupeneus barberinoides</i>	FISH		Animalia
<i>Chaetodon unimaculatus</i>	FISH		Animalia
<i>Cirripectes</i> sp.	FISH		Animalia
<i>Grammistes sexlineatus</i>	FISH		Animalia
<i>Pseudamia gelatinosa</i>	FISH		Animalia
<i>Entomacrodus striatus</i>	FISH		Animalia
<i>Bathygobius cocosensis</i>	FISH		Animalia
<i>Plectroglyphidodon imparipennis</i>	FISH		Animalia
<i>Asterropteryx semipunctatus</i>	FISH		Animalia
<i>Cirripectes castaneus</i>	FISH		Animalia
<i>Apogon variegata</i>	FISH		Animalia
<i>Scolopsis lineata</i>	FISH		Animalia
<i>Sphyaena barracuda</i>	FISH		Animalia
<i>Pterocaesio</i> tile	FISH		Animalia

<i>Eviota lachdeberiei</i>	FISH		Animalia
<i>Labroides dimidiatus</i>	FISH		Animalia
<i>Parapercis hexophtalma</i>	FISH		Animalia
<i>Asterropteryx semipunctatus</i>	FISH		Animalia
<i>Pomacentrus pavo</i>	FISH		Animalia
<i>Fowleria variegata</i>	FISH		Animalia
<i>Plectroglyphidodon dickii</i>	FISH		Animalia
<i>Doryrhamphus excisus</i>	FISH		Animalia
<i>Canthigaster janthinoptera</i>	FISH		Animalia
<i>Cosmophasis lami</i>	INVERT		Animalia
<i>Cosmophasis lami</i>	INVERT		Animalia
<i>Geogarypus longidigitatus</i>	INVERT		Animalia
<i>Xenisthmus sp.</i>	FISH		Animalia
<i>Istiblennius lineatus</i>	FISH		Animalia
<i>Ecsenius bicolor</i>	FISH		Animalia
<i>Amblyglyphidodon ternatensis?</i>	FISH		Animalia
<i>Conger cinereus</i>	FISH		Animalia
<i>Apogon exostigma</i>	FISH		Animalia
<i>Lethrinus obsoletus</i>	FISH		Animalia
<i>Latrodectus geometricus</i>	INVERT		Animalia
<i>Scarus oviceps</i>	FISH		Animalia
<i>Kaupichthys hyoprroides</i>	FISH		Animalia
<i>Gnatholepis cauerensis</i>	FISH		Animalia
<i>Sula sula</i>	BIRD	MI	Animalia
<i>Cephalopholis urodeta</i>	FISH		Animalia
<i>Ctenochaetus strigosus</i>	FISH		Animalia
<i>Pseudamia gelatinosa</i>	FISH		Animalia
<i>Sargocentron diadema</i>	FISH		Animalia
<i>Halichoeres marginatus</i>	FISH		Animalia
<i>Gnatholepis cauerensis</i>	FISH		Animalia
<i>Ctenochaetus striatus</i>	FISH		Animalia
<i>Lethrinus olivaceus</i>	FISH		Animalia
<i>Sula sula</i>	BIRD	MI	Animalia
<i>Petroscirtes xestus</i>	FISH		Animalia
<i>Eviota melasma</i>	FISH		Animalia
<i>Labroides dimidiatus</i>	FISH		Animalia
<i>Acanthurus nigricans</i>	FISH		Animalia
<i>Chaetodon mitratus</i>	FISH		Animalia
<i>Istiblennius edentulus</i>	FISH		Animalia
<i>Lethrinus harak</i>	FISH		Animalia
<i>Zebrasoma scopas</i>	FISH		Animalia
<i>Apogon angustatus</i>	FISH		Animalia
<i>Heteropriacanthus cruentatus</i>	FISH		Animalia
<i>Oxycheilinus digrammus</i>	FISH		Animalia
<i>Micrognathus brevirostris</i>	FISH		Animalia
<i>Xenisthmus sp.</i>	FISH		Animalia
<i>Cirrhilabrus exquisitus</i>	FISH		Animalia
<i>Halichoeres trimaculatus</i>	FISH		Animalia
<i>Vanderhorstia ornatissima</i>	FISH		Animalia
<i>Micrognathus brevirostris</i>	FISH		Animalia
<i>Heteroconger hassi</i>	FISH		Animalia
<i>Scolecenchelys macroptera</i>	FISH		Animalia
<i>Dascyllus aruanus</i>	FISH		Animalia
<i>Xestochilus nebulosus</i>	FISH		Animalia
<i>Plesiops corallicola</i>	FISH		Animalia
<i>Lethrinus obsoletus</i>	FISH		Animalia
<i>Genicanthus bellus</i>	FISH		Animalia
<i>Gymnothorax enigmaticus</i>	FISH		Animalia

<i>Chrysiptera glauca</i>	FISH		Animalia
<i>Chrysiptera biocellata</i>	FISH		Animalia
<i>Plectroglyphidodon imparipennis</i>	FISH		Animalia
<i>Gymnothorax undulatus</i>	FISH		Animalia
<i>Geogarypus longidigitatus</i>	INVERT		Animalia
<i>Sula sula</i>	BIRD	MI	Animalia
<i>Zenarchopterus dunckeri</i>	FISH		Animalia
<i>Lutjanus fulvus</i>	FISH		Animalia
<i>Halichoeres chloropterus</i>	FISH		Animalia
<i>Sunagocia otaitensis</i>	FISH		Animalia
<i>Crenimugil crenilabrus</i>	FISH		Animalia
<i>Gymnothorax undulatus</i>	FISH		Animalia
<i>Plectroglyphidodon imparipennis</i>	FISH		Animalia
<i>Gunnellichthys monostigma</i>	FISH		Animalia
<i>Xenisthmus sp.</i>	FISH		Animalia
<i>Cymolutes sp.</i>	FISH		Animalia
<i>Sphyraena barracuda</i>	FISH		Animalia
<i>Gymnothorax fimbriatus</i>	FISH		Animalia
<i>Pseudamia gelatinosa</i>	FISH		Animalia
<i>Pseudocheilinus hexataenia</i>	FISH		Animalia
<i>Apogon exostigma</i>	FISH		Animalia
<i>Kuhlia mugil</i>	FISH		Animalia
<i>Bathygobius cocosensis</i>	FISH		Animalia
<i>Chaetodon ulietensis</i>	FISH		Animalia
<i>Chalixodytes tauensis</i>	FISH		Animalia
<i>Plectroglyphidodon leucozonus</i>	FISH		Animalia
<i>Sphyraena barracuda</i>	FISH		Animalia
<i>Gymnothorax rueppellii</i>	FISH		Animalia
<i>Trimma insularum</i> MS	FISH		Animalia
<i>Arothron hispidus</i>	FISH		Animalia
<i>Naso lituratus</i>	FISH		Animalia
<i>Enneapterygius tutuilae</i>	FISH		Animalia
<i>Fowleria aurita</i>	FISH		Animalia
<i>Blenniella chrysopilos</i>	FISH		Animalia
<i>Muraenichthys laticaudatus</i>	FISH		Animalia
<i>Corythoichthys flavofasciatus</i>	FISH		Animalia
<i>Echidna polyzona</i>	FISH		Animalia
<i>Rattus rattus</i> subsp. diardii	MAMMAL		Animalia
<i>Rattus rattus</i> subsp. diardii	MAMMAL		Animalia
<i>Rattus rattus</i> subsp. diardii	MAMMAL		Animalia
<i>Rattus rattus</i> subsp. diardii	MAMMAL		Animalia
<i>Mus musculus</i> subsp. musculus	MAMMAL		Animalia
<i>Cercamia eremia?</i>	FISH		Animalia
<i>Stethojulis strigiventer</i>	FISH		Animalia
<i>Ctenochaetus strigosus</i>	FISH		Animalia
<i>Amblygobius albimaculatus</i>	FISH		Animalia
<i>Rattus rattus</i>	MAMMAL		Animalia
<i>Trimma hoesei</i>	FISH		Animalia
<i>Neoniphon argenteus</i>	FISH		Animalia
<i>Entomacrodus striatus</i>	FISH		Animalia
<i>Gnathodentex aurolineatus</i>	FISH		Animalia
<i>Gnatholepis anjerensis</i>	FISH		Animalia
<i>Myripristis murdjan</i>	FISH		Animalia
<i>Silhouettea sp.</i>	FISH		Animalia
<i>Eviota irrasa?</i>	FISH		Animalia
<i>Chromis nigrura</i>	FISH		Animalia
<i>Entomacrodus striatus</i>	FISH		Animalia
<i>Vanderhorstia ornatissima</i>	FISH		Animalia

<i>Chrysiptera glauca</i>	FISH		Animalia
<i>Dascyllus aruanus</i>	FISH		Animalia
<i>Macropharyngodon meleagris</i>	FISH		Animalia
<i>Gomphosus varius</i>	FISH		Animalia
<i>Enneapterygius</i> sp.	FISH		Animalia
<i>Pseudobalistes flavimarginatus</i>	FISH		Animalia
<i>Moringua ferruginea</i>	FISH		Animalia
<i>Muraenichthys laticaudatus</i>	FISH		Animalia
<i>Lethrinus xanthochilus</i>	FISH		Animalia
<i>Epibulus insidiator</i>	FISH		Animalia
<i>Muraenichthys schultzi</i>	FISH		Animalia
<i>Asterropteryx semipunctatus</i>	FISH		Animalia
<i>Ptereleotris microlepis</i>	FISH		Animalia
<i>Novaculichthys macrolepidotus</i>	FISH		Animalia
<i>Cercamia eremia?</i>	FISH		Animalia
<i>Hyporhamphus</i> sp.	FISH		Animalia
<i>Uropterygius marmoratus</i>	FISH		Animalia
<i>Enneapterygius</i> sp.	FISH		Animalia
<i>Thalassoma quinquevittatum</i>	FISH		Animalia
<i>Thalassoma purpureum</i>	FISH		Animalia
<i>Naso unicornis</i>	FISH		Animalia
<i>Epinephelus macrospilos</i>	FISH		Animalia
<i>Myripristis berndti</i>	FISH		Animalia
<i>Enchelycore bayeri</i>	FISH		Animalia
<i>Chlorurus sordidus</i>	FISH		Animalia
<i>Enchelycore pardalis</i>	FISH		Animalia
<i>Stethojulis bandanensis</i>	FISH		Animalia
<i>Thalassoma quinquevittatum</i>	FISH		Animalia
<i>Stegastes fasciolatus</i>	FISH		Animalia
<i>Conger cinereus</i>	FISH		Animalia
<i>Palutris</i> sp.	FISH		Animalia
<i>Anous stolidus</i>	BIRD	MI	Animalia
<i>Hyporhamphus affinis</i>	FISH		Animalia
<i>Gymnothorax zonipectis</i>	FISH		Animalia
<i>Rattus rattus</i>	MAMMAL		Animalia
<i>Blenniella periophthalmus</i>	FISH		Animalia
<i>Chaetodon auriga</i>	FISH		Animalia
<i>Rattus rattus</i>	MAMMAL		Animalia
<i>Myripristis violacea</i>	FISH		Animalia
<i>Callogobius maculipinnis</i>	FISH		Animalia
<i>Cheilinus chlorourus</i>	FISH		Animalia
<i>Parapercis hexophtalma</i>	FISH		Animalia
<i>Amblygobius tekomaji</i>	FISH		Animalia
<i>Gymnothorax pictus</i>	FISH		Animalia
<i>Cheilinus chlorourus</i>	FISH		Animalia
<i>Siganus</i> sp.	FISH		Animalia
<i>Pseudocheilinus octotaenia</i>	FISH		Animalia
<i>Nectamia bandanensis</i>	FISH		Animalia
<i>Lutjanus monostigma</i>	FISH		Animalia
<i>Apogon kallopterus</i>	FISH		Animalia
<i>Cephalopholis urodeta</i>	FISH		Animalia
<i>Brotula multibarbata</i>	FISH		Animalia
<i>Sargocentron caudimaculatum</i>	FISH		Animalia
<i>Stegastes nigricans</i>	FISH		Animalia
<i>Chromis margaritifer</i>	FISH		Animalia
<i>Choeroichthys sculptus</i>	FISH		Animalia
<i>Chrysiptera biocellata</i>	FISH		Animalia
<i>Apogonichthys ocellatus</i>	FISH		Animalia

<i>Fowleria variegata</i>	FISH	Animalia
<i>Gorgasia</i> sp.	FISH	Animalia
<i>Cirripectes</i> sp.	FISH	Animalia
<i>Suttonia lineata</i>	FISH	Animalia
<i>Cladophora</i> sp.	ALGA	Animalia
<i>Plectroglyphidodon lacrymatus</i>	FISH	Animalia
<i>Stegastes lividus</i>	FISH	Animalia
<i>Pseudoplesiops immaculatus</i>	FISH	Animalia
<i>Stegastes lividus</i>	FISH	Animalia
<i>Pseudogramma polyacanthum</i>	FISH	Animalia
<i>Eviota irrasa?</i>	FISH	Animalia
<i>Pseudanthias evansi</i>	FISH	Animalia
<i>Enneapterygius</i> sp.	FISH	Animalia
<i>Leiuranus semicinctus</i>	FISH	Animalia
<i>Ecsenius bicolor</i>	FISH	Animalia
<i>Apogon kallopterus</i>	FISH	Animalia
<i>Istiblennius edentulus</i>	FISH	Animalia
<i>Cheilodipterus quinquelineatus</i>	FISH	Animalia
<i>Macropharyngodon meleagris</i>	FISH	Animalia
<i>Helcogramma chica</i>	FISH	Animalia
<i>Coryphopterus neophytus</i>	FISH	Animalia
<i>Apogon exostigma</i>	FISH	Animalia
<i>Pterois volitans</i>	FISH	Animalia
<i>Halichoeres trimaculatus</i>	FISH	Animalia
<i>Eviota nebulosa?</i>	FISH	Animalia
<i>Epinephelus hexagonatus</i>	FISH	Animalia
<i>Rattus rattus</i> subsp. <i>diardii</i>	MAMMAL	Animalia
<i>Rattus rattus</i> subsp. <i>diardii</i>	MAMMAL	Animalia
<i>Schultzidia johnstonensis</i>	FISH	Animalia
<i>Gymnothorax rueppellii</i>	FISH	Animalia
<i>Rattus rattus</i>	MAMMAL	Animalia
<i>Chromis opercularis</i>	FISH	Animalia
<i>Lethrinus obsoletus</i>	FISH	Animalia
<i>Eviota melasma</i>	FISH	Animalia
<i>Thalassoma janseni</i>	FISH	Animalia
<i>Istiblennius edentulus</i>	FISH	Animalia
<i>Ctenogobiops feroculus</i>	FISH	Animalia
<i>Plectrypops lima</i>	FISH	Animalia
<i>Muraenichthys laticaudatus</i>	FISH	Animalia
<i>Gymnothorax fimbriatus</i>	FISH	Animalia
<i>Caranx melampygus</i>	FISH	Animalia
<i>Mulloidichthys flavolineatus</i>	FISH	Animalia
<i>Chaetodon auriga</i>	FISH	Animalia
<i>Chaetodon auriga</i>	FISH	Animalia
<i>Lethrinus obsoletus</i>	FISH	Animalia
<i>Amblygobius tekoma</i>	FISH	Animalia
<i>Pseudamiops</i> sp.	FISH	Animalia
<i>Dinematichthys trilobatus</i>	FISH	Animalia
<i>Apogon melas</i>	FISH	Animalia
<i>Coryphopterus neophytus</i>	FISH	Animalia
<i>Asterropteryx semipunctatus</i>	FISH	Animalia
<i>Bromophyciops pautzkei</i>	FISH	Animalia
<i>Scorpaenodes hirsutus</i>	FISH	Animalia
<i>Leiuranus semicinctus</i>	FISH	Animalia
<i>Sebastapistes strongia</i>	FISH	Animalia
<i>Centropyge flavissima</i>	FISH	Animalia
<i>Epinephelus merra</i>	FISH	Animalia
<i>Sargocentron punctatissimum</i>	FISH	Animalia

<i>Myripristis vittata</i>	FISH	Animalia
<i>Myripristis pralinia</i>	FISH	Animalia
<i>Dinematichthys trilobatus</i>	FISH	Animalia
<i>Gnatholepis scapulostigma</i>	FISH	Animalia
<i>Chromis atripes</i>	FISH	Animalia
<i>Forcipiger flavissimus</i>	FISH	Animalia
<i>Plesiops coeruleolineatus</i>	FISH	Animalia
<i>Stegastes albifasciatus</i>	FISH	Animalia
<i>Chaetodon lunulatus</i>	FISH	Animalia
<i>Cosmophasis lami</i>	INVERT	Animalia
<i>Caulerpa brachypus</i>	ALGA	Plantae
<i>Canistrocarpus cervicornis</i>	ALGA	Protozoa
<i>Scolopendra subspinipes</i>	INVERT	Animalia
<i>Heteropoda venatoria</i>	INVERT	Animalia
<i>Geogarypus longidigitatus</i>	INVERT	Animalia
<i>Heteropoda venatoria</i>	INVERT	Animalia
<i>Nephila edulis</i>	INVERT	Animalia
<i>Caulerpa brachypus</i>	ALGA	Plantae
<i>Scolopendra subspinipes</i>	INVERT	Animalia
<i>Heteropoda venatoria</i>	INVERT	Animalia
<i>Gracilaria sp.</i>	ALGA	Animalia
<i>Cosmophasis lami</i>	INVERT	Animalia
<i>Hormophysa cuneiformis</i>	ALGA	Protozoa
<i>Muntingia calabura</i>	DICOT	Plantae
<i>Thalassia hemprichii</i>	MONOCOT	Plantae
<i>Melinis repens</i>	MONOCOT	Plantae
<i>Halimeda sp.</i>	ALGA	Animalia
<i>Asparagopsis taxiformis</i>	ALGA	Plantae
<i>Champia sp.</i>	ALGA	Animalia
<i>Canistrocarpus cervicornis</i>	ALGA	Protozoa
<i>Collema leucocarpum</i>	LICHEN	Fungi
<i>Eviota latifasciata</i>	FISH	Animalia
<i>Rattus rattus</i> subsp. <i>diardii</i>	MAMMAL	Animalia
<i>Vanderhorstia ornatissima</i>	FISH	Animalia
<i>Chrysiptera biocellata</i>	FISH	Animalia
<i>Cirripectes castaneus?</i>	FISH	Animalia
<i>Amblygobius albimaculatus</i>	FISH	Animalia
<i>Moringua ferruginea</i>	FISH	Animalia
<i>Callogobius maculipinnis</i>	FISH	Animalia
<i>Nectamia fusca</i>	FISH	Animalia
<i>Apogon taeniophorus</i>	FISH	Animalia
<i>Plesiops coeruleolineatus</i>	FISH	Animalia
<i>Asterropteryx semipunctatus</i>	FISH	Animalia
<i>Pseudanthias smithvanizi</i>	FISH	Animalia
<i>Rattus rattus</i>	MAMMAL	Animalia
<i>Fowleria aurita</i>	FISH	Animalia
<i>Stegastes nigricans</i>	FISH	Animalia
<i>Cercamia eremia?</i>	FISH	Animalia
<i>Apogon novemfasciatus</i>	FISH	Animalia
<i>Rattus rattus</i> subsp. <i>diardii</i>	MAMMAL	Animalia
<i>Rattus rattus</i> subsp. <i>diardii</i>	MAMMAL	Animalia
<i>Rattus rattus</i> subsp. <i>diardii</i>	MAMMAL	Animalia
<i>Parupeneus pleurostigma</i>	FISH	Animalia
<i>Myripristis vittata</i>	FISH	Animalia
<i>Ctenochaetus striatus</i>	FISH	Animalia
<i>Gomphosus varius</i>	FISH	Animalia
<i>Callogobius sp.</i>	FISH	Animalia
<i>Stegastes fasciolatus</i>	FISH	Animalia

<i>Parapercis clathrata</i>	FISH	Animalia
<i>Thalassoma amblycephalum</i>	FISH	Animalia
<i>Bothus pantherinus</i>	FISH	Animalia
<i>Cosmocampus banneri</i>	FISH	Animalia
<i>Thalassoma lutescens</i>	FISH	Animalia
<i>Siphamia tubifer</i>	FISH	Animalia
<i>Pseudogramma polyacanthum</i>	FISH	Animalia
<i>Pterois radiata</i>	FISH	Animalia
<i>Moringua ferruginea</i>	FISH	Animalia
<i>Parupeneus crassilabris</i>	FISH	Animalia
<i>Gymnothorax undulatus</i>	FISH	Animalia
<i>Chromis viridis</i>	FISH	Animalia
<i>Rattus rattus</i> subsp. <i>diardii</i>	MAMMAL	Animalia
<i>Rattus rattus</i> subsp. <i>diardii</i>	MAMMAL	Animalia
<i>Priolepis semidoliata</i>	FISH	Animalia
<i>Siganus</i> sp.	FISH	Animalia
<i>Zenarchopterus dispar</i>	FISH	Animalia
<i>Gerres acinaces</i>	FISH	Animalia
<i>Coryphopterus duospilus</i>	FISH	Animalia
<i>Epinephelus spilotoceps</i>	FISH	Animalia
<i>Trimma insularum</i> MS	FISH	Animalia
<i>Alionematichthys</i> cf. <i>piger</i>	FISH	Animalia
<i>Scolecenchelys macroptera</i>	FISH	Animalia
<i>Apogon taeniophorus</i>	FISH	Animalia
<i>Halichoeres claudia</i> MS	FISH	Animalia
<i>Antennarius coccineus</i>	FISH	Animalia
<i>Gymnothorax margaritophorus</i>	FISH	Animalia
<i>Novaculichthys taeniourus</i>	FISH	Animalia
<i>Sebastapistes</i> sp.	FISH	Animalia
<i>Entomacrodus thalassinus?</i>	FISH	Animalia
<i>Epibulus insidiator</i>	FISH	Animalia
<i>Gymnothorax margaritophorus</i>	FISH	Animalia
<i>Parupeneus multifasciatus</i>	FISH	Animalia
<i>Choeroichthys sculptus</i>	FISH	Animalia
<i>Labroides dimidiatus</i>	FISH	Animalia
<i>Coris gaimard</i>	FISH	Animalia
<i>Neoniphon sammara</i>	FISH	Animalia
<i>Apogon unicolor</i>	FISH	Animalia
<i>Thalassoma lutescens</i>	FISH	Animalia
<i>Kaupichthys hyoproroides</i>	FISH	Animalia
<i>Cheilodipterus macrodon</i>	FISH	Animalia
<i>Coryphopterus duospilus</i>	FISH	Animalia
<i>Rattus rattus</i>	MAMMAL	Animalia
<i>Petroscirtes xestus</i>	FISH	Animalia
<i>Rhinecanthus aculeatus</i>	FISH	Animalia
<i>Cheilinus undulatus</i>	FISH	Animalia
<i>Rattus rattus</i>	MAMMAL	Animalia
<i>Rattus rattus</i>	MAMMAL	Animalia
<i>Rattus rattus</i>	MAMMAL	Animalia
<i>Rattus rattus</i>	MAMMAL	Animalia
<i>Rattus rattus</i>	MAMMAL	Animalia
<i>Rattus rattus</i>	MAMMAL	Animalia
<i>Istiblennius lineatus</i>	FISH	Animalia
<i>Doryrhamphus excisus</i>	FISH	Animalia
<i>Leiuranus semicinctus</i>	FISH	Animalia
<i>Stethojulis strigiventer</i>	FISH	Animalia
<i>Epinephelus tauvina</i>	FISH	Animalia
<i>Saurida gracilis</i>	FISH	Animalia

<i>Trimma emeryi</i>	FISH	Animalia
<i>Fowleria variegata</i>	FISH	Animalia
<i>Chaetodon vagabundus</i>	FISH	Animalia
<i>Gnatholepis cauerensis</i>	FISH	Animalia
<i>Thalassoma hardwicke</i>	FISH	Animalia
<i>Scolecenchelys macroptera</i>	FISH	Animalia
<i>Asterropteryx semipunctatus</i>	FISH	Animalia
<i>Gymnothorax flavimarginatus</i>	FISH	Animalia
<i>Saurida gracilis</i>	FISH	Animalia
<i>Exyrias belissimus</i>	FISH	Animalia
<i>Crenimugil crenilabrus</i>	FISH	Animalia
<i>Gerres acinaces</i>	FISH	Animalia
<i>Chromis viridis</i>	FISH	Animalia
<i>Apogon melas</i>	FISH	Animalia
<i>Asterropteryx semipunctatus</i>	FISH	Animalia
<i>Leiuranus semicinctus</i>	FISH	Animalia
<i>Acanthurus triostegus</i>	FISH	Animalia
<i>Halichoeres trimaculatus</i>	FISH	Animalia
<i>Cymolutes praetextatus</i>	FISH	Animalia
<i>Halichoeres margaritaceus</i>	FISH	Animalia
<i>Gymnothorax flavimarginatus</i>	FISH	Animalia
<i>Cephalopholis argus</i>	FISH	Animalia
<i>Stegastes albifasciatus</i>	FISH	Animalia
<i>Moringua microchir</i>	FISH	Animalia
<i>Hyporhamphus sp.</i>	FISH	Animalia
<i>Sueviota lachneri</i>	FISH	Animalia
<i>Rattus rattus subsp. diardii</i>	MAMMAL	Animalia
<i>Rattus rattus subsp. diardii</i>	MAMMAL	Animalia
<i>Rattus rattus subsp. diardii</i>	MAMMAL	Animalia
<i>Rattus rattus subsp. diardii</i>	MAMMAL	Animalia
<i>Rattus rattus subsp. diardii</i>	MAMMAL	Animalia
<i>Fowleria variegata</i>	FISH	Animalia
<i>Dinematichthys trilobatus</i>	FISH	Animalia
<i>Chromis amboinensis</i>	FISH	Animalia
<i>Halichoeres marginatus</i>	FISH	Animalia
<i>Rattus rattus subsp. diardii</i>	MAMMAL	Animalia
<i>Amblycirrhitus bimacula</i>	FISH	Animalia
<i>Poecilia reticulata</i>	FISH	Animalia
<i>Myripristis kuntee</i>	FISH	Animalia
<i>Epibulus insidiator</i>	FISH	Animalia
<i>Amblygobius albimaculatus</i>	FISH	Animalia
<i>Stegastes albifasciatus</i>	FISH	Animalia
<i>Spratelloides delicatulus</i>	FISH	Animalia
<i>Gymnothorax zonipectis</i>	FISH	Animalia
<i>Nectamia fusca</i>	FISH	Animalia
<i>Stegastes lividus</i>	FISH	Animalia
<i>Blenniella chrysospilos</i>	FISH	Animalia
<i>Echidna leucotaenia</i>	FISH	Animalia
<i>Scolopsis lineata</i>	FISH	Animalia
<i>Blenniella periophthalmus</i>	FISH	Animalia
<i>Chaetodon citrinellus</i>	FISH	Animalia
<i>Bodianus axillaris</i>	FISH	Animalia
<i>Chaetodon lunula</i>	FISH	Animalia
<i>Nectamia fusca</i>	FISH	Animalia
<i>Cercamia eremia</i>	FISH	Animalia
<i>Mus musculus subsp. musculus</i>	MAMMAL	Animalia
<i>Gymnothorax thrysoideus</i>	FISH	Animalia
<i>Platybelone argalus</i>	FISH	Animalia

<i>Chalixodytes tauensis</i>	FISH		Animalia
<i>Epinephelus hexagonatus</i>	FISH		Animalia
<i>Mus musculus</i> subsp. <i>musculus</i>	MAMMAL		Animalia
<i>Leiuranus semicinctus</i>	FISH		Animalia
<i>Trimma insularum</i> MS	FISH		Animalia
<i>Bathygobius cocosensis</i>	FISH		Animalia
<i>Moringua javanica</i>	FISH		Animalia
<i>Dascyllus aruanus</i>	FISH		Animalia
<i>Scolecenchelys macroptera</i>	FISH		Animalia
<i>Centropyge jocularis</i>	FISH		Animalia
<i>Istigobius?</i> sp.	FISH		Animalia
<i>Dinematichthys trilobatus</i>	FISH		Animalia
<i>Lutjanus monostigma</i>	FISH		Animalia
<i>Thalassoma quinquevittatum</i>	FISH		Animalia
<i>Ecsenius lineatus</i>	FISH		Animalia
<i>Hemidactylus frenatus</i>	REPTILE		Animalia
<i>Hemidactylus brookii</i>	REPTILE		Animalia
<i>Hemidactylus frenatus</i>	REPTILE		Animalia
<i>Hemidactylus frenatus</i>	REPTILE		Animalia
<i>Gehyra mutilata</i>	REPTILE		Animalia
<i>Hemidactylus frenatus</i>	REPTILE		Animalia
<i>Gehyra mutilata</i>	REPTILE		Animalia
<i>Ramphotyphlops braminus</i>	REPTILE		Animalia
<i>Hemidactylus brookii</i>	REPTILE		Animalia
<i>Gehyra mutilata</i>	REPTILE		Animalia
<i>Hemidactylus frenatus</i>	REPTILE		Animalia
<i>Hemidactylus frenatus</i>	REPTILE		Animalia
<i>Hemidactylus frenatus</i>	REPTILE		Animalia
<i>Hemidactylus frenatus</i>	REPTILE		Animalia
<i>Gehyra mutilata</i>	REPTILE		Animalia
<i>Urochloa mosambicensis</i>	MONOCOT		Plantae
<i>Conyza bonariensis</i>	DICOT		Plantae
<i>Conyza bonariensis</i>	DICOT		Plantae
<i>Cynodon dactylon</i>	MONOCOT		Plantae
<i>Dactyloctenium aegyptium</i>	MONOCOT		Plantae
<i>Chrysopogon aciculatus</i>	MONOCOT		Plantae
<i>Sporobolus indicus</i> var. <i>major</i>	MONOCOT		Plantae
<i>Eleusine indica</i>	MONOCOT		Plantae
<i>Melinis minutiflora</i>	MONOCOT		Plantae
<i>Euphorbia heterophylla</i>	DICOT		Plantae
<i>Melinis repens</i>	MONOCOT		Plantae
<i>Tridax procumbens</i>	DICOT		Plantae
<i>Euphorbia hirta</i>	DICOT		Plantae
<i>Cenchrus ciliaris</i>	MONOCOT		Plantae
<i>Phyllanthus amarus</i>	DICOT		Plantae
<i>Urochloa mutica</i>	MONOCOT		Plantae
<i>Dichotomaria marginata</i>	ALGA		Plantae
<i>Champia</i> sp.	ALGA		Animalia
<i>Urochloa mutica</i>	MONOCOT		Plantae
<i>Cenchrus ciliaris</i>	MONOCOT		Plantae
<i>Acalypha indica</i>	DICOT		Plantae
<i>Gracilaria</i> sp.	ALGA		Animalia
<i>Indigofera hirsuta</i>	DICOT		Plantae
<i>Dugong dugon</i>	MAMMAL	MI	Animalia
<i>Oldenlandia corymbosa</i>	DICOT		Plantae
<i>Turnera ulmifolia</i>	DICOT		Plantae
<i>Aerva lanata</i>	DICOT		Plantae
<i>Blenniella periophthalmus</i>	FISH		Animalia

<i>Istiblennius edentulus</i>	FISH	Animalia
<i>Pterois radiata</i>	FISH	Animalia
<i>Asterropteryx semipunctatus</i>	FISH	Animalia
<i>Thalassoma hardwicke</i>	FISH	Animalia
<i>Rattus rattus</i> subsp. <i>diardii</i>	MAMMAL	Animalia
<i>Mus musculus</i> subsp. <i>musculus</i>	MAMMAL	Animalia
<i>Coryphopterus duospilus</i>	FISH	Animalia
<i>Amblygobius tekomaji</i>	FISH	Animalia
<i>Eviota</i> sp.	FISH	Animalia
<i>Nectamia fusca</i>	FISH	Animalia
<i>Epibulus insidiator</i>	FISH	Animalia
<i>Coryphopterus neophytus</i>	FISH	Animalia
<i>Liza vaigiensis</i>	FISH	Animalia
<i>Cirripectes castaneus</i>	FISH	Animalia



ghd.com

→ **The Power of Commitment**