



PROFILE FOR MANAGEMENT OF THE HABITATS AND RELATED ECOLOGICAL AND CULTURAL RESOURCE VALUES OF **BOIGU ISLAND**

January 2013

Prepared by 3D Environmental for
Torres Strait Regional Authority Land & Sea Management Unit



Australian Government



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EXECUTIVE SUMMARY

Boigu Island is low lying and swampy with a high point of barely 1.7m AHD and occupies a total area of 7 906 ha. Along with the nearby larger island of Saibai and the granite rock pile that forms Dauan Island, Boigu forms part of the Northern Island Group and is an alluvial extension of the Papua New Guinea mainland which is clearly visible from the islands northern coastline. A total of 10 vegetation communities, within eight broad vegetation groups and eight regional ecosystems are recognised across the island. Three of the regional ecosystems are restricted to the Northern Island Group although these are likely to be more extensive on the nearby Papua New Guinea mainland.

There are currently 245 flora species recorded on the island which comprises 178 (73%) native taxa, with 67 (27%) introduced species. This represents approximately 22% of the known flora for the Torres Strait Island group. Seventy-two families are represented with 182 genera, 132 of which are native. The high percentage of naturalised species (27% of island flora) is heavily influenced by a concentration of past botanical collections in and around the settled areas. Major native plant families are Rhizophoraceae (17 species), Poaceae (13 species), Fabaceae (12 species), Euphorbiaceae and Cyperaceae (8 species), Lythraceae (7 species) and Rubiaceae (6 species). One plant species is considered threatened at the state level and a further seven species are considered to have significance at a regional level.

As for the majority of Torres Strait Islands there is a lack of systematic survey of fauna habitats on the island. A desktop review identified 179 fauna species that have been reported for Boigu Island (**Appendix G**). This includes two frog, 13 reptile, 155 bird and 9 mammal species. This can be compared with the 384 terrestrial fauna species that have been reported for the broader Torres Strait Island group. Of these, one reptile, one bird and four mammal species are introduced. An additional two species have been identified by the Protected Matters Search Tool as possibly occurring.

A total of seven species of conservation significance (threatened species) at either state or federal level have been recorded on the island, with an additional two species predicted to occur. There are also an additional 32 Migratory species considered to have significance at federal level that are reported to occur on the island.

Although recent reports have added significant information to what is known of the fauna on Boigu Island, there undoubtedly remains much to learn. The low lying and swampy nature of the island means that opportunistic recording of fauna will always be limited to the more easily accessible, and often disturbed, parts of the island. Well-planned and systematic survey work is required to adequately assess the island's fauna in its entirety. The proximity of the New Guinea mainland

means that bird and bat species are likely to be added to the island's species list each time any substantial survey effort is undertaken.

Within the eight broad vegetation groups (or management units) identified on the island, a number of issues for future management are identified as necessary for the future biodiversity maintenance and ecological health of the island. These are:

- Maintenance of traditional burning regimes within native grassland habitats.
- Monitoring of landscapes threatened by changing burning regimes.
- Monitoring for the introduction and spread of a number of exotic species, both fauna and flora, throughout the island landscape.
- A requirement for further survey work to document the poorly known faunal assemblage on the island.
- Continued collection of floristic information, specifically those plants with cultural and biodiversity significance.
- Further survey and documentation of the complex and diverse cultural landscape on the island.

It is important that any future surveys on Boigu are undertaken in collaboration with the Boigulgal and to include study of Boigulgal traditional ecological knowledge and ethnotaxonomy. Furthermore all mapping and assessment work must comply with research protocols (to be finalised) and must be approved by the Boigulgal PBC, and involve and be guided by the Mawi Kaia Rangers.

ACKNOWLEDGEMENTS

The project has been funded by through the Land and Sea Management Unit of the Torres Strait Regional Authority. Our thanks are extended for the support and guidance of Tony O’Keeffe and Michael Bradby of TSRA who administered the project and provided valuable input throughout. 3D Environmental also wish to acknowledge all Boigulgal Elders and thank the Boigulgal PBC for their access to the land. Much appreciation is also given to the Mawi Kaia Rangers Nelson Gibuma, Ishmael Gibuma, Nemiah Marama and TSRA Ranger Supervisor James Mills for assistance in the field.

Fauna information and review was provided by Terry Reis with peer review carried out by Dr Garrick Hitchcock and Peter Stanton who also provided the text for fire in the ecological landscape. Dr Paul Forster and staff of the Queensland Herbarium assisted with identification of plant specimens and provided advice on significant species ecology and distribution. Barbara Waterhouse of the Australian Quarantine Inspection Service provided valuable information on the occurrence and distribution of weeds. All members of the expert technical panel provided essential input into the process and their contribution is most appreciated.

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1.0 Introduction

Boigu Island represents one of seven islands within the broader Torres Strait Island group selected for the development of an island specific biodiversity management profile. The profile aims to document the biodiversity features, landscape processes, and cultural values (from both a landscape and site specific perspective) that are intrinsic to the island and develop management actions to ensure preservation or enhancement of those features. In the process of developing this plan, those sites and landscape features of specific cultural importance to the Boigu Island (Boigulgal) people are recognised and recommendations contained within are pertinent to the management of values of importance from both a traditional cultural and western scientific perspective. The specific management recommendations detailed within this profile will be directly incorporated into the developing 'Boigu Island Working on Country Plan' as a basis for specific management actions.

1.1 Cultural Setting

The population of Boigu consists of 255 Indigenous and 27 non-Indigenous people (2006 census). Land tenure is DOGIT (Deed of Grant in Trust) with Native Title determined on 10/12/2004. The Registered Native Title Body Corporate¹ (RNTBC or PBC in shortened form) is the Malu Ki'ai (Torres Strait Islanders) Corporation who hold the title of the land on behalf of the traditional owners.

The Boigulgal, the people of Boigu, speak Kalaw Kawaw Ya, one of four dialects of Kala Lagaw Ya, the Western-Central Torres Strait language.

1.2 Geographic Setting

Boigu Island, along with the nearby larger island of Saibai and the granite rock pile that forms Dauan Island, is part of the Northern Island Group and is located approximately 146 km north of Thursday Island (see **Figure 1**). Boigu and Saibai are extensions of the Papua New Guinea mainland which is clearly visible from the islands northern coastlines. Boigu, with an area of 7 906 ha, is low lying and swampy with a high point of barely 1.7m AHD. The mean annual rainfall of 1 479mm (BOM 2008a) compares with 1 983mm on Badu Island, the wettest recording station in the Torres Strait Islands (BOM 2008b) and Dauan, the driest recording station at 1 082mm (BOM 2008c). There are no areas of natural permanent freshwater on the island although a freshwater well was buried during construction of the airstrip. The constructed water-body which fringes the airstrip is also likely to be seasonally fresh.

¹ Registered Native Title Body Corporate – the organisation that is recognised as holding native title in trust for the benefit of the native title holders. It contacts native title holders and administers business between them and outsiders, such as government, industry and developers.

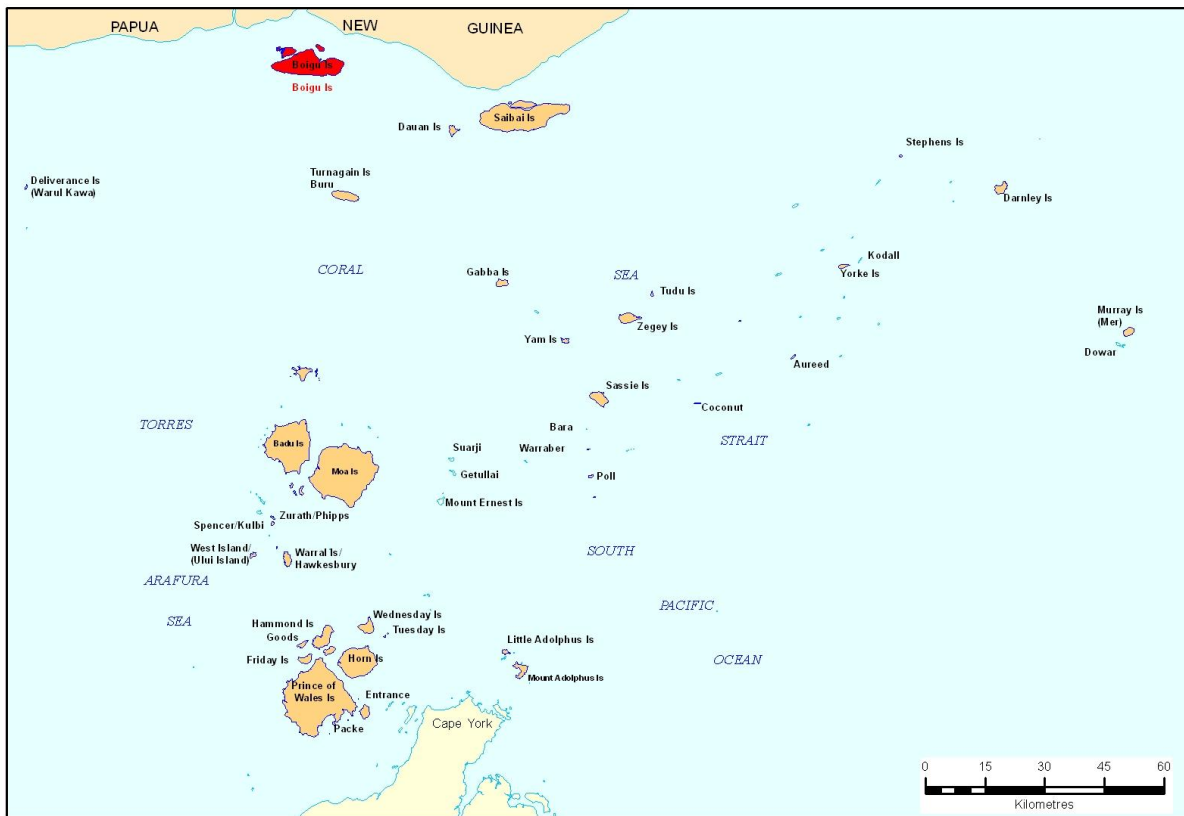


Figure 1. Location of Boigu Island.

1.3 Geological Context

The Fly Platform, the largest tract of low-lying country in Papua New Guinea (Loffler 1977), terminates on Papua New Guinea's southern coast with an extensive system of estuarine wetlands. Boigu Island represents a remnant of this platform, separated from the Papua New Guinea mainland through the erosive actions of major Papua New Guinea river systems (including the Pahoturi, the Mai Kussa, and the Wassi Kussa Rivers) under tidal influence. The island is formed dominantly from recent estuarine sedimentary deposits, although suppressed and highly fragmented remnants of Pleistocene age alluvial plains are scattered throughout the islands interior. Many of these alluvial remnants have been reduced to narrow slivers, barely emerging above a much broader expanse of brackish wetland communities. Suppressed shell and coralline beach ridges are also present, scattered mostly around the islands southern fringes where they form low rises over estuarine sediment. The most elevated point on Boigu Island is found on the northern coast (proximity to the island township), at 2-3m above mean sea level (Conics 2009). With the majority of Boigu's landscape under tidal influence, a limited area of land is suitable for development or settlement purposes.

2.0 *Methods*

This document provides a compendium of information that has been compiled from a range of sources, supplemented with information gathered from consultation with both technical experts and the Boigulgal people. Numerous surveys relevant to flora, fauna and cultural heritage matters have contributed to the compilation of this document and these are referenced throughout the body of the report. Steps taken during preparation of this document include:

1. Compilation of desktop resources which includes but is not limited to Stanton *et al.* (2009), Queensland Herbarium's Herbrecks Database, Queensland Museum fauna record extracts, Birds Australia database extract, WildNet database extracts, Conics Land Use Management Plan for Boigu Island (Conics 2008) and various technical papers relating to both flora and fauna (see references section).
2. Presentation of this information at a workshop in Cairns, where biodiversity information was presented to a range of technical experts for discussion and further input. A list of workshop attendees is provided in **Appendix A**.
3. An island based consultation with Mawi Kaia Rangers on Boigu Island (22-25th November, 2010).

3.0 *Aims and Objectives*

The aim of this document is to compile and annotate existing information relating to:

1. The extent, values and condition of island habitats and the plants and animals which occur in them.
2. Island-scale ecological processes, that is, the environmental and human factors which are influencing habitats, plants and animals.
3. The cultural interactions with these processes, that is, the ways that Boigulgal people interact with the natural environment including identification of values.
4. The establishment of a prescribed list of management actions intended to be used by island rangers and managers to assist in updating Land and Sea Ranger Work Plans and increasing the effectiveness of the island's ecological and cultural value management.

Owing to the long term occupancy of the islands (>4 000yrs) (McNiven & Wright 2008), the apparent stability of the majority of landscapes, and general lack of detailed ecological information pertaining to these landscapes, it is assumed that maintaining the existing landscape condition and process (in all but a few cases) is the safest management option. Habitat maintenance has therefore been a primary consideration during the compilation of this document. The specific actions that are adopted and direction of island-scale ecological management will however be ultimately up to the

discretion of the Boigu Island Rangers and the Boigulgal people, who are represented by their Registered Native Title Body Corporate, the Boigulgal (Torres Strait Islanders) Corporation.

4.0 Legislative and Policy Considerations

Biodiversity (plants, animals and their habitats) is regulated at state and national levels by a range of legislative mechanisms which classify animal species, plant species and habitats according to their rarity, population size, distribution and threats. The legislative classification is generally used as a way to assign significance to a particular species or ecological value. If an animal, plant or vegetation type is listed on any Australian or Queensland government legislation, it is subject to rules which protect it from being destroyed or harmed. For example, if a certain orchid species is listed on the legislation it would mean that the orchid could not be collected from the bush and sold at a nursery without the necessary authorisation and permits. Similarly, if an animal such as a bat species or bat colony, which was listed as threatened under legislation, lived in a rock shelter where a housing development was proposed, then detailed studies would be required to determine how the bats would be affected by the development. A description of relevant components of the major legislation mechanisms requiring consideration is provided briefly below.

Nature Conservation Act 1992: *The Nature Conservation Act* (NC Act) is a legislative mechanism of the Queensland Government that is regulated by the Department of Environment and Heritage Protection (EHP). The *Nature Conservation (Wildlife) Regulation 2006* is subordinate to the NC Act and defines five classes that are:

- Extinct in the Wild.
- Endangered.
- Vulnerable.
- Near-Threatened.
- Least Concern.

These classes collectively relate to native species that are protected wildlife (plants and animals).

Vegetation Management Act: *The Vegetation Management Act 1999* (VMA) is a state regulated planning initiative that underpins the regional management of vegetation in Queensland. Under the VMA, conservation significance to particular vegetation groups termed regional ecosystems (REs) is assigned on a consistent state-wide basis. The classification of regional ecosystems is based on a hierarchical system with a three-part code defining bioregion, followed by land zone, and then vegetation. Thirteen bioregions are classified in Queensland with the Torres Strait Islands being a sub-province of the broader Cape York Peninsula bioregion.

Land zones are geological and geomorphic categories that describe the major geologies and landforms of Queensland. The system is based primarily on geology, with geologic age considered

an important determinant. The classification of land zone generally utilises available geological information (Neldner *et al.* 2005) although field inspection is utilised as a supplementary measure where geological mapping is inadequate.

The status of REs is based on their pre-clearing and remnant extent, and is gazetted under the VMA and listed in the Regional Ecosystem Description Database maintained by the EHP. The Vegetation Management Status (VMS) of a regional ecosystem is described in line with the following:

Endangered regional ecosystem: a regional ecosystem that is prescribed under a regulation and has either:

- less than 10% of its pre-clearing extent remaining; or
- 10% to 30% of its pre-clearing extent remaining and the remnant vegetation remaining is less than 10 000 hectares (ha).

Of Concern regional ecosystem: means a regional ecosystem that is prescribed under a regulation and has either:

- 10% to 30% of its pre-clearing extent remaining; or
- more than 30% of its pre-clearing extent remaining and the remnant vegetation remaining is less than 10 000 ha.

Least Concern regional ecosystem: means a regional ecosystem that is prescribed under a regulation and has more than 30% of its pre-clearing extent remaining and the remnant vegetation remaining is more than 10 000 ha.

Hence, the majority of vegetation scheduled under the VMA as 'of concern' on Boigu (e.g. grassland habitat RE3.3.62) is classified as such because on a regional level (Cape York Peninsula) more than 30% of the original habitat extent remains although the total area of the habitat is less than 10 000ha. The regional ecosystem mapping available for Boigu provides accurate information on the legislative significance of vegetation on the island offering an information planning resource for the Boigu community, the TSIRC and the TSRA. For example, if a sewerage plant was proposed in an area which supported a regional ecosystem (vegetation type) that was considered 'of concern', then clearing of this vegetation without authorisation is in breach of the VMA. Liaison with regulators must be undertaken to determine the conditions that must be met for clearing to be authorised. EHP also assigns a Biodiversity Status (BS) to REs, a non-statutory indicator of a regional ecosystems susceptibility to elements of degradation.

Land Protection (Pest and Stock Route Management) Act 2002: The *Land Protection (Pest and Stock Route Management) Act 2002* (LPA) provides a framework and powers for improved management of weeds, pest animals and the stock route network. The Act provides for designation

of threat classes to species of plant and animal considered not native to Queensland (exotic or invasive) and which degrade natural resources, threaten conservation of biodiversity, threaten remnant vegetation, reduce rural production and interfere with human health and recreational activities. Exotic species that pose a threat are declared under one of the following three categories:

- Class 1 Pest: a pest that has potential to become a very serious pest in Queensland in the future.
- Class 2 Pest: a pest that has already spread over substantial areas of Queensland, but its impact is considered sufficiently serious to warrant control.
- Class 3 Pest: a pest that is commonly established in parts of Queensland but its control by landholders is not warranted unless the plant is impacting, or has potential to impact on a nearby environmentally sensitive area.

For example, if a Class 2 weed such as belly-ache bush (*Jatropha gossypifolia*) was found on Boigu, there is a requirement under the Act for landowners to take reasonable steps to control and manage the weed. Weeds of National Significance (WONS) identify the top 20 weed in terms of impact to productivity and landscape at a national level on a non-statutory basis.

The Back on Track Species Prioritisation Framework: The 'Back on Track (BOT) species prioritisation framework' is a non-legislative Queensland Government initiative that prioritises Queensland's native species as a means to guide their conservation, management and recovery. The assessment method utilises multiple criteria allowing identification of those species that are threatened and facing population declines, and those species that have a high potential for recovery. The BOT methodology classifies four priority levels for action to remediate declining Queensland wildlife being 'Critical Priority (CR)', 'High Priority (H)', 'Medium Priority (M)' and 'Low Priority (L)'.

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act): The EPBC Act, an initiative of the Australian Government, provides recognition of four classes of wildlife and habitat being those which are:

- Extinct in the wild
- Critically endangered
- Endangered
- Vulnerable

Plant and animal species and habitats scheduled under these categories are referred to collectively as 'Threatened Wildlife'. The EPBC Act also provides for protection of those species which are considered migratory under international conventions which include:

- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)
- China-Australia Migratory Bird Agreement (CAMBA)
- Japan-Australia Migratory Bird Agreement (JAMBA)
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA)

Interference or destruction of plants, animals or areas of habitat for species listed as threatened under the EPBC Act requires specific authorisation from the regulator who are likely to provide conditions under which the interference can take place. Interference (such as removal of protected orchid species) without authorisation is in breach of the EPBC Act.

5.0 Vegetation

As described in the following sections, the classification of vegetation includes both nomenclature of individual species and the classification of groups of plants, the latter often forming unique assemblages that can be consistently recognised across islands (e.g. Boigu), island groups (Near Northern Torres Strait Islands) or bioregions (Cape York Peninsula Bioregion).

5.1 Vegetation Groups and Mapping

The hierarchy of vegetation classification used in the Torres Strait Islands is described below with relationships illustrated in **Figure 2**. At the highest level, the classification of plant assemblages is based on vegetation structure considering the dominant life form (tree or grass), height of the tallest strata, and canopy closure. The structural classification used by the Queensland Government is included within **Appendix B**. Vegetation structural groupings (i.e. shrubland etc) are used to define **Broad Vegetation Groups** (BVGs) which provide the broadest level of vegetation classification recognised in vegetation mapping produced for the Torres Strait Islands (Stanton et al, 2009). BVGs may be an amalgamation of a number of more specific plant groupings known as **Vegetation Communities**. Vegetation communities (VCs) can be described as ‘a unit of vegetation that demonstrates similarities in both structure and floristic composition’. VCs are useful to describe fine scale variation in floristic composition that may occur due to the consistent dominance of a particular plant species or suite of plant species. REs as described in **Section 4** comprise a group of vegetation communities, although unlike BVGs, they consider regional distribution and geology within the classification. REs must be considered due to their legislative implications, although in this document, for specific habitat management purposes, BVGs provide a more readily usable management grouping and have been used to define habitat management units.

Vegetation Classification on Boigu Island: For management purposes, the islands vegetation is classified into broad vegetation groups (BVGs), herein referred to as habitats, as derived from Stanton et al (2009). The spatial extent and relative contribution of these groupings is provided in

Table 1, descriptions of component vegetation communities and associated regional ecosystems provided in **Table 2**. Further characterisation of habitat types is provided in the following text.

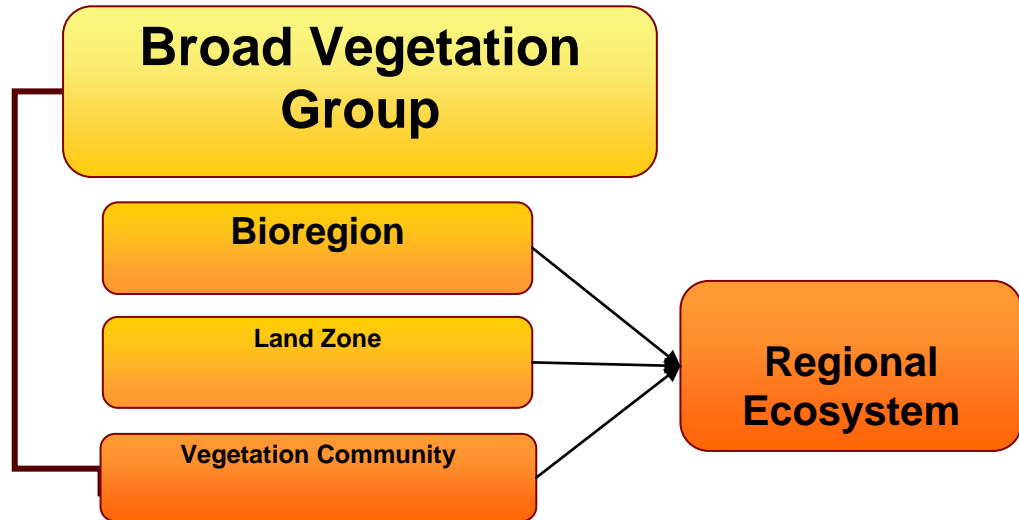


Figure 2. Diagrammatic illustration of the hierarchy and relationship between components of the vegetation classification system used in the Torres Strait Islands vegetation mapping study (Stanton et al. 2009).

Table 1. Broad vegetation groups and relative contributions to island vegetation.

Broad Vegetation Group/ Habitat**	Component Vegetation Communities**	Area (ha)	Contribution (%)
Deciduous / Semi deciduous vine forest and vine thicket	2a	32	0.4
Shrublands and shrubland complexes	14b	52	0.7
Pandanus dominant woodland and shrubland	11a	7.4	0.1
Grasslands and grassland complexes	17a	11	0.2
Samphire grasslands	26a, 26b	115	1.5
Samphire herblands and shrublands and salt pans	25a, 25b	228	2.9
Estuarine wetland complexes and mosaics	27a	835	10.6
Mangrove forest, woodland and shrubland complexes	24a	6567	83
Regrowth	RE (Pre disturbance 24a)	7	0.1
Cleared Areas	CI (Pre disturbance 17e)	32	0.4

Broad Vegetation Group/ Habitat**	Component Vegetation Communities**	Area (ha)	Contribution (%)
Total		7906	100

Table 2. Descriptions of component vegetation communities and association with regional ecosystems currently recognised on Boigu Island (from Stanton *et. al.* 2009).

Vegetation Community	Description	Geological Association	Regional Ecosystem	VMS	BDS
2a	Deciduous/Semi-deciduous vine forest + <i>Erythrina variegata</i> + <i>Manilkara kauki</i> + <i>Terminalia subacroptera</i> + <i>Mimusops elengi</i> + <i>Cordia subcordata</i> .	Calcareous Beach Ridges - Cheniers	3.2.2b	LC	Of Concern
14b	<i>Melaleuca cajuputi</i> subsp. <i>platyphylla</i> + <i>Acacia auriculiformis</i> +/- <i>Terminalia subacroptera</i> open scrub and low open forest.	Alluvial Plains	3.3.68	OC	OC
11a	<i>Pandanus</i> sp. +/- <i>Melaleuca cajuputi</i> subsp. <i>platyphylla</i> +/- <i>Acacia leptocarpa</i> +/- <i>Melaleuca acacioides</i> shrubland and low woodland.	Alluvial Plains	3.3.62	OC	OC
17a	Tall <i>Ischaemum australe</i> +/- <i>Imperata cylindrica</i> +/- <i>Themeda triandra</i> +/- <i>Mnesithea rottboellioides</i> +/- <i>Heteropogon triticeus</i> grassland.	Alluvial Plains	3.3.62	OC	OC
26a	Closed <i>Sporobolus</i> sp. grassland.	Saline Alluvial Plains	3.1.5	LC	NCAP
26b	<i>Sporobolus</i> sp. Grassland / Chenopod forbland and herbland complex (26a/25a - 50/50).	Saline Alluvial Plains	3.1.5/ 3.1.6	LC	NCAP
25a	Dwarf halophytic shrubland and saltpan.	Hypersaline Alluvium	3.1.6	LC	NCAP
25b	Salt pan.	Hypersaline Alluvium	3.1.6	LC	NCAP
27a	<i>Schoenoplectus</i> sp. sedgeland.	Estuarine muds (periodically inundated)	3.1.7	OC	OC
24a	Mangrove closed and open forest, woodland and shrubland complexes (24d/24c – 80/20).	Estuarine muds (periodically inundated)	3.1.1/ 3.1.2	LC	OC Sub-dominant

5.2 Flora Species

The Boigu flora assemblage has been compiled from analysis of Queensland Herbarium data (Herbrechs 2008), 3D Environmental survey data (Stanton *et al.* 2009; 2011 field survey) and results of previous studies including Dowe (2010) in Burrows (2010). The known flora of 245 species comprises 178 (73%) native species (**Appendix E**). The 67 introduced species account for 27% of the island flora. This represents approximately 22% of the known flora for the Torres Strait Islands. Seventy-two families are represented within 182 genera, 132 of which are native. Major native plant

families are Rhizophoraceae (17 species), Poaceae (13 species), Fabaceae (12 species), Euphorbiaceae and Cyperaceae (8 species), Lythraceae (7 species) and Rubiaceae (6 species). A comparison of the island flora in relation to other Torres Strait Islands and regional floras is provided in **Table 3**.

Table 3. Summary of the vascular flora of the Boigu Island in relation to Torres Strait Islands (Stanton *et al.* 2009), Cape York Peninsula (Neldner and Clarkson 1995 in Neldner 1998) and Great Barrier Reef Continental Islands (Batianoff and Dilleward 1997) and Queensland Flora (Bostock and Holland 2010).

Islands	Families/Species	Pteridophytes	Gymnosperms	Angiosperms	Total
Boigu Is	Families	3	0	69	72
	Species	4	0	239	243
Mabuiag Is.	Families	2	1	101	104
	Species	4	1	429	434
Badu is.	Families	11	2	117	130
	Species	17	2	586	605
Iama Is.	Families	2	0	78	80
	Species	2	0	266	268
Torres Strait Islands (Combined)	Families	15	1	158	174
	Species	39	1	1,289	1,330
Cape York Peninsula	Families ²	30	5	183	218
	Species	157	6	3,173	3,338
GBR Continental Islands³	Families	25	5	165	195
	Species	97	7	2,091	2,195
Qld Flora⁴	Species	396	70	9,424	9,890

The high percentage of naturalised (exotic) species (27% of island flora) is heavily influenced by a concentration of botanical surveys and collections in and around the settled areas. This figure compares to 15% for Torres Strait Islands (Stanton *et al.* 2009), 7.4% for Cape York Peninsula (Neldner & Clarkson 2005) and 15.6% for Queensland (Bostock & Holland 2010). Disturbed areas support the greatest number of species with 96 species recorded (see **Table 4**). Vine forests and thickets (72 species) and mangroves (57 species) support the greatest species richness. The relatively low number of introduced species indicates that remnant habitats on the island are generally in natural condition. Additional systematic surveys in grasslands, pandanus woodlands and estuarine wetlands are likely to increase the species composition.

Table 4. Summary of the vascular flora of the Boigu Island in relation to Broad Vegetation Groups

Broad Vegetation Group	Total Species Recorded (to end 2010)	% native	% naturalised
Cleared land and non remnant regrowth (C/Re)	96	36	64
2. Deciduous and semi deciduous vine forest and vine thickets (VC2a - RE3.3.2b)	72	92	8
24. Mangroves and mangrove complexes (VC24a, 24b, RE3.1.1)	57	100	0
14. Shrubland and shrubland complexes	27	100	0

² Cape York flora utilises Henderson (2002).

³ Batianoff and Dilleward (1997) identify 552 continental islands along the east coast of Queensland within the Great Barrier Reef Marine Park (GBRMP), a total land area of about 1,627 km².

⁴ Bostock and Holland (2010).

Broad Vegetation Group	Total Species Recorded (to end 2010)	% native	% naturalised
(VC14b – RE3.3.68)			
17. Grasslands and grassland complexes (VC17a – RE3.3.62)	24	100	0
11. Pandanus dominant woodland and shrubland (VC11a – RE3.3.62)	24	100	0
27. Estuarine wetland complexes and mosaics (VC27a – RE3.1.7)	18	100	0
26. Samphire grasslands (VC26a/26b – RE 3.1.5/3.1.6)	9	100	0
25. Samphire herblands, shrublands and salt pans (VC25a, 25b – RE3.1.6)	3	100	0

5.2.1 Flora Species with Biodiversity Significance

An assessment of significant flora species draws from the data sources identified above and seeks to provide details sufficient to document additional flora and habitats which should be considered a priority and focus for management actions. Additional and complementary species management criteria have been assessed with consideration of the existing Torres Strait Region Back on Track Species Prioritisation program (DERM 2009) and ongoing assessments of the status of Queensland flora by the Queensland Herbarium. Species have been broadly categorised into significance categories (i.e. National, State, Regional and Cultural) based on criteria which include legislative status, keystone/focal, threatened or sensitive, restricted, otherwise noteworthy or of cultural interest value. Culturally significant species are assessed separately. The eight species identified as having significance at the state, and regional level are summarised in **Table 5** below.

Table 5. Summary of flora with biodiversity significance on Boigu Island.

Species	National EPBC	State NC Act	Regionally Significant	BVG	VC	RE
<i>Dolichandrone spathacea</i>	-	NT	Disjunct	Mangroves	24a	3.1.1/3.1.2
<i>Nypa fruticans</i>	-	-	Disjunct	Mangroves	24a	3.1.1/3.1.2
<i>Sonneratia alba</i>	-	-	Southern limit of distribution	Mangroves	24a	3.1.1/3.1.2
<i>Acanthus ebracteatus</i> subsp. <i>ebarbartus</i>	-	-	New record for Qld	Mangroves	24a	3.1.1/3.1.2
<i>Synima cordierorum</i>	-	-	Disjunct Locally rare	Shrublands and shrubland complexes	14b	3.3.68
<i>Livistona benthamii</i>	-	-	Disjunct Locally rare	Shrublands and shrubland complexes	14b	3.3.68
<i>Corypha utan</i>	-	-	Disjunct Locally rare	Grassland	17a	3.3.62
<i>Leptochloa simoniana</i>	-	-	Disjunct Locally restricted Southern limit of distribution	Mangrove margins	24a	3.1.1/3.1.2

NT = Near -Threatened

National Significance

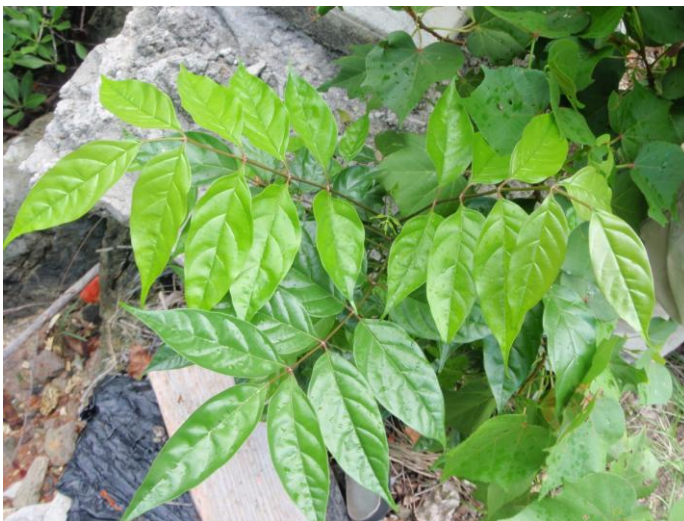
No species listed on the EPBC Act are known to occur.

State Significance

One species known from the island is listed on the NC Act.

Mangrove Trumpet Tree (*Dolichandrone spathacea*) - Near-Threatened: A small tree found close to mangroves in brackish areas (VC24a – RE3.1.1/3.1.2). It is native to India, Sri Lanka; Cambodia, Myanmar, Thailand, Vietnam; Indonesia, Malaysia, Papua New Guinea, New Caledonia, Solomon Islands, Vanuatu and Australia in north eastern Cape York Peninsula (Olive River and Temple Bay) where it may be threatened by pond apple.

The seeds are peculiar in having comparatively short opaque wings of a spongy/corky texture similar to that of the body of the seed. Dispersal is by wind, however it is better adapted for dispersal by ocean currents (van Steenis 1977). In Torres Strait it has also been recorded from Iama Island however it is expected to occur on other islands with extensive mangrove habitats. Cultural uses and values known from Papua New Guinea, Solomons, Java and the Philippines include various medicinal uses and as a fish poison.



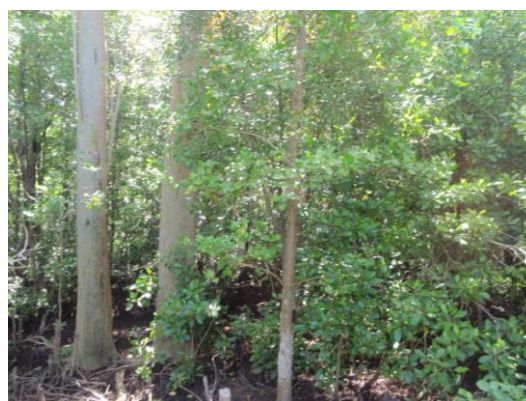
Photograph 1. A sapling of *Dolichandrone spathacea* from Iama Island.

Regional Significance

The classification of regionally significant species takes into account factors such as disjunct occurrence, endemism (at the bioregional, bioprovince, and island scales), limits of geographic distribution, and local rarity in the landscape. Six species are recognised on Boigu Island.

***Sonneratia ovata*:** A mangrove tree recorded by Duke (2010 in Burrows 2010) in mangroves on Boigu Island. The species is known from scattered, widely separate localities along tidal areas and seashores from China and Thailand through Peninsular Malaysia, the Riau Archipelago, Java, and Borneo, to Sulawesi, the Moluccas, and Daru Island and Milne

Bay in Papua New Guinea. The occurrence on Boigu represents a new record for the Australian territory (Duke 2010 in Burrows 2010) and a southern limit of distribution. The extent of the population is not known, however information on its preferred habitat indicates that it typically occurs as scattered individuals amongst mangrove communities. The species, which is also expected to occur on nearby Saibai Island, has no known threats. Cultural uses and values are not documented for Boigu however uses known from Papua New Guinea and Indonesia include: firewood; tannin or dyestuff (bark); food (sour but edible fruit); medicine (fruit applied in poultices to relieve sprain, and fermented juice is believed to check hemorrhages) (Othman 1997).



Photographs 2 & 3. *Sonneratia ovata* on the margin of mangroves Boigu Island.

Purple Holly Mangrove (*Acanthus ebracteatus* var. *ebarbatus*): A species restricted to Australia where it is found in silts and muds in lower tidal positions along tidal waterways in Western Australia (Kimberley) to the MacArthur River in the Northern Territory. The record by Duke (2010) from Boigu represents new record for Queensland. It is also expected to occur on Saibai Island.

***Synima cordierorum*:** A small tree that occurs on Boigu Island in shrubby vine thicket on alluvium (VC14b/RE3.3.68) and is also known from Papua New Guinea, Cape York Peninsula and between Cape Tribulation and Ravenshoe in the Wet Tropics bioregion. The Boigu population is disjunct and represents the northern limit of Australian distribution although is also potentially occurs on Saibai Island in similar habitat. Threatening processes include habitat change associated with rising sea levels and changed fire regimes. Cultural resource utilisation and values are not known.

***Nypa Palm (Nypa fruticans)*:** A palm known from Pacific Islands, Asia, India, Papua New Guinea, Malesia, and Northern Territory which occurs in Cape York Peninsula in a number of disjunct populations (e.g. Jardine, Olive, Claudie, McIvor Rivers) and on the wet tropical coast at the mouth of the Herbert River. Torres Strait populations are rare and limited to a small patch on Prince of Wales, and on Boigu and Saibai. These represent disjunct occurrences and northern limit of Australian distribution, yet are part of a continuous distribution between

northern Australia and Asia-Pacific. No threatening processes apparent. Cultural uses are known from other regions however they are not documented for Torres Strait populations.

Cabbage Palm (*Livistona benthamii*): Known from (Western, Central Districts), NT, Torres Strait (Saibai, Boigu, Badu, Mua), and Cape York Peninsula. Boigu occurrence is disjunct and represents the northern limit of Queensland and Australian distribution. Populations are potentially threatened by rising sea levels. Cultural uses and values known from other regions however are not documented for Boigu.

Corypha Palm (*Corypha utan*): Known from Pacific Islands, Asia, India, Papua New Guinea, Malesia, and Northern Territory. Occurs in Cape York Peninsula in a number of disjunct populations (e.g. Lakefield, Aurukun, Silver Plains, and Dulhunty River). Torres Strait populations are rare and limited to a small patch on Prince of Wales (Stanton *et al.* 2009) and a reported observation on Boigu (see Dowe 2010). These represent disjunct occurrences and the northern limit of Australian distribution, yet are part of a continuous distribution between northern Australia and the Asia-Pacific. No threatening processes are apparent. Cultural uses are known from other regions however they have not been documented for Torres Strait populations.

***Leptochloa simoniana*:** This grass was first described in 2000 from collections in Papua New Guinea and Boigu Island by Barbara Waterhouse and Louise Hucks. Collection notes show that it is known to occur in the vicinity of old Mattawatta and Ture Ture in the Western Province of Papua New Guinea in seasonally inundated sites where it is a common weed alongside tracks extending from the beach to village. Records from Boigu note that the coarse tufted grass grows to 1.2m tall occurring in two small clumps at the western end of the rubbish dump, on the edge of mangroves. It has also been recorded from Saibai Island where it grows in a narrow sandy zone adjacent to mangroves (Herbrechs 2011).

5.2.2 Flora with Cultural Significance

Information on useful plants of Boigu Island compiled in this study has been sourced from Mulu Kaia Land and Sea Rangers and from review of literature. It is intended as a foundation to inform ongoing recording of Traditional Ecological Knowledge (TEK) as part of the Land and Sea Ranger working on country plans. The information and species recorded should be viewed as preliminary in nature. More detailed ethnobotanical studies within a formal TEK system are required to complement the existing list of useful plants and the local language names. This includes information on uses, seasonality, habitat, distribution, abundance, phenology, and most importantly the relationships to story and culture. Further work in this area is likely to significantly increase the numbers of plants known to be culturally utilised on the island.

The preliminary list provided in **Appendix C** identifies 70 species which have either known traditional uses or language names. This represents 27% of the island flora. Naturalised species

such as stinking passionflower (*Passiflora foetida*), bamboo (*Bambusa vulgaris*), mango (*Mangifera indica*), and coconut (*Cocos nucifera*) may occur within remnant vegetation, often in vicinity of old settlement and garden sites. Others such as cassava (*Manihot esculenta*), tree cashew (*Anacardium occidentale*), ringworm shrub (*Senna alata*), and tridax daisy (*Tridax procumbens*) may be abundant in community areas. Uzu (*Syzygium branderhorstii*) and bell fruit (*Syzygium aqueum*) are favoured bush fruit trees which are often planted in house gardens. These are considered domesticated native species as neither have been recorded in the vine forests of Boigu. They occur naturally in remnant vine forests on Erub, Mer, Dauan, and Mua.

The majority of the useful species (56%) are utilised for material purposes. Material uses include products made from timber (e.g. *Acacia auriculiformis*, *Manilkara kauki*), decoration (*Erythrina insularis* and *E. variegata*, *Entada phaseoloides*), rope or binding (*Hibiscus tiliaceus*, *Flagellaria indica*). The small proportion of plants used for medicinal purposes is a reflection of the limitations of the information compiled to date.

5.2.3 Introduced Plants

Information on weed species has been sourced from Stanton *et al.* (2009), Queensland Herbarium voucher data, a report on the terrestrial flora of Boigu (Dowe 2010 in Burrows 2010), the land use planning report of Conics (2009), and personal communication with Barbara Waterhouse from Department of Agriculture, Forestry and Fisheries (DAFF). With reference to **Appendix D**, 65 naturalised species occur on the island. Field surveys coupled with review of flora species data indicate that the remnant vegetation is generally free of introduced weeds. As for the majority of the inhabited islands in the Strait, the developed town areas and disturbed margins support high numbers of weeds. Those species considered a potential threat to biodiversity on the island and requiring management action are summarized below.

Declared Weeds

Two species declared under the LPA Act are found on Boigu Island and these have the potential to degrade the islands natural and cultural resources.

Belly Ache Bush (*Jatropha gossypifolia*) (Class 2): Bellyache bush has been recorded from the town area. As for lantana it has not been observed in remnant vegetation however it poses a serious threat to grasslands, shrublands and vine thicket habitats.

Lantana (*Lantana camara*) (Class 3): Lantana has been recorded from the town area, possibly as a garden plant. It has not been observed in remnant vegetation however it may pose a serious threat to grasslands, shrublands and vine thicket habitats. Lantana is listed as a WONS species.

Environmental Weeds

The following section details weeds capable of causing long term changes to biodiversity although they are not currently declared under state legislation.

Leucaena (*Leucaena leucocephala*): *Leucaena* is a small tree up to about 6 m tall with fine bipinnate leaflets, spherical creamy yellow flower heads, dense clusters of flattened pods up to 15 cm long with 20 glossy brown and flat seeds that scatter when ripe (Biosecurity Queensland 2007). A native to Central and South America, it is listed as a weed in 25 countries including New Guinea, Hawaii, western Polynesia and USA. *Leucaena* is not a declared plant in Queensland and there are currently no legal requirements or resources under state legislation for it to be controlled except for possibly schedules under local government law. Its origins on Boigu are not known, however it is often introduced for purposes such as fodder, shade, firewood and as a soil stabilizer. The International Union for Conservation of Nature's (IUCN) Invasive Species Specialist Group has listed *leucaena* in the 100 worst invasive organisms (Lowe *et al.* 2000 in Walton 2003) identifying the features that contribute to the weediness of *Leucaena* being that the species:

- Produces an abundant amount of seed throughout the year.
- Builds-up of a substantial seed bank (seeds remain viable for at least 10 years).
- Lacks pollinator specificity.
- Resprouts after cutting or burning.
- Is tolerant of drought.
- Forms dense impenetrable thickets, and
- Maintains self-compatibility, meaning that it can spread from an isolated tree.

Dense infestations which have rapidly become established in and around the margins of the Boigu community pose a significant threat to the islands cultural and natural values. Recent control efforts on Boigu by mechanical means i.e. excavation, have seen only short term results with vigorous resprouting from any disturbed roots not entirely dug out and potential for increased seed germination. *Leucaena* is reported by Walton (2003) as relatively easy to kill. However, once established, the species can be difficult to eradicate, given the longevity of the soil seed bank. Control methods documented by Walton (2003) include:

- Application of chemicals by methods such as basal bark, cut stem and foliar spray treatments.
- Where mechanical/physical methods are used, the roots must be dug out, as it will resprout vigorously after cutting.
- Use of a blade plough can cut the root low enough, and cultivation will kill most trees and roots.
- Mulching derived from the plant spread over the area can be replanted with fast-growing plants. When put back as thick mulch (with seed pods removed), this material will also suppress new *leucaena* seedlings.

The infestation urgently requires a long term control strategy which aims to eradicate the species.



Photograph 4 & 5. Typical infestations of *Leucaena* on Boigu.

Porcupine Flower (*Barleria prionitis*): This plant is considered an emerging environmental weed, which has the potential to seriously degrade Boigu Island biodiversity. It is recognised as one of 28 weeds on the *Alert List for Environmental Weeds* (NHT 2010). Porcupine flower is a low compact shrub introduced to Boigu as a garden plant. It is reported by Barbara Waterhouse to have been identified in 1993 and had spread on the edges of the town through natural seed dispersal by birds and improper disposal of garden clippings. Fortunately efforts by the Boigu Council have controlled known infestations near the track to the old crocodile enclosure. Ongoing control of any remaining plants and monitoring of this species is important given that the shrub has the potential to form dense thickets which may displace native vegetation and restrict access to waterways. It is also known to occur around townships in the Northern Territory (Darwin, Berry Springs, Katherine, Mataranka and the Victoria River district) and Queensland (Townsville) and in the Kimberley Region of Western Australia (NHT 2010). Experience throughout Australia has shown that *barleria* can be relatively easily controlled, especially where infestations are small. Reports of successful control of small infestations by physical and chemical means (herbicides application or removed by hand) in the Katherine and the Kimberley regions emphasize the need for timing of control, weed hygiene measures, and follow up programs to effect long term control.

Butterfly Pea (*Clitoria ternatea*): This vigorous sprawling vine is one of a number of leguminous vines and herbs which occur throughout the disturbed parts of the island. Butterfly pea is a tropical perennial legume adapted to a range of soils and climates in northern (tropical and subtropical) Australia. It is promoted by the pastoral industry as a legume that establishes quickly to produce a relatively cheap but high-quality, productive pasture on soils previously considered 'difficult to establish'. Current infestations are restricted to disturbed areas however its potential to invade Boigu grasslands and shrublands warrants concern. Seeds are likely to be dispersed by vectors such as machinery, water and grazing deer. Ongoing monitoring and prompt control of any infestations outside the community area is recommended.



Photograph 6 & 7. Robust infestation of butterfly pea on disturbed margins of the Boigu community.

Forest Bluegrass (*Bothriochloa bladhii*): This robust grass is rapidly spreading along roadsides and disturbed sites. It should be considered a potential threat to grassland ecosystems and monitoring of these habitats is warranted. It spreads readily by seed, with an ability to colonise away from the parent stand under favourable conditions and is very tolerant of fire. Surveys to determine the extent of this grass in native grasslands are also required. A confirmation of the identity of the species to distinguish it from the native subspecies *B. bladhii* var. *bladhii* is necessary.



Photograph 8. Typical infestation of forest blue grass on road edges.

Summary of Other Environmental Weeds

Together with the aforementioned butterfly pea, legumes such as siratro (*Macroptilium atropurpureum*), beggar weed (*Desmodium tortuosum*), gambia pea (*Crotalaria gooreensis*), six o'clock/ringworm shrub (*Senna alata*) and sensitive weed (*Mimosa pudica*), occur in various densities within and on the edge of the community, and are considered a threat to biodiversity on the island particularly grasslands and shrublands.

Other species such as cockatoo weed (*Hyptis suaveolens*), snake weed (*Stachytarpheta jamaicensis*), tridax daisy (*Tridax procumbens*), yellow bells (*Tecoma stans* var. *stans*), sidas (*Sida*



acuta, *S. corrugata*), and painted spurge (*Euphorbia cyathophora*), are widespread throughout disturbed areas and, in combination with the legumes, are rapid colonizers of any disturbance.

Grassy weeds are widespread throughout the disturbed areas with some species posing a threat to grasslands and grassy woodland habitats. Introduced grasses recorded from the island include Mossman River grass (*Cenchrus echinatus*), purpletop Rhodes grass (*Chloris inflata*), couch (*Cynodon dactylon*), crowsfoot (*Eleusine indica*), red Natal grass (*Melinis repens*), awnless barnyard grass (*Echinochloa colona*), buttongrass (*Dactyloctenium aegyptium*, *D. radulans*), and job's tears (*Coix lacryma-jobi*).

Weed Threats

Those weeds currently not recorded on Boigu which are capable of causing long-term changes to the island's vegetation are as follows.

Table 6. Major weed threats

Species	Comments	Photograph
Gamba grass (<i>Andropogon gayanus</i>)	Gamba is a Class 2 Declared Weed that has not yet been recorded in Torres Strait however, it is considered a serious potential threat. Together with Annual Mission Grass it is listed as a Key Threatening Processes under the EPBC Act and has recently been listed as a WONS species. It is widespread in the Bamaga district of northern Cape York Peninsula (Fell <i>et al.</i> 2009). The grass is an aggressive colonist which develops a standing biomass of 5-7 times that of native species resulting in extremely intense fires (Rossiter <i>et al.</i> 2003).	 Gamba grass near Injinoo (April 09).
Annual mission grass (<i>Pennisetum pedicellatum</i> subsp. <i>unispiculum</i>)	Annual mission grass is considered a serious potential threat and is listed as a Key Threatening Processes under the EPBC Act. It occurs on Mua and Mabuig Islands.	 Annual mission grass St Pauls area, Mua (March 2011).
Pond Apple (<i>Annona glabra</i>)	A deciduous shrub that infests swamplands and the brackish margins of mangrove habitats. The species is spread by dispersal of fruit and seeds which are ingested by animal or float on tidal currents. Severe infestations occur on Queensland's wet tropical coast. The species, which has been recorded on Horn Island, is a WONS species.	

6.0 Fauna (Animals)

For the purposes of this report, terrestrial fauna includes amphibious species such as crocodiles and amphibians and aerial species such as swifts. It does not include marine species and hence marine turtles, sea snakes and sea birds are excluded. Sea birds include all members of the Order Procellariiformes such as shearwaters and petrels, as well as frigatebirds (family Fregatidae), boobies (family Sulidae) and tropicbirds (family Phaethontidae). Some species of tern (family Laridae) are largely marine but are usually considered as shorebirds rather than sea birds (e.g. Pringle 1987).

As for the majority of Torres Strait Islands there is a lack of systematic survey of fauna habitats on the island. A desktop review of the EHP WildNet (Wildlife Online) database, Online Zoological Collections of Australian Museums (OZCAM 2011), the EPBC Online Protected Matters Search Tool maintained by the DSEWPC (2011g), was supported by analysis of the survey results of Conics (2008a) and Burrows *et al.* (2010), the latter completing comprehensive surveys of wetland fauna. Other records are incidental, or part of a broader regional survey targeted towards particular life forms (e.g. Draffan *et al.* 1983; Clarke 2004; Garnet *et al.* 2000; Hall 2008, Helgen 2004) of which studies of avifauna (birds) have been most comprehensive.

The desktop review identified 179 fauna species that have been reported for Boigu Island (**Appendix F**). This includes two frog, 13 reptile, 155 bird and 9 mammal species. This can be compared with the 384 terrestrial fauna species that have been reported for the broader Torres Strait Island group. Of these, one reptile, one bird and four mammal species are introduced. An additional two species have been identified by the Protected Matters Search Tool as possibly occurring.

6.1 Culturally Important Fauna Species

Over 100 years ago, English anthropologist Alfred Cort Haddon (1912:230) noted Torres Strait Islanders' familiarity with the natural world:

'[they] are good field naturalists and have names for a large number of plants and animals. A considerable number of plants are utilised in one way or another, more so than we have mentioned in these Reports. Although the land fauna is deficient in forms of economic importance, the natives have names for animals which are not of value to them, and are acquainted with their habits; their knowledge of the natural history of marine animals being very extensive. The uses and properties of most of the plants are known to them.'

The region's birds, mammals and reptiles also have cultural significance for Torres Strait Islanders. Many feature in local myths and legends, and some are also clan totems (*augadh*). On Mabuiag Island, clan totems include dog (*umay*), flying-fox (*sapur*), snake (*thabu*) and crocodile (*koedal*) (Haddon & Rivers 1904:154).

The calls of some birds are recognised as omens, foretelling events such as weather, the arrival of a ship or the death of a relative (e.g. Haddon 1908:260-261). Others are 'calendar species' which alert people to the fact that a particular food resource is now available. Feathers from birds such as herons (*Egretta sacra* and *Ardea* spp.) and the cassowary (*Casuarius casuarius* – obtained from Papua New Guinea traders) continue to be used for traditional headdresses.

6.2 Fauna Habitat Values

Although the reports by Clarke (2004a, b) and those contained within Burrows (2010) have added significant information to what is known of the fauna on Boigu Island there undoubtedly remains much to learn. The low lying and swampy nature of the island means that opportunistic recording of fauna will always be limited to the more easily accessible, and often disturbed, parts of the island. Well-planned and systematic survey work is required to adequately assess the island's fauna in its entirety. The proximity of the New Guinea mainland means that bird and bat species are likely to be added to the island's species list each time any substantial survey effort is undertaken.

The reported frog fauna is only two species, both of which are widespread, common species. The frog fauna of the Torres Strait overall is somewhat depauperate based on known records, and the majority of species are confined to larger islands and/or islands close to Cape York. Given the saline nature of the wetland habitats, other than after heavy rains, the actual frog assemblage for Boigu Island is unlikely to be much greater than that already identified, despite the rich frog fauna of New Guinea. Other than around human habitation, vine thicket appears the habitat most likely to support species. But the area of this habitat is comparatively small, it would be salt affected due to its linear nature and is difficult for frogs to colonise given its location on the southern edge of the island.

The 13 reptiles recorded is undoubtedly an under-representation of the actual assemblage. It is likely that more species will be recorded should further survey be undertaken, particularly nocturnal species. The mangroves and vine forest are likely habitats for additional reptile species, though there are a number of aquatic snakes that could occur in the wetlands. Reptile survey work requires a greater level of expertise than for frogs, birds and many mammals, given the difficulty in identification for many species. Some New Guinea species, not yet recorded in Australian territory, may be present.

Although survey work by Clarke (2004b) added a substantial number of bird species to the known assemblage, many more species are likely to be recorded if further survey work is undertaken, particularly on a seasonal basis. A lack of permanent freshwater waterbodies does, however, limit the number of possible species. Most of the bird species recorded in the Torres Strait are highly mobile and many are migratory, including many species that are not listed as Migratory under the EPBC Act. Habitat specificity is less likely among the species that do, and may, occur on Boigu Island. The limited area of vine forest limits the number of species that may occur, though many

species that occur in vine forest will frequent mangroves, though usually as a secondary habitat. Further survey work on Boigu Island is likely to add New Guinea species new to an Australian territory.

Five native mammal species have been reported for Boigu Island, four of which are mega-bats, *i.e.* blossom bats and flying-foxes. The water mouse is predicted to occur given the abundance of suitable habitat. It is very likely that a number of micro-bat species are present but this will require dedicated survey work for any confirmation beyond a very coarse scale, such as family level, or perhaps even suborder, the Microchiroptera.

The proximity of the Papua New Guinea coast means that some ground-dwelling species found in the coastal lowlands of New Guinea could conceivably occur on Boigu Island. This includes short-beaked echidna (*Tachyglossus aculeatus*), which occurs on many islands around the Australian mainland, Papuan planigale (*Planigale novaeguineae*), red-cheeked dunnart (*Sminthopsis virginiae*) and common echymipera (*Echymipera kalubu*). The echidna and echymipera, a bandicoot species that is a popular food item in New Guinea, would be known to the local community, should they ever occur. More likely to be present and not reported are the two dasyurids, that are very small and likely to be of little interest to the local community. However, habitat is likely to be a limiting factor and occurrence of such species, though possible, is unlikely.

6.3 Fauna Species with Conservation Significance

In this report fauna of conservation significance include:

- Species listed as Critically Endangered, Endangered or Vulnerable under the EPBC Act including those listed as Migratory.
- Species listed as Endangered, Vulnerable or Near-Threatened under Queensland's NC Act.
- Species considered of 'Critical' or 'High' priority under the Back on Track framework (DERM 2011a).

Other species may be assessed as being significant at the regional scale (*i.e.* Torres Strait) by the study team based on criteria such as local rarity, state and bioregional endemism, limits of distribution and disjunct occurrences.

6.3.1 Endangered, Vulnerable and Near-Threatened Species

A total of seven species of conservation significance (threatened species) at either state or federal level have been recorded on the island, with an additional two species predicted to occur (see **Table 7**). There are also an additional 32 migratory species considered to have significance at federal level that are reported to occur on the island (**Appendix H**). Those EVNT species reported or predicted to occur on Boigu Island are also listed in **Table 8**.

Table 7. Endangered, Vulnerable and Near-Threatened fauna species¹ reported or predicted² to occur on Boigu Island.

Scientific Name ³	Common Name	Status ⁴			Source ⁶
		EPBC Act	NC Act	BoT ⁵	
SPECIES REPORTED					
<i>Crocodylus porosus</i>	Salt-water crocodile	M	V		Unpublished record.
<i>Emoia atrocostata</i>	Littoral whiptail-skink		NT		Database & unpublished records.
<i>Varanus prasinus</i>	Emerald monitor		NT		Published & unpublished records.
<i>Tadorna radjah</i>	Radjah shelduck		NT		Database & unpublished records.
<i>Ephippiorhynchus asiaticus</i>	Black-necked stork		NT		Database & published records.
<i>Numenius madagascariensis</i>	Eastern curlew	M	NT		Database & published records.
<i>Sternula albifrons</i> ⁷	Little tern	M	E	high	Database & published records.

1. Listed as Endangered, Vulnerable, Near-Threatened or Migratory under the EPBC Act 1999 and/or the NC Act 1992 or of critical or high priority under the Back on Track prioritisation framework (DERM 2011a).
2. Predicted by the EPBC Protected Matters Search Tool maintained by DSEWPC (2011g). Only noted if not recorded from another source.
3. Nomenclature follows the Australian Faunal Directory (DSEWPC 2011d).
4. Status: E = Endangered, V = Vulnerable, NT = Near-Threatened, M = Migratory, LC = Least Concern (Common).
5. BoT = Back on Track priority species.
6. Known from Museum records, published literature (eg Draffan *et al.* 1983; Clarke 2004a, b), WildNet database and/or reports and other grey literature (eg Schaffer 2010). These sources are not necessarily mutually exclusive.
7. Listed under the EPBC Act (Bonn Convention, CAMBA, JAMBA, ROKAMBA) as *Sterna albifrons*.

Salt-water Crocodile (*Crocodylus porosus*)

EPBC Act: Migratory (Bonn Convention); **NC Act:** Vulnerable

Listed as estuarine crocodile under the Queensland Nature Conservation (Wildlife) Regulation 2006.

The salt-water crocodile occurs in tidal rivers, coastal floodplains and swamps, extending hundreds of kilometres inland along major drainage systems, but is also seen regularly in the open ocean (Webb *et al.* 1983; Read *et al.* 2004; Wilson & Swan 2010). The species is found from India through south-east Asia to the western Pacific and northern Australia (Wilson & Swan 2010). In Australia the species is most common in large areas of productive wetlands and estuaries (Fukuda *et al.* 2007). In Queensland, salt-water crocodiles are mainly found in coastal areas north of the Fitzroy River (QPWS 2007) with the highest densities in Queensland found in north-west Cape York Peninsula (Read *et al.* 2004; EPA 2007). Salt-water crocodile is known from Boigu Island (Schaffer 2009) and is also known from Saibai and Thursday Islands (OZCAM 2011) and Mabuiag Island (Watson 2009). The species is likely to occur throughout the Torres Strait. On Boigu Island salt-water crocodiles could occur along all shorelines and mangroves, and throughout much of the islands estuarine wetlands, depending of water levels.

The salt-water crocodile is still threatened by drowning in fishing nets (Ehmann 1992) with juveniles more likely to become entangled. This does not appear to pose a major threat to the species (EPA 2007). A lack of suitable nesting habitat appears to be the most significant limiting factor for the

recovery of the species in Queensland (Read *et al.* 2004). On Boigu Island the salt-water crocodile may be threatened by clearing of mangroves, entanglement in fishing nets, and by direct human persecution. These threats are likely to be minor.

Littoral Whiptail-skink (*Emoia atrocostata*)

NC Act: Near-Threatened

The littoral whiptail-skink is found on rocky shores and in foreshore vegetation, including mangrove forests. It shelters in rock recesses and crevices, in tree root crevices and in logs. It readily swims in tidal pools and can remain submerged for short periods (Heatwole 1975; Ehmann 1992). Cogger (2000) states that the species also occurs in lowland forests, coastal scrubs and grasslands near beaches but Hediger (1933-34 in Heatwole 1975) states that it is never found more than 100 m from the sea.

The littoral whiptail-skink is widespread from Japan, through south-east Asia and into the south-west Pacific. It is found on the tip of Cape York Peninsula and islands of the Torres Strait (Ehmann 1992; Wilson 2005). Cogger (2000) considers its distribution poorly known and despite references to its occurrence on Torres Strait Islands there is no available record for any island except Boigu Island (Wilson 2005; Schaffer 2010). Ingram (2008) refers to a WildNet record from Moa but the species was not returned by a search of the database in 2010 (DERM 2010f) and the validity of the record is uncertain. *Emoia* species are efficient rafters and colonise islands on floating debris (Wilson 2005) and it is likely to occur on Torres Strait Islands in addition to Boigu.

Ehmann (1992) states the littoral whiptail-skink is abundant and secure. It is a common mangrove species in some areas and is especially abundant on rocky foreshores (Cogger 2000). Threats are unknown, however small reptiles, including littoral whiptail-skink, are eaten by cats (*Felis catus*) on Christmas Island. However, the species made up a very small percentage of known prey (Tidemann *et al.* 1994), possibly due to cats spending little time foraging in foreshore habitats. On Boigu Island the littoral whiptail-skink would be threatened by cats, and loss of mangroves due to clearing or storm damage.

Little Tern (*Sternula albifrons*)

EPBC Act: Migratory; **NC Act:** Endangered

Listed under the EPBC Act as *Sterna albifrons* (Bonn Convention, CAMBA, JAMBA, ROKAMBA).

The little tern is also considered of 'High' priority under the Back on Track species prioritisation framework (DERM 2011a).

The little tern is found along a variety of coastal areas, including open beaches, lagoons, estuaries, river mouths, lakes, bays, harbours and inlets, especially those with exposed sandbanks. They feed

primarily on small fish, crustaceans and other invertebrates and nest on open sandy beaches. Nesting occurs mainly from September to January but in northern Australia nesting also occurs from April to July. Little terns breed in small colonies (Pringle 1987; Higgins & Davies 1996).

The species occurs in Europe, Asia and Australasia and within Australia occurs along the coastal regions of eastern Australia, south to Tasmania, and across northern Australia, west to northern parts of Western Australia (Higgins & Davies 1996). The little tern is mainly a summer visitor to northern Australia, including Torres Strait, though there is a winter-breeding population in the Gulf of Carpentaria (Blakers *et al.* 1984). In the Torres Strait Draffan *et al.* (1983) reports the species from 13 islands, including Badu, Mer and Erub. It is also known from Boigu (Clarke 2004b; DERM 2010a), Moa (Ingram 2008) and Iama (Conics 2008b). Draffan *et al.* (1983) described it as an uncommon summer visitor throughout the Torres Strait. In summer of 2002, Clarke (2004b) recorded 151 individuals on Boigu Island, approximately one third of which were in, or near, full breeding plumage, suggesting that the northern Torres Strait Islands may be more important for the species than previously thought.

The little tern in Australia is both increasing in abundance and expanding its distribution. The species has a naturally high rate of breeding failure, with ground-nesting making it vulnerable to natural events that contribute to low success, such as loss of eggs and chicks through native predators, flooding of nesting sites (including high tides), and adverse weather conditions (Garnett & Crowley 2000). Little terns are also threatened by human disturbance at nesting colonies, encroachment of vegetation in colonies (Blakers *et al.* 1984), nest predation by rats, gulls and feral pigs, and by degradation of estuaries, pesticide residues in fish, and oil-fouling of both birds and beaches (Garnett & Crowley 2000). Little tern is unlikely to breed on Boigu Island and therefore threats are likely to be minimal.

Emerald Monitor (*Varanus prasinus*)

NC Act: Near-Threatened

The emerald monitor is an arboreal species, living in the upper canopy of rainforest and monsoon forest (Wilson 2005), in palm forest, mangroves (Greene 1986; Cogger 2000), cocoa plantations (Greene 1986), vine thickets (Schaffer 2010) and around lagoons (Cogger 2000). The species uses its prehensile tail to forage among slender branches and outer foliage (Wilson & Swan 2010) and eats mainly katydids and other small arthropods and occasionally rodents (Greene 1986). Emerald monitors lay eggs in termite mounds in trees (Greene 1986; Ehmann 1992).

The emerald monitor is widespread in New Guinea. In Australia it is restricted to several islands in the Torres Strait, south to Moa Island, where it is known as Wyniss (Wilson & Swan 2010). The species is known from Boigu (Clarke 2004a; Schaffer 2010, Stanton & Fell pers. obs. 2010); Moa (Whittier & Moeller 1993; Wilson 2005; Ingram 2008; DERM 2010f), Badu (Borsboom 2007 in

Conics 2009a) and Mer Islands (DERM 2010d; OZCAM 2011). The species is likely to be widespread on Boigu Island, especially in areas of vine thicket and mangroves.

The emerald monitor is one of the most poorly known monitors (Greene 1986) and threats to the species in Australia are unknown. However, in Papua New Guinea the species is targeted by the pet trade, though the threat is considered low (Allison 2006). The emerald monitor is highly desired by reptile keepers and illegal collecting could become a threat in the Torres Strait. The species would be threatened by habitat clearance. Given its known diet the emerald monitor does not appear susceptible to mortality through attempted ingestion of cane toads *Rhinella marina* as per many other species of varanid (eg Shine 2010). On Boigu Island the species is probably most at threat to loss and degradation of vine thicket and mangroves.

Radjah Shelduck (*Tadorna radjah*)

NC Act: Near-Threatened

The radjah shelduck prefers shallow brackish waters, typically coastal and including estuarine mudflats, tidal creeks and mangrove swamps (Blakers *et al.* 1984; Pringle 1985). In the dry season the species congregates on permanent swamps and lagoons and artificial waterbodies such as sewage farms (Pringle 1985; Marchant & Higgins 1990). They are rarely found more than 20 m from a waterbody (Frith 1977; Marchant & Higgins 1990). Breeding occurs in the wet season, mostly between December and February in north-east Queensland. Nests are placed in large hollow branches in trees in, or close to, water (Frith 1977).

Radjah shelducks occur in eastern Indonesia, New Guinea and tropical Australia, with occasional records further south (Blakers *et al.* 1984; Pringle 1985). The species has disappeared from the Kimberleys and more southern Australia but remains common with no sign of decline through most of its current Australian distribution (Garnett & Crowley 2000). In the Torres Strait the radjah shelduck is known from Mua (Draffan *et al.* 1983; Ingram 2008), Badu (Draffan *et al.* 1983) and Boigu Islands (Clarke 2004b; DERM 2010a). Draffan *et al.* (1983) reports the species from a further five Torres Strait Islands, all in the south-western group of islands including Horn and Thursday Islands. Much of Boigu Island provides habitat for the species, with birds frequenting freshwater and saline wetlands, the edges of mangroves, foreshores and artificial grasslands.

The species is threatened by reclamation of habitat for agricultural activities and infrastructure (Marchant & Higgins 1990) as well as indiscriminate shooting (Pringle 1985) but despite the decline of some sub-populations the species is not considered to be threatened nationally (Garnett & Crowley 2000) and may be increasing in some areas (Pringle 1985). Radjah shelduck is common on Boigu Island, at least at times. Clarke (2004b) saw them daily and recorded 500 birds. Local threats would appear minimal.

Black-necked Stork (*Ephippiorhynchus asiaticus*)

NC Act: Near-Threatened

The black-necked stork occurs in swamps, estuarine mudflats and other littoral habitats and on floodplains, in irrigated crops and occasionally open grassy woodland. The species is most frequently associated with open freshwater rather than saline habitats (Pringle 1985; Marchant & Higgins 1990).

The black-necked stork occurs from Pakistan through south-east Asia to New Guinea and Australia. It is widespread in northern and eastern Australia and occurs through much of Queensland (Marchant & Higgins 1990), though is not abundant anywhere. The sparse distribution of the species is probably due to the requirement of large areas of freshwater swamps for the maintenance of even one pair (Pringle 1985). Black-necked stork has been recorded on Boigu (Draffan *et al.* 1983; Clarke 2004b; DERM 2010a), Badu Islands (Draffan *et al.* 1983; DERM 2010g) and Saibai Island (Stanton & Fell pers. obs. Oct 2007). Ingram (2008) refers to a WildNet record from Mua but the species was not returned by a search of the database in 2010 (DERM 2010f), though it is likely to occur. Draffan *et al.* (1983) reports the species from a further seven Torres Strait Islands, all in the south-western group of islands and including Horn, Prince of Wales and Thursday Islands. There is a large amount of suitable habitat for black-necked stork on Boigu Island, though this will vary with inundation levels.

The black-necked stork feeds on a variety of aquatic prey items including crustaceans, fish, amphibians, reptiles and arthropods. The species is very sparsely distributed throughout its range and it appears that the maintenance of even one pair may require large areas of freshwater swamps. Breeding is very poorly known, although they nest in tall trees, both live and dead, in or near freshwater swamps (Pringle 1985; Marchant & Higgins 1990; Dorfman *et al.* 2001).

Although the black-necked stork is thought to be threatened by disturbance and habitat loss it has not been greatly affected by the intensification of land-use in eastern Australia (Garnett & Crowley 2000). Nonetheless, the species is threatened by the use of chemicals including herbicides and insecticides near wetlands, the loss of suitable nesting trees, disturbance of waterbodies by livestock, loss of wetlands due to agriculture and development, and possibly by ingestion of Cane Toads (Garnett & Crowley 2000; Dorfman *et al.* 2001; NSW NPWS 2002; Clancy 2010). In the Torres Strait the species is most likely to be threatened by disturbance during foraging and at nest sites and possibly hunting.

Eastern Curlew (*Numenius madagascariensis*)

EPBC Act: Migratory (Bonn Convention, CAMBA, JAMBA, ROKAMBA); **NC Act:** Near-Threatened

The eastern curlew is mostly confined to coastal habitats, particularly estuaries, harbours and coastal lagoons. They mainly forage on open intertidal mudflats, sandflats and saltmarsh, often near

mangroves, and occasionally on ocean beaches. Roosting occurs on sandy spits and islets, in mangroves and saltmarsh, and along high water mark on beaches (Pringle 1987; Higgins & Davies 1996). The species usually feeds individually or in small groups (Pringle 1987), though large numbers may congregate at high tide roosts (Lane 1987).

Eastern curlews breed in eastern Siberia during the northern hemisphere summer and arrive in north-eastern Australia as early as late July, but most individuals arrive in eastern Australia by late August and September (Ueta *et al.* 2002). Birds begin to depart to return to breeding grounds around March and April (Lane 1987). However, a significant percentage of the Australian population remains through the Australian winter, particularly in northern Australia (Pringle 1987; Driscoll & Ueta 2002). In Australia eastern curlews occur in suitable habitat on all coasts (Higgins & Davies 1996). In the Torres Strait Draffan *et al.* (1983) reported them from 18 islands, including Boigu, Mua, Badu, Mer and Erub, and there is a single WildNet record from Mabuia (DERM 2010e) and an unpublished record from Iama (Conics 2008b). The species is likely, at least on passage, on any island that has suitable foraging habitat.

The Australian eastern Curlew population is estimated at 19 000 and numbers have fallen significantly in some southern areas. In Tasmania populations have declined by 65% (Reid & Park 2003). It is unknown as to whether these declines are a result of overall population decline or a change in non-breeding range. Eastern curlews are easily disturbed by people at foraging and roosting sites (Higgins & Davies 1996; Taylor & Bester 1999) and are often the first species in a high-tide roost to take to flight if disturbed, relocating to alternative roosts often some considerable distance away (Lane 1987). Eastern curlews will take off when humans approach to within 30-100 m (Taylor & Bester 1999) and sometimes are disturbed within 250 m of approach (Higgins & Davies 1996). Pollution may have also reduced food availability (Higgins & Davies 1996).

That Clarke (2004b) recorded only one or two individuals of this conspicuous species during January suggests that eastern curlews are scarce visitors to Boigu Island, though the species may be more common during passage. The species is most likely to be threatened by disturbance when foraging and such a threat is likely to be significant only during passage to northern hemisphere breeding grounds.

6.3.2 Additional Possible EVNT species

Table 8 lists the 10 Critically Endangered, Endangered, Vulnerable and Near-Threatened species that are predicted to occur on Boigu Island. The island has been inadequately surveyed for fauna so predictions from throughout the Torres Strait are included to aid in the identification of additional likely species for Boigu Island. Species profiles for the EVNT species predicted to occur are provided in **Appendix G**.

Table 8. Critically Endangered, Endangered, Vulnerable and Near-Threatened fauna species¹ predicted² to occur on Boigu Island.

Scientific Name	Common Name	Status ³			Known Distribution in Torres Strait ⁵
		EPBC Act	NC Act	BoT ⁴	
REPTILES					
<i>Lepidodactylus pumilus</i>	Slender chained gecko		NT		Mua, Mer, Saibai, Masig, Hammond and Prince of Wales Islands.
MAMMALS					
<i>Dobsonia magna</i> ⁷	Bare-backed fruit-bat		NT		Mua Island.
<i>Nyctimene cephalotes</i>	Torresian tube-nosed bat		NT		Mua Island.
<i>Pteropus conspicillatus</i>	Spectacled flying-fox	V	LC	high	No record. Protected Matters Search Tool only.
<i>Rhinolophus philippinensis</i> (large form)	Greater large-eared horseshoe bat	E	E	high	No record. Protected Matters Search Tool only.
<i>Hipposideros cervinus</i>	Fawn leaf-nosed bat		V	high	Mua and Thursday Islands.
<i>Saccolaimus saccolaimus nudicluniatus</i>	Bare-rumped sheath-tail-bat	CE	E	high	No record. Protected Matters Search Tool only.
<i>Taphozous australis</i>	Coastal sheath-tail bat		V	high	Mua, Mabuiag and Possession Islands.
<i>Xeromys myoides</i>	Water mouse	V	V	high	Boigu Island (unconfirmed).
<i>Conilurus penicillatus</i>	Brush-tailed tree-rat	V	LC		No record. Protected Matters Search Tool only.

1. Listed under listed as Critically Endangered, Endangered, Vulnerable and/or Near-Threatened (EVNT) under the EPBC Act and/or Queensland's NC Act.
2. Predicted by the EPBC Protected Matters Search Tool maintained by DSEWPC (2011g).
3. Status: CE = Critically Endangered, E = Endangered, V = Vulnerable, NT = Near-Threatened, M = Migratory, LC = Least Concern (Common).
4. Back on Track (BoT) species considered of 'critical' or 'high' priority under the Back on Track framework (DERM 2011a).
5. May include records that require verification.
6. Listed under the EPBC Act (Bonn Convention, CAMBA, JAMBA, ROKAMBA) as *Sterna albifrons*.
7. Listed under the NC Act as *Dobsonia moluccensis*.

Reptiles

It is likely, given its occurrence on nearby Saibai, Mua, Mer, Saibai, Masig, Hammond and Prince of Wales Islands (OZCAM 2011), that the slender chained gecko (*Lepidodactylus pumilus*) will also occur on Boigu Island.

Birds

There are no EVNT bird species other than those already recorded that are expected to occur on Boigu Island. However, the proximity of the Papua New Guinea mainland means that Boigu Island is a likely location for threatened New Guinea species not yet recorded in Australian territory. Such species will be listed as Critically Endangered, Endangered, Vulnerable, or Near-Threatened by the IUCN.

Mammals

The bare-backed fruit-bat (*Dobsonia magna*⁵) is abundant in most habitats in New Guinea and is known from coastal areas near Boigu Island (Flannery 1995). The Torresian tube-nosed bat (*Nyctimene cephalotes*) is widespread in New Guinea and specimens are known from the coast immediately adjacent to Torres Strait (Duncan *et al.* 1999). Fawn leaf-nosed bat (*Hipposideros cervinus*) and spectacled flying-fox (*Pteropus conspicillatus*) also occur in New Guinea, though there are few records of spectacled flying-fox in Papua New Guinea. A number of sources, including Duncan *et al.* (1999) and Churchill (2008), state that the spectacled flying-fox occurs in the Torres Strait but no location details are provided. The four species may be present on Boigu Island, or at least occur as sporadic or seasonal visitors from the nearby New Guinea mainland. Spectacled fly-fox is an obvious and easily identified species and its occurrence is the least likely of the four bat species to occur.

The water mouse is patchily distributed in the Northern Territory, and from the Gold Coast to Proserpine in Queensland (Menkhorst & Knight 2004). The species has been recently recorded from New Guinea (Hitchcock 1998). Suitable habitat exists on Boigu with targeted surveys required.

6.3.3 Migratory Species

Fifty-seven bird species listed as Migratory under the EPBC Act are known to occur in Torres Strait (**Appendix F**). The Vulnerable (NC Act) salt-water crocodile is also listed as Migratory under the EPBC Act and is known from Boigu Island. A number of other species also migrate into or through the Torres Strait but are not listed under the EPBC Act. Unless otherwise stated it should be assumed that reference to Migratory species in this report refers only to those species listed as such under the EPBC Act. **Table 9** lists the 32 Migratory species known or predicted to occur on Boigu Island. All species are listed as Least Concern under the NC Act unless otherwise noted.

Table 9. Migratory¹ species reported or predicted² to occur on Boigu Island

Scientific Name ³	Common Name	Comments ⁴
SPECIES REPORTED		
<i>Crocodylus porosus</i> ⁵	Salt-water crocodile	Unpublished record.
<i>Hirundapus caudacutus</i> ⁶	White-throated needletail	Database record.
<i>Apus pacificus</i>	Fork-tailed swift	Published record.
<i>Ardea modesta</i> ⁷	Eastern great egret	Database & published records.
<i>Egretta sacra</i>	Eastern reef egret	Database & published records.
<i>Plegadis falcinellus</i>	Glossy ibis	Database & published records.
<i>Pandion cristatus</i> ⁸	Eastern osprey	Database & published records.
<i>Haliaeetus leucogaster</i>	White-bellied sea-eagle	Database & published records.
<i>Pluvialis fulva</i>	Pacific golden plover	Database & published records.
<i>Pluvialis squatarola</i>	Grey plover	Published record.
<i>Charadrius mongolus</i>	Lesser sand plover	Database & published records.
<i>Charadrius leschenaultii</i>	Greater sand plover	Database & published records.

⁵ Listed under the NC Act as *Dobsonia moluccensis*

Scientific Name ³	Common Name	Comments ⁴
<i>Gallinago hardwickii</i>	Latham's snipe	Published record.
<i>Gallinago megala</i>	Swinhoe's snipe	Published record.
<i>Limosa limosa</i>	Black-tailed godwit	Published record.
<i>Numenius minutus</i>	Little curlew	Published record.
<i>Numenius phaeopus</i>	Whimbrel	Database & published records.
<i>Numenius madagascariensis</i> ⁹	Eastern curlew	Database & published records.
<i>Xenus cinereus</i>	Terek sandpiper	Database & published records.
<i>Actitis hypoleucos</i> ¹⁰	Common sandpiper	Database & published records.
<i>Tringa brevipes</i> ¹¹	Grey-tailed tattler	Database & published records.
<i>Tringa nebularia</i>	Common greenshank	Database & published records.
<i>Tringa stagnatilis</i>	Marsh sandpiper	Database & published records.
<i>Tringa glareola</i>	Wood sandpiper	Database & published records.
<i>Arenaria interpres</i>	Ruddy turnstone	Database record.
<i>Calidris ruficollis</i>	Red-necked stint	Database & published records.
<i>Calidris melanotos</i>	Pectoral sandpiper	Published record.
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	Database & published records.
<i>Calidris ferruginea</i>	Curlew sandpiper	Database & published records.
<i>Glareola maldivarum</i>	Oriental pratincole	Database record.
<i>Onychoprion anaethetus</i> ¹²	Bridled tern	Published record.
<i>Sternula albifrons</i> ¹³	Little tern	Database & published records.
<i>Hydroprogne caspia</i>	Caspian tern	Database & published records.
<i>Chlidonias leucopterus</i>	White-winged black tern	Published record.
<i>Sterna sumatrana</i>	Black-naped tern	Published record.
<i>Sterna hirundo</i>	Common tern	Published record.
<i>Cuculus optatus</i> ¹⁴	Oriental cuckoo	Published record.
<i>Merops ornatus</i>	Rainbow bee-eater	Database & published records.
<i>Coracina tenuirostris melvillensis</i>	(Melville) Cicadabird	Database & published records. Subspecies not identified in records.
<i>Rhipidura rufifrons</i>	Rufous fantail	Database record.
<i>Myiagra cyanoleuca</i>	Satin flycatcher	Published record.
<i>Monarcha melanopsis</i>	Black-faced monarch	Database & published records.
<i>Symposiachrus trivirgatus</i> ¹⁵	Spectacled monarch	Database record.
<i>Hirundo rustica</i>	Barn swallow	Database & published records.
<i>Cecropis daurica</i> ¹⁶	Red-rumped swallow	Database & published records.
<i>Motacilla</i> species	Yellow wagtail species	Published record. Not identified to species.
SPECIES PREDICTED		
<i>Monarcha frater</i>	Black-winged monarch	Predicted by the EPBC Protected Matters Search Tool – considered likely to occur.

1. Listed as Migratory under the EPBC Act 1999.
2. Predicted by the EPBC Protected Matters Search Tool maintained by DSEWPC (2011g). Only noted if not recorded from another source.
3. Nomenclature follows the Australian Faunal Directory (DSEWPC 2011d).
4. Known from Museum records, published literature (eg Draffan *et al.* 1983; Clarke 2004a, b; Wilson 2005), WildNet database and/or reports and other grey literature (Schaffer 2010), (these sources are not necessarily mutually exclusive).
5. Listed as Vulnerable under the NC Act.
6. Also listed under the EPBC Act (ROKAMBA) as *Chaetura caudacuta*.
7. Listed under the EPBC Act (CAMBA, JAMBA) as Great Egret *Ardea alba*. Australian birds elevated to full species level as *A. modesta* (Kushlan & Hancock 2005; Christidis & Boles 2008).
8. Listed under the EPBC Act (Bonn Convention) as Osprey *Pandion haliaetus*. Australian birds have been elevated to species level as *P. cristatus* (Wink *et al.* 2004; Christidis & Boles 2008).
9. Listed as Near-Threatened under the NC Act.
10. Also listed under CAMBA and ROKAMBA as *Tringa hypoleucos*.
11. Also listed under the Bonn Convention and JAMBA as *Heteroscelus brevipes*.
12. Listed under the EPBC Act (CAMBA, JAMBA) as *Sterna anaethetus*.
13. Listed under the EPBC Act (Bonn Convention, CAMBA, JAMBA, ROKAMBA) as *Sterna albifrons*. Listed as Endangered under the NC Act.
14. Listed under the EPBC Act (CAMBA, JAMBA, ROKAMBA) as *Cuculus saturatus*. Australian birds elevated to full species level as *A. optatus* (Christidis & Boles 2008).
15. Listed under the EPBC Act (Bonn Convention) as *Monarcha trivirgatus*.
16. Listed under the EPBC Act (ROKAMBA) as *Hirundo daurica*.

6.3.4 Additional Possible Migratory Species

Of the other 11 species of Migratory bird known from the Torres Strait (**Appendix H**), bar-tailed godwit (*Limosa lapponica*), great knot (*Calidris tenuirostris*), red knot (*C. canutus*), common noddy (*Anous stolidus*), roseate tern (*Sterna dougallii*) and lesser crested tern (*Thalasseus bengalensis*) are expected to occur on Boigu Island. The other five species are not expected based on known movements and habitat requirements.

6.3.5 Species of Regional Significance

The *Action Plan for Australian Birds 2000* lists 16 bird species or subspecies that occur on Boigu and Saibai Islands and meet the criteria for listing as Vulnerable under the EPBC Act (**Table 10**). However, due to likely genetic exchange with Papua New Guinea these birds are regarded as Near-Threatened and are not listed under the EPBC Act (Garnett & Crowley 2000). This EPBC category of Near-Threatened is not the same as the Near-Threatened status under the NC Act.

Table 10. Species considered Near-Threatened¹ known or expected to occur on Boigu Island.

Scientific Name	Common Name	Comments ²
<i>Geopelia striata papua</i>	Peaceful dove	Published record.
<i>Eclectus roratus polychloros</i>	Eclectus parrot	Published record.
<i>Ceyx pusilla pusilla</i>	Little kingfisher	Published record.
<i>Gerygone magnirostris brunneipectus</i>	Large-billed gerygone	Published record.
<i>Myzomela obscura fumata</i>	Dusky honeyeater	Database & published records.
<i>Myzomela erythrocephala infuscata</i>	Red-headed honeyeater	Published record.
<i>Xanthotis flaviventer saturator</i>	Tawny-breasted honeyeater	Database & published records.
<i>Cracticus quoyi alecto</i>	Black butcherbird	Database & published records.
<i>Dicrurus bracteatus carbonarius</i>	Spangled drongo	Database & published records.
<i>Rhipidura rufiventris gularis</i>	Northern fantail	Database & published records.
<i>Rhipidura leucophrys melaleuca</i>	Willie wagtail	Database & published records.
<i>Corvus orru orru</i>	Torresian crow	Database & published records.
<i>Myiagra rubecula papuana</i>	Leaden flycatcher	Database record. Subspecies not provided.
<i>Arses telescopthalmus harterti</i>	Frilled monarch	Unconfirmed record (Clarke 2004b).
<i>Phonygammus keraudrenii jamesii</i>	Trumpet manucode	Published record. Subspecies not provided.
<i>Aplornis cantoroides</i>	Singing starling	Database & published records.

1. Listed under the *Coordinated Conservation Plan for Torres Strait* (Garnett & Crowley 2000).

2. Known from Museum records, published literature (Draffan *et al.* 1983; Clarke 2004a, b; Wilson 2005), WildNet database and/or reports and other grey literature (eg Schaffer 2010). These sources are not necessarily mutually exclusive and many records are unconfirmed.

All of these species are listed as Least Concern under the NC Act and with the exception of singing starling, are considered of some conservation significance, as they are subspecies that occur in New Guinea but which, in Australia, are restricted to Boigu, Saibai and/or Dauan Islands. Singing starling is included because it is similarly restricted within Australia to these islands, but at the species level. None of these species is considered threatened in Torres Strait except perhaps by the effects of climate change (Garnett & Crowley 2000). Conics (2008a) reports eclectus parrot *Eclectus roratus macgillivrayi*, listed as Vulnerable under the NC Act, as occurring on Boigu Island.

However, the subspecies present is *E. r. polychloros* (Garnett & Crowley 2000; Clarke 2004b), which is listed as “Least Concern”.

During a nine day visit to Boigu Island in 2002, Clarke (2004b) observed one additional species, collared imperial-pigeon *Ducula mullerii*, and three subspecies, orange-footed scrubfowl (*Megapodius reinwardt duperryi*), rainbow lorikeet (*Trichoglossus haematodus caeruliceps*) and red-cheeked parrot (*Geoffroyus geoffroyi aruensis*) that also would be considered Near-Threatened under Garnett and Crowley’s (2000) *Action Plan for Australian Birds*. Mounds of the orange-footed scrubfowl have been observed in semi deciduous vine thicket on the southern shores of the island (Stanton & Fell, Pers. obs. Nov. 2010).

That these common species are considered of conservation significance on Boigu Island is a reflection of political, not biogeographical boundaries. This is evidenced by Clarke (2004b) observing collared and pied imperial-pigeons and eclectus parrots flying between Boigu Island and the New Guinea mainland. It is likely that there is substantial movement between the two areas and the conservation significance of such species on Boigu should not be overstated.

A single Gurney’s eagle (*Aquila gurneyi*) was recorded on Boigu Island in 2002 (Clarke 2004b). This was only the second record of the species for an Australian territory. Gurney’s eagle is listed as Least Concern under the NC Act but is considered Near-Threatened by the IUCN. The species occurs in the Moluccas and New Guinea at low population densities and is considered likely to be declining due to habitat loss and degradation (BirdLife International 2008). Future survey work should attempt to identify possible nesting by the species. Consultation with local people may provide an indication of the regularity of occurrence given that the species is reasonably distinctive locally.

6.3 Pest Animal (Fauna) Species

Exotic (introduced) fauna species reported for Boigu Island are house gecko, house sparrow (*Passer domesticus*), dog, cat, pig and rusa deer (*Cervus timorensis*).

House gecko is considered a threat to native species through competition in both natural habitats and on buildings (Case *et al.* 1994; Hoskin 2010). There are records of native geckoes on Boigu Island, mourning gecko (*Lepidodactylus lugubris*), and the congeneric slender chained gecko is predicted to occur. Mourning gecko is superficially similar in appearance to Asian house gecko and also inhabits buildings. Local information on geckoes is therefore unlikely to be reliable in regards to species and an assessment of the level of threat posed by house gecko requires survey effort. This could be combined with other, higher priority, reptile survey.

House sparrow is unlikely to pose any threat to native species on Boigu Island and no action is required for the species.

Dogs are reportedly present in considerable numbers on the island and pose a risk to environmental health (Conics 2008a). Dogs are a threat to ground nesting birds and are a disturbance factor for waders, terns and radjah shelduck and black-necked stork.

An over-population of cats is reported for the island (Conics 2008a). Although house cats in Australian suburbs have been shown to kill mainly introduced rats and mice, native wildlife are also killed, including mammals, birds, reptiles and frogs. Cat predatory behaviour appears largely opportunistic, though small mammals are preferred. Therefore, should house cats have access to relatively undisturbed habitats it is likely that they would have a substantial impact on native fauna, particularly mammals (Barratt 1997). Potential habitat exists for the water mouse however further survey work is required to confirm its presence and to identify additional native ground-dwelling mammals. Cats would kill water mouse and would also prey on small birds, reptiles and frogs.

Pigs are reported for the island but level of abundance is unknown. Pigs present a threat directly to frogs, reptiles and birds through predation. Ground-dwelling birds are particularly vulnerable. They also have indirect impacts through habitat destruction and degradation. Any wetland or riparian area is especially susceptible to damage by pigs.

Rusa deer are present and can cause significant habitat degradation through grazing/browsing and trampling of native vegetation. They may also be a vector for the introduction and spread of weed species and possibly disease. Surveys of numbers and habitat use together with control measures are likely to be required.

6.4 Threats

The major threats to fauna in any location are loss, degradation and fragmentation of habitat. These processes may be due to deliberate clearing or may be the result of inappropriate fire regimes, damage by feral and domestic herbivores, storm damage and weed invasion. Weed invasion may not simply alter the plant species assemblage but can also choke out ground cover, reducing suitability for ground-dwelling species, and increase fire frequency and intensity, thus altering plant species composition and physical structure even further.

As mentioned above, exotic predators, such as dogs and cats, pose a threat to native fauna, either directly through predation or by disturbance. At this stage the most significant potential threats to native fauna on Boigu Island are the possible introduction of the exotic cane toad and rats (*Rattus* spp.). Cane toads would have dramatic impacts on the varanid (goanna) and snake fauna and, given the small size of the island, could lead to local extinctions. Rats, assuming they are not already on the island, are an even greater potential threat given their agility and generalist diet. Should exotic rats be present, an extermination, or control, project is recommended. Habitat destruction by rusa deer could be significant if the population is not extirpated or at least controlled.

Hunting may pose a threat to some species. Species likely to be targeted include varanids (goannas), amethyst python (*Morelia amethystina*), waterfowl, pigeons and black flying-fox (*Pteropus alecto*). Hunting should be regulated so as to be sustainable.

6.5 Future work

It is important that the faunal values of Boigu Island be more comprehensively identified so that the most important conservation elements are managed appropriately. In addition to general systematic survey methods for the compilation of the fauna species assemblage for the island, the following actions are recommended:

High Priority

A targeted trapping survey for water mouse is given high priority. The *Draft Recovery Plan for the Water Mouse* (DERM 2009) included the following key recovery actions:

- Identify habitats potentially supporting populations of the water mouse and map the current habitat distribution.
- Confirm occurrence and current distribution of the water mouse.
- Conduct surveys and ecological assessments of potential water mouse habitat.
- Describe key biological and ecological features of the water mouse and its habitat.
- Determine whether genetic variation exists across populations of the water mouse.

Medium Priority

- Bat survey, both mega-bats and micro-bats.
- Identification of any breeding areas for terns, particularly little tern.
- Identification of the most important foraging and high roost sites for waders.
- Survey for gurney's eagle, including consultation with local community.
- Survey for slender chained gecko and, if so, identification of any overlap in habitat use with house gecko.

Low Priority

- General fauna survey of mangroves and vine forest.
- Ground-dwelling mammal trapping survey.

7.0 The Role of Fire in Savanna Landscapes

Most Cape York Peninsula, and hence Torres Strait Island plant communities will burn if enough fuel is present. The exceptions are rainforest communities, communities of rocky areas and some wetland areas such as mangroves and the deeper permanent swamps. We know from the historical record and anthropological studies that the landscape of Torres Strait and Cape York Peninsula when Europeans arrived was the product of traditional burning practices that had changed little over many thousands of years and had led to stability in the nature of the plant communities and the way they were distributed across the landscape. In many areas the loss of traditional burning practices in recent times has led to a loss of that stability as vegetation types that had evolved under particular fire regimes were subjected to new regimes⁶. This destabilisation has led to widespread loss of plant communities and inevitably will be found to have led to serious loss of the species of plants and animals that depend upon them.

In the history of the indigenous occupation of the Torres Strait Islands and Cape York Peninsula, there were dramatic changes in plant communities as the climate shifted under a rapid succession of global ice ages, but these changes happened over thousands of years. It is clear from the nature of recent changes however that they have been greater in the period of as little as fifty years than occurred in those millennia prior to European arrival. It is not the change itself that is the problem but its rapidity. Species cannot evolve rapidly enough to accommodate it and the inevitable result will be the loss of species.

The past and present use of fire in the Torres Strait Islands is evident on the majority of islands and there is no doubt that its ongoing use has been fundamental in shaping and modifying vegetation cover and influencing habitat diversity across the islands. McNiven (2008) notes the ethnographic record of Haddon (1935) where fire use forms an integral part of garden preparation and land cleaning in the late 1800's, and evidence of fire is also in the pollen and phytolith record (Rowe 2006, Parr and Carter 2003).

The reasons people used fire are well documented (Russell Smith *et al.* 2009) and include managing to favour various species of food plants, to protect sacred places, to attract game or drive them towards the spears of hunters and to create open landscapes that made travel easy and ambush by enemies difficult. Above all however, they burnt for their own safety. As people who used fire in their daily lives they had to burn to manage the fuel around them, thus avoiding situations where a stray spark landing in heavy fuel could threaten their lives.

The fire dependence of the non-rainforest communities is related largely to the regeneration strategies of the species within them. Some have woody fruits which have to be cracked by heat to release the seed and most require bare ground and sunlight for those seeds to germinate and grow.

⁶ Fire regimes are defined by the frequency of fires and their season of occurrence, both of which have relationship to their relative severity

Many perennial grasses begin to decline and die after several years without fire. Some species will only generate from seed and others are capable of resprouting after fire. Of those species that will germinate and grow through heavy litter, all still require sunlight to survive and most will not persist under a wildfire regime of infrequent hot fires.

In post - European northern Australia, altered fire regimes have led to massive loss of open forest and woodland habitats in the high rainfall areas, particularly the east coast of Cape York Peninsula. In that area fire has disappeared completely because of the complexity of the landscape, with numerous streams and rainforest areas which have made it impossible for individual fires to spread very far. The result has been widespread development of a dense understory of shrubs and trees which is preventing the regeneration of the canopy. The end result will be the replacement of open forest areas with rainforest related vegetation. In areas of shallow soils dominated by shrubs, there has been a progressive loss of species as they reach the end of their life cycle and die without replacement.

The land management imperatives that now arise as a result of the influences discussed above are to maintain fire in those plant communities that will still support it in order to stabilise them against further change, and to ensure that the prevailing fire regime is one of numerous small cool fires rather than widespread late dry season fires.

8.0 Profiles for Boigu Island Habitats

The following section presents a summary of current knowledge, management issues and recommended management actions for the habitats that occur on Boigu Island. The information presented has been derived from prior and recent field survey efforts, review of previous reports, input from experts at technical workshops, and consultation with island rangers and indigenous community members.

8.1 Deciduous / Semi Deciduous Vine Forest and Thicket

8.1.1 Status of Ecological Knowledge

Deciduous/Semi-deciduous vine forest occurs as a narrow belt of linear, discontinuous slivers on the islands southern coast. The grouping occupies suppressed ridges of calcareous sand and shell grit, representative of former tidal strandlines. Hence, the distribution of the grouping parallels and occurs in close proximity to the present coastline. The distribution of the community, derived from Stanton *et al.* (2009), is represented in **Figure 3** below.

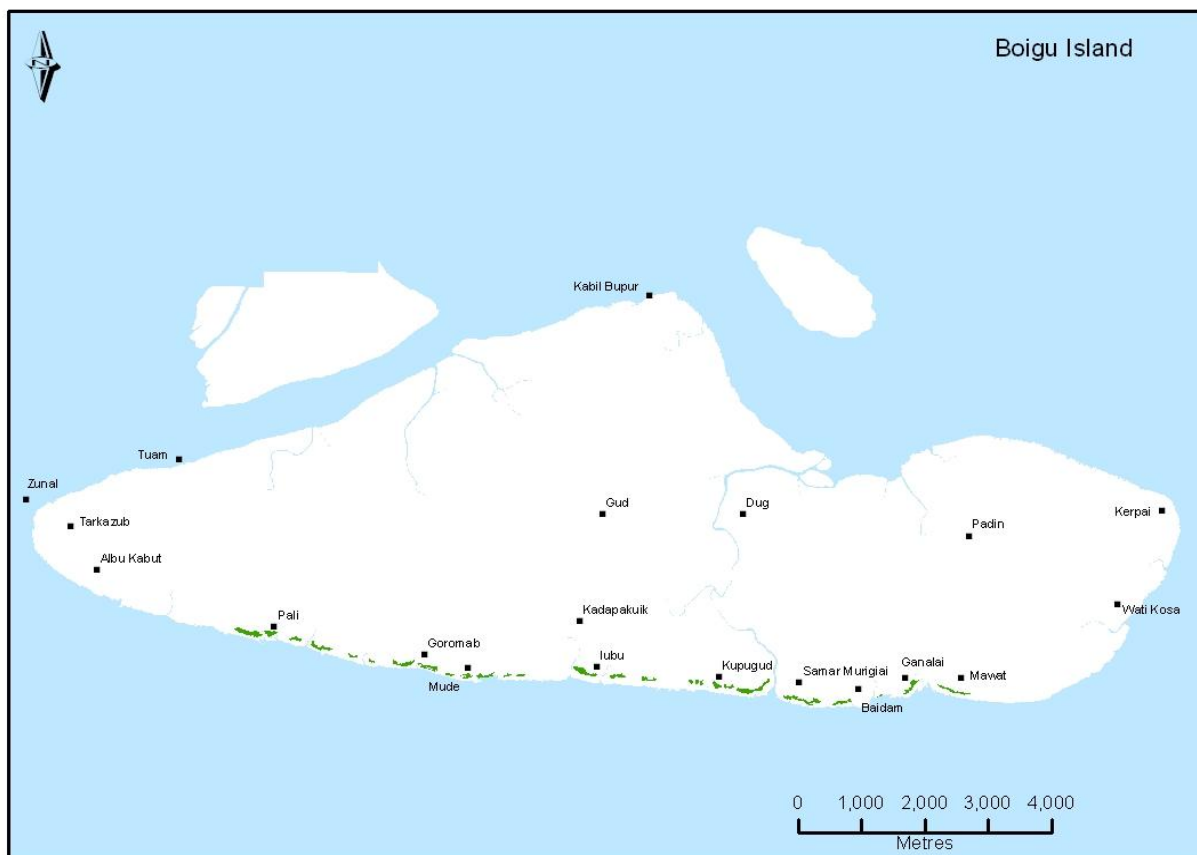


Figure 3. Distribution of semi-deciduous vine forest on Boigu Island (place names after Lawrie, 1970).

Given the remoteness of the habitat, floristic surveys of vine forest communities on Boigu have been limited to those carried out as part of this study and descriptions of Dowe (in Burrows *et al.* 2010). The distribution of vine forest has been mapped remotely, supplemented with overview from helicopter. Major canopy species include *Erythrina insularis*, *Terminalia catappa*, *Terminalia subacroptera*, *Cordia subcordata*, *Antiaris toxicarya* var. *macrophylla* and *Milletia pinnata* mixed with evergreen species such as *Manilkara kauki*, *Mimusops elengi*, *Guettardia speciosa*, *Thespesia populneoides*, and *Aglaiia elaeagnoidea*. The occasional presence of *Heritiera littoralis*, *Xylocarpus granatum* and *Excoecaria agallocha* is associated with an often sharp transition to mangrove forest. Dense thickets of the sprawling vines *Ceasalpinia bonduc*, and *Carissa laxiflora*, and the shrubs *Clerodendrum inerme*, *Colubrina asiatica*, *Dendrolobium arbuscula*, *Gymnosporia inermis*, *Vitex trifolia*, *Pemphis acidula* and *Ximenia americana* are often associated with the transition from vine thicket to mangrove communities. Vines include *Flagellaria indica* and *Derris trifoliata* and *Gymnanthera oblonga*.



Photograph 9 & Photograph 10. Large specimen of *Erythrina insularis* (left) and linear extent of vine forest on the sandy ridge taken from the air.

8.1.2 Ecological / Cultural Considerations

Habitat Condition: These habitats have been extensively utilised by the Boigulgal people as garden areas and continue to provide important seasonal resources, living and camping sites for traditional owners. The camp sites are traditionally accessed only by boat. The habitat is often fragmented as a result of clearing and large areas of bare, compacted sand are present in the internal areas of the majority of occurrences. One such open beach area known as ‘Kowai’ was the location of a large US army camp in the 1940’s, which saw the removal of the frontal mangroves (N. Giguma Pers. Comm. Nov. 2010). Madagascar periwinkle (*Catharanthus roseus*), one of the few exotic species observed within these habitats, is restricted to bare sandy areas and appears to be relatively stable in this niche. Other naturalised species are those utilised as traditional resources such as bamboo (*Bambusa vulgaris*), papaya (*Carica papaya*), coconut (*Cocos nucifera*), taro (*Calocasia esculenta*) and cotton (*Gossypium hirsutum*). Rusa deer were observed to be utilizing

this habitat although the extent of utilization and impact is not known. There is also reported to be extensive erosion of this habitat occurring in exposed locations, which can be attributed to both tidal and storm action.

Fauna: The fauna assemblage associated with this habitat is poorly sampled and as such, poorly known. Further structured survey effort and opportunistic sampling/observation would greatly improve the current knowledge of baseline fauna assemblage. The emerald monitor (*Varanus prasinus*)(*thamai*) was observed during surveys associated with this study (November 2010) in the understorey of semi deciduous vine forest on the dunes of the southern shore, and has been recorded during previous study efforts. Other fauna known from ranger observation include yellow spotted monitor (*Varanus panoptes panoptes*) (*karroom*), a small rat which climbs trees (*Melomys* sp. - *Marrkas*), brown flying fox (*cu du sapu*), and a black flying fox (*kupi sapu*).

Flora: This habitat supports the highest species richness on the island with 72 species recorded to date. Only six of these are introduced.

Cultural Perspectives: The discontinuous stands of the habitat along the southern shore is intricately known by Boigu people. The sandy rises, which are accessed from the sea by small mangroves inlets, are individually named with specific ownership and cultural responsibilities, attributed to each area. The well-drained sandy soils on which the vine forests occur continues to be utilised for seasonal habitation providing food, material items and medicinal resources from the plants and animals which occur. This utilisation has had considerable impact on the natural structure of the community. Language names and traditional utilisation for flora species are listed in **Appendix D**.

8.1.3 Management Implications

This is a restricted and fragile habitat requiring highly specific edaphic conditions, where a threshold depth of well-drained calcareous drained sand is necessary for survival. The major long-term risk to the habitat is considered to be sea level rise and its associated erosion and salinisation of the sandy soil profile, which will result in the ultimate replacement of vine forest habitat with mangrove species. The apparent proliferation of rusa deer also presents a major threat to habitat integrity, significantly increasing the potential for introduction of exotic plant species such as leucaena (*Leucaena leucacephala*) into already disturbed areas as well as having an unknown impact on overall habitat stability and species diversity. Porcupine flower (*Barleria prionitis*) is an exotic shrub known from disturbed areas around the Boigu community and is considered to be a potential threat to ground cover diversity in this habitat, as is the leguminous vine butterfly pea.

At present, minimal active management is required although the passive management situation may change rapidly with the introduction of invasive exotic species. Regular patrols, focusing initially on disturbed areas should continuously monitor for introduction of exotic species such as leucaena. The impact that feral rusa deer populations are having on this habitat is subtle at present and

difficult to quantify. An increasing deer population may, however, dramatically change the extent and nature of impact. Structured observations relating to the utilisation and impact deer are having on this habitat should be recorded for future reference and used toward developing a management response.

There is considerable scope for a structured fauna survey program to be undertaken within this habitat which may include nocturnal spotlighting, mist-netting, and Anabat recording (recording bat calls). This program would however require expert guidance with support from the rangers on the ground.

8.1.4 Summary of Recommended Management Actions

The information provided in **Table 11** below aims to summarise the key issues, actions and priorities so as to aid the transfer of information into the Boigu Island Working on Country Plan. Priority categories are adapted from the Draft Plan of Management for Pulu Indigenous Protected Area (Hitchcock *et al.* 2009) as follows:

Immediate Priority Actions – Actions required for management issues which have potential to significantly alter or damage the islands natural or cultural values in the short term (0-5years).

High Priority Actions – Actions required for management issues which have potential to result in significant damage of the islands natural or cultural values within the medium term (5-15 years) or where lack of knowledge significantly hampers the ability to manage a habitat effectively.

Moderate Priority Actions – Actions required for management issues which have potential to result in significant damage of the islands natural or cultural values within the long term (>15 years) or where there is a knowledge gap that does not detract significantly from the ability to manage a habitat effectively.

Table 11. Summary of management actions for evergreen and semi evergreen vine forests

Management Category	Context/Issue	Actions	Priority
Fauna Surveys	Fauna composition within this habitat is poorly known.	Design and implement a structured fauna survey and trapping program utilising collaborative research. Maintain focus on ethnotaxonomy to feed into TEK.	High
Plant Surveys	Flora composition is documented although limited to rapid surveys in dry season. Potential for new records for the island of significant species particularly during the wet season.	Carry out additional flora field surveys with focus on collection of new records for the island and important cultural resource species. Collect leaf specimens and photograph plants with known uses/values and that may have been used in the past, and catalogue.	Moderate

Management Category	Context/Issue	Actions	Priority
		Update island species list as new information becomes available.	
Traditional Ecological Knowledge	Composition of TEK within this habitat is poorly known. Plant and animal lists provided in the appendices provide a good foundation for increasing TEK and ethnotaxonomy.	Collect and collate TEK knowledge within this habitat gained through fauna and flora survey actions on an ongoing basis.	High
Fire Management	No major issues identified. The habitat is mostly protected by extensive surrounding mangrove forest.	No specific management actions required.	Not required
Threatened Species Management	<u>Flora</u> : No significant flora species currently known. The ecology of this habitat is poorly documented. The habitat is potentially threatened by rising sea levels.	<u>Flora</u> : No management actions required. Carry out ongoing surveys as identified above.	Moderate
	<u>Fauna</u> : Composition of fauna within this habitat is poorly known although there have been several sightings of the emerald monitor within this habitat.	<u>Fauna</u> : Further baseline information is required (see fauna surveys) before discrete management actions can be defined.	High
Invasive Species Management	<u>Flora</u> : No existing weed issues identified however a number of species known from disturbed areas pose a threat in the long term.	<u>Flora</u> : No active weed control or management currently required. Monitoring for new weed infestations, particularly for weeds including leucaena and barleria, is required on a regular basis. The utilization of these habitats by rusa deer dramatically increases the risk of weed introduction.	High
	<u>Fauna</u> : The impacts that feral deer are having on this habitat are unknown and the extent of utilization by other exotic animal species needs to be ascertained.	<u>Fauna</u> : Areas are known to be utilised by rusa deer although the composition of invasive fauna can be further assessed from fauna survey results. An island specific program for management of the feral deer population should be considered by the rangers as priority.	Immediate
Monitoring	Observations relating to any changes to habitat condition, particularly those arising from utilisation by feral animals or exotic species. Appropriate management responses can be formulated once a particular threat arises. It may also be beneficial to monitor the rate and extent of erosion and foredune scarp retreat in badly affected areas although opportunities to mitigate such erosion events are limited.	Carry out informal observation of habitat condition including health of canopy (monitoring for dieback) and presence of invasive weed species, on a regular annual to bi-annual basis. Permanently mark monitoring sites in selected accessible habitats for photographic monitoring to be undertaken on an annual basis. Sites can be placed along foredune erosion scarps to provide measurement of foredune erosion rates.	Moderate

8.2 Shrublands and Shrubland Complexes

8.2.1 Status of Ecological Knowledge

This grouping, with a sole representation on the island by vegetation community 14b (Stanton *et al.* 2009) is restricted to narrow, often sinuous alluvial relicts within the islands interior isolated within the broader expanse of estuarine wetland communities. The alluvial rises are rarely more than 0.5m above the maximum tidal levels. The limited accessibility of this community means that floristic sampling has been limited to a few poorly developed examples associated with the margins of grassland communities, supplemented with helicopter survey. The canopy, rarely taller than 10m, is typically dominated by *Acacia auriculiformis*, *Melaleuca cajuputi* subsp. *platyphylla* and *Terminalia subacroptera* with a range of vine thicket species including *Hibiscus tiliaceus*, *Mimusops elengi*, *Thespesia populneoides*, *Drypetes deplanchei*, *Diospyros compacta*, *Acacia leptocarpa*, *Cyclophyllum brevipes*, *Aglaiia eleagnoidea*, and *Excoecaria agallocha* forming a sub-dominant component of the canopy. Vines such as *Flagellaria indica*, *Gymnanthera oblonga*, *Secamone elliptica* and *Cynanchum carnosum* are common as is the *Acrostichum aureum* in the groundcover.

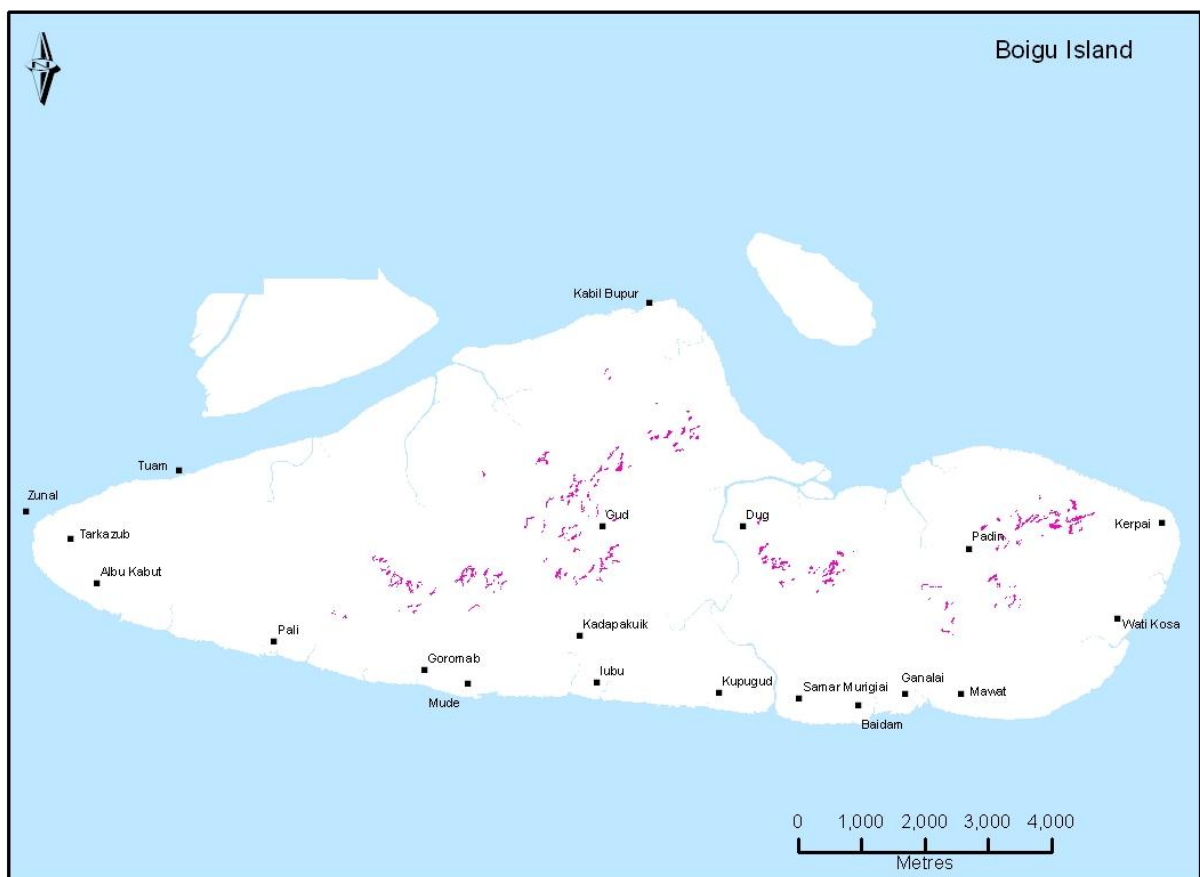


Figure 4. Distribution of shrubland and shrubland complexes on Boigu Island (place names after Lawrie, 1970).



Photograph 11. Well-developed tall shrubland, verging on low closed forest in the central portion of Boigu Island and; **Photograph 12.** Developing shrubland on the margins of grassland community, noting the presence of recent fire in the right portion of the photograph.

8.2.2 Ecological / Cultural Considerations

Habitat Condition: From limited observation, the community appears unaffected by any element of exotic species invasion and the relative isolation of these communities limits anthropogenic interference. It is likely that these habitats are heavily utilised by feral rusa deer for shelter and the impacts of this species on habitat viability are not known. Intensive utilization is however likely to degrade the landform on which this habitat relies, increasing the susceptibility of the benched landform margins to erosion as well as increasing the susceptibility of the habitat to weed incursion.

Fauna: The fauna assemblage associated with this habitat is poorly sampled and as such, poorly understood. Further structured survey effort and opportunistic sampling/observation would greatly improve the current knowledge of baseline fauna assemblage.

Flora: The 27 flora species recorded for the habitat include a disjunct population of the small tree *Synima cordierorum*. The Boigu population is disjunct and represents the northern limit of Australian distribution. No weeds have been recorded.

Cultural Perspectives: The extent of cultural utilisation of this habitat is unknown.

8.2.3 Management Implications

It should be noted that changes to frequency and intensity of burning within or on the margins of this habitat are likely to have a significant effect on the equilibrium between grassland and shrubland habitats. The nature of this relationship and management implications/requirements are discussed more fully in **Section 8.3.2**. Whilst sea level rise is a threat to the current distribution and ultimate survival of this community in the long term, it is likely that rising sea levels will result in habitat redistribution in the medium term rather than broad scale habitat loss. The utilization of this habitat by rusa deer significantly increases the risk of degradation by exotic plants species, although canopy density will slow the establishment of new invaders. The impact rusa deer is having on this habitat appears subtle at present although the extent and impact of utilization requires ongoing

observation. Considering the proliferation of *Leuceana* and to a lesser extent Butterfly Pea in the township area, these species represent the greatest threat to long-term habitat integrity.

Due to its dynamic nature, this habitat is particularly suited to monitoring through analysis of the aerial photographic record. Mapping of changes to vegetation boundaries over time through interpretation of available historical aerial photography will highlight subtle landscape scale trends on Boigu Island such as the impact of sea level rise. Considering aerial photography dates back to 1973, there is considerable scope to assess long-term trends in terms of habitat distribution and change.

8.2.4 Summary of Recommended Management Actions

Table 12. Summary of management actions for shrubland and shrubland complexes.

Management Category	Context/Issue	Actions	Priority
Fauna Surveys	The fauna composition within this habitat is poorly known.	Ongoing collection and documentation of observed wildlife is critical to providing greater insight into the habitats fauna assemblage and utilization. Consideration should be given to the design and implementation of a structured fauna survey and trapping program utilising collaborative research. Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK.	High
Plant Surveys	Flora composition is documented although limited to surveys in accessible habitats. There is potential for expansion of the known botanical assemblage, particularly in habitats that are not generally accessible.	Flora field surveys should focus on collection of new records for the island and important cultural resource species. Collect leaf specimens and photograph plants with known uses/values and that may have been used in the past, and catalogue. Update island species list as new information becomes available.	Moderate
Traditional Ecological Knowledge	Composition of TEK within this habitat is poorly known. Plant and animal lists provided in the appendices provide a good foundation for increasing TEK and ethnotaxonomy.	Collect and collate TEK knowledge within this habitat gained through fauna and flora survey actions on an ongoing basis.	High
Fire Management	Fire management should be considered in conjunction with grassland communities. It should be recognised that the development of these shrublands is a response to fire exclusion in grassland habitats.	Management should focus on maintaining current extent and occurrence in the landscape considered in conjunction with fire management in grassland habitats (discussed in Section 8.3)	High
Threatened Species Management	<u>Flora</u> : Two significant species are known to occur.	<u>Flora</u> : No management actions required. Carry out ongoing surveys as identified above.	Moderate
	<u>Fauna</u> : Composition of fauna	<u>Fauna</u> : Further baseline	High

Management Category	Context/Issue	Actions	Priority
	within this habitat is poorly known although there have been several sightings of the emerald monitor.	information is required (see fauna surveys) before discrete management actions can be defined.	
Invasive Species Management	<p><u>Flora</u>: No existing weed issues are currently identified within this habitat however a number of species known from disturbed areas pose a threat to habitat condition in the long term.</p> <p><u>Fauna</u>: The impacts that feral deer are having on this habitat are unknown and the extent of utilization by other exotic animal species needs to be ascertained.</p>	<p><u>Flora</u>: No active weed control or management currently required. Monitoring for new weed infestations, particularly for weeds including leucaena and lantana, is required on a regular basis. The utilization of these habitats by rusa deer dramatically increases the risk of weed introduction.</p> <p><u>Fauna</u>: Areas are known to be utilised by rusa deer although the composition of invasive fauna can be further assessed from fauna survey results. An island specific program for management of the feral deer population should be considered by the rangers as priority.</p>	<p>High</p> <p>Immediate</p>
Monitoring	Observations relating to any changes to habitat condition, particularly those arising from utilisation by feral animals or exotic species. Appropriate management responses can be formulated once a particular threat arises.	<p>Carry out informal observation of habitat condition including health of canopy (monitoring for dieback) and presence of invasive weed species, on a regular annual to bi-annual basis.</p> <p>Carry out review of historical aerial photography to provide an indication of long-term trends in habitat distribution.</p>	Moderate

8.3 Grassland / Grassland Complexes and Pandanus Dominant Woodland and Shrubland

8.3.1 Status of Ecological Knowledge

This habitat combines pandanus dominant woodlands and grasslands into a single management unit, which is justifiable on the grounds that both communities frequently form mosaics that are intrinsically linked through both edaphic controls and fire history. On Boigu, the habitat is limited in extent with occurrences on suppressed alluvial terraces south of the township, and fragmented occurrences throughout the islands interior (refer Figures 5 & 6). The habitat is however much more extensive on Saibai Island, and is reportedly widespread on the Morehead-Kiunga area of the Papua New Guinea lowlands identified in the Bula and Mibini Land Systems (Bleaker 1983). Neldner et al. (1997) acknowledge the bioregional conservation value of native grassland habitats which are assigned an 'Of Concern' biodiversity and vegetation management status under the Queensland VMA (1999). Grasslands on the northern Torres Strait Islands are in particularly good condition, unaffected by many of the landscape scale processes of shrubland invasion and exotic species incursions affecting habitats in the broader Cape York Peninsula bioregional area and on the eastern islands of Erub and Mer.

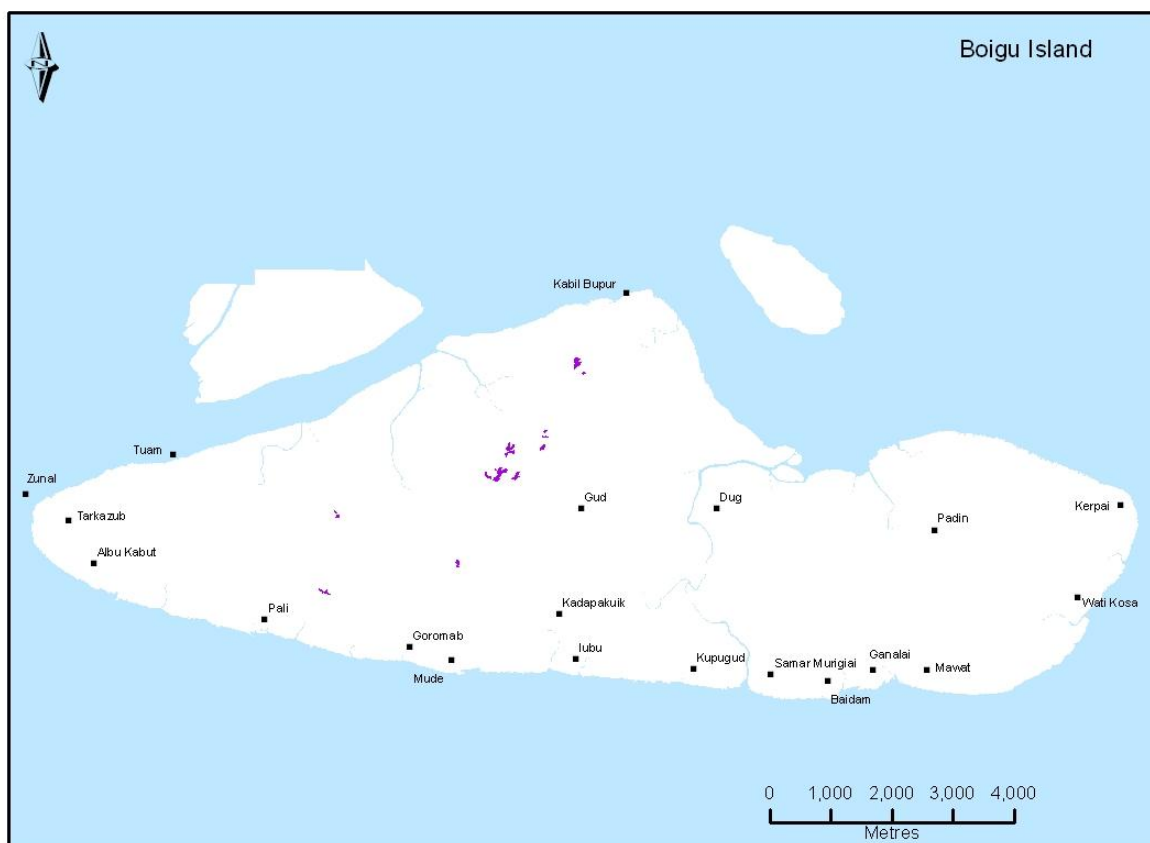


Figure 5. Distribution of grassland habitats on Boigu Island (place names after Lawrie, 1970).

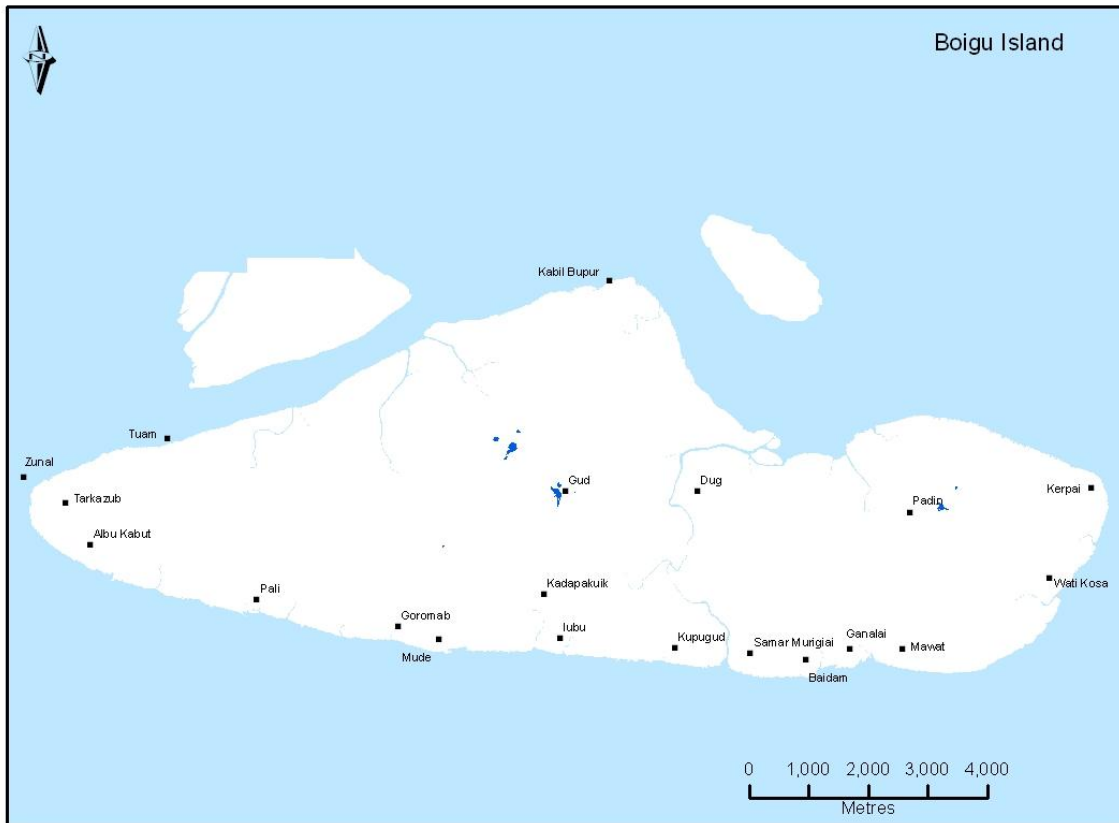


Figure 6. Distribution of pandanus dominant woodland communities (place names after Lawrie, 1970).

Grasslands are generally expressed as closed tussock grassland dominated by *Ischaemum australe* with associated species including *Imperata cylindrica*, *Themeda triandra*, *Mnesithea rottboellioides*, *Vandasina retusa*, and *Derris trifoliata*. Species associated with brackish margins include *Fimbristylis ferruginea*, *Acrostichum aureum*, *Flagellaria indica* and *Cynanchum carnosum*. Characteristic emergent shrubs are *Melaleuca cajuputi* subsp. *platyphylla*, *Pandanus* sp. and *Acacia auriculiformis*. In pandanus woodland habitats, *Pandanus spiralis* forms the dominant component of the upper stratum which has a height range of 4m to 10m, and PFC generally ranging between 10% and 40%. The salt tolerant plants *Acrostichum aureum*, *Cynanchum carnosum*, *Gymosperma inermis* and *Excoecaria agallocha* are frequently present on the margins on grassland communities adjacent to estuarine wetlands.

8.3.2 Ecological / Cultural Considerations

Habitat Condition: Whilst largely free from exotic species, the grassland habitat is being gradually consumed through saltwater incursion, a process which appears responsible for broadscale reduction in the extent of this habitat on the island. This ecosystem is also affected by shrubby invasion of *Melaleuca cajuputi* subsp. *platyphylla*, *Acacia auriculiformis* and *Acacia leptocarpa* in some areas, generally on habitat margins where there is an apparent reduction on grassy fuel

loads. Sprawling mats of canavalia are smothering native grass covers in swampier areas, which is also reducing the capacity of the habitat to sustain fire.



Photograph 13. A small area of pandanus dominant shrubland mosaicing with broader grassland habitats, and; **Photograph 14.** A mosaic of grassland and pandanus dominant shrubland in the central region of Boigu Island (local area name 'Gud'). Attrition of the margins of this community is apparent through saltwater incursion. Note should also be given to the recent fire scar.

Aerial surveys conducted by DAFF (formerly as AQIS) in November 2007 estimate a population of 60 deer on the island (Tim Kerlin, pers. comm. June 2008). Whilst no conclusion can be made concerning the population trends of feral rusa deer and their current impact on this habitat, anecdotal evidence from Boigu Rangers and the authors of this document suggests that the deer population is expanding. This is possibly due to a reduction in hunting pressure following the introduction of gun licensing. This is a worrying trend given that the introduction of rusa deer into savannah ecosystems of the Trans-Fly region of Papua New Guinea has resulted in a dramatic shrubby thickening of grassland communities, facilitated through the capacity of feral deer to reduce grassy fuel loads by grazing pressure, and subsequent changes to fire regimes (Bartolo *et al.* 2002). This fuel load reduction lowers the intensity of seasonal burning events which favours development of shrubland at the expense of grassland habitats (Jeremy Russell-Smith, pers. comm.).

Fauna: The fauna assemblage of this habitat is poorly known and has not been subject to systematic survey.

Flora: The 24 species recorded for this habitat are all native, indicating its high integrity. Additional surveys are required to fully document the habitats floristic diversity.

Cultural Perspectives: Although limited in extent, these grassland habitats are of considerable cultural significance. The largest area of grassland in the central portion of the island (area called 'Gibu') was traditionally used as a resting point for people moving on foot between north and south coasts (N. Gibuma pers. comm. Nov. 2010). On nearby Saibai Island similar grassland ecosystems host prehistoric mound and ditch agricultural systems (Barnham 1999). Grassy areas on Boigu are likely to have also provided suitable areas of arable land for cultivation. Fire has been a fundamental management tool used for maintenance of grassland habitats.

8.3.3 Management Implications

Sea level rise resulting in saline incursion, shrubby thickening and weed invasion are considered the three greatest threats to survival of this habitat. Whilst habitat change from saline incursion associated with rising sea levels is an inevitable process that is largely beyond anthropogenic control, the latter will rely largely on efforts and desires of Boigulgal Rangers and the local community.

There is already clear evidence of shrubby encroachment in some locations within this habitat and without appropriate fire regimes, there is considerable risk that grassland areas will congest with shrubs. The process of shrubby encroachment threatens grassland habitats throughout much of Cape York Peninsula, the result of altered fire regimes that has occurred with the cessation of traditional landscape burning practice. At the discretion of the rangers, areas subject to shrubby thickening should be considered for a prescriptive late season fire regime which will destroy regenerating shrubs. Burning immediately after the first seasonal storm events (storm burning) will effectively promote grassy cover over shrubs and this should be considered as a management option.

Whilst the use of late season fire is a fundamental requirement for control of shrubby thickening, prescribed burning efforts for this purpose will be futile if the feral deer population is not effectively controlled. An increasing deer population will promote continued degradation of these habitats as grazing intensity increases over time and the grassy fuel load is ultimately reduced. It should also be considered that whilst fire is a necessary tool for grassland maintenance, the promotion of new areas of green pick will concentrate grazing pressure on recently burnt areas which will in turn reduce the effectiveness of fire as a tool to prevent shrubby invasion. In addition to impacts through grazing and browsing, deer are known to damage trees and shrubs by antler rubbing and degrade water quality and wetland habitat by wallowing (Biosecurity Queensland 2010).

The introduction of rusa deer into the Boigu landscape has considerably complicated management requirements on the island and population control is considered a fundamental requirement for the long-term maintenance of grassland habitat. Continued increase in the current deer population will ultimately result in loss of grassland habitats to shrubland communities. Given population trends and numbers are currently speculative informed management requires strategic ranger assisted research to more accurately define the feral deer problem and find effective management solutions. At a minimum, rangers should be part of any regular population assessments carried out by agencies such as DAFF. Control strategies should follow those prescribed in the *Feral Deer Management Strategy 2010 – 2015* (Biosecurity Queensland 2010). The complications caused by feral deer foraging on areas of regenerating green pick after fire events also require consideration, and eradication programs should concentrate on newly burnt areas until full grass cover has regenerated.

The utilization of this habitat by rusa deer also significantly increases the risk of degradation by exotic plants, in particular leucaena which is already well established within settlement areas. There is also some threat from the introduction of other herbaceous weeds such as butterfly pea, siratro, and mint weed and together with a number of exotic grass species, these threaten to significantly alter the ecology of these habitats. Gamba grass (*Andropogon gayanus*), which has spread rapidly across a number of areas in northern and central Cape York Peninsula with large infestations in the Bamaga area, has not been recorded in the Torres Strait Islands. However it presents the greatest threat, together with annual mission grass (*Pennisetum* sp.) which is present on Mua (St Pauls) and Mabuiag. These grasses are aggressive colonists the former developing a standing biomass of 5-7 times that of native species (Rossiter *et al.* 2003) resulting in extremely intense savanna fires, significantly altering habitat ecology.

8.3.4 Summary of Recommended Management Actions

Management actions should aim to maintain the current landscape function which is considered important from both ecological and cultural perspectives. Recommendations for landscape maintenance are provided below, although ultimately management direction will be guided by the desires of the local community and representative rangers.

Table 13. Summary of recommended management actions for grassland and pandanus dominated woodland habitats.

Management Category	Context/Issue	Actions	Priority
Fauna Surveys	The fauna composition within this habitat is poorly known although the assemblage is likely to be relatively simple.	Ongoing collection and documentation of observed wildlife is critical to providing greater insight into the habitats fauna assemblage and utilization. Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK.	High
Plant Surveys	Flora composition is poorly documented and limited to surveys in accessible habitats.	Flora field surveys should focus on collection and identification of important cultural resource species. The most immediate action is to collect leaf specimens and photograph plants with known uses/values, in particular those that may have been used in the past, and catalogue.	Moderate
Traditional Ecological Knowledge	Composition of TEK within this habitat is poorly known. Plant and animal lists provided in the appendices provide a good foundation for increasing TEK and ethnotaxonomy.	Collect and collate TEK knowledge within this habitat gained through fauna and flora survey actions on an ongoing basis. Documentation of traditional land management practices, particularly in relation to fire management practice should be undertaken through collaboration with knowledgeable members of the local community.	High
Fire Management	Fire management is required to	Management should focus on	High

Management Category	Context/Issue	Actions	Priority
	<p>maintain current extent and condition of grassland communities and adjacent shrubland habitats although management is complicated considerably by the presence of rusa deer in the landscape.</p>	<p>maintaining current extent and occurrence of grassland habitats in the landscape although this should be guided by requirements and wishes of the Boigulgal people.</p> <p>At the discretion of the Boigulgal Rangers, areas being subject to shrubby thickening should be identified and be the focus of prescribed late season (hot) burns.</p> <p>Hot fires should be a component of a broader seasonal mosaic of fire events, the majority being cooler early season mosaic burns.</p> <p>Removal of fire from the landscape will ultimately result in loss of grassland habitat from the Boigu landscape.</p> <p>The frequency and usage of late dry season fires as a tool to manage shrubby invasion can be reduced once thickening is controlled and a more consistent cycle of mid-dry season fires (August to October) completed on a 2 – 3 year cycle dependent on an assessment of developing fuel loads.</p> <p>Timing and frequency of fires should be recorded for future reference. This will allow practice to be adjusted and refined to improve management outcomes.</p>	
Threatened Species Management	<p>No threatened flora or fauna species are known to occur within or utilise these habitats for foraging.</p>	<p><u>Flora</u>: No management actions required. Carry out ongoing surveys as identified in flora and actions above.</p> <p><u>Fauna</u>: Further baseline information is required (see fauna surveys) before discrete management actions can be defined.</p>	<p>Moderate</p> <p>High</p>
Invasive Species Management	<p><u>Flora</u>: There are no existing weed issues currently identified within this habitat. A number of species known from disturbed areas pose a threat to habitat condition in the long term.</p> <p><u>Fauna</u>: The impacts that feral deer are having on this habitat are unknown and the extent of</p>	<p><u>Flora</u>: No active weed control or management is currently required in areas away from the township. Monitoring for new weed infestations, particularly for weeds including leucaena and lantana, is required on a regular basis. The utilization of these habitats by rusa deer dramatically increases the risk of weed introduction.</p> <p><u>Fauna</u>: Areas are known to be utilised by rusa deer although the composition of invasive fauna can</p>	<p>Medium</p> <p>Immediate</p>

Management Category	Context/Issue	Actions	Priority
	utilization by other exotic animal species needs to be ascertained.	<p>be further assessed from the results of ongoing fauna surveys.</p> <p>Ranger assisted research to more accurately define the feral deer problem and find effective management solutions should be a priority action. At a minimum, rangers should be part of any regular population assessments carried out by agencies such as DAFF. Control strategies should consider those prescribed in the <i>Feral Deer Management Strategy 2010 – 2015</i> (Biosecurity Queensland 2010).</p>	
Monitoring	Observations relating to any changes in habitat structure or condition, particularly those arising from utilisation by feral animals or exotic species needs ongoing assessment and monitoring.	<p>Carry out informal observation of habitat condition including health of canopy (monitoring for dieback) and presence of invasive weed species, on a regular annual to bi-annual basis.</p> <p>A record of those areas informally surveyed utilising GPS tracks should be kept to ensure comprehensive ongoing coverage of the island.</p> <p>Place permanent photographic monitoring sites in a range of accessible grassland areas. Monitoring sites should be placed both within habitats known to be frequently utilised by deer and other areas where deer foraging is thought to be infrequent. This will allow ongoing assessment of any changes to vegetation structure, composition or condition caused by deer or exotic species invasion.</p>	High

8.4 Samphire Grasslands

8.4.1 Status of Ecological Knowledge

Salt water couch (*Sporobolus virginicus*) dominant grasslands (VC26a) are extensive on Boigu Island, typically occurring as a broad interface between chenopod forbland and mangrove habitats. Whilst *Sporobolus virginicus* is the dominant ground cover, associated species may also include *Tecticornia australasica*, *Cynanchum carnosum*, and *Sesuvium portulacastrum*. Emergent shrubs to 1m may occur and include *Avicennia marina*, *Bruguiera parviflora*, *Clerodendrum inerme*, *Gymnosporia inermis*, *Excoecaria agallocha*, and *Thespesia populneoides*. This is a dynamic community, the composition of which will undoubtedly respond to cyclical variations in climate and tidal incursion. Frequent tidal inundation in the absence of sufficient rainfall to flush accumulating salt will favor the gradual replacement of grass with chenopod forbs. The threats from sea level rise are unknown although more frequent tidal incursion will undoubtedly result in a changing distribution of this habitat.



Photograph 15. Extensive sporobolus dominant grassland on the margins of mangrove habitats in the proximity of the Boigu settlement, and; **Photograph 16.** Mangrove shrubland invasion of sporobolus dominant grasslands on the north eastern section of the island.

8.4.2 Ecological / Cultural Considerations

Habitat Condition: The habitat is universally free from exotic species, with species composition regulated by soil salinity. Large areas in the north eastern portion of the island are subject to invasion by mangrove shrubs.

Fauna: Samphire grassland provides valuable habitat for a range of significant fauna species including black-necked stork (*Ephippiorhynchus asiaticus*), radjah shelduck (*Tadorna radjah*) and false water mouse (*Xeromys myoides*).

Flora: Low species diversity.

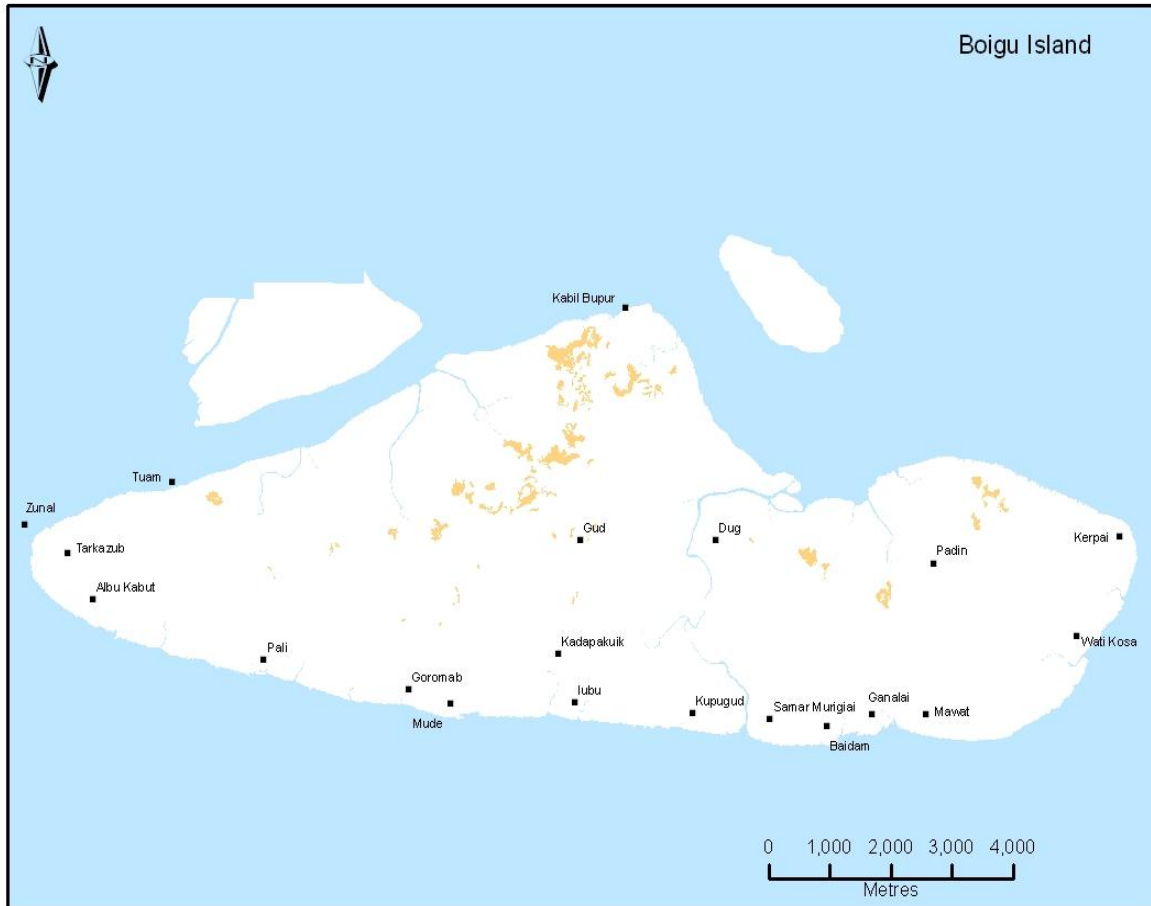


Figure 7. Distribution of samphire grassland habitats on Boigu Island (place names after Lawrie, 1970).

Cultural Perspectives: The sporobolus grasslands are seasonally burnt as traditional practice, possibly to assist the long-term maintenance of habitat diversity as well as maintaining access for traditional prawning practices and hunting of introduced deer. All burns observed appear to be low intensity and patchy nature.

8.4.3 Management Implications

This is a self-regulating habitat that requires minimal input in terms of active management. The long-term distribution of saline grassland will be determined largely by tidal regime, trends in sea level and climatic factors such as rainfall.

8.4.4 Summary of Recommended Management Actions

No active management is required. Observations relating to the timing and frequency of fire events should be recorded opportunistically as the majority of fires will occur in close proximity to the township. Documentation of all animals observed (including invasive/exotic species) should be undertaken with photographs and collections (preserved in freezer) where possible for future formal

identification by authorities or agencies. Particular attention should be paid to verification of the presence of the false water mouse, of which there is an unconfirmed record for the island. This habitat would benefit from a trapping program targeted specifically towards confirmation of the presence of this species. Documentation of the traditional usage of this habitat should be an ongoing component of the ranger program.

Table 14. Summary of recommended management actions for samphire grassland habitat.

Management Category	Context/Issue	Actions	Priority
Fauna Surveys	The fauna composition within this habitat is poorly documented although the assemblage is likely to be relatively simple.	Ongoing collection and documentation of observed wildlife is critical to providing greater insight into the habitat's fauna assemblage and utilization. Targeted survey for false water mouse should be considered a priority action. This can be completed using Elliott Traps (A or B) baited with sardines placed on the interface between mangroves and grasslands. Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK.	High
Plant Surveys	Flora composition is relatively well documented although previous survey has been limited to survey in accessible habitats.	Flora field surveys should focus on the collection and identification of important cultural resource species as well as potentially invasive exotic species.	Moderate
Traditional Ecological Knowledge	Composition of TEK within this habitat is poorly known. Plant and animal lists provided in the appendices provide a good foundation for increasing TEK and ethnotaxonomy.	Collect and collate TEK knowledge within this habitat gained through fauna and flora survey actions on an ongoing basis. Documentation of traditional land management practices, particularly in relation to fire management practice, should be undertaken through collaboration with knowledgeable members of the local community.	Moderate
Fire Management	Fire management is required to maintain current extent and condition of grassland communities and adjacent shrubland habitats although management is complicated considerably by the presence of rusa deer in the landscape.	This habitat generally does not require fire for maintenance and is regulated by saline influx. Field observation indicated however that this habitat is subject to occasional patch burning. The timing and purpose of these burns should be noted for future reference and retention of traditional land management practice knowledge.	Moderate
Threatened Species Management	No threatened flora species are known to occur within this habitat. The grassland however provides habitat and foraging ground for a range of threatened fauna species.	<u>Flora:</u> No management actions required. Carry out ongoing surveys as identified in flora and actions above. <u>Fauna:</u> Further baseline information is required (see fauna surveys) before discrete	Moderate High

Management Category	Context/Issue	Actions	Priority
		<p>management actions can be defined.</p> <p>Particular attention should be paid to recording site locations of threatened species including black necked stork and radjah shelduck.</p> <p>Targeted survey for false water mouse should be considered priority and inform management requirements.</p>	
Invasive Species Management	<p><u>Flora</u>: There are no existing weed issues identified within this habitat and weed incursions are likely to be regulated by regular saline incursion which limits the potential for aggressive weed invasion.</p> <p><u>Fauna</u>: The degree of utilisation and impacts that feral deer are having on this habitat is unknown. Other invasive species including both domesticated and feral dogs and cats may have a significant impact on populations and habits of threatened fauna species which utilise or potentially utilise this habitat.</p>	<p><u>Flora</u>: No active weed control or management is currently required in areas away from the township. Ongoing passive survey for exotic species should be undertaken as a component of the rangers daily duties.</p> <p><u>Fauna</u>: Utilisation of this habitat by deer should be documented. Monitoring and control requirements should be guided by the <i>Feral Deer Management Strategy 2010 – 2015</i> (Biosecurity Queensland 2010).</p> <p>Survey of habitat usage by other exotic species should be an ongoing component of the ranger program with sightings recorded and populations monitored informally. Indications of population expansions, particularly feral cats and dogs, will require a structured eradication program.</p>	<p>Moderate</p> <p>Immediate</p>
Monitoring	<p>Observations relating to any changes in habitat structure or condition, particularly those arising from utilisation by feral animals or exotic species needs ongoing assessment and monitoring.</p>	<p>Carry out informal observation of habitat condition including health of presence of invasive weed species, incursion by mangrove shrublands etc. on a regular annual to bi-annual basis. At present, there is no requirement for placement of permanent monitoring sites although this may be necessitated if changes to habitat structure or condition are noted during informal observation.</p>	Moderate

8.5 Samphire Herblands and Shrublands and Salt Pans

8.5.1 Status of Ecological knowledge

The habitat is a response to hyper-saline conditions, a result of repetitive tidal wetting and subsequent surface water evaporation. The dominant floristic components are halophytic forbs including *Tecticornia australasica*, *Sarcocornia quinqueflora* subsp. *quinqueflora* and *Suaeda australis*. Some areas lack any significant ground cover due to persistent salt scalding with evaporative crusts forming in topographic lows during dryer periods (recognised as a separate VC 25b).

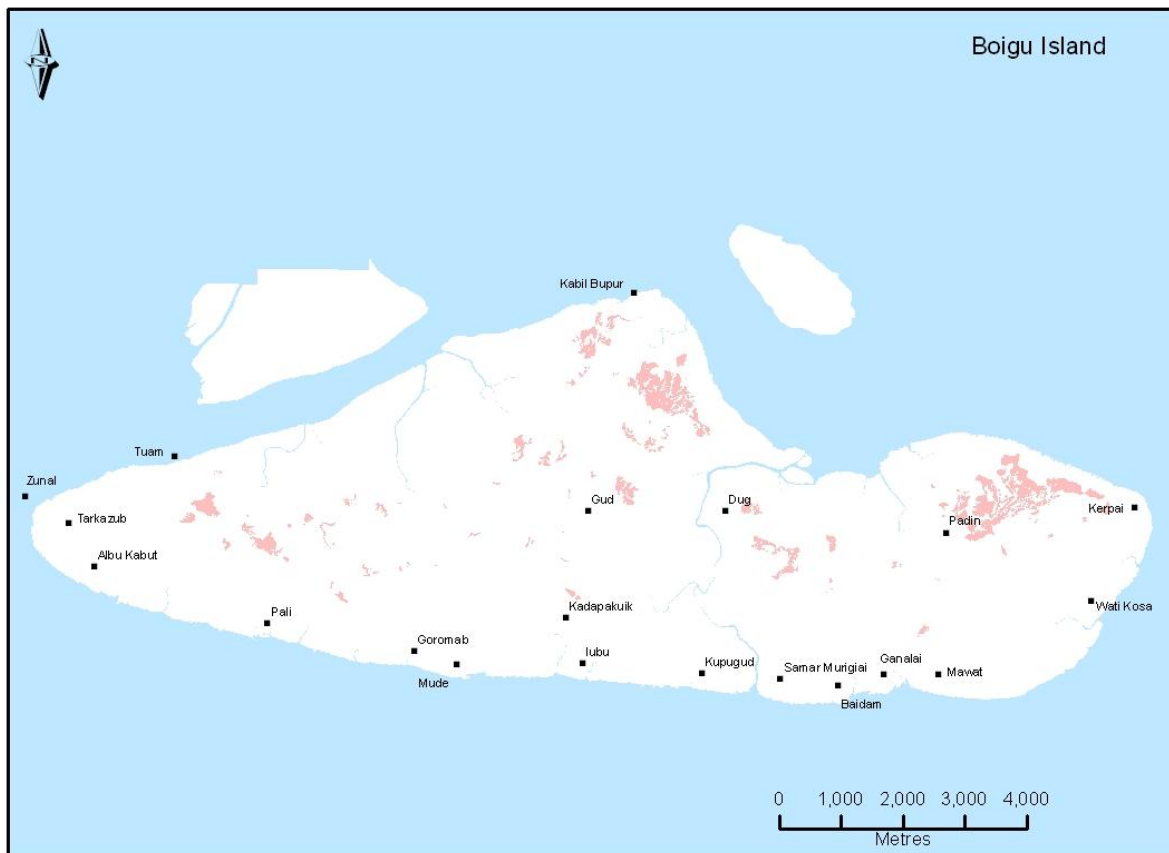


Figure 8. Distribution of samphire herbland and shrublands on Boigu Island (place names after Lawrie, 1970).



Photograph 17. An extensive complex of samphire herblands, salt scalds and mangrove shrublands in the eastern portion of Boigu Island in the late dray season of 2007. Tracks are made by rusa deer.

8.5.2 Ecological / Cultural Considerations

Habitat Condition: The habitat is universally free from exotic species. This is a dynamic community that responds to variations in tidal regime and rainfall.

Fauna: Samphire grassland provides valuable habitat for a range of significant fauna species including black-necked stork (*Ephippiorhynchus asiaticus*), radjah shelduck (*Tadorna radjah*) and false water mouse (*Xeromys myoides*).

Flora: Low species diversity.

Cultural Perspectives: Traditional usage is unknown.

8.5.3 Management Implications

This is a self-regulating habitat that requires minimal input in terms of active management. The long term distribution and floristic composition of this habitat will be determined largely by tidal regime, trends in sea level and climatic factors such as rainfall.

8.5.4 Summary of Recommended Management Actions

No active management is required although the following actions should be considered during the course of the rangers duties.

Table 15. Summary of recommended management actions for samphire herblands and shrublands

Management Category	Context/Issue	Actions	Priority
Fauna surveys	The fauna composition and utilization within this habitat is poorly documented.	Ongoing collection and documentation of observed wildlife is critical to providing greater insight into the habitats fauna assemblage and utilization. Targeted survey for false water mouse should be considered a priority action. This can be completed using Elliott Traps (A or B) baited with sardines placed on the interface between samphire habitats and mangroves. Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK.	High
Plant Surveys	Flora composition is relatively well documented although previous survey has been limited to survey in accessible habitats.	Flora field surveys should focus on the collection and identification of important cultural resource species. There is limited potential for exotic species invasion within this habitat due to the regulatory affect of frequent tidal incursion.	Moderate
Traditional Ecological	Composition of TEK within this habitat is poorly known. Plant and	Collect and collate TEK knowledge within this habitat	Moderate

Management Category	Context/Issue	Actions	Priority
Knowledge	animal lists provided in the appendices provide a good foundation for increasing TEK and ethnotaxonomy.	gained through fauna and flora survey actions on an ongoing basis. Documentation of traditional habitat utilization is a fundamental information requirement.	
Fire Management	This habitat will not generally carry fire and there is no requirement for active fire management or monitoring.	No action required.	Non- priority
Threatened Species Management	No threatened flora species are known to occur within this habitat. The grassland however provides habitat and foraging ground for a range of threatened fauna species.	<u>Flora</u> : No management actions required. Carry out ongoing surveys as identified in flora and actions above. <u>Fauna</u> : Further baseline information is required (see fauna surveys) before discrete management actions can be defined. Particular attention should be paid to recording site locations of threatened species including black-necked stork and radjah shelduck. Targeted survey for false water mouse should be considered priority and inform management requirements.	Moderate High
Invasive Species Management	<u>Flora</u> : There are no existing weed issues identified within this habitat and weed incursions are likely to be regulated by saline incursion which limits the potential for aggressive weed invasion. <u>Fauna</u> : The degree of utilisation and impacts that feral deer are having on this habitat is unknown although it is likely that considerable ground disturbance may occur during drier periods when water level is low. Other invasive species including both domesticated and feral dogs and cats may have a significant impact on populations and habitats of threatened fauna species which utilise or potentially utilise wetland areas.	<u>Flora</u> : No active weed control or management required at present. <u>Fauna</u> : Habitat utilisation and impacts of feral deer should be recorded (including photographic reference) as component of general ranger duties. Monitoring and control requirements should be guided by the <i>Feral Deer Management Strategy 2010 – 2015</i> (Biosecurity Queensland 2010). Survey of habitat usage by other exotic species should be an ongoing component of the ranger program with sightings recorded and populations monitored informally. Indications of population expansions, particularly feral cats and dogs will require a structured eradication program. Vigilance in respect to monitoring climbing perch (<i>Anabus testudineus</i>) populations which may occur within water bodies throughout this habitat (see Burrows <i>et al.</i> 2010).	Moderate Immediate
Monitoring	Observations relating to any changes in habitat structure or	Carry out informal observation of habitat condition including health	Moderate

Management Category	Context/Issue	Actions	Priority
	condition, particularly those arising from utilisation by feral animals or exotic species needs ongoing assessment and monitoring.	of canopy (monitoring for dieback) and presence of invasive weed species, on an annual to bi-annual basis. At present, there is no requirement for placement of permanent monitoring sites.	

8.6 Estuarine Wetland Complexes

8.6.1 Status of Ecological Knowledge

The habitat is prominent on Boigu Island where it occupies seasonally inundated drainage depressions on tidal flats. The salinity in these semi-permanent water bodies varies dependent on seasonal rainfall. During the wet season, these depressions accumulate freshwater, which progressively evaporates during drier periods to increase salinity. Field investigations by Burrows (2010) in May 2010 indicated that none of the wetlands sampled had salinity levels low enough for the water to be considered freshwater. Salinity of water in the interior swamps ranged from 4,000-8,000 $\mu\text{S}/\text{cm}$ which is about 10-15% the strength of seawater (Burrows 2010). During the driest periods of the year, the wetlands are characterised by desiccated sedges including *Schoenoplectus littoralis* and *Eleocharis dulcis* and *E. equisetina* often with an evaporate accumulation in drainage low points. The extent of similar ecosystems on the Fly Platform of mainland Papua New Guinea is unknown yet likely to be associated with the Wunji Land System (Bleaker 1983).

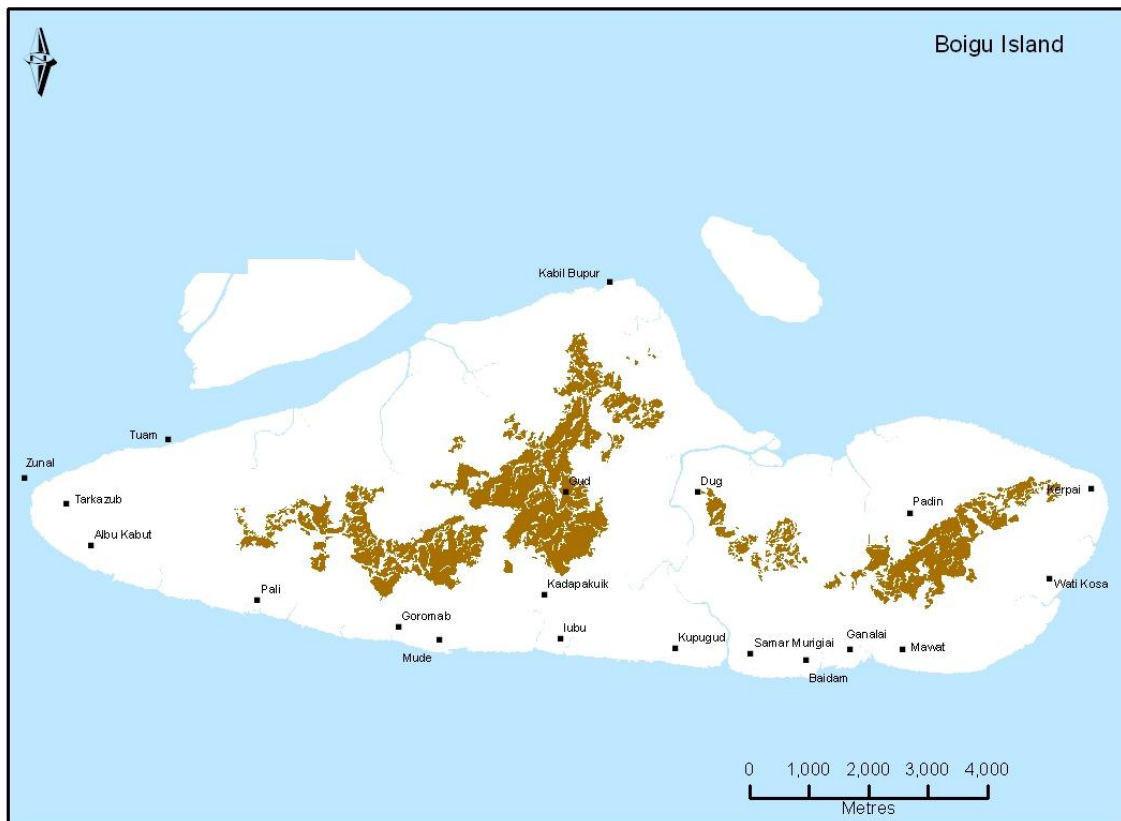


Figure 9. Distribution of estuarine wetland habitats and shrublands on Boigu (places Lawrie, 1970).



Photograph 18. Brackish wetland system with *Schoenoplectus littoralis* in the northern section of Boigu Island, and; **Photograph 19.** A mosaic of *Schoenoplectus littoralis*, *Eleocharis dulcis* sedgeland and *Sporobolus virginicus* dominant grassland in Boigu Islands northern section.

8.6.2 Ecological / Cultural Considerations

Habitat Condition: The habitat exhibits high integrity although there may be minor impacts associated with grazing by feral deer. Minor degradation is also associated with use of the recently acquired all-terrain vehicle (argo) which has flattened sedgeland communities along vehicle access points and had some impact on aquatic water quality. The potential for the interior wetlands to become hypersaline (higher salt content than seawater) as indicated by Burrows (2010) is increased by the likelihood of sea level rise affecting Boigu Island. As such Burrows (2010) considers that further understanding of the salinity dynamics of the wetlands is important to monitoring any changes that are likely to result from sea level rise.

Fauna: Estuarine sedgeland provides valuable habitat for a range of significant fauna species including black-necked stork (*Ephippiorhynchus asiaticus*), radjah shelduck (*Tadorna radjah*), and also the estuarine crocodile (*Crocodylus porosus*). Burrows (2010) recorded bockadams (*Cerberus australis*) a reddish coloured snake, from the interior swamps which was the first record for Torres Strait. Wetland values are described by Burrows (2010).

Aquatic Fauna: An aquatic survey was carried out at four wetland sites around the Boigu community and in the estuarine wetlands of the interior by Burrows (2010). The majority of the 14 native fish species recorded were considered to be estuarine, rather than freshwater fish (see **Appendix J**). The presence of a climbing perch population was confirmed.

Flora: Surveys in this habitat have been carried out by Burrows *et al.* (2010) with 17 species recorded.

Cultural Perspectives: The habitat provides an important traditional resource base for fishing and prawning.

8.6.3 Management Implications

This is a self-regulating habitat that requires minimal input in terms of active management although it may be sensitive to a range of disturbance factors including impacts to water quality. The use of the 'argo' was observed to be causing degradation of sedgeland communities and care should be taken to ensure usage is restricted to essential management patrols and designated access points or tracks are used. The vehicle also has potential to transfer weed infestation from areas around the town settlement to more remote undisturbed habitats. Any use into the island interior should be preceded by a thorough weed washdown.

Sea level rise and changes to tidal regime will almost certainly affect the salinity of within-island wetlands, potentially having a significant impact on ecological function across large areas of the island. Whilst mitigation against this impact will not be possible, consideration should be given to implementation of monitoring programs to ensure changes to wetland water quality and chemistry are detected, and broader ecological responses documented. Monitoring should cover several full seasonal cycles and also include assessments of salinity in the wetlands before and immediately after king tides (see Burrows 2010).

Burrows (2010) recommends further surveys for climbing perch on the island, (especially in the dry season), to better determine distribution. Community education is also recommended to assist prevention of climbing perch and other exotic fishes spreading on Boigu Island and to other islands.

8.6.4 Summary of Recommended Management Actions

No active management is required although the following actions should be considered during the course of the rangers duties.

Table 16. Summary of recommended management actions for samphire herblands and shrublands.

Management Category	Context/Issue	Actions	Priority
Fauna Surveys	The fauna composition and utilization within this habitat is poorly documented.	Ongoing collection and documentation of observed wildlife is critical to providing greater insight into the habitats fauna assemblage and utilization. Targeted survey for false water mouse should be considered a priority action. This can be completed using Elliott Traps (A or B) baited with sardines placed on the interface between wetland areas and other habitats (mangroves, samphire grasslands etc.). Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK.	High
Plant Surveys	Flora composition is relatively well documented and simple both in	Flora field surveys should focus on the collection and identification	Moderate

Management Category	Context/Issue	Actions	Priority
	composition and structure.	of important cultural resource species. There is limited potential for exotic species invasion within this habitat due to the regulatory affect of frequent inundation and salinity.	
Traditional Ecological Knowledge	Composition of TEK within this habitat is poorly known. Plant and animal lists provided in the appendices provide a good foundation for increasing TEK and ethnotaxonomy.	Collect and collate TEK knowledge within this habitat gained through fauna and flora survey actions on an ongoing basis. Documentation of traditional habitat utilization is a fundamental information requirement.	Moderate
Fire Management	This habitat will not generally carry fire and there is no requirement for active fire management or monitoring.	No action required	Non- priority
Threatened Species Management	No threatened flora species are known to occur within this habitat. The wetland habitats however provide habitat and foraging ground for a range of threatened fauna species.	<u>Flora:</u> No management actions required. Carry out ongoing surveys as identified in flora and actions above. <u>Fauna:</u> Further baseline information is required (see fauna surveys) before discrete management actions can be defined. Particular attention should be paid to recording site locations of threatened species including black necked stork, radjah shelduck and estuarine crocodile. Targeted survey for false water mouse should be considered priority and inform management requirements.	Moderate High
Invasive Species Management	<u>Flora:</u> There are no existing weed issues identified within this habitat and weed incursions are likely to be regulated by saline incursion which limits the potential for aggressive weed invasion. <u>Fauna:</u> The degree of utilisation and impacts that feral deer are having on this habitat is unknown although it is likely that considerable ground disturbance may occur during drier periods when water level is low. Other invasive species including both domesticated and feral dogs and cats may have a significant impact on populations and habitats of threatened fauna species which utilise or potentially utilise wetland areas.	<u>Flora:</u> No active weed control or management required at present. <u>Fauna:</u> Habitat utilisation and impacts of feral deer should be recorded (including photographic reference) as component of general ranger duties. Monitoring and control requirements should be guided by the <i>Feral Deer Management Strategy 2010 – 2015</i> (Biosecurity Queensland 2010). Survey of habitat usage by other exotic species should be an ongoing component of the ranger program with sightings recorded and populations monitored informally. Indications of population expansions,	Moderate Immediate

Management Category	Context/Issue	Actions	Priority
		<p>particularly feral cats and dogs will require a structured eradication program.</p> <p>Aquatic Fauna: Conduct surveys for climbing perch on the island in the dry season when limited surface water is present so their distribution can be more confidently determined.</p> <p>Design and implement community education and ranger training to prevent the spread of climbing perch. Train rangers in identification and monitoring methods for climbing perch and other potential exotic fish.</p>	<p>Immediate</p> <p>Immediate</p>
Monitoring	Wetland areas may be particularly prone to rapid changes in water chemistry, quality and habitat structure/ composition due to sea level rise. Observations relating to any changes in habitat structure or condition, particularly those arising from utilisation by feral animals.	Permanent long-term photographic monitoring points should be established in accessible wetland locations and photographic information collected consistently over a number of seasonal periods. Photographic evidence may be an important means of documenting ecological responses within wetlands to sea level fluctuation.	Moderate
Other Actions	Habitat degradation caused directly or facilitated by the Argo vehicle may be problematic with long term ongoing usage.	Ensure usage is restricted to essential management patrols and designated access points or tracks are used. The vehicle also has potential to transfer weed infestation from areas around the town settlement to more remote undisturbed habitats. Any use of the vehicle in the island interior should be preceded by a thorough weed washdown.	Immediate

8.7 Mangrove Forest, Woodland and Shrubland Complexes

8.7.1. Status of Current Ecological Knowledge

This is a highly complex and variable habitat type occupying intertidal areas. Although considerable structural variation is apparent, this habitat is mapped by Stanton *et al.* (2009) as a complex of tall closed to open forest, woodland and shrubland. This reflects limitations in sampling and general structural complexity.

Surveys undertaken by Duke (2010) recorded 30 mangrove species, one of the highest biodiversities of mangroves in Australia and the world and attributed to the range of salinities, the consistently warm temperatures, and an abundant supply of reproductive material from nearby large riverine estuaries entering Torres Strait from the Gulf of Papua to the north and north-east. Duke (2010) recognised at least three structural zones ranging from sea and channel edge forests comprising *Rhizophora* species (including *R. stylosa*, *R. apiculata*, *R. mucronata*) to inner mangrove wetland assemblages comprising *Avicennia marina*, *Bruguiera exaristata*, *Ceriops australis*, *Excoecaria agallocha*, *Lumnitzera racemosa*, *Scyphiphora hydrophylacea* and *Acrostichum speciosum*. The inner wetland zones are essentially a collection of structural forms ranging from copses of ground fern, to shrubs and small trees in thickets. It is common for mangrove forests to exceed 30m in better-developed locations on the island.

8.7.2 Ecological / Cultural Considerations

Habitat Condition: The habitat exhibits high integrity although there may be minor impacts associated with local timber usage. Relatively extensive areas of mangrove regrowth are associated with the maintenance of the perimeters of the Boigu airstrip.

Fauna: Mangrove forest and woodland areas provide habitat for estuarine crocodile whilst the interface between mangrove forest and samphire grassland/ wetland areas provides potential habitat for the false water mouse (*Xeromys myoides*). The emerald monitor (*Varanus prasinus*) has also been recorded within this habitat (Burrows *et al.* 2010).

Flora: The high species diversity of the mangroves is previously documented by Burrows *et al.* (2010) who describe the Boigu Island mangrove flora as one of the highest biodiversity of mangroves in Australia and the world. The 30 species of mangrove recorded include:

- the 'Near-Threatened' species *Dolichandrone spathacea*;
- the regionally significant species: *Sonneratia ovata* (a new record for Australia, Duke 2010); *Acanthus ebracteatus* var. *barbatus* (a new record for Queensland, previously known only in the Northern Territory, see Duke 2010).
- the regionally significant grass *Leptochloa simoniana* which occurs on the sandy margins of mangroves is locally restricted and reaches its southern limit of distribution on Boigu and Saibai Islands.

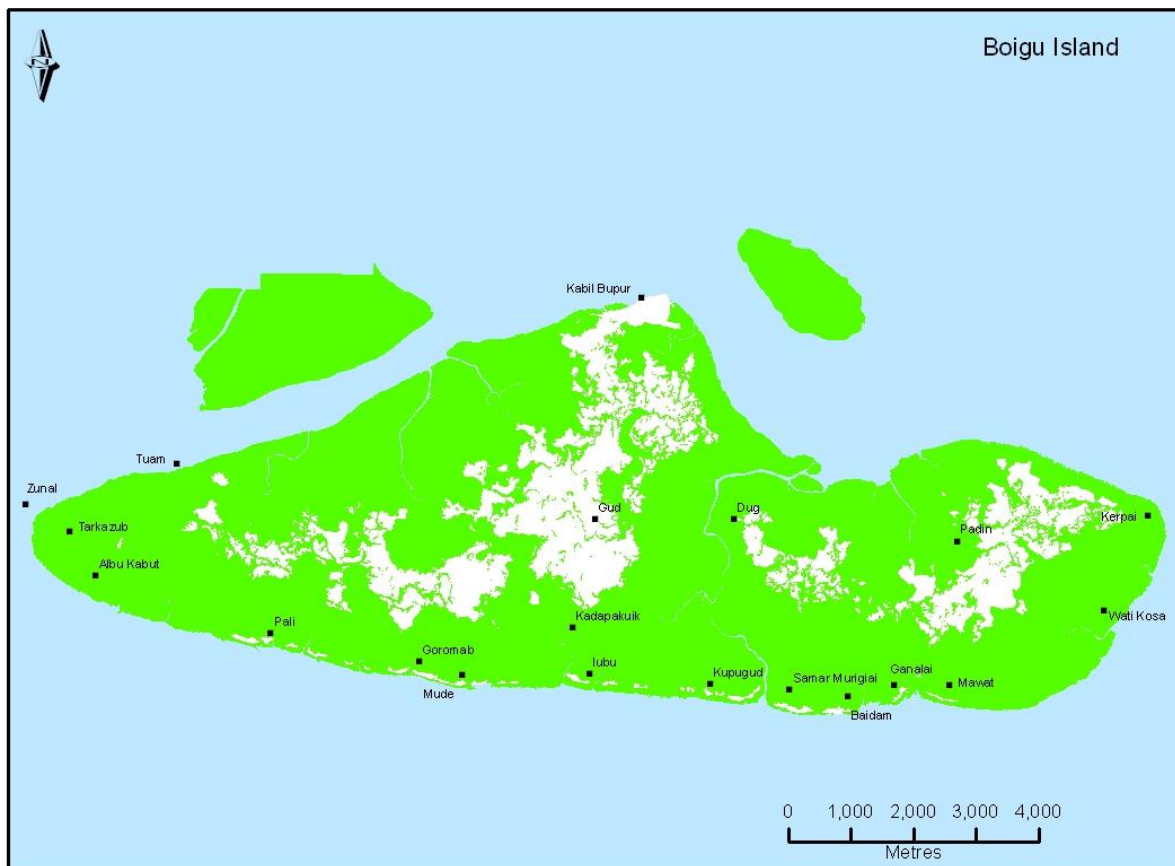


Figure 10. Distribution of mangrove dominant habitats on Boigu Island (place names after Lawrie, 1970).



Photograph 20. A tall specimen of *Avicennia marina* subsp. *eucalyptifolia* exceeding 30m height near the Boigu airstrip and; **Photograph 21.** Mangrove open forest on the margins of a tidal wetland.

Cultural Perspectives: The habitat provides an important traditional resource base for timber harvesting, fishing and hunting. Many species are intimately known and used by Boigu Islanders and mangroves are generally recognised as an essential and traditional natural resource (Burrows *et al.* 2010).

8.7.3 Management Implications

This is a self-regulating habitat that requires minimal input in terms of active management. Extensive recommendations for management and monitoring of mangrove ecosystems within the Mangrove Watch program are identified by Duke (2010) in Burrows (2010).

8.7.4 Summary of Recommended Management Actions

No active management is required although the following actions should be considered during the course of the ranger's duties.

Table 17. Summary of recommended management actions for samphire herblands and shrublands

Management Category	Context/Issue	Actions	Priority
Fauna Surveys	The fauna composition and utilization within this habitat is poorly documented.	Ongoing collection and documentation of observed wildlife is critical to providing greater insight into the habitats fauna assemblage and utilization. Targeted survey for false water mouse should be considered a priority action. This can be completed using Elliott Traps (A or B) baited with sardines placed on the interface between mangrove areas and other habitats (estuarine wetlands, samphire grasslands etc). Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK.	High
Plant Surveys	Floristic composition has been comprehensively documented by Duke (2010).	Floristic survey should focus on the collection and identification of important cultural resource species and traditional nomenclature. There is limited potential for exotic species invasion within this habitat due to the regulatory affect of frequent inundation and salinity.	Moderate
Traditional Ecological Knowledge	Composition of TEK within this habitat is poorly known. Plant and animal lists provided in the appendices provide a good foundation for increasing TEK and ethnotaxonomy.	Collect and collate TEK knowledge within this habitat gained through fauna and flora survey actions on an ongoing basis. Documentation of traditional habitat utilization is a fundamental information requirement.	Moderate
Fire Management	This habitat will not generally carry	No action required.	Non- priority

Management Category	Context/Issue	Actions	Priority
	fire and there is no requirement for active fire management or monitoring.		
Threatened Species Management	Documentation on the extent and density of the population of the 'Near-Threatened' species <i>Dolichandrone spathacea</i> .	<u>Flora</u> : No management actions required. Carry out ongoing surveys as identified in flora and actions above.	Moderate
		<u>Fauna</u> : Further baseline information is required (see fauna surveys) before discrete management actions can be defined. Particular attention should be paid to recording site locations of threatened species including black necked stork, emerald monitor and estuarine crocodile. Targeted survey for false water mouse should be considered priority and inform management requirements.	High
Invasive Species Management	<u>Flora</u> : There are no existing weed issues identified within this habitat and weed incursions are likely to be regulated by saline incursion which limits the potential for aggressive weed invasion.	<u>Flora</u> : No active weed control or management required at present.	Moderate
	<u>Fauna</u> : The mangrove habitat is known to host populations of climbing perch.	<u>Fauna</u> : Vigilance in respect to monitoring climbing perch (<i>Anabus testudineus</i>) populations which may occur within water bodies throughout this habitat (see Burrows <i>et al.</i> 2010).	Immediate
Monitoring	Changes to mangrove condition and structure may occur due to the effects of ongoing sea level rise.	Extensive recommendations for management and monitoring of mangrove ecosystems within the Mangrove Watch program are identified by Duke (2010).	Moderate

8.8 Cleared Areas and Regrowth

8.8.1 Status of Ecological Knowledge

Cleared areas refer to areas of anthropogenic disturbance, generally relating to development of the township and associated infrastructure. Management of these areas is under control of the local Council although the spread of exotic species from these areas poses a particular threat to the integrity of natural habitats across the island. Dowe (2010) recorded a number of potentially significant weeds including *Achyranthes aspera*, *Euphorbia cyathophora*, *Hyptis suaveolens*, *Jatropha gossypifolia* and *Senna alata*. This is supplemented by a list provided by Miller (*et al.* 2009) that identifies *Lantana camara*, *Leucaena leucocephala* and *Stachytarpheta jamaicensis* as additional weed species on the island. Of these weed species *Jatropha gossypifolia* (a Class 2 declared weed under the LPA), *Lantana camara* (WONS, Class 3 declared weed under the LPA)

and *Leucaena leucocephala* are assessed to have the greatest potential to spread away from the area around the township into natural communities (Dowe 2010). Porcupine flower (*Barleria prionitis*) is also considered a potential threat to island biodiversity.



Photograph 22. (left) Dense regeneration of *Leucaena* on margins of the Boigu community.

Photograph 23. Areas of *leucaena* infestations on margins of the Boigu cemetery subject to mechanical clearing (November 2010).

8.8.2 Management Implications

Areas utilised for habitation and infrastructure purposes are sites for a number of processes with significant potential to degrade natural ecosystems. Of these processes, the proliferation of exotic weed species presents by far the most serious threat to the integrity of natural habitats across the island. Whilst detailed weed management strategies are beyond the scope of this exercise, absolute priority should be given to the management of *leucaena* (*Leucaena leucocephala*) and porcupine flower (*Barleria prionitis*) both of which have considerable potential to spread to undisturbed alluvial habitats throughout the islands interior. A comprehensive program of weed control and eradication around the township is required to minimise the risk of spread of these species into natural habitats. Recent control of *Leucaena* by mechanical means (i.e. front end loader) will only be temporary if follow up spraying of the rapidly regenerating seed soil bank and vegetative stems is not carried out. Any areas mechanically disturbed with no follow up control are likely to produce denser infestations at the site. Dispersal mechanisms into natural habitats will include natural means such as water, wind and birds as well as by human means on all terrain vehicles and machinery. Declared weeds such as lantana (*Lantana camara*) and bellyache bush (*Jatropha gossypifolia*) have been recorded around the community area and should also be targeted as a priority. The spread of other weeds onto the islands can be minimised by washdowns of all vehicle and machinery arriving on the island. It is also very important for any plant and equipment working on Boigu to be thoroughly cleaned of *leucaena* seed before moving to other Torres Strait Islands.

8.8.3 Summary of Recommended Management Actions

No active management is required although the following actions should be considered during the course of the rangers duties.

Table 18. Summary of recommended management actions for disturbed areas.

Management Category	Context/Issue	Actions	Priority
Fauna Surveys	The fauna composition and utilization within cleared habitats has not been documented although these areas have concentrated populations of domestic dogs and to a lesser extent cats.	Maintain communications with council animal control and DAFF officers in regard to the spread of domesticated animal into broader environs.	Moderate
Plant Surveys	The introduction of problematic pest species is most likely to occur in the vicinity of the island settlement	No formal surveys required other than recording occurrences of problematic pest species. Maintain communications with council environmental officers and DAFF officers in regard to the spread of weeds into broader environs.	High
Traditional Ecological Knowledge	No issues identified	No action required	Non-priority
Fire Management	Fire exclusion area	No action required.	Non-priority
Threatened Species Management	Threatened fauna species are known to frequent disturbed areas.	<u>Fauna</u> : Documentation of native fauna species utilizing cleared habitats (such as insectivorous bats and native rodents) may provide information on the degree to which disturbed areas are utilised by threatened species.	Moderate
Invasive Species Management	Cleared and disturbed areas are likely to be the focal point for introduction of exotic flora and fauna species.	Monitor disturbed areas for any suspected new arrivals of exotic plant and animal species and contact with DAFF in regard to potential introductions.	High
Monitoring	No issues other than those identified in regard to exotic species invasion.	Restricted largely to informal monitoring of exotic species infestation.	High.

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10.0 Glossary

Alluvium/ Alluvial: Sediments deposited by the action of flowing water, generally derived from the action of rivers or from wash of hillslopes.

Bioregion: The bioregion is forms the primary level of classification for terrestrial biodiversity values on a state and nationwide basis. Thirteen bioregions are classified in Queensland with the Torres Strait Islands being a sub-province of the broader Cape York Peninsula bioregion.

Broad Vegetation Group: The highest level of classification used to describe plant assemblages in the Torres Strait Islands, typically referring to plant habit and structure.

Deciduous: A tree species that undergoes a seasonal shedding of leaves, typically being leafless in the drier seasonal periods (e.g. *Bombax ceiba*).

Edaphic: Pertaining to characteristics of the soil including moisture, drainage and fertility.

Evergreen: A tree or vegetation community that retains foliage on an annual basis i.e. always has leaves.

Holocene: The period of time less than 11 thousand years to present. Less than 5 thousand years old is considered to be 'Late Holocene'.

Igneous Rock: A rock formed by cooling and solidification of molten magma or lava.

Notophyll: A category of leaf size with a leaf blade for 7.5 to 12.5 cm long.

Obligate Seeder: A plant that can only regenerate after fire from a seed or stored seed bank.

Pleistocene: The period of time between 11 thousand and 1.8 million years old.

Pyrophytic: In relation to vegetation, refers to a habitat which benefits or regenerates following a fire event.

Pyrophobic: In relation to vegetation, a vegetation type which is fire intolerant, or is killed or damaged by a fire event.

Quaternary: The period of time between present and 1.8 million years old, which is sub-divided into Pleistocene and Holocene ages.

Regional Ecosystem: The primary unit against which Queensland's Vegetation Management Act (1999) is regulated and as such, the classification specific legislative significance. The classification of regional ecosystems is based on a hierarchical system with a three part code defining bioregion, followed by land zone, and then vegetation.

Savanna: A habitat typified by grasses where trees do not form a closed canopy.

Semi-evergreen: A tree or forest type whose pattern of leaf loss can be related to specific periods of environmental stress. In semi-evergreen vine forest, only portions of the canopy will be subject to leaf loss at a particular time.

Semi-deciduous: A rainforest or vine thicket type in which a component of the forest canopy trees and canopy emergents are seasonally (obligate) deciduous.

Vine Thicket: A vegetation community that is formed by predominantly soft leaf (rainforest) trees and shrubs, typically with dense layers of wiry lianes (vines) growing from ground level and reaching canopy height. Thicket is in reference to canopy height with the predominant canopy forming at < 9m.

Vine Forest: A vegetation community commonly referred to as rainforest, that is formed by predominantly soft leaf (rainforest) trees and shrubs. Dense cover of lianes (vines) and epiphytes are common at all structural levels. Vine forest is differentiated from vine thicket by height, with predominant vine forest canopy being > 9m.

11.0 Appendices

Appendix A. Expert Panel Attendees

Expert	Organisation	Expertise	Inputs
David Stanton	3D Environmental	Vegetation and landscape mapping and assessment.	<ul style="list-style-type: none"> Specialist knowledge of Torres Strait vegetation community distribution, condition and landscape (geology, geomorphology).
David Fell	3D Environmental	Flora survey, species identification, species distribution, and significant flora.	<ul style="list-style-type: none"> Specialist knowledge of Torres Strait and Cape York flora and habitats.
David Gooding	3D Environmental	GIS analyst	<ul style="list-style-type: none"> Development and management of Torres Strait GIS.
Peter Stanton	Private Consultant	Landscape scale ecological and fire management.	<ul style="list-style-type: none"> Specialist regional knowledge of Cape York ecology Practical implementation of ecological management practices i.e. fire, weeds, vegetation change
Dr Jeremy Russell-Smith	Consultant - North Australian Indigenous Land & Sea Management Alliance (NAISMA)	Sustainable ecological and cultural resource management.	<ul style="list-style-type: none"> PNG and regional northern Australian context Advice on integrated fire and cultural resource management Emissions abatement in tropical savanna fire regimes.
Dr Garrick Hitchcock	Arafura Consulting	Environmental anthropology and cultural resource use and management Torres Strait and PNG	<ul style="list-style-type: none"> Cultural landscape context integration of cultural resource values Cultural use of fauna, flora and habitats.
Terry Reis	NRA	Fauna ecology	<ul style="list-style-type: none"> Identification and review of fauna values Fauna survey methods Management of habitat for fauna values.
Other engaged parties			
Dr Paul Forster	DERM - Qld Herbarium	Taxonomy and distribution of Qld flora	<ul style="list-style-type: none"> Threatened flora distribution Conservation and listing context.
Keith Macdonald	DERM Threatened Species Unit	Fauna and flora ecology and distribution	<ul style="list-style-type: none"> Back on Track methodology. Threatened fauna and flora distribution Conservation and listing context.
Tony O'Keeffe Michael Bradby Vic McGrath	TSRA LMSU	Land and Sea Program and Ranger Project	<ul style="list-style-type: none"> Project background, management and liaison. Protocols and process.

Appendix B. Queensland Govt. Vegetation Structural Classification

Structural formation classes qualified by height for Non-Rainforest Vegetation: Neldner *et al.* 2005) modified from Specht (1970).

Projective Foliage Cover	70-100%	30-70%	10-30%	<10%
Approximate Crown Cover %	80 - 100%	50 - 80%	20 - 50%	< 20%
Crown separation	closed or dense	mid-dense	sparse	very sparse
Growth Form⁷	Structural Formation Classes (qualified by height)			
Trees > 30m	tall closed-forest (TCF)	tall open-forest (TCF)	tall woodland (TW)	tall open-woodland (TOW)
Trees 10 – 30m	closed-forest (CF)	open-forest (OF)	woodland (W)	open-woodland (OW)
Trees < 10m	low closed-forest (LCF)	low open-forest (LOF)	low woodland (LW)	low open-woodland (LOW)
Shrubs 2 - 8m	closed-scrub (CSC)	open-scrub (OSC)	tall shrubland (TS)	tall open-shrubland (TOS)
Shrubs 1 - 2m	closed-heath (CHT)	open-heath (OHT)	shrubland (S)	open-shrubland (OS)
Shrubs <1m	-	dwarf open-heath (DOHT)	dwarf shrubland (DS)	dwarf open-shrubland (DOS)
Succulent shrub	-	-	succulent shrubland (SS)	dwarf succulent shrubland (DSS)
Hummock grasses	-	-	hummock grassland (HG)	open hummock grassland (OHG)
Tussock grasses	closed-tussock grassland (CTG)	tussock grassland (TG)	open tussock grassland (OTG)	sparse-tussock grassland (STG)
Herbs	closed-herbland (CH)	Herbland (H)	open-herbland (OH)	sparse-herbland (SH)
Forbs	closed-forbland (CFB)	Forbland (FB)	open-forbland (OFB)	sparse-forbland (SFB)
Sedges	closed-sedgeland (CV)	Sedgeland (V)	open-sedgeland (OV I)	-

⁷ Growth form of the predominant layer (the ecologically dominant layer).

Appendix C. Introduced Plants of Boigu

BOTANICAL NAME		Common Name	Life Form	Habitat	
Family	Species			Remnant Vegetation (BVG)	Non Remnant (Disturbed)
Acanthaceae	<i>Barleria obtusa</i> 'purple prince'	Purple Prince	S	-	X
	<i>Barleria prionitis</i>	Porcupine Flower	S		X
	<i>Ruellia tweediana</i>	Mexican Petunia			
Aizoaceae	<i>Trianthema portulacastrum</i>	Black Pigweed	H	-	X
Amaranthaceae	<i>Alternanthera ficoidea</i>	Alternanthera	H	-	X
	<i>Alternanthera sessilis</i>	Sessile Joyweed	H	-	X
	<i>Amaranthus interruptus</i>	Native Amaranth	H	-	X
	<i>Amaranthus viridis</i>	Slender or Green Amaranth	H	-	X
	<i>Gompherna celesoides</i>	Gomphrena Weed	H	-	X
Anacardiaceae	<i>Anacardium occidentale</i>	Cashew	S	-	X
	<i>Mangifera indica</i>	Mango	T	2	X
Apocynaceae	<i>Allamanda cathartica</i>	Golden Trumpet	S	-	X
	<i>Catharanthus roseus</i>	Pink Periwinkle	H	2	X
	<i>Nerium oleander</i>	Oleander	S	-	X
Arecaceae	<i>Cocos nucifera</i>	Coconut	P	-	X
Asteraceae	<i>Emilia sonchifolia</i> var. <i>sonchifolia</i>	Emelia or Purple Sows Thistle	H	-	X
	<i>Pseudelephantopus spicatus</i>	Dogs Tongue	H	-	X
	<i>Synedrella nodiflora</i>	Cinderella weed	H	-	X
	<i>Tridax procumbens</i>	Tridax Daisy	H	-	X
	<i>Zinnia peruviana</i> *	Zinnia	H	-	X
Bignoniaceae	<i>Tecoma stans</i> var. <i>stans</i>	Yellow Bells	S	-	X
Caesalpiniaceae	<i>Chamaecrista rotundifolia</i>	Round leaf Cassia	H	-	X
	<i>Senna alata</i>	Ringworm Shrub	S	-	X
Caricaceae	<i>Carica papaya</i>	Paw Paw	S	-	X
Cochicaceae	<i>Gloriosa superba</i>	Gloriosa lily	H	-	X

BOTANICAL NAME		Common Name	Life Form	Habitat	
Family	Species			Remnant Vegetation (BVG)	Non Remnant (Disturbed)
Cucurbitaceae	<i>Citrullus lanatus</i>	Bitter or Wild Melon	V	-	X
Euphorbiaceae	<i>Chamaesyce hirta</i>	Asthma Plant	H	-	X
	<i>Chamaesyce prostrata</i>	Mexican Petunia	H	-	X
	<i>Euphorbia cyathophora</i>	Painted Spurge	H	-	X
	<i>Jatropha gossypifolia</i>	Bellyache Bush	S	-	X
	<i>Manihot esculenta</i>	Cassava	H	-	X
Fabaceae	<i>Clittorea ternatea</i>	Butterfly Pea	V	-	X
	<i>Crotalaria gooreensis</i>	Gambia Pea	S	-	X
	<i>Desmodium tortuosum</i>	Beggar Weed	H	-	X
	<i>Macropitium atropurpureum</i>	Siratro	V	-	X
	<i>Macropitium lathyroides var. semierectum</i>	Phasey Bean	V	-	X
	<i>Mucuna pruriens var. utilis</i>	Velvet Bean	V	-	X
	<i>Stylosanthes hamata</i>	Townsville stylo	H	-	X
	<i>Stylosanthes scabra</i>	Townsville stylo	H	-	X
Lamiaceae	<i>Hyptis suaveolens</i>	Mintweed	H	-	X
	<i>Ocimum basilicum</i>	Basil	H	-	X
Malvaceae	<i>Gossypium hirsutum</i>	Cotton	S	-	X
	<i>Sida acuta</i>	Spiny headed Sida	H	-	X
	<i>Sida cordifolia</i>	Flannel Weed	H	-	X
Mimosaceae	<i>Leucaena leucocephala</i>	Leucaena	S	-	X
	<i>Mimosa pudica</i>	Sensitive Weed	H	-	X
Musaceae	<i>Musa acuminata</i>	Banana	S	-	X
Passifloraceae	<i>Passiflora foetida</i>	Stinking Passionflower	V	2, 11, 14, 17	X
	<i>Passiflora suberosa</i>	Corky Passionflower	V	-	X
Phyllanthaceae	<i>Phyllanthus amarus</i>	Phyllanthus	H	-	X
Poaceae	<i>Bothriochloa bladhii</i>	Forest Blue Grass	G	-	X
	<i>Cenchrus echinatus</i>	Mossman River Grass	G	-	X
	<i>Chloris inflata</i>	Purple Top Rhodes Grass	G	-	X
	<i>Coix lacryma-jobi</i>	Jobs Tears	G	-	X
	<i>Cynodon dactylon var. dactylon</i>	Couch Grass	G	-	X

BOTANICAL NAME		Common Name	Life Form	Habitat	
Family	Species			Remnant Vegetation (BVG)	Non Remnant (Disturbed)
	<i>Dactyloctenium aegyptium</i>	Coast Finger Grass	G	-	X
	<i>Dactyloctenium radulans</i>	Button Grass	G	-	X
	<i>Echinochloa colona</i>	Barnyard Grass	G	-	X
	<i>Melinis repens</i>	Red Natal Grass	G	-	X
Portulacaceae	<i>Portulaca pilosa</i>	Hairy Portulaca	H	-	X
Scrophulariaceae	<i>Angelonia salicarifolia</i>	Angelonia	H	-	X
	<i>Scoparia dulcis</i>	Bitter Broom	H	-	X
Solanaceae	<i>Physalis angulata</i>	Gooseberry	H	-	X
	<i>Physalis minima</i>	Gooseberry	H	-	X
	<i>Solanum americanum</i>	Glossy American Nightshade	H	-	X
Sparmanniaceae	<i>Triumfetta rhomboidea</i>	Chinese Burr	H	-	X
Verbenaceae	<i>Lantana camara</i>	Lantana	S	-	X
	<i>Stachytarpheta jamaicensis</i>	Snake Weed	H	-	X
Total Species					69

Appendix D. Preliminary List of Useful Plants for Boigu Island

Scientific Name	Language Name <i>Kalaw Kawaw Ya</i>	Common Name	Life Form	Broad Use	Part Used	Broad Habitat	Source
<i>Acacia auriculiformis</i>	Garagarrh or Goeragarr	Earlobe wattle	Tree	Material	Timber used for the making of dugong spears (whaps), building timber and firewood. The spear made from it is called <i>Thulup</i> .	Vine forests on dunes and shrublands on alluvium.	Nelson Gibuma pers. com. Nov. 2010.
<i>Aegiceras corniculatum</i>	goowagoowa	River mangrove	Shrub	TBD	TBD	Mangroves	Duke (2010) through N.Gibuma
<i>Aegialitis annulata</i>	Yham, yaam	Club Mangrove	Shrub	Indicator	Barramundi hide under shade at high tides.	Mangroves	Nelson Gibuma pers. com. Nov. 2010.
<i>Aglaiia eleagnoidea</i>	TBD	Coastal boodyara	Tree	Material	Timber for building purposes.	Vine forests and thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Antiaris toxicarya</i> var. <i>macrophylla</i>	kabi?	Antiaris	Tree	Material	Timber for house construction.	Vine forests and thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Antidesma parviflora</i>	mergey	Black currant bush	Shrub	Food	Small purplish-black fruit eaten (staining hands and mouth)	Vine forest & thickets, Welchiodendron forests, woodlands & shrublands.	Nelson Gibuma pers. com. Nov. 2010.
<i>Avicennia marina</i>	zangau	Grey mangrove	Tree	Material	Timber	Mangroves	Duke (2010) through N.Gibuma
<i>Avicennia marina</i> var. <i>australasica</i>	zanghow	Grey Mangrove	Shrub/Tree	Material	Timber	Mangroves	Nelson Gibuma pers. com. Nov. 2010.
<i>Bambusa</i> sp.	sarrwah	Bamboo	Grass	Material	Stems	Groves within disturbed vine forests on dunes.	Nelson Gibuma pers. com. Nov. 2010.
<i>Bruguiera exaristata</i>	abi	Rib-fruited orange mangrove	Tree	Material	Timber.	Mangroves	Duke (2010) through N.Gibuma
<i>Bruguiera gymnorhiza</i>	biw	Large-leafed orange mangrove	Tree	Material	Timber.	Mangroves	Duke (2010) through N.Gibuma
<i>Bruguiera parviflora</i>	queedh	Small-leafed orange	Tree	Material	Timber.	Mangroves	Duke (2010)

Scientific Name	Language Name <i>Kalaw Kawaw Ya</i>	Common Name	Life Form	Broad Use	Part Used	Broad Habitat	Source
		mangrove					through N.Gibuma
<i>Caesalpinia bonduc</i>	TBD	Nicker nut	Shrub/Vine	Material	Seeds for playing marbles.	Margins of vine forests near coast.	Nelson Gibuma pers. com. Nov. 2010.
<i>Camptostemon schultzi</i>	thapi or kapi	Kapok mangrove	Tree	Material	Timber for housing construction.	Mangroves	Duke (2010) through N.Gibuma
<i>Capparis lucida</i>	kadal darng	Coast caper	Vine	Food	Fruit ripening blackish.	Vine forests and thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Carissa laxiflora</i>	patali or puttarli	Carissa	Sprawling shrub	Food	Fruit	Vine forests and thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Ceriops australis</i>	amu	Smooth-fruited yellow mangrove (locally called White Mangrove)	Tree	Material	Timber.	Mangroves	Duke (2010) through N.Gibuma
<i>Ceriops decandra</i>	caradh	Clumped yellow mangrove	Tree	Material	Timber.	Mangroves	Duke (2010) through N.Gibuma
<i>Ceriops tagal</i>	amu	Rib-fruited yellow mangrove	Tree	Material	Timber for fencing and construction.	Mangroves	Duke (2010) through N.Gibuma
<i>Chamaesyce mitchelliana</i> (or <i>C. atoto</i>)	TBD	A Coastal spurge	Herb	Material	Sap.	Open sandy areas in vine forests.	Nelson Gibuma pers. com. Nov. 2010.
<i>Cocos nucifera</i>	urub	Coconut	Palm	Food Material	Kernel	Planted locations.	Duke (2010) through N.Gibuma
<i>Cocos nucifera</i>	Samoan urub	Small yellow coconut	Palm	Food Material	Kernel	Planted locations.	Duke (2010) through N.Gibuma
<i>Colubrina asiatica</i>	TBD	Colubrina or beach berry bush	Shrub	Material	Leaves in water to wash hands.	Margins of vine forests near coast.	Nelson Gibuma pers. com. Nov. 2010.
<i>Cordia subcordata</i>	wharrup	Golden trumpet tree	Tree	Material	Timber for drums.	Vine forests and thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Cucumis melo</i>	kipap	Bitter melon	Vine	Food	Small round fruit about	Disturbed sites.	M. Lawrie

Scientific Name	Language Name <i>Kalaw Kawaw Ya</i>	Common Name	Life Form	Broad Use	Part Used	Broad Habitat	Source
					gooseberry size turns yellow when ripe and is edible.		(HerbreCs specimen data)
<i>Dendrolobium arbuscula</i>	waubook	Horse bush	Sprawling shrub	Material	Firewood.	Vine forests and thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Derris trifoliata</i>	oomi	Derris	Vine	Material	Stems used for rope. Fish poison?	Mangrove margins and shrublands.	Nelson Gibuma pers. com. Nov. 2010.
<i>Diospyros littorea</i>	usar coon	Ebony mangrove	Shrub	Not known	Not known	Mangroves	Duke (2010) through N.Gibuma
<i>Eleocharis dulcis</i>	mardhar	Bulkuru, Water chestnut	Sedge	Food	Tuberous nuts eaten.	Brackish Wetlands	Duke (2010) through N.Gibuma
<i>Erythrina insularis</i>	arbi	Coral tree	Tree	Material	Glossy red seeds used for decorative purposes i.e. necklaces and bracelets.	Vine forests and thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Erythrina variegata</i>	arbi	Coral tree	Tree	Material	Glossy red seeds used for decorative purposes i.e. necklaces and bracelets.	Vine forests and thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Excoecaria agallocha</i>	kem	Milky mangrove	Shrub/Tree	Medicinal	Sap is remedy for sting from fish spines.	Mangroves and mangrove margins of wetlands.	Nelson Gibuma pers. com. Nov. 2010.
<i>Ficus drupacea</i> var. <i>drupacea</i>	Kabai	Fig	Tree	Food	Orange fruit eaten.	Town areas, vine forests.	M. Lawrie (HerbreCs specimen data)
<i>Flagellaria indica</i>	booz	Whip vine	Vine	Material	Stems for tying and binding.	Vine forests and thickets, shrublands.	Nelson Gibuma pers. com. Nov. 2010.
<i>Guettarda speciosa</i>	borrdow	Beach gardenia	Tree	Material	Leaves for Kup Muri	Vine forests and thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Heritiera littoralis</i>	kong	Keeled-pod mangrove	Tree	Not known	Not known	Mangroves	Duke (2010) through N.Gibuma
<i>Hibiscus tiliaceus</i>	themi woerakarr	Cottonwood hibiscus	Tree	Material	Light wood for making small racing canoes. Fibrous bark possibly used for fibre.	Coastal grasslands & mangrove edges.	Nelson Gibuma pers. com. Nov. 2010.
<i>Ipomoea pes capre</i>	pul	Goats foot	Herb/Vine	Material	Stems	Coastal sites.	Duke (2010)

Scientific Name	Language Name <i>Kalaw Kawaw Ya</i>	Common Name	Life Form	Broad Use	Part Used	Broad Habitat	Source
<i>var. brasiliensis</i>		convolvulus					through N.Gibuma
<i>Lumnitzera littorea</i>	kalkar gamorl pisurr	Red-flowered black mangrove	Tree	Not known	Not known	Mangroves	Duke (2010) through N.Gibuma
<i>Lumnitzera racemosa</i>	pisurr	White-flowered black mangrove	Tree	Not known	Not known	Mangroves	Duke (2010) through N.Gibuma
<i>Lysiphyllum binatum</i>	gurragoohl	No common name	Sprawling shrub	Not known	Not known	Vine forests and thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Manilkara kauki</i>	ubar	Wongai	Tree	Food Material	Fruit are eaten. Strong timber favoured for dugong spears and carving.	Vine forests & thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Melaleuca cajuputi</i>	ubu	Paperbark	Shrub	Not known	Leaves?	Pandanus grasslands and shrublands	Nelson Gibuma pers. com. Nov. 2010.
<i>Micromelum minutum</i>	bom	Lime berry	Shrub	Not known	Not known	Vine forests and thickets.	Nelson Gibuma pers. com. Nov. 2010.
<i>Milletia pinnata</i>	arbi	Pongamia	Tree	Material	Seed pods for children toy things. Leaves for Kup Muri.	Vine forests and thickets	Nelson Gibuma pers. com. Nov. 2010.
<i>Mimusops elengii</i>	usarkuhn	Mimusops	Tree	Material	Timber for light dugong spear.	Vine forests and thickets	Nelson Gibuma pers. com. Nov. 2010.
<i>Nypa fruticans</i>	kudhu	Mangrove palm	Palm	Not known	Not known	Mangroves	Duke (2010) through N.Gibuma
<i>Ormocarpum orientale</i>	waubuk	Ormocarpum	Shrub	Material Food	Timber for firewood. Cultivated for young leaves used as a vegetable.	Vine forest & thickets, town area.	Nelson Gibuma pers. com. Nov. 2010.
<i>Osbornia octodonta</i>	surrh	Myrtle mangrove	Shrub	Not known	Not known	Mangroves	Duke (2010) through N.Gibuma
<i>Pandanus spiralis</i>	habal or arbaal	Pandanus	Pandanus Palm	Food Material	Kernel of individual fruit segments hammered out when dry and eaten. Leaves used for fibre making baskets etc.	Pandanus grasslands.	Nelson Gibuma pers. com. Nov. 2010.

Scientific Name	Language Name <i>Kalaw Kawaw Ya</i>	Common Name	Life Form	Broad Use	Part Used	Broad Habitat	Source
<i>Pandanus tectorius</i>	kusargh or kassadh	Screw palm	Pandanus Palm	Food Material	Base of ripe fruit eaten fresh in small amounts. Fruits treated in water to make paste? Leaves sued for making mats.	Vine forests on dunes.	Nelson Gibuma pers. com. Nov. 2010.
<i>Pemphis acidula</i>	sowrrl?	Pemphis	Shrub	Material	Timber used for firewood.	Mangrove margins.	Nelson Gibuma pers. com. Nov. 2010.
<i>Physalis angulata</i> *	TDB	Wild gooseberry	Herb	Food	Fruit	Disturbed sites.	M. Lawrie Herbreccs Data.
<i>Rhizophora apiculata</i>	goob	Corky mangrove stilt	Tree	Not known	Not known	Mangroves	Duke (2010) through N.Gibuma
<i>Rhizophora mucronata</i>	thag	Upriver mangrove stilt	Tree	Not known	Not known	Mangroves	Duke (2010) through N.Gibuma
<i>Rhizophora stylosa</i>	thag	Long-style mangrove stilt	Tree	Material	Gum scraped from underbark for glueing drum skins.	Mangroves	Duke (2010) through N.Gibuma
<i>Rhizophora lamarckii</i> x	goob pui	Hybrid mangrove stilt	Tree	Not known	Not known	Mangroves	Duke (2010) through N.Gibuma
<i>Sesuvium sp.</i>	Garuwadh	Sea purslane	Herb	Not known	Not known	Coastal sites.	Duke (2010) through N.Gibuma
<i>Sonneratia alba</i>	kuzub	White-flowered apple mangrove	Tree	Not known	Not known	Mangroves	Duke (2010) through N.Gibuma
<i>Sonneratia ovata</i>	wana	Sonneratia	Tree	Not known	Not known	Mangroves	Nelson Gibuma pers. com. Nov. 2010.
<i>Syzygium aqeum</i>	TBD	Bell fruit	Tree	Food	Fruit eaten.	Town gardens.	Nelson Gibuma pers. com. Nov. 2010.
<i>Syzygium branderhorstii</i>	uzu	Lockerbie satin ash	Shrub/Tree	Food	Fruit eaten. This plant grows in the wild on Moaand Erub, Dauan however is planted in domestic gardens.	Town gardens.	Nelson Gibuma pers. com. Nov. 2010.
<i>Terminalia catappa</i>	merkai	Sea almond	Tree	Food	Outer skin of fruit eaten when ripe. Inner nut eaten when	Community areas.	Nelson Gibuma pers. com. Nov.

Scientific Name	Language Name <i>Kalaw Kawaw Ya</i>	Common Name	Life Form	Broad Use	Part Used	Broad Habitat	Source
					dry.		2010.
<i>Terminalia subacroptera</i>	gughabargh or mipa	No Common Name	Shrub or small tree	Food	Fleshy skin of small purplish-black fruit eaten when ripe.	Vine forest & thickets, & shrublands.	Nelson Gibuma pers. com. Nov. 2010.
<i>Thespesia populnea</i>	warakarr	Pacific rosewood	Shrub/Tree	Material	Round fruit used for toys.	Mangrove margins.	Duke (2010) through N.Gibuma
<i>Thespesia populneoides</i>	wanu?	Pacific rosewood	Shrub/Tree	Material	Round fruit used for toys.	Mangrove margins.	Nelson Gibuma pers. com. Nov. 2010.
<i>Vitex trifloia</i>	del	Vitex	Shrub	Not known	Not known	Disturbed sites in vine forests on dunes.	Duke (2010) through N.Gibuma
<i>Ximenia americana</i>	putit	Yellow plum	Shrub	Food	Fruit with yellowish flesh is eaten.	Edge of Mangroves	Nelson Gibuma pers. com. Nov. 2010.
<i>Xylocarpus granatum</i>	budha	Cannonball mangrove	Tree	Material	Fruit parts for play, timber for construction.	Mangroves	Duke (2010) through N.Gibuma
<i>Xylocarpus mollucensis</i>	budha	Cedar mangrove	Tree	Material	Fruit parts for play, timber for construction.	Mangroves	Duke (2010) through N.Gibuma

Other plants which occur on Boigu and are known to be utilised on other Torres Strait Islands.

Scientific Name	Language Name <i>Kalaw Kawaw Ya</i>	Common Name	Life Form	Broad Use	Part Used	Broad Habitat	Source
<i>Abrus precatorius</i>	TBD	Gidee gidee	Vine	Material	Black and red seeds used for decorative purposes i.e. necklaces and bracelets.	Vine forest & thickets, & shrublands.	TBD
<i>Anacardium occidentale*</i>	TBD	Cashew	Shrub	Food	Fruit eaten.	Disturbed areas.	TBD
<i>Buchanania arborescens</i>	TBD	Little gooseberry tree	Tree	Food	Small black fruits eaten as a snack when ripe.	Vine forests & thickets.	TBD
<i>Cassytha filiformis</i>	TBD	Dodder laurel devils twine	Vine	Food	Small fruit eaten as a snack when ripe.	Vine forest & thickets, & shrublands.	TBD
<i>Coix lacryma-jobi*</i>	TBD	Jobs tears	Tall growing cane like perennial grass.	Material	Hard grey seed used for beads.		M. Lawrie Herbreces Data.

Scientific Name	Language Name <i>Kalaw Kawaw Ya</i>	Common Name	Life Form	Broad Use	Part Used	Broad Habitat	Source
<i>Crinum uniflorum</i>	TBD	Ground lily	Tuber	Food	On Mabuiag the tuber is dug and is scraped tin preparation of a paste	Grasslands and dunes.	TBD
<i>Entada phaseolioides</i>	TBD	Matchbox bean	Vine	Material	Large flat glossy brown seeds used for dancing decorations and instruments in music.	Vine forests & thickets, mangroves edges.	TBD
<i>Exocarpos latifolius</i>	TBD	Broad leaved ballart	Shrub	Food	Small fruit eaten when ripe.	Vine forest & thickets, & shrublands.	TBD
<i>Mangifera indica</i> *	TBD	Mango	Tree	Food	Fruit eaten.	Disturbed areas.	TBD
<i>Manihot esculenta</i> *	TBD	Cassava	Shrub	Food	Tuber used for food.	Disturbed areas.	TBD
<i>Passiflora foetida</i> *	TBD	Wild passionfruit	Vine	Food	Small fruit eaten as a snack when ripe.	Vine forest & thickets, & shrublands, disturbed areas.	TBD
<i>Senna alata</i> *	TBD	Ringworm shrub, 6 o'clock	Shrub	Medicinal	Decoction from leaves used for treatment of ringworms.	Disturbed areas.	TBD
<i>Tridax procumbens</i> *	TBD	Tridax	Annual herb	Medicinal	Decoction of leaves used for treating cuts and sores.	Disturbed areas.	TBD

Appendix E. Preliminary Flora Species List – Boigu Island, Torres Strait, Queensland.

D.G. FELL & D.J. STANTON 3D ENVIRONMENTAL_20 January 2011 Version 4

- Nomenclature follows Bostock & Holland (2010) 'Census of the Queensland Flora'.
- * Denotes naturalised or doubtfully naturalised taxa according to Bostock & Holland (2010).
- Unnamed taxa are followed by a collection number (i.e. DGF10153) pending formal identification at Queensland Herbarium.

LIFE FORM

F	Fern
H	Herb
H(a)	Herb aquatic
O(e)	Orchid (epiphyte)
Ge	Geophyte
Gr	Graminoid (Grass/Sedge)
E	Epiphyte
P	Palm
V	Vine
S	Shrub
S/T	Shrub/Small Tree
T	Tree

SUMMARY

245 taxa (4 ferns, 239 angiosperms)
178 native (73%)
67 naturalised (27%)
72 families
182 genera (132 native, 50 naturalised)

BROAD VEGETATION GROUPS (BVG) (from Stanton, Fell & Gooding 2008)

2	Deciduous/Semi deciduous vine forest and thicket (VC2a – RE3.2.2b)
11	Woodland and shrubland dominated by Pandanus (VC11a – RE3.3.62)
14	Shrublands and shrubland complexes (VC14b – RE3.3.68)
17	Grasslands and grassland complexes (VC17a – RE3.3.62)
24	Mangroves (VC24a- RE3.1.1 / 3.1.2)
25	Samphire herblands, shrublands and saltpans (VC25a, 25b – RE3.1.6)
26	Samphire grasslands (VC26a/26b – RE 3.1.5/3.1.6)
27	Estuarine wetland complexes and mosaics (VC27a – RE3.1.7)
Cl/Re	Cleared and heavily disturbed regrowth

Major native families (% of total native flora)

1. Rhizophoraceae 17 (9.5%)
 2. Poaceae 13 (7.3%)
 3. Fabaceae 12 (6.7%)
 4. Euphorbiaceae 8 (4.5%)
 5. Cyperaceae 8 (4.5%)
 6. Lythraceae 7 (4%)
 7. Rubiaceae 6 (3.4%)
 8. Mimosaceae 5 (2.8%)
 9. Malvaceae 5 (2.8%)
 10. Asteraceae 5 (2.8%)
- Others (51.7%)

FLORA SPECIES LIST – BOIGU ISLAND, TORRES STRAIT, QUEENSLAND.

BOTANICAL NAME		Life Form	Broad Vegetation Group								Total Records
Family	Species		CI/Re	2	27	17/11	24	26	25	14	
PTERIDIOPHYTES (FERNS)											
Parkeriaceae	<i>Ceratopteris thalictroides</i>	F	1								1
Pteridaceae	<i>Acrostichum aureum</i>	F		1	1		1	1			4
	<i>Acrostichum speciosum</i>	F			1		1			1	3
Schizaeaceae	<i>Lygodium reticulatum</i>	F								1	1
ANGIOSPERMS (FLOWERING PLANTS)											
Acanthaceae	<i>Acanthus ebracteatus</i> subsp. <i>ebarbatus</i>	S					1				1
	<i>Acanthus ilicifolius</i>	S					1				1
	<i>Barleria obtusa</i> 'purple prince'	S	1								1
	<i>Barleria prionitis</i> *	S	1								1
	<i>Ruellia tweediana</i> *	H	1								1
Aizoaceae	<i>Trianthema portulacastrum</i> *	H	1								1
Amaranthaceae	<i>Achyranthes aspera</i>	H	1	1							2
	<i>Alternanthera ficoidea</i> *	H	1								1
	<i>Alternanthera sessilis</i> *	H	1								1
	<i>Amaranthus interruptus</i> *	H	1								1
	<i>Amaranthus viridis</i> *	H	1								1
	<i>Gomphrena celosioides</i> *	H	1								1
Amaryllidaceae	<i>Crinum</i> sp. (DGF10723)	G	1	1							2
Anacardiaceae	<i>Buchanania arborescens</i>	T		1							1
	<i>Mangifera indica</i> *	T	1								1
Apocynaceae	<i>Allamanda cathartica</i> *	S	1								1

BOTANICAL NAME		Life Form	Broad Vegetation Group								
Family	Species		CI/Re	2	27	17/11	24	26	25	14	Total Records
	<i>Carissa laxiflora</i>	S		1						1	2
	<i>Catharanthus roseus*</i>	H	1	1							2
	<i>Cynanchum carnosum</i>	V		1						1	1
	<i>Gymnanthera oblonga</i>	V									1
	<i>Nerium oleander*</i>	S	1								1
	<i>Tylophora benthamii</i>	V					1				1
Araceae	<i>Alocasia brisbanensis</i> (garden)	G	1								1
Arecaceae	<i>Cocos nucifera*</i>	P	1	1							2
	<i>Corypha utan</i>	P	1								1
	<i>Livistona benthamii</i>	P								1	1
	<i>Nypa fruticans</i>	P					1				1
Asteraceae	<i>Cyanthillium cinereum</i>	H	1			1					2
	<i>Eclipta prostrata</i>	H			1						1
	<i>Emilia sonchifolia</i> var. <i>sonchifolia*</i>	H	1								1
	<i>Pluchea indica</i>	S				1			1		1
	<i>Pseudelephantopus</i> <i>spicatus*</i>	H	1								1
	<i>Sphaeranthus africanus</i>	H		1							1
	<i>Synedrella nodiflora*</i>	H	1								1
	<i>Tridax procumbens*</i>	H	1	1							2
	<i>Wollastonia biflora</i>	H				1					1
	<i>Zinnia peruviana*</i>	H	1								1
Avicenniaceae	<i>Avicennia integra</i>	T					1				1
	<i>Avicennia marina</i> subsp. <i>australasica</i>	T			1		1	1			3
	<i>Avicennia marina</i> subsp. <i>eucalyptifolia</i>	T			1		1				2
Bataceae	<i>Batis argillicola</i>	H							1		1
Bignoniaceae	<i>Dolichandrone</i> <i>spathacea</i> (Near- threatened)	S/T					1				1
	<i>Tecoma stans</i> var. <i>stans*</i>	S	1								1
Boraginaceae	<i>Cordia subcordata</i>	S/T		1							1
Caesalpiniaceae	<i>Caesalpinia bonduc</i>	S		1							1

BOTANICAL NAME		Life Form	Broad Vegetation Group								
Family	Species		CI/Re	2	27	17/11	24	26	25	14	Total Records
	<i>Chamaecrista rotundifolia*</i>	H	1								1
	<i>Cynometra iripa</i>	T					1				1
	<i>Lysiphyllum binatum</i>	S		1							1
	<i>Senna alata*</i>	S	1								1
Capparaceae	<i>Capparis lucida</i>	S		1			1			1	3
	<i>Capparis quiniflora</i>	S					1				1
Caricaceae	<i>Carica papaya*</i>	S	1	1							2
Cleomaceae	<i>Cleome viscosa</i>	H	1								1
Casuarinaceae	<i>Casuarina equisetifolia</i>	T	1								1
Celastraceae	<i>Gymnosporia inermis</i>	S		1			1			1	3
	<i>Hippocratea barbata</i>	V		1							1
	<i>Salacia chinensis</i>	S		1							1
Chenopodiaceae	<i>Tecticornia australasica</i>	H						1	1		2
Colchicaceae	<i>Gloriosa superba* (gardens)</i>	H	1								1
Combretaceae	<i>Terminalia catappa</i>	T	1	1							1
	<i>Terminalia subacroptera</i>	S/T, T		1						1	2
Commelinaceae	<i>Commelina diffusa</i>	H	1								1
Convolvulaceae	<i>Ipomoea pes-capre subsp. brasiliensis</i>	V	1	1							2
	<i>Xenostegia tridentata</i>	H				1					1
Cucurbitaceae	<i>Citrullus lanatus var. lanatus*</i>	V	1								1
	<i>Cucumis melo</i>	V	1			1					2
Cyperaceae	<i>Cyperus lucidus</i>	G	1								1
	<i>Cyperus scariosus</i>	G	1								1
	<i>Eleocharis dulcis</i>	G			1						1
	<i>Eleocharis equisetina</i>	G			1		1				2
	<i>Fimbristylis dichotoma</i>	G	1			1					2
	<i>Fimbristylis ferriuginea</i>	G			1			1			2
	<i>Fimbristylis littoralis</i>	G	1		1	1					3
	<i>Schoenoplectus littoralis</i>	G			1		1				2
Dioscoreaceae	<i>Dioscorea bulbifera</i>	V		1							1
Ebenaceae	<i>Diospyros littorea</i>	S/T		1			1			1	3

BOTANICAL NAME		Life Form	Broad Vegetation Group								
Family	Species		CI/Re	2	27	17/11	24	26	25	14	Total Records
	<i>Diospyroa compacta</i>	S/T		1							1
	<i>Diospyros maritima</i>	S/T		1							1
Euphorbiaceae	<i>Acalypha lanceolata</i>	H	1								1
	<i>Antidesma</i> sp. (DGF10706)	S								1	1
	<i>Antidesma</i> sp. (DGF10707)	S								1	1
	<i>Chamaesyce hirta</i> *	H	1								1
	<i>Chamaesyce micradenia</i>	H	1								1
	<i>Chamaesyce mitchelliana</i>	H	1								1
	<i>Chamaesyce prostrata</i> *	H	1								1
	<i>Chamaesyce vachellii</i>	H	1								1
	<i>Euphorbia cyathophora</i> *	H	1								1
	<i>Excoecaria agallocha</i>	S/T		1	1		1				3
	<i>Jatropha gossypifolia</i> *	S	1								1
	<i>Manihot esculenta</i> *	S	1								1
Fabaceae	<i>Clitoria ternatea</i> *	V	1								1
	<i>Crotalaria goreensis</i> *	S	1								1
	<i>Cullen badocanum</i>	S	1								1
	<i>Dalbergia densa</i> var. <i>australis</i>	V		1						1	2
	<i>Dendrolobium arbuscula</i>	S		1							1
	<i>Derris trifoliata</i>	V		1	1	1				1	4
	<i>Derris</i> sp. (DGF10724)	V		1							1
	<i>Desmodium tortuosum</i> *	H	1								1
	<i>Erythrina insularis</i>	T		1							1
	<i>Erythrina variegata</i>	T		1							1
	<i>Intsia bijuga</i>	T		1							1
	<i>Macroptilium atropurpureum</i> *	V	1								1
	<i>Macroptilium lathyroides</i> var. <i>semierectum</i> *	V	1								1
	<i>Millettia pinnata</i>	T		1							1
	<i>Ormocarpum orientale</i>	S	1								1
	<i>Pycnospora lutescens</i>	H	1								1

BOTANICAL NAME		Life Form	Broad Vegetation Group								
Family	Species		CI/Re	2	27	17/11	24	26	25	14	Total Records
	<i>Sesbania cannabina</i> var. <i>cannabina</i>	H	1	1							2
	<i>Stylosanthes hamata</i> *	H	1								1
	<i>Stylosanthes scabra</i> *		1								1
Flagellariaceae	<i>Flagellaria indica</i>	V		1			1			1	3
Hypoxidaceae	<i>Curculigo ensifolia</i> var. <i>ensifolia</i>	H	1								1
Lamiaceae	<i>Hyptis suaveolens</i> *	H	1								1
	<i>Ocimum basilicum</i> *	H	1								1
	<i>Ocimum tenuiflorum</i>	H	1								1
	<i>Premna serratifolia</i>	S/T		1							1
	<i>Vitex trifolia</i>	S		1							1
Lecythidaceae	<i>Barringtonia racemosa</i>	T					1				1
Lythraceae	<i>Pemphis acidula</i>	S, S/T					1				1
	<i>Sonneratia alba</i>	T					1				1
	<i>Sonneratia caseolaris</i>	T					1				1
	<i>Sonneratia lanceolata</i>	T					1				1
	<i>Sonneratia ovata</i>	T					1				1
	<i>Sonneratia x gulngai</i>	T					1				1
	<i>Sonneratia x urama</i>	T					1				1
Malvaceae	<i>Abutilon albescens</i>	S	1	1							2
	<i>Camptostemon schultzei</i>	T					1				1
	<i>Gossypium hirsutum</i> *	S		1							1
	<i>Hibiscus tiliaceus</i>	T		1							1
	<i>Sida acuta</i> *	H	1								1
	<i>Sida cordifolia</i> *	H	1								1
	<i>Thespesia populnea</i>	T		1							1
	<i>Thespesia populneoides</i>	T		1	1		1			1	4
	<i>Urena lobata</i> *	H	1								1
Meliaceae	<i>Aglaia elaeagnoidea</i>	S/T		1							1
	<i>Xylocarpus granatum</i>	T		1			1				2
	<i>Xylocarpus mollucensis</i>	T		1			1				2
Menispermaceae	<i>Tinospora smilacina</i>	V								1	1
Mimosaceae	<i>Acacia auriculiformis</i>	T		1						1	2

BOTANICAL NAME		Life Form	Broad Vegetation Group								
Family	Species		CI/Re	2	27	17/11	24	26	25	14	Total Records
	<i>Acacia leptocarpa</i>	S				1					1
	<i>Acacia polystachya</i>	T		1						1	1
	<i>Albizia lebbek</i>	S/T								1	1
	<i>Cathormion umbellatum</i> <i>var. monoliforme</i>	S		1							1
	<i>Leucaena leucocephala</i> <i>subsp. leucocephala*</i>	S	1								1
	<i>Mimosa pudica*</i>	H	1								1
Moraceae	<i>Antiaris toxicaria</i> <i>var. macrophylla</i>	T		1							1
	<i>Ficus drupacea</i> <i>var. drupacea</i>	T	1								1
	<i>Ficus virens</i> <i>var. sublanceolata</i>	T	1	1							2
Musaceae	<i>Musa acuminata*</i>	S	1								1
Myrsinaceae	<i>Aegiceras corniculatum</i>	S					1				1
Myrtaceae	<i>Melaleuca cajuputi</i> <i>subsp. platyphylla</i>	S	1			1					2
	<i>Melaleuca viridiflora</i>	S				1				1	2
	<i>Osbornia octodonta</i>	S					1				1
Nyctaginaceae	<i>Boerhavia</i> <i>sp.</i>	H	1			1					2
Olacaceae	<i>Ximenia americana</i>	S		1						1	2
Oleaceae	<i>Chionanthus ramiflora</i>	S/T		1						1	1
Opiliaceae	<i>Opilia armentacea</i>	V		1						1	2
Pandanaceae	<i>Pandanus</i> <i>sp.</i> (DGF11+DJS)	P		1							1
	<i>Pandanus spiralis</i>	P				1					1
Passifloraceae	<i>Passiflora foetida*</i>	V	1							1	2
	<i>Passiflora suberosa*</i>	V								1	1
Phyllanthaceae	<i>Breynia oblongifolia</i>	S				1				1	2
	<i>Phyllanthus novae-hollandiae</i>	S									
	<i>Bridelia tomentosa</i>	S				1					1
Pittosporaceae	<i>Pittosporum ferrugineum</i>	S								1	1
Plumbaginaceae	<i>Aegialitis annulata</i>	S					1				1
Poaceae	<i>Bothriochloa bladhii</i> <i>subsp. bladhii</i>	G				1					1

BOTANICAL NAME		Life Form	Broad Vegetation Group								
Family	Species		CI/Re	2	27	17/11	24	26	25	14	Total Records
	<i>Cenchrus echinatus</i> *	G	1								1
	<i>Chloris inflata</i> *	G	1								1
	<i>Coix lacryma-jobi</i> *	G	1								1
	<i>Cynodon dactylon</i> var. <i>dactylon</i> *	G	1	1							2
	<i>Dactyloctenium aegyptium</i> *	G	1								1
	<i>Dactyloctenium radulans</i> *	G	1								1
	<i>Digitaria setigera</i>	G	1			1					2
	<i>Echinochloa colona</i> *	G	1								1
	<i>Eriochloa fatmensis</i>	G	1								1
	<i>Eriochloa procera</i>	G				1					1
	<i>Eriochloa pseudoacrotricha</i>	G	1								1
	<i>Heteropogon contortus</i>	G	1			1					2
	<i>Imperata cylindrica</i>	G	1			1					2
	<i>Ischaemum australe</i> var. <i>australe</i>	G			1	1		1		1	4
	<i>Ischaemum australe</i> var. <i>villosum</i>	G			1	1					2
	<i>Leptochloa simoniana</i> (Regionally Significant)	G				1	1				2
	<i>Melinis repens</i> *	G	1								1
	<i>Mnesithea rottboelioides</i>	G				1					1
	<i>Sporobolus virginicus</i>	G			1			1			2
	<i>Xerochloa imberbis</i>	G				1					1
Portulacaceae	<i>Portulaca pilosa</i> *	H		1				1			2
	<i>Sesuvium portulacastrum</i>	H						1			1
Putranjivaceae	<i>Drypetes deplanchei</i>	S/T		1						1	2
Rhamnaceae	<i>Colubrina asiatica</i>	S		1							1
Rhizophoraceae	<i>Bruguiera cylindrica</i>	T					1				1
	<i>Bruguiera exaristata</i>	T					1				1
	<i>Bruguiera gymnorhiza</i>	T					1				1
	<i>Bruguiera parviflora</i>	T			1		1				2
	<i>Bruguiera sexangula</i>	T					1				1

BOTANICAL NAME		Life Form	Broad Vegetation Group								
Family	Species		CI/Re	2	27	17/11	24	26	25	14	Total Records
	<i>Bruguiera x rhyncopetala</i>	T					1				1
	<i>Carallia brachiata</i>	T		1							1
	<i>Ceriops australis</i>	T					1				1
	<i>Ceriops decandra</i>	T					1				1
	<i>Ceriops tagal</i>	T			1		1				2
	<i>Lumnitzera littorea</i>	T					1				1
	<i>Lumnitzera racemosa</i>	T					1	1			2
	<i>Lumnitzera x rosea</i>	T					1				1
	<i>Rhizophora apiculata</i>	T					1				1
	<i>Rhizophora mucronata</i>	T					1				1
	<i>Rhizophora stylosa</i>	T					1				1
	<i>Rhizophora x lamarckii</i>	T					1				1
Rubiaceae	<i>Cyclophyllum maritima</i>	S		1							1
	<i>Guettarda speciosa</i>	T		1							1
	<i>Hydnophytum moseleyanum</i>	E					1				1
	<i>Morinda citrifolia</i>	S		1							1
	<i>Myrmecodia platyptera</i> subsp. <i>antionii</i>	E					1				1
	<i>Scyphiphora hydrophylacea</i>	S					1				1
Rutaceae	<i>Micromelum minutum</i>	S		1							1
Santalaceae	<i>Exocarpos latifolius</i>	S		1							1
Sapindaceae	<i>Allophylus cobbe</i>	S		1							1
	<i>Cupaniopsis anacardioides</i>	S/T		1							1
	<i>Synima cordierorum</i>	S/T								1	1
Sapotaceae	<i>Manilkara kauki</i>	T		1							1
	<i>Pouteria obovoidea</i>	T		1							1
	<i>Mimusops elengi</i>	T		1						1	2
Scrophulariaceae	<i>Angelonia salicariifolia</i> *	H	1								1
	<i>Scoparia dulcis</i> *	H	1								1
Smilacaceae	<i>Smilax australis</i>	V		1							1
	<i>Smilax sp. (DGF10721)</i>	V		1							1

BOTANICAL NAME		Life Form	Broad Vegetation Group								
Family	Species		CI/Re	2	27	17/11	24	26	25	14	Total Records
Solanaceae	<i>Physalis angulata</i> *	H	1								1
	<i>Physalis minima</i> *	H	1								1
	<i>Solanum americanum</i> *	H	1								1
	<i>Solanum viridifolium</i>	H					1				1
Sparrmanniaceae	<i>Corchorus aestuans</i>	H	1								1
	<i>Corchorus bilocularis</i>	H	1								1
	<i>Triumfetta rhomboidea</i> *	H	1								1
Sterculiaceae	<i>Heritiera littoralis</i>	T					1				1
Turneraceae	<i>Turnera ulmifolia</i> *	H	1								1
Verbenaceae	<i>Clerodendron inerme</i>	S					1				1
	<i>Lantana camara</i> *	S	1								1
	<i>Stachytarpheta jamaicensis</i> *	H	1								1
Vitaceae	<i>Cayratia maritima</i>	V		1							1
	<i>Cayratia trifolia</i>	V		1							1
Total			97 (36% native); 62 (64% naturalised)	73 (59 native/92%); 7 naturalised / 8%)	18 (100% native)	24 (100% native)	57 (100% native)	9 (100% native)	3 (100% native)	27 (100% native)	245 (178/73% native; 67/27% naturalised)

Appendix F. Terrestrial Vertebrates Known¹ or Predicted² to Occur on the Islands of Torres Strait and their Occurrence on Boigu Island.

Family	Scientific Name ³	Common Name	Status ⁴			Boigu Island
			EPBC Act	NC Act	BoT	
AMPHIBIANS						
Myobatrachidae	<i>Limnodynastes ornatus</i>	Ornate Burrowing Frog		LC		
Myobatrachidae	<i>Uperoleia lithomoda</i>	Stonemason Toadlet		LC		
Myobatrachidae	<i>Uperoleia mimula</i>	Mimic Toadlet		LC		
Hylidae	<i>Litoria bicolor</i>	Northern Dwarf Tree Frog		LC		
Hylidae	<i>Litoria caerulea</i>	Green Tree Frog		LC		Unpublished record. Kahteku
Hylidae	<i>Litoria gracilentia</i>	Dainty Green Tree Frog		LC		
Hylidae	<i>Litoria infrafrenata</i>	White-lipped Tree Frog		LC		
Hylidae	<i>Litoria nasuta</i>	Rocket Frog		LC		
Hylidae	<i>Litoria nigrofrenata</i>	Bridle Frog		LC		Unpublished record.
Hylidae	<i>Litoria rubella</i>	Red Tree Frog		LC		
Microhylidae	<i>Austrochaperina gracilipes</i>	Slender Frog		LC		
Microhylidae	<i>Cophixalus</i> sp.	No common name				
Ranidae	<i>Rana daemeli</i>	Wood Frog		LC		
Bufonidae	<i>Rhinella marina</i>	Cane Toad		I		
REPTILES						
Crocodylidae	<i>Crocodylus porosus</i>	Salt-water Crocodile	M	V		Unpublished record.
Gekkonidae	<i>Cyrtodactylus lousiadensis</i>	Ring-tailed Gecko		LC		
Gekkonidae	<i>Gehyra baliola</i>	Short-tailed Dtella		LC		
Gekkonidae	<i>Gehyra dubia</i>	Dubious Dtella		LC		
Gekkonidae	<i>Gehyra variegata</i>	Tree Dtella		LC		
Gekkonidae	<i>Hemidactylus frenatus</i>	House Gecko		I		Unpublished record.
Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's Gecko		LC		
Gekkonidae	<i>Lepidodactylus lugubris</i>	Mourning Gecko		LC		Unpublished record.
Gekkonidae	<i>Lepidodactylus pumilus</i>	Slender Chained Gecko		NT		
Gekkonidae	<i>Nactus eboracensis</i>	no common name		LC		
Gekkonidae	<i>Nactus 'pelagicus'</i>	Pelagic Gecko		LC		
Gekkonidae	<i>Oedura rhombifer</i>	Zigzag Velvet Gecko		LC		

Family	Scientific Name ³	Common Name	Status ⁴			Boigu Island
			EPBC Act	NC Act	BoT	
Gekkonidae	<i>Pseudothecadactylus australis</i>	Giant Tree Gecko		LC		
Pygopodidae	<i>Lialis burtonis</i>	Burton's Snake-lizard		LC		
Scincidae	<i>Bellatorias frerei</i>	Major Skink		LC		
Scincidae	<i>Carlia coensis</i>	Coen Rainbow-skink		LC		
Scincidae	<i>Carlia longipes</i>	Closed-litter Rainbow-skink		LC		
Scincidae	<i>Carlia quinquecarinata</i>	no common name		LC		
Scincidae	<i>Carlia sexdentata</i>	no common name		LC		WildNet & unpublished records. Moga.
Scincidae	<i>Carlia storri</i>	Brown Bicarinate Rainbow-skink		LC		
Scincidae	<i>Cryptoblepharus litoralis litoralis</i>	Supralittoral Shinning-skink		LC		
Scincidae	<i>Cryptoblepharus virgatus</i>	Cream-striped Shinning-skink		LC		Unpublished record.
Scincidae	<i>Ctenotus inornatus</i>	Bar-shouldered Ctenotus		LC		
Scincidae	<i>Ctenotus robustus</i>	Robust Ctenotus		LC		
Scincidae	<i>Ctenotus spaldingi</i>	Straight-browed Ctenotus		LC		
Scincidae	<i>Emoia atrocostata</i>	Littoral Whiptail-skink		NT		WildNet & unpublished records.
Scincidae	<i>Emoia longicauda</i>	Shrub Whiptail-skink		LC		
Scincidae	<i>Eremiascincus pardalis</i>	Lowlands Bar-lipped Skink		LC		
Scincidae	<i>Eugongylus rufescens</i>	Bar-lipped Sheen-skink		LC		
Scincidae	<i>Glaphyromorphus crassicaudus</i>	Cape York Mulch-skink		LC		
Scincidae	<i>Glaphyromorphus nigricaudis</i>	Black-tailed Bar-lipped Skink		LC		Unpublished record.
Scincidae	<i>Glaphyromorphus pumilus</i>	Dwarf Mulch-skink		LC		
Scincidae	<i>Lygisaurus macfarlani</i>	Translucent Litter-skink		LC		
Agamidae	<i>Chlamydosaurus kingii</i>	Frilled Lizard		LC		Unpublished record.
Agamidae	<i>Diporiphora bilineata</i>	Two-lined Dragon		LC		
Agamidae	<i>Lophognathus temporalis</i>	Swamplands Lashtail		LC		
Varanidae	<i>Varanus gouldii</i>	Gould's Goanna		LC		
Varanidae	<i>Varanus indicus</i>	Mangrove Monitor		LC		Unpublished record. Karum.
Varanidae	<i>Varanus mertensi</i>	Mertens' Water Monitor		LC		
Varanidae	<i>Varanus panoptes</i>	Yellow-spotted Monitor		LC		
Varanidae	<i>Varanus prasinus</i>	Emerald Monitor		NT		Published & unpublished records. Tamai

Family	Scientific Name ³	Common Name	Status ⁴			Boigu Island
			EPBC Act	NC Act	BoT	
Varanidae	<i>Varanus scalaris</i>	Spotted Tree Monitor		LC		Unpublished record.
Varanidae	<i>Varanus tristis</i>	Black-tailed Monitor		LC		
Typhlopidae	<i>Ramphotyphlops braminus</i>	Flowerpot Blind Snake		I		
Typhlopidae	<i>Ramphotyphlops leucoproctus</i>	Cape York Blind Snake		LC		
Typhlopidae	<i>Ramphotyphlops polygrammicus</i>	North-eastern Blind Snake		LC		
Boidae	<i>Antaresia cf childreni</i>	Children's Python		LC		
Boidae	<i>Antaresia maculosa</i>	Spotted Python		LC		
Boidae	<i>Liasis fuscus</i>	Water Python		LC		
Boidae	<i>Morelia amethystina</i>	Amethyst Python		LC		
Boidae	<i>Morelia kinghorni</i>	Scrub Python		LC		
Colubridae	<i>Boiga irregularis</i>	Brown Tree Snake		LC		
Colubridae	<i>Cerberus australis</i>	Bockadam		LC		Unpublished record Burrows (2010). Urmoutabu
Colubridae	<i>Dendrelaphis calligastra</i>	Northern Tree Snake		LC		Unpublished record.
Colubridae	<i>Dendrelaphis punctulatus</i>	Common Tree Snake		LC		
Colubridae	<i>Stegonotus cucullatus</i>	Slaty-grey Snake		LC		
Colubridae	<i>Stegonotus parvus</i>	Slate-brown Snake		LC		
Elapidae	<i>Acanthophis praelongus</i>	Northern Death Adder		LC		
Elapidae	<i>Demansia papuensis</i>	Papuan Whipsnake		LC		
Elapidae	<i>Demansia vestigiata</i>	Black Whipsnake		LC		
Elapidae	<i>Furina tristis</i>	Brown-headed Snake		LC		
Elapidae	<i>Pseudechis papuanus</i>	Papuan Black Snake		LC		
BIRDS						
Megapodiidae	<i>Alectura lathamii</i>	Australian Brush-turkey		LC		
Megapodiidae	<i>Megapodius reinwardt duperryi</i>	Orange-Footed Scrubfowl		LC		WildNet, published & unpublished records.
Phasianidae	<i>Coturnix ypsilophora</i>	Brown Quail		LC		
Anseranatidae	<i>Anseranas semipalmata</i>	Magpie Goose		LC		WildNet & published records.
Anatidae	<i>Dendrocygna guttata</i>	Spotted Whistling-Duck		LC		WildNet & published records.
Anatidae	<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck		LC		
Anatidae	<i>Dendrocygna arcuata</i>	Wandering Whistling-Duck		LC		WildNet & published records.
Anatidae	<i>Tadorna radjah</i>	Radjah Shelduck		NT		WildNet & published records.

Family	Scientific Name ³	Common Name	Status ⁴			Boigu Island
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Anatidae	<i>Chenonetta jubata</i>	Australian Wood Duck		LC		
Anatidae	<i>Nettapus pulchellus</i>	Green Pygmy-goose		LC		
Anatidae	<i>Anas gracilis</i>	Grey Teal		LC		WildNet & published records.
Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck		LC		Published record.
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe		LC		
Columbidae	<i>Columba livia</i>	Rock Dove		I		
Columbidae	<i>Geopelia striata papua</i>	Emerald Dove		LC		Published record.
Columbidae	<i>Geopelia striata</i>	Peaceful Dove		LC		WildNet & published records.
Columbidae	<i>Geopelia humeralis</i>	Bar-shouldered Dove		LC		WildNet & published records.
Columbidae	<i>Ptilinopus magnificus</i>	Wompoo Fruit-Dove		LC		
Columbidae	<i>Ptilinopus superbus</i>	Superb Fruit-Dove		LC		WildNet record.
Columbidae	<i>Ptilinopus regina</i>	Rose-crowned Fruit-Dove		LC		Published record.
Columbidae	<i>Ptilinopus iozonus</i>	Orange-Bellied Fruit-Dove		LC		Published record.
Columbidae	<i>Ducula mullerii</i>	Collared Imperial-Pigeon		LC		WildNet & published records.
Columbidae	<i>Ducula bicolor</i>	Pied Imperial-Pigeon		LC		WildNet & published records.
Columbidae	<i>Lopholaimus antarcticus</i>	Topknot Pigeon		LC		
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth		LC		
Podargidae	<i>Podargus papuensis</i>	Papuan Frogmouth		LC		
Eurostropodidae	<i>Eurostropodus mystacalis</i>	White-throated Nightjar		LC		
Eurostropodidae	<i>Eurostropodus argus</i>	Spotted Nightjar		LC		
Caprimulgidae	<i>Caprimulgus macrurus</i>	Large-tailed Nightjar		LC		WildNet & published records.
Apodidae	<i>Collocalia esculenta</i>	Glossy Swiftlet		LC		
Apodidae	<i>Aerodramus terraereginae</i>	Australian Swiftlet		NT		
Apodidae	<i>Aerodramus vanikorensis</i>	Uniform Swiftlet		LC		Published record – unconfirmed.
Apodidae	<i>Hirundapus caudacutus</i> ⁵	White-throated Needletail	M	LC		WildNet record.
Apodidae	<i>Mearnsia novaeguineae</i>	Papuan Spine-tailed Swift		LC		Published record.
Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift	M	LC		Published record.
Apodidae	<i>Apus affinis</i>	House Swift		LC		
Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian Darter		LC		WildNet & published records.
Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		LC		WildNet & published records.
Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Great Cormorant		LC		WildNet & published records.
Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		LC		WildNet & published records.

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Phalacrocoracidae	<i>Phalacrocorax varius</i>	Pied Cormorant		LC		
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican		LC		WildNet & published records.
Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork		NT		WildNet & published records.
Ardeidae	<i>Ixobrychus dubius</i>	Australian Little Bittern		LC		
Ardeidae	<i>Ixobrychus flavicollis</i>	Black Bittern		LC		Published record.
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron		LC		Published record.
Ardeidae	<i>Ardea modesta</i> ⁶	Eastern Great Egret	M	LC		WildNet & published records.
Ardeidae	<i>Ardea intermedia</i>	Intermediate Egret		LC		WildNet & published records.
Ardeidae	<i>Ardea sumatrana</i>	Great-billed Heron		LC		WildNet & published records.
Ardeidae	<i>Ardea ibis</i> ⁷	Cattle Egret	M	LC		
Ardeidae	<i>Butorides striata</i>	Striated Heron		LC		WildNet & published records.
Ardeidae	<i>Egretta picata</i>	Pied Heron		LC		WildNet & published records.
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron		LC		WildNet & published records.
Ardeidae	<i>Egretta garzetta</i>	Little Egret		LC		WildNet & published records.
Ardeidae	<i>Egretta sacra</i>	Eastern Reef Egret	M	LC		WildNet & published records.
Ardeidae	<i>Nycticorax caledonicus</i>	Nankeen Night-Heron		LC		WildNet & published records.
Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy Ibis	M	LC		WildNet & published records.
Threskiornithidae	<i>Threskiornis molucca</i>	Australian White Ibis		LC		WildNet & published records.
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis		LC		
Threskiornithidae	<i>Platalea regia</i>	Royal Spoonbill		LC		Published record.
Accipitridae	<i>Pandion cristatus</i> ⁸	Eastern Osprey	M	LC		WildNet & published records.
Accipitridae	<i>Elanus axillaris</i>	Black-shouldered Kite		LC		
Accipitridae	<i>Hamirostra melanosternon</i>	Black-breasted Buzzard		LC		
Accipitridae	<i>Aviceda subcristata</i>	Pacific Baza		LC		WildNet & published records.
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	LC		WildNet & published records.
Accipitridae	<i>Haliastur sphenurus</i>	Whistling Kite		LC		WildNet & published records.
Accipitridae	<i>Haliastur indus</i>	Brahminy Kite		LC		WildNet & published records.
Accipitridae	<i>Milvus migrans</i>	Black Kite		LC		
Accipitridae	<i>Accipiter fasciatus</i>	Brown Goshawk		LC		
Accipitridae	<i>Accipiter cirrhocephalus</i>	Collared Sparrowhawk		LC		
Accipitridae	<i>Accipiter novaehollandiae</i>	Grey Goshawk		NT		
Accipitridae	<i>Circus assimilis</i>	Spotted Harrier		LC		

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Accipitridae	<i>Circus approximans</i>	Swamp Harrier		LC		WildNet & published records.
Accipitridae	<i>Erythrotriorchis radiatus</i>	Red Goshawk	V	E	high	
Accipitridae	<i>Aquila gurneyi</i>	Gurney's Eagle		LC		WildNet & published records.
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel		LC		WildNet & published records.
Falconidae	<i>Falco berigora</i>	Brown Falcon		LC		
Falconidae	<i>Falco longipennis</i>	Australian Hobby		LC		WildNet & published records.
Falconidae	<i>Falco peregrinus</i>	Peregrine Falcon		LC		Published record.
Gruidae	<i>Grus rubicunda</i>	Brolga		LC		Published record.
Rallidae	<i>Porphyrio porphyrio</i>	Purple Swamphen		LC		
Rallidae	<i>Eulabeornis castaneiventris</i>	Chestnut Rail		LC		Published record.
Rallidae	<i>Rallina tricolor</i>	Red-necked Crake		LC		
Rallidae	<i>Gallirallus philippensis</i>	Buff-banded Rail		LC		Published record.
Rallidae	<i>Porzana pusilla</i>	Baillon's Crake		LC		
Rallidae	<i>Porzana fluminea</i>	Australian Spotted Crake		LC		
Rallidae	<i>Porzana tabuensis</i>	Spotless Crake		LC		
Rallidae	<i>Amauornis cinerea</i>	White-browed Crake		LC		Published record.
Rallidae	<i>Amauornis moluccana</i>	Pale-vented Bush-hen		LC		
Otididae	<i>Ardeotis australis</i>	Australian Bustard		LC		
Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew		LC		
Burhinidae	<i>Esacus magnirostris</i>	Beach Stone-curlew		V	high	
Haematopodidae	<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		LC		
Haematopodidae	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		NT		
Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged Stilt		LC		WildNet & published records.
Charadriidae	<i>Pluvialis fulva</i>	Pacific Golden Plover	M	LC		WildNet & published records.
Charadriidae	<i>Pluvialis squatarola</i>	Grey Plover	M	LC		Published record.
Charadriidae	<i>Charadrius ruficapillus</i>	Red-capped Plover		LC		
Charadriidae	<i>Charadrius bicinctus</i>	Double-banded Plover	M	LC		
Charadriidae	<i>Charadrius mongolus</i>	Lesser Sand Plover	M	LC		WildNet & published records.
Charadriidae	<i>Charadrius leschenaultii</i>	Greater Sand Plover	M	LC		WildNet & published records.
Charadriidae	<i>Erythronyx cinctus</i>	Red-kneed Dotterel		LC		Published record.
Charadriidae	<i>Vanellus miles</i>	Masked Lapwing		LC		WildNet & published records.
Scolopacidae	<i>Gallinago hardwickii</i>	Latham's Snipe	M	LC		Published record.

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Scolopacidae	<i>Gallinago megala</i>	Swinhoe's Snipe	M	LC		Published record.
Scolopacidae	<i>Limosa limosa</i>	Black-tailed Godwit	M	LC		Published record.
Scolopacidae	<i>Limosa lapponica</i>	Bar-tailed Godwit	M	LC		
Scolopacidae	<i>Numenius minutus</i>	Little Curlew	M	LC		Published record.
Scolopacidae	<i>Numenius phaeopus</i>	Whimbrel	M	LC		WildNet & published records.
Scolopacidae	<i>Numenius madagascariensis</i>	Eastern Curlew	M	NT		WildNet & published records.
Scolopacidae	<i>Xenus cinereus</i>	Terek Sandpiper	M	LC		WildNet & published records.
Scolopacidae	<i>Actitis hypoleucos</i> ⁹	Common Sandpiper	M	LC		WildNet & published records.
Scolopacidae	<i>Tringa brevipes</i> ¹⁰	Grey-tailed Tattler	M	LC		WildNet & published records.
Scolopacidae	<i>Tringa incana</i> ¹¹	Wandering Tattler	M	LC		
Scolopacidae	<i>Tringa nebularia</i>	Common Greenshank	M	LC		WildNet & published records.
Scolopacidae	<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	LC		WildNet & published records.
Scolopacidae	<i>Tringa glareola</i>	Wood Sandpiper	M	LC		WildNet & published records.
Scolopacidae	<i>Arenaria interpres</i>	Ruddy Turnstone	M	LC		WildNet record.
Scolopacidae	<i>Calidris tenuirostris</i>	Great Knot	M	LC		
Scolopacidae	<i>Calidris canutus</i>	Red Knot	M	LC		
Scolopacidae	<i>Calidris alba</i> ¹²	Sanderling	M	LC		
Scolopacidae	<i>Calidris ruficollis</i>	Red-necked Stint	M	LC		WildNet & published records.
Scolopacidae	<i>Calidris melanotos</i>	Pectoral Sandpiper	M	LC		Published record.
Scolopacidae	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	LC		WildNet & published records.
Scolopacidae	<i>Calidris ferruginea</i>	Curlew Sandpiper	M	LC		WildNet & published records.
Turnicidae	<i>Turnix maculosus</i>	Red-backed Button-quail		LC		WildNet & published records.
Turnicidae	<i>Turnix pyrrhorostris</i>	Red-chested Button-quail		LC		
Glareolidae	<i>Glareola maldivarum</i>	Oriental Pratincole	M	LC		WildNet record.
Glareolidae	<i>Stiltia isabella</i>	Australian Pratincole		LC		WildNet & published records.
Laridae	<i>Anous stolidus</i>	Common Noddy	M	LC		
Laridae	<i>Anous minutus</i>	Black Noddy		LC		
Laridae	<i>Onychoprion anaethetus</i> ¹³	Bridled Tern	M	LC		Published record.
Laridae	<i>Onychoprion fuscata</i>	Sooty Tern		LC		WildNet record.
Laridae	<i>Sternula albifrons</i> ¹⁴	Little Tern	M	E	high	WildNet & published records.
Laridae	<i>Gelochelidon nilotica</i>	Gull-billed Tern		LC		WildNet & published records.
Laridae	<i>Hydroprogne caspia</i>	Caspian Tern	M	LC		WildNet & published records.

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Laridae	<i>Chlidonias hybrida</i>	Whiskered Tern		LC		WildNet & published records.
Laridae	<i>Chlidonias leucopterus</i>	White-winged Black Tern	M	LC		Published record.
Laridae	<i>Sterna dougallii</i>	Roseate Tern	M	LC		
	<i>Sterna striata</i>	White-fronted Tern		LC		
Laridae	<i>Sterna sumatrana</i>	Black-naped Tern	M	LC		Published record.
Laridae	<i>Sterna hirundo</i>	Common Tern	M	LC		Published record.
Laridae	<i>Thalasseus bengalensis</i> ¹⁵	Lesser Crested Tern	M	LC		
Laridae	<i>Thalasseus bergii</i>	Crested Tern		LC		WildNet & published records.
Laridae	<i>Chroicocephalus novaehollandiae</i>	Silver Gull		LC		
Cacatuidae	<i>Probosciger aterrimus</i>	Palm Cockatoo		NT		
Cacatuidae	<i>Eolophus roseicapilla</i>	Galah		LC		
Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo		LC		
Psittacidae	<i>Trichoglossus haematodus caeruleiceps</i>	Rainbow Lorikeet		LC		WildNet & published records.
Psittacidae	<i>Cyclopsitta</i> species	fig-parrot species				Published record. Not identified to species.
Psittacidae	<i>Eclectus roratus polychloros</i>	Eclectus Parrot		LC		WildNet & published records.
Psittacidae	<i>Geoffroyus geoffroyi aruenensis</i>	Red-cheeked Parrot		LC		WildNet & published records.
Cuculidae	<i>Centropus phasianinus</i>	Pheasant Coucal		LC		WildNet & published records.
Cuculidae	<i>Eudynamys orientalis</i>	Eastern Koel		LC		WildNet & published records.
Cuculidae	<i>Urodynamys taitensis</i>	Long-tailed Cuckoo				
Cuculidae	<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo		LC		WildNet record.
Cuculidae	<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo		LC		WildNet record.
Cuculidae	<i>Chalcites osculans</i>	Black-eared Cuckoo		LC		
Cuculidae	<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		LC		
Cuculidae	<i>Chalcites minutillus</i>	Little Bronze-Cuckoo		LC		WildNet & published records.
Cuculidae	<i>Cacomantis pallidus</i>	Pallid Cuckoo		LC		
Cuculidae	<i>Cacomantis castaneiventris</i>	Chestnut-breasted Cuckoo		LC		
Cuculidae	<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		LC		
Cuculidae	<i>Cacomantis variolosus</i>	Brush Cuckoo		LC		Published record.
Cuculidae	<i>Cuculus optatus</i> ¹⁶	Oriental Cuckoo	M	LC		Published record.
Strigidae	<i>Ninox connivens</i>	Barking Owl		LC		

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Strigidae	<i>Ninox novaeseelandiae</i>	Southern Boobook		LC		
Tytonidae	<i>Tyto longimembris</i>	Eastern Grass Owl		LC		
Alcedinidae	<i>Ceyx azureus</i>	Azure Kingfisher		LC		WildNet record.
Alcedinidae	<i>Ceyx pusilla pusilla</i>	Little Kingfisher		LC		WildNet & published records.
Halcyonidae	<i>Tanysiptera sylvia</i>	Buff-breasted Paradise-Kingfisher		LC		Published record.
Halcyonidae	<i>Tanysiptera galatea</i>	Common Paradise-Kingfisher		LC		
Halcyonidae	<i>Tanysiptera hydrocharis</i>	Little Paradise-Kingfisher				
Halcyonidae	<i>Dacelo leachii</i>	Blue-winged Kookaburra		LC		
Halcyonidae	<i>Syma torotoro</i>	Yellow-billed Kingfisher		LC		
Halcyonidae	<i>Todiramphus macleayii</i>	Forest Kingfisher		LC		WildNet & published records.
Halcyonidae	<i>Todiramphus sanctus</i>	Sacred Kingfisher		LC		WildNet & published records.
Halcyonidae	<i>Todiramphus chloris</i>	Collared Kingfisher		LC		Published record.
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater	M	LC		WildNet & published records.
Coraciidae	<i>Eurystomus orientalis</i>	Dollarbird		LC		Published record.
Pittidae	<i>Pitta erythrogaster</i>	Red-bellied Pitta		LC		
Pittidae	<i>Pitta versicolor</i>	Noisy Pitta		LC		
Ptilonorhynchidae	<i>Ptilonorhynchus nuchalis</i>	Great Bowerbird		LC		
Acanthizidae	<i>Sericornis beccarii</i>	Tropical Scrubwren		LC		
Acanthizidae	<i>Gerygone levigaster</i>	Mangrove Gerygone		LC		
Acanthizidae	<i>Gerygone magnirostris brunneipectus</i>	Large-billed Gerygone		LC		WildNet & published records.
Acanthizidae	<i>Gerygone palpebrosa</i>	Fairy Gerygone		LC		
Meliphagidae	<i>Meliphaga notata</i>	Yellow-spotted Honeyeater		LC		
Meliphagidae	<i>Meliphaga gracilis</i>	Graceful Honeyeater		LC		
Meliphagidae	<i>Lichenostomus versicolor</i>	Varied Honeyeater		LC		WildNet & published records.
Meliphagidae	<i>Manorina melanocephala</i>	Noisy Miner		LC		
Meliphagidae	<i>Ramsayornis modestus</i>	Brown-backed Honeyeater		LC		WildNet & published records.
Meliphagidae	<i>Conopophila albogularis</i>	Rufous-banded Honeyeater		LC		WildNet & published records.
Meliphagidae	<i>Myzomela obscura fumata</i>	Dusky Honeyeater		LC		WildNet & published records.
Meliphagidae	<i>Myzomela erythrocephala infuscata</i>	Red-headed Honeyeater		LC		WildNet & published records.

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Meliphagidae	<i>Cissomela pectoralis</i>	Banded Honeyeater		LC		
Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater		LC		
Meliphagidae	<i>Philemon buceroides</i>	Helmeted Friarbird		LC		
Meliphagidae	<i>Philemon argenteiceps</i>	Silver-crowned Friarbird		LC		
Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird		LC		
Meliphagidae	<i>Philemon citreogularis</i>	Little Friarbird		LC		
Meliphagidae	<i>Xanthotis flaviventer saturator</i>	Tawny-breasted Honeyeater		LC		WildNet & published records.
Pomatostomidae	<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		LC		
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		LC		WildNet & published records.
Campephagidae	<i>Coracina papuensis</i>	White-bellied Cuckoo-shrike		LC		WildNet & published records.
Campephagidae	<i>Coracina lineata</i>	Barred Cuckoo-shrike		LC		
Campephagidae	<i>Coracina tenuirostris melvillensis</i>	(Melville) Cicadabird	M	LC		WildNet & published records.
Campephagidae	<i>Lalage tricolor</i>	White-winged Triller		LC		
Campephagidae	<i>Lalage leucomela</i>	Varied Triller		LC		WildNet & published records.
Pachycephalidae	<i>Pachycephala melanura</i>	Mangrove Golden Whistler		LC		WildNet & published records.
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler		LC		
Pachycephalidae	<i>Colluricincla megarrhyncha</i>	Little Shrike-thrush		LC		
Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian Figbird		LC		
Oriolidae	<i>Oriolus flavocinctus</i>	Yellow Oriole		LC		Published record.
Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed Oriole		LC		WildNet record.
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow		LC		WildNet & published records.
Artamidae	<i>Artamus cinereus</i>	Black-faced Woodswallow		LC		
Artamidae	<i>Artamus minor</i>	Little Woodswallow		LC		
Artamidae	<i>Cracticus quoyi alecto</i>	Black Butcherbird		LC		WildNet & published records.
Dicruridae	<i>Dicrurus bracteatus carbonarius</i>	Spangled Drongo		LC		WildNet & published records.
Rhipiduridae	<i>Rhipidura rufifrons</i>	Rufous Fantail	M	LC		WildNet record.
Rhipiduridae	<i>Rhipidura phasiana</i>	Mangrove Grey Fantail		LC		
Rhipiduridae	<i>Rhipidura rufiventris gularis</i>	Northern Fantail		LC		WildNet & published records.
Rhipiduridae	<i>Rhipidura leucophrys melaleuca</i>	Willie Wagtail		LC		WildNet & published records.

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Corvidae	<i>Corvus orru orru</i>	Torresian Crow		LC		WildNet & published records.
Monarchidae	<i>Myiagra ruficollis</i>	Broad-billed Flycatcher		LC		WildNet & published records.
Monarchidae	<i>Myiagra rubecula</i>	Leaden Flycatcher		LC		WildNet record.
Monarchidae	<i>Myiagra cyanoleuca</i>	Satin Flycatcher	M	LC		Published record.
Monarchidae	<i>Myiagra alecto</i>	Shining Flycatcher		LC		WildNet & published records.
Monarchidae	<i>Myiagra inquieta</i>	Restless Flycatcher		LC		
Monarchidae	<i>Monarcha melanopsis</i>	Black-faced Monarch	M	LC		WildNet & published records.
Monarchidae	<i>Monarcha frater</i>	Black-winged Monarch	M	LC		Predicted by the EPBC Protected Matters Search Tool
Monarchidae	<i>Symposiachrus trivirgatus</i> ¹⁷	Spectacled Monarch	M	LC		WildNet record.
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark		LC		Published record.
Monarchidae	<i>Arses telescopthalmus</i>	Frilled Monarch		LC		Published record. Unconfirmed.
Paradisaeidae	<i>Phonygammus keraudrenii</i>	Trumpet Manucode		LC		Published record.
Paradisaeidae	<i>Ptiloris magnificus</i>	Magnificent Riflebird		LC		
Petroicidae	<i>Microeca flavigaster</i>	Lemon-bellied Flycatcher		LC		
Petroicidae	<i>Peneoenanthe pulverulenta</i>	Mangrove Robin		LC		Published record.
Petroicidae	<i>Drymodes superciliaris</i>	Northern Scrub-robin		LC		
Cisticolidae	<i>Cisticola exilis</i>	Golden-headed Cisticola		LC		WildNet & published records.
Acrocephalidae	<i>Acrocephalus australis</i> ¹⁸	Australian Reed-Warbler	M	LC		
Megaluridae	<i>Megalurus timoriensis</i>	Tawny Grassbird		LC		
Megaluridae	<i>Megalurus gramineus</i>	Little Grassbird		LC		
Timaliidae	<i>Zosterops citrinella</i>	Pale White-eye		LC		WildNet & published records.
Timaliidae	<i>Zosterops lateralis</i>	Silvereye		LC		
Hirundinidae	<i>Hirundo rustica</i>	Barn Swallow	M	LC		WildNet & published records.
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow		LC		WildNet & published records.
Hirundinidae	<i>Petrochelidon ariel</i>	Fairy Martin		LC		WildNet record.
Hirundinidae	<i>Petrochelidon nigricans</i>	Tree Martin		LC		WildNet & published records.
Hirundinidae	<i>Cecropis daurica</i> ¹⁹	Red-rumped Swallow	M	LC		WildNet & published records.
Turdidae	<i>Zoothera</i> sp.	thrush species		LC		
Sturnidae	<i>Aplornis cantoroides</i>	Singing Starling		LC		WildNet & published records.
Sturnidae	<i>Aplornis metallica</i>	Metallic Starling		LC		WildNet & published records.
Sturnidae	<i>Sturnus tristis</i>	Common Myna		I		
Nectariniidae	<i>Dicaeum geelvinkianum</i>	Red-capped Flowerpecker		LC		

Family	Scientific Name ³	Common Name	Status ⁴			Boigu Island
			EPBC Act	NC Act	BoT	
Nectariniidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird		LC		
Nectariniidae	<i>Nectarinia jugularis</i>	Olive-backed Sunbird		LC		WildNet & published records.
Estrildidae	<i>Poephila personata</i>	Masked Finch		LC		WildNet. This record is almost certainly erroneous and has been questioned with DERM.
Estrildidae	<i>Lonchura punctulata</i>	Nutmeg Mannikin		I		
Estrildidae	<i>Lonchura castaneothorax</i>	Chestnut-breasted Mannikin		LC		WildNet & published records.
Passeridae	<i>Passer domesticus</i>	House Sparrow		I		WildNet & published records.
Motacillidae	<i>Motacilla</i> sp.	Yellow Wagtail species	M	LC		Unpublished record.
MAMMALS						
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna		LC		
Peramelidae	<i>Isoodon macrourus</i>	Northern Brown Bandicoot		LC		
Peramelidae	<i>Isoodon obesulus</i>	Southern Brown Bandicoot		LC		
Macropodidae	<i>Macropus agilis</i>	Agile Wallaby		LC		
Pteropodidae	<i>Dobsonia magna</i>	Bare-backed Fruit-bat		NT		
Pteropodidae	<i>Macroglossus minimus</i>	Northern Blossom-bat		LC		WildNet record.
Pteropodidae	<i>Syconycteris australis</i>	Common Blossom-bat		LC		
Pteropodidae	<i>Nyctimene cephalotes</i>	Torresian Tube-nosed Bat		NT		
Pteropodidae	<i>Nyctimene robinsoni</i>	Eastern Tube-nosed Bat		LC		
Pteropodidae	<i>Pteropus alecto</i>	Black Flying-fox		LC		WildNet record.
Pteropodidae	<i>Pteropus conspicillatus</i>	Spectacled Flying-fox	V	LC	high	Predicted by the EPBC Protected Matters Search Tool
Pteropodidae	<i>Pteropus macrotis</i>	Large-eared Flying-fox		LC		Published record (Hall 2008). There is some uncertainty about this species occurring on Boigu Island (Helgen 2004).
Pteropodidae	<i>Pteropus scapulatus</i>	Little Red Flying-fox		LC		WildNet record.
Rhinolophidae	<i>Rhinolophus philippinensis</i> (large form)	Greater Large-eared Horseshoe Bat	E	E	high	
Hipposideridae	<i>Hipposideros ater aruensis</i>	(eastern) Dusky Leaf-nosed Bat		LC		
Hipposideridae	<i>Hipposideros cervinus</i>	Fawn Leaf-nosed Bat		V	high	
Hipposideridae	<i>Hipposideros diadema</i>	Diadem Leaf-nosed Bat		LC		
Emballonuridae	<i>Saccolaimus saccolaimus nudicluniatus</i>	Bare-rumped Sheath-tail-bat	CE	E	high	
Emballonuridae	<i>Taphozous australis</i>	Coastal Sheath-tail Bat		V	high	

Family	Scientific Name ³	Common Name	Status ⁴			Boigu Island
			EPBC Act	NC Act	BoT	
Molossidae	<i>Chaerephon jobensis</i>	Northern Freetail-bat		LC		
Molossidae	<i>Mormopterus beccarii</i>	Beccari's Freetail-bat		LC		
Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	Hoary Wattled Bat		LC		
Vespertilionidae	<i>Miniopterus australis</i>	Little Bent-wing Bat		LC		
Vespertilionidae	<i>Miniopterus schreibersii</i>	Eastern Bent-wing Bat		LC		
Vespertilionidae	<i>Myotis macropus</i>	Large-footed Myotis		LC		
Vespertilionidae	<i>Nyctophilus bifax</i>	Eastern Long-eared Bat		LC		
Vespertilionidae	<i>Pipistrellus</i> sp.	Pipistrelle species		LC		
Muridae	<i>Conilurus penicillatus</i>	Brush-tailed Tree-rat	V	LC		
Muridae	<i>Hydromys chrysogaster</i>	Water-rat		LC		
Muridae	<i>Melomys burtoni</i>	Grassland Melomys		LC		
Muridae	<i>Melomys capensis</i>	Cape York Melomys		LC		
Muridae	<i>Melomys rubicola</i>	Bramble Cay Melomys	E	E	high	
Muridae	<i>Mus musculus</i>	House Mouse		I		
Muridae	<i>Pseudomys delicatulus</i>	Delicate Mouse		LC		
Muridae	<i>Rattus exulans</i>	Pacific Rat		I		
Muridae	<i>Rattus norvegicus</i>	Brown Rat		I		
Muridae	<i>Rattus rattus</i>	Black Rat		I		
Muridae	<i>Xeromys myoides</i>	Water Mouse	V	V	high	Unpublished record. There is no detail provided for this record and it should be regarded as unconfirmed.
Canidae	<i>Canis lupus</i>	Dingo, Domestic Dog		I		Unpublished record.
Felidae	<i>Felis catus</i>	Cat		I		Unpublished record.
Equidae	<i>Equus caballus</i>	Horse, Brumby		I		
Suidae	<i>Sus scrofa</i>	Pig		I		Unpublished record.
Bovidae	<i>Capra hircus</i>	Goat		I		
Cervidae	<i>Cervus timorensis</i>	Rusa Deer		I		Unpublished record.

1. Known from Museum records, published literature (eg Tyler 1972; Storr 1973; Draffan et al. 1983; Whittier & Moeller 1993; Clarke 2004a, b; 2005, 2006; Wilson 2005; Ingram 2008), Wild-Net database and/or reports and other grey literature (eg Smith & Smith 2006; Borsboom 2007; Conics 2008a, b, c; 2009a, b; Schaffer 2010). These sources are not necessarily mutually exclusive and many records are un-confirmed. Some appear unreliable. Wild-Net database searches were conducted for Boigu, Saibai, Dauan, Bramble Cay, Erub, Mer, Mabuiag, Iama, Mua, Badu, Possession, Thursday, Wednesday, Friday, Horn, Hammond and Prince of Wales Islands.
2. Predicted by the EPBC Protected Matters Search Tool maintained by the Department of Sustainability, Environment, Water, Population and Communities, Canberra (DSEWPC) <http://www.environment.gov.au/erin/ert/epbc/index.html>. Only noted if not recorded from another source.
3. Nomenclature follows the Australian Faunal Directory maintained by DSEWPC. <http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/afd/index.html>
4. Status: CE = Critically Endangered, E = Endangered, V = Vulnerable, NT = Near-Threatened, M = Migratory, LC = Least Concern (Common), I = Introduced (Exotic) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and/or Nature Conservation Act 1992 (NC Act). BoT = species listed as critical or high priority under the Back on Track species prioritisation framework. Department of Environment and Resource Management, Brisbane. http://www.derm.qld.gov.au/wildlife-ecosystems/wildlife/back_on_track_species_prioritisation_framework/index.html.
5. Also listed under the EPBC Act (ROKAMBA) as *Chaetura caudacuta*.
6. Listed under the EPBC Act (CAMBA, JAMBA) as great egret *Ardea alba*. Australian birds elevated to full species level as *A. modesta* (Kushlan & Hancock 2005; Christidis & Boles 2008).
7. Listed under CAMBA as *Ardeola ibis*, listed under JAMBA as *Bubulcus ibis*.
8. Listed under the Bonn Convention as osprey *Pandion haliaetus*. Australian birds have been elevated to species level as *P. cristatus* (Wink et al. 2004; Christidis & Boles 2008).
9. Also listed under CAMBA and ROKAMBA as *Tringa hypoleucos*.
10. Also listed under the Bonn Convention and JAMBA as *Heteroscelus brevipes*.
11. Also listed under the Bonn Convention and JAMBA as *Heteroscelus incanus*.
12. Also listed under ROKAMBA as *Crocethia alba*.
13. Listed under the EPBC Act (CAMBA, JAMBA) as *Sterna anaethetus*.
14. Listed under the EPBC Act (Bonn Convention, CAMBA, JAMBA, ROKAMBA) as *Sterna albifrons*.
15. Listed under the EPBC Act (CAMBA) as *Sterna bengalensis*.
16. Listed under the EPBC Act (CAMBA, JAMBA, ROKAMBA) as *Cuculus saturatus*. Australian birds elevated to full species level as *A. optatus* (Christidis & Boles 2008).
17. Listed under the EPBC Act (Bonn Convention) as *Monarcha trivirgatus*.
18. Listed under the EPBC Act (Bonn Convention) as clamorous reed-warbler *Acrocephalus stentoreus*. Australian birds elevated to full species level as *A. australis* (Higgins et al. 2006b).
19. Listed under the EPBC Act (ROKAMBA) as *Hirundo daurica*.

Appendix G. Species Profiles for Endangered, Vulnerable and Near-Threatened Animals Predicted to Occur on Boigu Island

Fawn Leaf-nosed Bat (*Hipposideros cervinus*)

NC Act: Vulnerable

Fawn Leaf-nosed bat is also considered of 'High' priority under the Back on Track species prioritisation framework (DERM 2011a).

Fawn Leaf-nosed bats occur in rainforest, gallery forest and open eucalypt forest. The species roosts in caves and mines in colonies mostly of 20 to 100 individuals and occasionally of up to 900 individuals. Individuals are occasionally found roosting in buildings. Foraging occurs below the canopy and the species also forages around buildings and in open areas. Fawn Leaf-nosed bats eat a variety of insects and move along well-established pathways, often creeks and gullies (Churchill 2008; Pavey & Burwell 2008).

A single young is born in November or December but otherwise the breeding biology is little known. The maternity colony is the same cave as the roost site. The fawn leaf-nosed bat is widespread in Malaysia, Indonesia, the Philippines, New Guinea and the western Pacific. In Australia it is restricted to Cape York Peninsula, north of Coen (Churchill 2008; Pavey & Burwell 2008). In the Torres Strait the fawn leaf-nosed bat is known from Thursday Island (WildNet database record) and there is a Queensland Museum record (reported in Conics 2008c) and four WildNet records (DERM 2010f) for Mua Island. The species is not known from Boigu Island and availability of roost sites would limit its occurrence. However, it may occur in woodlands, either as a visitor for the Papua New Guinea mainland or through the use of buildings on Boigu Island as roost sites.

Fawn leaf-nosed bats are threatened by roost destruction. It is believed that roost disturbance; habitat alteration and predation by cats also threaten this species (DERM 2011b). These threats would be relevant on Boigu Island should the species be present.

Water Mouse (*Xeromys myoides*)

EPBC Act: Vulnerable; **NC Act:** Vulnerable

Water mouse is also considered of 'High' priority under the Back on Track species prioritisation framework (DERM 2011a).

The water mouse (also known as the false water-rat) is nocturnal and lives in mangroves, saltmarsh, sedges, lakes near foredunes, and coastal freshwater swamps. It is a capable swimmer but prefers to follow the receding tide to forage for crustaceans, molluscs and flatworms. During the day, or when foraging areas are inundated, the water mouse shelters in a nest, termitarium-like mounds up to 60 cm high, in tunnels in natural and human-made banks, and in mud structure associated with hollow tree trunks. The nests, regardless of type or structure, primarily serve as diurnal refuges and

reproductive sites. Nests often occupy naturally elevated ground and utilise the bases of fallen trees or logs for support of the nest structure (Van Dyck 1996; Gynther & Janetzki 2008).

Generally, there is only one sexually active male present in a nest and nests may be used by successive generations over a number of years. Once constructed, nests are continuously added to, with the larger mounds or nests having potential to provide significant historical information about populations and habitats over time (Van Dyck 1996).

The water mouse is patchily distributed in the Northern Territory, and from the Gold Coast to Proserpine in Queensland (Menkhorst & Knight 2004). There is one unconfirmed record from Boigu Island (Conics 2008a) and the species has been recently recorded from New Guinea (Hitchcock 1998). Its presence on Boigu Island needs to be confirmed.

The species is threatened by swamp and mangrove reclamation, feral predators, changes to water tables, offshore pollution, the spread of weeds and the impacts of grazing (Woinarski 2007; Gynther & Janetzki 2008). Much of Boigu Island is suitable habitat for the species and destruction of mangroves and the effects of climate change would be the greatest threats.

Slender Chained Gecko (*Lepidodactylus pumilus*)

NC Act: Near-Threatened

The slender chained gecko is found in southern New Guinea, the Torres Strait and the tip of Cape York (Covacevich *et al.* 1982; Ehmann 1992). In the Torres Strait there is a WildNet database record from Mer Island (DERM 2010d), and a Queensland Museum specimen (reported in Conics 2008c) and a record by Ingram (2008) from Mua Island. There are also Australian Museum specimens from Saibai, Masig, Mer, Hammond and Prince of Wales Islands (OZCAM 2011) and it is likely the species occurs more widely through the region than is yet documented. It is expected to occur on Boigu Island in habitats other than wetlands, treeless areas and on coastal dunes.

The species is arboreal and occurs in open and closed forests and coastal habitats (Ehmann 1992; Wilson & Swan 2010) and in human dwellings (Wilson 2005). The female lays two eggs per clutch under bark or within closed-in vegetation. Nesting is often communal and takes place during the warmer wet months (Ehmann 1992).

Threats to the species are unknown. Ehmann (1992) states the species is common and secure. However, the species is not known from any national park or other reserve affording protection (Covacevich *et al.* 1982). The slender chained gecko may be threatened by loss of habitat due to clearing and/or rising sea levels and storm surges as a result of climate change and by competition with house gecko *Hemidactylus frenatus*, in both natural habitats and on buildings (Case *et al.* 1994; Buden 2007; Hoskin 2010). House Gecko is present on Boigu Island but is unlikely to pose a threat to any possible population of slender chained gecko unless the introduced species spreads into natural habitats.

Bare-backed Fruit-bat (*Dobsonia magna*)

NC Act: Near-Threatened (listed as *D. moluccensis*)

The Bare-backed fruit-bat is found in rainforest, gallery forest, and woodlands, and occurs in New Guinea and associated islands and south to Cooktown on Cape York Peninsula (Churchill 2008; Hall 2008). Churchill (2008) states that the species is found in the Torres Strait, without location details. Duncan *et al.* (1999) reports the species for Mua Island.

The bare-backed fruit-bat is the only species of mega-bat in Australia known to regularly roost in caves (Hall 2008). The species also roosts in boulder piles, disused mines, abandoned buildings, dark rainforest thickets and large tree hollows. Colonies are usually 100 individuals or less. The species feeds on fruits and blossom. A single young is born between September and November (Churchill 2008; Hall 2008).

The species is eaten by humans in New Guinea but this is not reported for Australia (Hall 2008). Duncan *et al.* (1999) state that no large-scale decline has been observed in Australia, although shooting has caused small losses of numbers and the species has been regularly killed on barbed wire. There has been some loss of habitat through clearing and the species may be threatened by changes to vegetation through historical changes to fire regime. There is limited habitat on Boigu Island for the species but, if present, it may be threatened by any loss of vine forest.

Torresian Tube-nosed Bat (*Nyctimene cephalotes*)

NC Act: Near-Threatened

In Australia the Torresian tube-nosed bat is known only from three specimens from Mua Island. Another tube-nosed bat of uncertain identification, possibly *N. cephalotes*, has been collected from central eastern Cape York (Duncan *et al.* 1999). Churchill (2008) considers these records from Torres Strait and Cape York dubious and questions both the taxonomy and identification of species within the genus. The Torresian Tube-nosed Bat is widespread in New Guinea and specimens are known from the coast immediately adjacent to Torres Strait (Duncan *et al.* 1999).

The specimens from Mua were caught on the edge of rainforest and open grassy woodland, and the species is found in lowland rainforest in Papua New Guinea (Bonaccorso 1999). It may also inhabit mangroves as there are records from south coastal New Guinea (Duncan *et al.* 1999).

No threat is known at present, but removal of rainforest or mangrove habitat would pose a serious threat if the Australian distribution of this species is limited to Torres Strait and Cape York Peninsula (Duncan *et al.* 1999).

Appendix H. Profiles of Migratory Fauna Species Potentially occurring on Boigu Island and Surrounding Islets

Waders

Life history: Waders listed as Migratory under the EPBC Act that have been recorded in the Torres Strait include plovers, sandpipers and oriental pratincole. Sandpipers are known by a number of common names including snipe, godwit, curlew, tattler, knot and stint. The majority of the waders recorded occur in coastal areas, particularly in the intertidal zone, on mudflats, sandflats, beaches, saltmarsh, coastal lagoons and mangroves. Some also forage and/or roost on rocky shores. Many of these species are also found on freshwater and artificial waterbodies such as rivers, streams, swamps, dams and sewage ponds. Two species are unlikely to be found in the intertidal zone, oriental pratincole and wood sandpiper. Oriental pratincole is largely restricted to grasslands and other open areas and wood sandpiper occurs on freshwater waterbodies (Pringle 1987). None of these wader species breed in Australia but individuals of some species, especially large sandpipers such as eastern curlew and bar-tailed godwit, may be present year-round.

Flat tidal shores with extensive muddy intertidal areas support the most species and individuals, though some waders feed in mangroves forests at low tide (Lane 1987). The coastal species have a life cycle driven largely by the tidal cycle, roosting in mixed species flocks above the high water mark at high tide and moving to feeding areas as the tide recedes. Most of these species are gregarious, wary and fly strongly and swiftly (Pringle 1987; Geering *et al.* 2007). Smaller species, such as red-necked stint and curlew sandpiper, feed for longer each tide cycle than do larger species and may continue to feed in non-tidal areas during high tide (Lane 1987).

Other than double-banded plover *Charadrius bicinctus*, which breeds in New Zealand, all the Migratory waders breed in the northern hemisphere during the Australian winter. Migration to Australia after breeding starts in mid-July and finishes by December. Birds begin returning to breeding grounds as early as mid-February, though most birds leave in mid-March (Lane 1987).

Threats: Although none of the species breed in Australia they are susceptible to loss of foraging and roosting habitat and to disturbance, when foraging or roosting, by human activities and feral and domestic animals. Such disturbance may limit their ability to undertake long migration flights through depletion of their energy reserves. Pollution may also affect the intertidal invertebrate species on which so many Migratory waders depend (Lane 1987). Much of Boigu Island provides habitat for waders but threats appear limited to disturbance on mudflats, beaches and around mangroves. This will be most relevant prior to return passage in autumn.

Terns

Life history: Six Migratory tern species have been recorded from Boigu Island, though other species are also expected to occur. Many tern species are cosmopolitan, with very large distributions. Most species are coastal, found in a variety of habitats, including open beaches, lagoons, estuaries, river mouths, lakes, bays, harbours and inlets. Some species do also occur on inland freshwater habitats

and others are largely restricted to pelagic waters. Fish is the major food item but crustaceans and insects are also taken by some and those species that feed in freshwater may also eat reptiles, frogs and small mammals. Most terns are gregarious when feeding and are colonial nesters, with most of the species that breed in Australia simply laying their eggs in shallow depressions, though noddies will nest in trees (Pringle 1987; Higgins & Davies 1996).

Threats: Ground-nesting makes many species susceptible to loss of eggs and chicks through native and feral predators and adverse weather conditions. Colonies can be threatened by human disturbance and birds are affected by degradation of feeding areas, pesticide residues in fish, and oil-fouling, both of birds and beaches. Birds occasionally are tangled in fishing nets (Blakers et al. 1984; Higgins & Davies 1996; Garnett & Crowley 2000). There is likely to be little, if any, breeding by terns on Boigu Island. Threats appear to be minimal.

Herons and egrets

Life history: The family Ardeidae includes herons, egrets and bitterns and all species are characterised by long necks and legs and long sharp bills. Although there is variation, most species forage in shallow water and eat fish, crustaceans, frogs, insects and other small animals (McKilligan 2005). Three species listed as Migratory occur in the Torres Strait; eastern great egret, cattle egret and eastern reef egret.

Eastern great egrets are generally associated with shallow water, both freshwater and saline, but also occur in dry habitats. The species occurs on coastal and inland habitats, including rivers, estuaries, tidal mudflats, swamps, man-made dams and ponds, sewage farms and wet pasture. Eastern great egrets eat mainly fish but also small vertebrates such as frogs and aquatic insects (Pringle 1985; Marchant & Higgins 1990; McKilligan 2005). The cattle egret inhabits grasslands, wetlands and wooded lands, often foraging away from water in grassland, pasture and crops. The species is strongly associated with grazing animals in Australia, but also forages at garbage tips, follows machinery, and feeds independently. Cattle egrets feed on invertebrates, especially grasshoppers, and small vertebrates such as frogs, reptiles and mammals (Pringle 1985; Marchant & Higgins 1990). Eastern reef egret is found on coastlines, foraging on rocky and muddy shores. The species eats mostly fish, but also crustaceans, molluscs, bird chicks and turtle hatchlings (McKilligan 2005).

Eastern great egret is common and widespread in Australia even in some arid areas. The cattle egret occurs in all Australian states and mainland territories. Eastern reef egret occurs along most of the Australian coastline. All three species extend through the Torres Strait into south-east Asia. The cattle egret has a limited distribution in the Torres Strait but has been undergoing a global expansion of range (Pringle 1985; Marchant & Higgins 1990; McKilligan 2005). It may become more widespread and common in the Torres Strait if there are changes to land use which favour the species.

Threats: The eastern great egret is threatened by destruction and modification of freshwater habitats by drainage and groundwater extraction, clearing, livestock, burning, increased salinity and weed invasions (Marchant & Higgins 1990). The most important issue is the allocation of water from

regulated rivers in sufficient quantity and with appropriate timing to maintain suitable wetland conditions (Maddock 2000). The cattle egret is also threatened by loss of breeding habitat through drainage of wetlands and river regulation and water harvesting that prevent or limit flooding of temporary wetlands. Nestlings may be susceptible to predation by Cats (DSEWPC 2011b). Eastern reef egrets can be disturbed by human activity near nest sites and are threatened by reclamation of tidal areas and deepening of channels. However, the species often tolerates human presence and roosts, and sometimes breeds, on artificial structures (Marchant & Higgins 1990).

Neither eastern great nor cattle egret is likely to breed on Boigu Island and threats appear minimal. Eastern reef egret may breed and would be susceptible to disturbance at its nest. The level of threat is likely to be minor.

Swifts

Life history: In Australia the white-throated needletail and fork-tailed swift are almost completely aerial species, possibly even sleeping on the wing. These species are sometimes found roosting in trees and may on rare occasions rest in trees and on the ground during the day. They are found over a wide variety of habitat, including forest, open areas, modified land and the ocean. Foraging for aerial invertebrates occurs at heights from less than one metre up to more than 1000 metres (Higgins 1999).

Both species breed in Asia and arrive in Australia in September/October and leave by April. Some birds may over-winter. White-throated needletail is widespread in eastern and south-eastern Australia and fork-tailed swift is widespread throughout Australia (Higgins 1999). The total population of white-throated needletail is unknown but it is described as abundant in some regions of Australia (Chantler 1999). A comparison of Birds Australia atlas data between 1977–81 and 1998–2002 indicates that the species has undergone a decline in both its area of occupancy and extent of occurrence in Australia (Blakers *et al.* 1984; Barrett *et al.* 2003). Worldwide the fork-tailed swift is thought to have a stable population with no evidence for any declines or substantial threats (BirdLife International 2011).

Threats: Both species are occasionally killed by collision with man-made structures, and Fork-tailed Swifts are occasionally killed by Cats (Higgins 1999), but there is no apparent major threat to either species overall, either in Australia or elsewhere (DSEWPC 2011a, f). A potential threat is a reduction in prey due to loss of habitat (Low 1995; DSEWPC 2011a). Neither species would be subject to any significant level of threat on Boigu Island.

Raptors

Life history: The family Accipitridae includes a very large number of species with an enormous variety of body sizes, prey species and habitat use. The two Migratory raptors, eastern osprey and white-bellied sea-eagle, are, however, very similar in much of their life history. Both species occur along the entire Australian coastline and extend far inland, typically along major rivers or on large lakes and reservoirs. Eastern osprey feeds on fish but the white-bellied sea-eagle also eats

mammals, birds, reptiles and carrion. Both species will nest on cliffs and in large trees but eastern osprey also nest on artificial structures such as power poles and towers (Debus 1998; NSW NPWS 2002). Established breeding pairs are mostly sedentary although there is evidence that territorial adults move long distances. Inland territorial birds are probably more dispersive than those on the coast and may move as waters disappear (Debus 1998).

Threats: The eastern osprey population in Australia has decreased since European settlement but has been recovering in recent years (Olsen 1998). They are threatened by loss of existing and suitable replacement breeding trees, disturbance at the nest site, reduction in quality and quantity of fish stocks, collision with or electrocution by power lines, and the use of pesticides (NSW NPWS 2002). The white-bellied sea-eagle is threatened by clearing of forests and the consequent loss of optimal breeding sites (Marchant & Higgins 1993) and disturbance at nest sites (Debus 1998). Neither species is likely to be threatened by current land use practices on Boigu Island.

Glossy Ibis (*Plegadis falcinellus*)

The glossy ibis is usually seen as single individuals or small groups. It feeds on aquatic invertebrates and occurs in terrestrial wetlands, preferring inland freshwater wetlands with abundant aquatic flora (Pringle 1985; Marchant & Higgins 1990). The species is widespread, occurring in Europe, Africa, Asia and North America. It occurs in much of Australia but is more widespread in the wetter northern and eastern areas. Glossy ibis breeds in dense colonies, often with other species of ibis and waterbirds (Marchant & Higgins 1990).

Threats: The species is generally uncommon and erratic in occurrence (Pringle 1985) and is threatened by destruction or modification of wetlands, invasion of wetlands by weeds and predation of breeding birds (Marchant & Higgins 1990). Clarke (2004b) reported two flocks, one of 15 birds, flying between Boigu Island and Papua New Guinea. The species is likely to use Boigu Island when areas are inundated with freshwater following heavy rain. Draffan *et al.* (1983) describe the species as an uncommon nomadic visitor but birds may occur regularly given the proximity of the mainland. Threats appear to be minimal.

Oriental Cuckoo (*Cuculus optatus*)

Listed under the EPBC Act (CAMBA, JAMBA, ROKAMBA) as *Cuculus saturatus*. Australian birds elevated to full species level as *A. optatus* (Christidis & Boles 2008).

The oriental cuckoo breeds in northern Asia with birds spending the non-breeding season in south-east Asia, New Guinea, the Solomons and Australia. The species mostly occurs on the northern and eastern coasts of Australia, between September and April. Most birds do not arrive in Australia until December. Oriental cuckoos occur in rainforest, vine thicket and open forest and woodland. The species is sometimes found in mangroves and is often recorded in gardens and plantations. It feeds on invertebrates, particularly caterpillars (Blakers *et al.* 1984; Higgins 1999).

Threats: The species is sometimes killed by cats and by collisions with windows and lighthouses (Higgins 1999). Clarke (2004b) recorded oriental cuckoo over the township and around the refuse dump. Draffan *et al.* (1983) state that it occurs in wooded areas, including mangroves. Oriental cuckoo is likely to be a regular visitor to Boigu Island, occurring in almost any habitat other than grasslands. Threats would be minimal.

Rainbow Bee-eater (*Merops ornatus*)

The rainbow bee-eater occurs in almost any habitat. The species eats insects, preferring bees and wasps, which are mostly caught in the air, and will also take food from the ground or vegetation and occasionally water. It is widespread in Australia, New Guinea, Indonesia and Micronesia. In northern Australia populations are present in coastal or sub-coastal areas where they breed in the riparian areas and move into more open habitat after the breeding season. Breeding may take place individually or in colonies, nesting in burrows in soft sand or soil (Higgins 1999; Boland 2004a).

Threats: The species appears little threatened, although cane toads have been found to prey on the eggs and nestlings (Boland 2004b). Draffan *et al.* (1983) describe rainbow bee-eater as an abundant passage migrant in Torres Strait and the species could occur in, or over, all habitats on Boigu Island. Cane toads are not reported for the island and threats to rainbow bee-eater would be minimal.

Passerines

Ten species of Migratory passerine are known from the Torres Strait. These species may be split into two broad groups, species that occur mostly in wooded habitats and those that occur mostly in open habitats. Members of these pairings may not be particularly closely related.

Wooded habitat species

Life history: Six of the Migratory passerine species that occur in Torres Strait occur mostly in wooded habitats. All of these birds, (Melville) cicadabird (subspecies *melvillensis*), rufous fantail, satin flycatcher, black-faced, black-winged and spectacled monarchs, occur in rainforest, melaleuca woodlands, mangroves and occasionally open forests, except for satin flycatcher, which typically avoids closed forest. All the species are insectivorous, though the cicadabird may also eat some fruit and seeds. All breed in Australia and, except for black-winged monarch; all are at least partly resident in Australia. Some individuals of black-winged monarch may also be present year-round (Higgins *et al.* 2006a).

Threats: Threats include the loss and fragmentation of habitat, especially along the migratory routes, and predation of eggs and young by the Black Rat (*Rattus rattus*) (Higgins *et al.* 2006a). All six species do or could occur on Boigu Island and would use any wooded areas, including mangroves. Breeding by any species would be limited, if any breeding occurs, and black rat has not been reported. Threats would appear to be limited to habitat loss.

Open habitat species

Life history: Four of the Migratory passerine species that occur in Torres Strait occur mostly in open habitats.

Reed-Warblers in Australia were previously thought to be a subspecies of the migratory clamorous reed-warbler (*Acrocephalus stentoreus*). They are now considered a full species, Australian reed-warbler (*A. australis*), and all movements are thought to occur within Australia. Australian reed-warblers typically occur in reeds and other dense vegetation in and adjacent to a variety of wetland types. They feed on insects and spiders. The species is not known to breed in the Torres Strait (Higgins *et al.* 2006b).

Barn and red-rumped swallows are both widespread species, particularly in the northern hemisphere, and neither breeds in Australia. Barn swallow is an annual visitor to northern Australia in small numbers but red-rumped swallow may not be present every year. Both species feed in open areas, particularly over wetlands, cane fields and sporting fields and often perch on overhead wires.

Yellow wagtail is listed under the EPBC Act as *Motacilla flava s. lat.* The birds that occur in Australia are now treated as full species, eastern yellow wagtail (*M. tschutschensis*) and green-headed yellow wagtail (*M. taivana*) (Christidis & Boles 2008). They were previously regarded as subspecies of *M. flava*, which is no longer considered to occur in Australia. The occurrence of yellow wagtails in the Torres Strait appears unconfirmed but yellow wagtails have been reported for Boigu, Thursday and Horn Islands (Baxter 2010) and are likely to occur as irregular visitors on many of the Torres Strait islands.

Yellow wagtails occur in open areas with low vegetation, especially in cultivation and on lawns, sporting fields and air fields. They are often recorded near water. Yellow wagtails are probably regular wet season non-breeding visitors to north Queensland. Diet consists mainly of invertebrates, taken mostly from the ground and occasionally from the air (Higgins *et al.* 2006b).

Threats: The major threat to Australian reed-warbler is loss of habitat due to coastal development in natural habitat areas (Higgins *et al.* 2006b). Barn and red-rumped swallows appear to be increasing in numbers in Australia, though this may be due to an increase in observers. Neither species appears subject to any particular threat in Australia. Threats to yellow wagtail in Australia are unknown.

Australian reed-warbler is not known from Boigu Island and is not expected to occur. Draffan *et al.* (1983) report the species only from south-western islands in Torres Strait. Barn and red-rumped swallows are known from Boigu Island but their status there, as for yellow wagtail, is unknown. Increased clearing of wooded areas would actually benefit these species and threats appear minimal.

Appendix I. Fish Species Found on estuarine wetlands of Boigu Island (source Burrows 2010)

Common Name	Species Name
Fishes	
Rainbowfish	<i>Melanotaenia sp.</i>
Yellowtail trumpeter	<i>Amniataba caudavittata</i>
Blue eyes	<i>Pseudomugil sp.</i>
Sea mullet	<i>Mugil cephalus</i>
Barramundi	<i>Lates calcarifer</i>
Garfish	<i>Zenarchopterus sp.</i>
Banded scat	<i>Selenotoca multifasciata</i>
Silver biddy	<i>Gerres filamentosus</i>
Pikey bream	<i>Acanthopagrus berda</i>
Dwarf goby	<i>Glossogobius sp. 3</i>
Saltpan sole	<i>Brachirus ?salinarum</i>
Tarpon	<i>Megalops cyprinoides</i>
Eel	<i>Anguilla sp.</i>
Glass fish	<i>Ambassis sp.</i>
Exotic Fish	
Climbing perch	<i>Anabas testudineus</i>
Crustacea	
Swamp crab	Undetermined
Prawns	Undetermined

