



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

January 2013

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



Australian Government



TSRA
www.tsra.gov.au

3D Environmental
vegetation analysis and mapping specialists

Cover image: 3D Environmental (2013)

EXECUTIVE SUMMARY

Iama Island, which occupies a total area of 186 ha, is formed on a pile of granitic basement rocks that outcrop to a height of 68m. The rocky interior of the island is fringed by a number of younger landform features including beach ridges and broad flats formed from estuarine mud. A total of 14 vegetation communities, within 6 intact broad vegetation groups and 11 regional ecosystems are recognised across the island, representing approximately 14% of regional ecosystems recorded across the broader Torres Strait Island landscape. The most widespread vegetation type on the island other than mangrove is an open forest formation dominated by earlobe wattle (*Acacia auriculiformis*) (*Thulup* in local dialect). This is a unique habitat type found only on Iama.

There are currently 259 flora species recorded on the island which comprises 202 (79%) native taxa, with 57 (21%) introduced species. This represents approximately 20% of the known flora for the Torres Strait Island group. One species of palm *Arenga australasica*, is listed as Vulnerable under Federal and State legislation with three species *Dolichandrone spathacea* (a shrub on mangrove margins), *Operculina brownii* (a vine of vine thickets) and *Neololeba atra* (a bamboo on vine thicket margins), listed as Near-Threatened under the Queensland *Nature Conservation Act* 1992. A further 12 species are considered to have significance at a local and regional level. Based on preliminary information, some 45 plant species are known to be culturally significant to Iamalgal.

As for the majority of Torres Strait Islands there is a considerable lack of systematic survey of fauna habitats on the island. A desktop review of previous reports and databases identified 71 animal species that have been reported on Iama Island including 1 frog, 15 reptile, 53 bird and two mammal species. Of these, 1 reptile, 1 bird and both mammal species are introduced. An additional 2 species have been identified as possibly occurring. This can be compared with the 384 terrestrial fauna species that have been reported for the broader Torres Strait Island group. A total of four species of conservation significance (threatened species) at either state or federal level have been recorded on the island, with an additional 5 species predicted to occur. There are also an additional 19 migratory species considered to have significance at federal level that are known to utilise the island's landscape.

Within the 6 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 include:

- Monitoring for the introduction of continued spread of a number of exotic species, both fauna and flora, throughout the 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 that are important as a traditional resource.
- Further survey and documentation of the complex and diverse cultural landscape on the island.

It is important for any future surveys on lama to be undertaken as collaborative research with the lamalgal and to include study of traditional ecological knowledge and ethnotaxonomy. Furthermore all mapping and assessment work must comply with lamalgal protocols and must be approved by the PBC and involve and be guided by the Land and Sea Rangers.

ACKNOWLEDGEMENTS

The project has been funded 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 lamalgal Elders and thank the lama PBC and lamalgal for access to the land. Much appreciation is also given to the rangers David Ned David, Richard Kepa and David Baragud and the TSRA Ranger Supervisor James Mills for assistance in the field.

Input in regard to the islands cultural background and assistance in the field was provided by Dr Garrick Hitchcock. Fauna information was provided by Terry Reis with peer review carried out by Dr Garrick Hitchcock. Mr Peter Stanton 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. Barbara Waterhouse of the Department of Agriculture, Forestry and Fisheries (DAFF) 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.

Table of Contents

1.0	<i>Introduction</i>	1
1.1	Cultural Setting.....	1
1.2	Geographic Setting	1
1.3	Geological Context.....	1
2.0	<i>Methods</i>	2
3.0	<i>Aims and Objectives</i>	3
4.0	<i>Legislative and Policy Considerations</i>	3
5.0	<i>Vegetation and Flora</i>	6
5.1	Vegetation Groups and Mapping	6
5.2	Flora Species	9
5.2.1	<i>Flora Species with Biodiversity Significance</i>	10
5.2.2	<i>Introduced Plants</i>	15
5.2.3	<i>Plants with Cultural Significance</i>	17
6.0	<i>Fauna (Animals)</i>	18
6.1	Culturally Important Fauna Species	19
6.2	Fauna Habitat Values.....	20
6.3	Fauna Species with Conservation Significance	20
6.3.1	<i>Critically Endangered, Endangered, Vulnerable and Near Threatened Species</i>	20
6.3.2	<i>Profiles of Species listed as Endangered or Vulnerable under the EPBC Act and/or NC Act known from Iama Island</i>	22
6.3.3	<i>Migratory Fauna Species</i>	25
6.3.4	<i>Additional Possible Migratory species</i>	26
6.3.5	<i>Fauna Species of Regional Significance</i>	26
6.4	Pest Fauna Species	27
6.5	Threats to Fauna Animals and Habitat	28
6.6	Future Priorities	28
7.0	<i>The Role of Fire in Savanna Landscapes</i>	29
8.0	<i>Profiles for Iama Island Habitats</i>	31
8.1	Deciduous / Semi Deciduous Vine Forest and Thicket.....	31
8.1.1	<i>Status of Ecological Knowledge</i>	31
8.1.2	<i>Ecological / Cultural Considerations</i>	32
8.1.3	<i>Management Implications</i>	33
8.1.4	<i>Summary of Recommended Management Actions</i>	33
8.2	Acacia Dominant Open Forests and Woodlands	35
8.2.1	<i>Status of Ecological Knowledge</i>	35
8.2.2	<i>Ecological / Cultural Considerations</i>	36

8.2.3	<i>Management Implications</i>	37
8.2.4	<i>Summary of Recommended Management Actions</i>	38
8.3	Shrublands and Shrubland Complexes	39
8.3.1	<i>Status of Ecological Knowledge</i>	39
8.3.2	<i>Ecological / Cultural considerations</i>	40
8.3.3	<i>Management Implications</i>	41
8.3.4	<i>Summary of Recommended Management Actions</i>	41
8.4	Coastal Dune Complexes	42
8.4.1	<i>Status of Ecological Knowledge</i>	42
8.4.2	<i>Ecological/ Cultural Considerations</i>	43
8.4.3	<i>Management Implications</i>	44
8.4.4	<i>Summary of Recommended Management Actions</i>	44
8.5	Grassland and Grassland Complexes	45
8.5.1	<i>Status of Ecological Knowledge</i>	45
8.5.2	<i>Ecological/ Cultural Considerations</i>	46
8.5.3	<i>Management Implications</i>	47
8.5.4	<i>Summary of Recommended Management Actions</i>	47
8.6	Mangrove Forest, Woodland and shrubland Complexes.....	48
8.6.1	<i>Status of Ecological Knowledge</i>	48
8.6.2	<i>Ecological / Cultural Considerations</i>	49
8.6.3	<i>Management Implications</i>	50
8.6.4	<i>Summary of Recommended Management Actions</i>	50
8.7	Cleared / Degraded Areas	51
9.0	<i>References and Bibliography</i>	52
10.0	<i>Glossary</i>	61
Appendices		63
Appendix A. Expert Panel Attendees		63
Appendix B. Queensland Government Vegetation Structural Classification.....		64
Appendix C. Introduced Plants of Iama.....		65
Appendix D. Preliminary List Of Useful Plants Of Iama, Torres Strait, Qld.....		68
Appendix E. Preliminary Flora Species List – Iama Island, Torres Strait, Queensland.		70
Appendix F. Fauna of Iama, Torres Strait, Qld.....		81
Appendix G. Profiles of Terrestrial Fauna Species Potentially occurring on Iama Island and Surrounding Islets		93
Appendix H. Profiles of Migratory Fauna Species Potentially occurring on Iama Island and Surrounding Islets		96

List of Tables

Table 1. Broad vegetation groups and relative contributions to island vegetation.....	7
Table 2. Descriptions of component vegetation communities and association with regional ecosystems currently recognised on lama Island (from Stanton <i>et. al.</i> 2009).	8
Table 3. Summary of the vascular flora of lama Island in relation to Torres Strait Islands (Stanton <i>et al.</i> 2009), Cape York Peninsula (Neldner and Clarkson 1995 in Neldner 1998) and Great Barrier Reef Continental Islands (Batianoff & Dilleward 1997) and Queensland Flora (Bostock and Holland 2010).	9
Table 4. Summary of the vascular flora of lama Island in relation to Broad Vegetation Groups	10
Table 5. Summary of flora with conservation significance on lama Island.	10
Table 6. Summary of regionally significant flora species, lama Island.	13
Table 7. Weed threats	16
Table 8. Endangered, Vulnerable and Near Threatened fauna species reported or predicted to occur on lama Island.	21
Table 9. Migratory ¹ species reported or predicted ² to occur on lama Island.	25
Table 10. Summary of Management Actions for Deciduous and Semi-deciduous Vine Forest and Thickets.	34
Table 11. Summary of management actions for deciduous and semi-deciduous vine forest and Thickets.	38
Table 12. Summary management recommendations for shrubland and shrubland complexes.....	41
Table 13. Summary management recommendations for coastal beach complexes.	44
Table 14. Summary of management actions for grasslands and grassland complexes.....	47
Table 15. Summary of management actions for mangrove (<i>thag</i>) habitats.	50

List of Figures

Figure 1. Location of lama Island.....	2
Figure 2. Diagrammatic illustration of the hierarchy and relationship between components of the vegetation classification system used in the Torres Strait Island vegetation mapping study (Stanton <i>et al.</i> 2009).	7
Figure 3. Distribution of deciduous vine forest and thicket (place names after Lawrie, 1970).	32
Figure 4. Distribution of Acacia dominant forest (place names after Lawrie, 1970).	36
Figure 5. Distribution of shrubland habitats (place names after Lawrie, 1970).	40
Figure 6. Distribution of coastal dune complexes (place names after Lawrie, 1970).	43
Figure 7. Distribution of grassland habitats (place names after Lawrie, 1970).....	46
Figure 8. Distribution of mangrove forests, woodlands and shrublands.	49

1.0 Introduction

lama Island (also known as Yam island) represents one of 7 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 lama Island (lamalgal) 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 management profile will be directly incorporated into the developing 'lama Island Working on Country Plan' for specific action.

1.1 Cultural Setting

The population of lama at the 2006 census consists of 288 Indigenous and 21 non-Indigenous people. Land tenure is DOGIT (Deed of Grant in Trust) with Native Title determined on 13/12/2004. The Registered Native Title Body Corporate¹ (RNTBC or PBC in shortened form) is the Magani Lagaugal (Torres Strait Islanders) Corporation who hold the title of the land on behalf of the traditional owners. The lamalgal, the people of lama, speak Kululgau Ya (dialect of Western-Central Torres Strait Language).

1.2 Geographic Setting

lama Island (shown in **Figure 1**), along with the larger island of Gebber, sand cay islands which include Masig (Yorke), Tudu and Warraber(Sue), and mangrove islands including Sassie and Zagai are part of the Central Island Group. lama, with an area of 186 ha, is formed by granite basement rising to 68m above sea level. The mean annual rainfall of 1 513mm (BOM 2008a) compares to 1 983mm on Badu Island, the wettest recording station in the Torres Strait (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 exists on the western side of the island as well as various seasonal creeks and groundwater seepage zones.

1.3 Geological Context

lama is formed on a small granite knoll with a range of Holocene aged landforms fringing its coastal margin. The coarse grained granite that forms the dominant landform feature on the island represents the most easterly extension of the Badu Granite batholith. Soil development on the island is typically skeletal, with large granite boulders (the product of onion weathering) forming an unsorted pile on the islands lower slopes and littoral margins. Small areas of acid volcanic rock form the headland in the

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.

islands east, with characteristic rocky pavements. Holocene features include ridges of coralline sand, and fine-grained estuarine deposits associated with the broad embayment on the islands north coast.

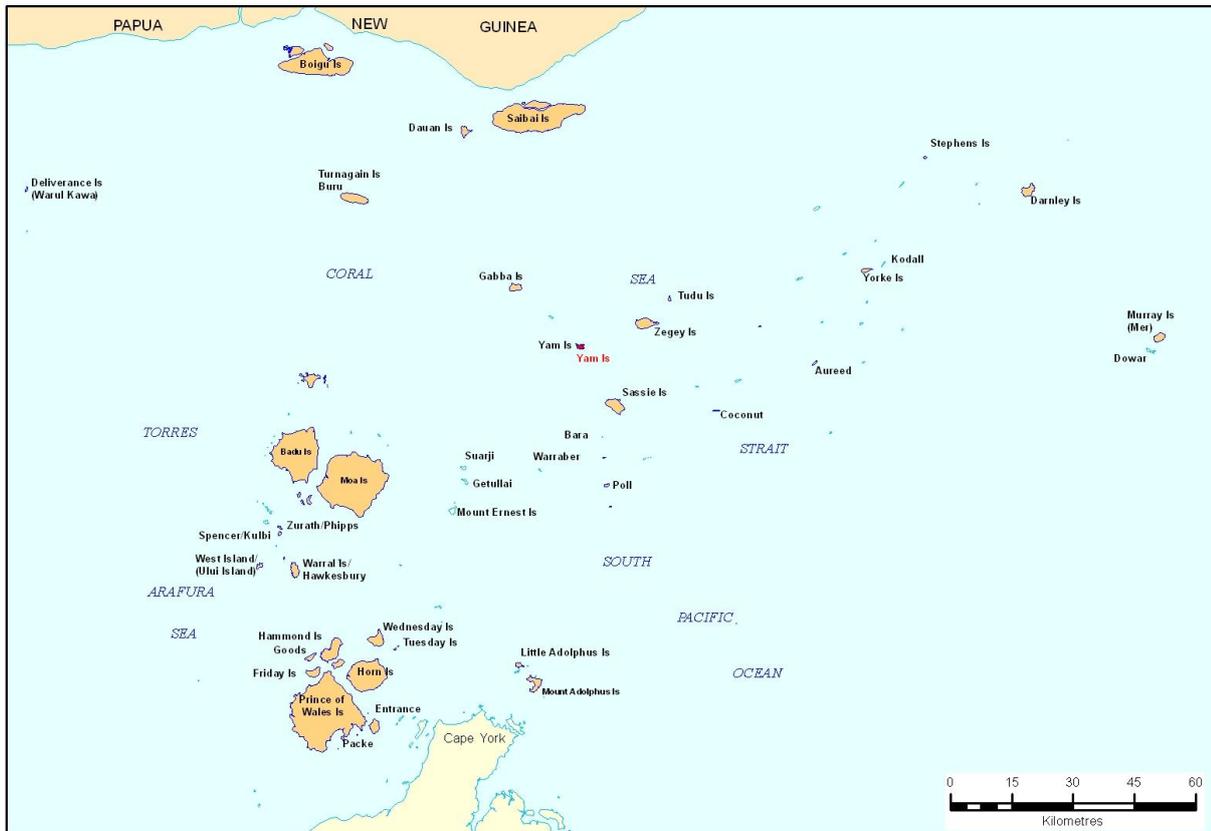


Figure 1. Location of Iama Island

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 traditional land owners on Iama. In summary, the process undertaken to complete this biodiversity assessment includes:

1. Compilation of desktop resources which includes but is not limited to Stanton, Fell and Gooding (2009), Queensland Herbarium's HerbreCs Database, Queensland Museum fauna record extracts, Birds Australia database extract, WildNet database extracts, Conics Land Use Management Plan for Iama Island (Conics 2008) and numerous additional technical papers relating to both flora and fauna (see references section).
2. Presentation of this information at a workshop in Cairns, at which 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 the Land and Sea Rangers and the broader island community was held on Iama Island between 22-25th November, 2010.

3.0 Aims and Objectives

The overall aim of this document is to compile and annotate existing information relating to island scale ecological process, introduce cultural interactions with these processes, and establish a framework of actions which can be drawn on by island rangers and managers to effectively manage the islands specific ecological and cultural values.

Owing to the long term occupancy of the islands (> 4 000yrs), 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 island rangers and Traditional Owners.

4.0 Legislative and Policy Considerations

Biodiversity is regulated at state and national levels by a range of legislative mechanisms which classify fauna species, flora species and habitats according to their rarity (at a range of scales), population size, distribution and threats. The legislative classification is generally used as a surrogate for assigning significance to a particular species or ecological value. Relevant components of the major legislative mechanisms that require consideration are described 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 seven classes that are:

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

These classes collectively relate to native species and 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 lama (e.g. vine thicket ecosystems classified under RE3.12.35) 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 lama provides accurate information on the legislative significance of vegetation on the island offering an information planning resource for the lama community, the TSIRC and the TSRA. For example, if a radio tower was proposed for a mountain top which supported a regional ecosystem (vegetation type) that was 'Endangered' or 'Of Concern', then clearing of this vegetation without authorisation is in breach of the VMA. Liaison with regulators (EHP) should 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* (LP Act) 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 exotic species 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 threat are declared within 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 ecologically sensitive area.

For example, if a Class 2 weed such as Gamba grass (*Andropogon gayanus*) was found on lama, there is a requirement under the act for landowners to take reasonable steps to control and manage the weed. In addition, the draft TSRA LMSU Pest Management Plan for lama forms a policy document to guide field and administrative staff and communities toward cooperative involvement of an integrated and coordinated approach to pest management across the Island. The commonwealth also provides an inaugural list of 'Weeds of National Significance (WONS)' based their perceived threat to a range of environmental, social and cultural values at a national level.

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 five priority levels for action to remediate declining Queensland wildlife being 'Critical Priority (CR)', 'High Priority (H)', 'Medium Priority (M)' and 'Low Priority (L)'. The information within this document will be valuable in future reassessments of BoT in the Torres Strait.

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 (Australian Government) who are likely to provide conditions under which the interference can take place. Interference (such as removal of the protected plant species *Arenga australasica*) without authorisation is in breach of the EPBC Act.

5.0 *Vegetation and Flora*

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. lama), island groups (Central Island Group) 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 which considers 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 their classification. REs must be considered due to their legislative implications although in this document, BVGs have been used as a principle unit to define habitat management groupings.

Vegetation Classification on lama Island: For management purposes, the island’s vegetation is classified into 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**, with descriptions of component vegetation communities and associated regional ecosystems provided in **Table 2**. Further characterisation of habitat types is provided in the following text.

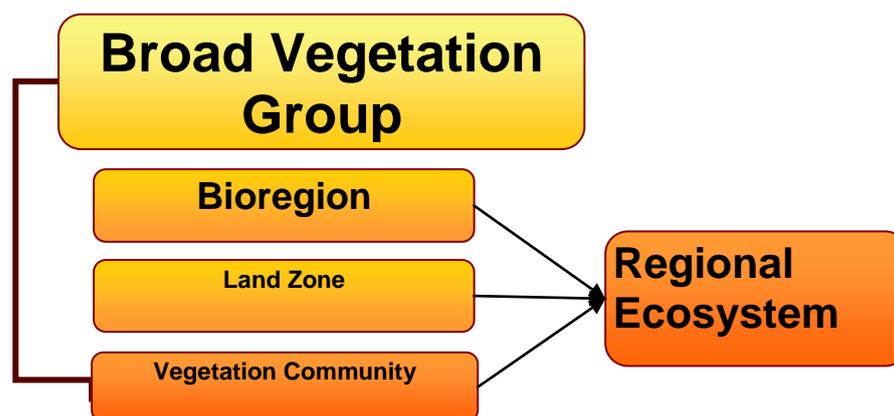


Figure 2. Diagrammatic illustration of the hierarchy and relationship between components of the vegetation classification system used in the Torres Strait Island vegetation mapping study (Stanton *et al.* 2009).

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	2h, 2n, 2u	20	10.6
Acacia dominant open forests and woodlands	6a	54	29.2
Shrublands and shrubland complexes	14g, 14ab**	0.5	0.4
Coastal Dune Complexes	16h, 16k	0.4	0.2
Grasslands and grassland complexes	17c, 17d	0.7	0.4
Mangrove forest, woodland and shrubland complexes	24a, 24b	65	34.6
Regrowth	RE	3	1.6
Exotics	Ex, Bamboo	11.6	6.3
Cleared Areas	CI	30	16.4
Total		186	100

** not recorded in regional assessment undertaken by Stanton *et al.* (2009)

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

Vegetation Community	Description	Geological Association	Regional Ecosystem	VMS ¹	BDS ²
2h	Deciduous notophyll vine forest + <i>Erythrina insularis</i> +/- <i>Antiaris toxicaria</i> var. <i>macrophylla</i> +/- <i>Terminalia subacroptera</i> +/- <i>Bombax ceiba</i> var. <i>leiocarpum</i> +/- <i>Canarium australianum</i> + <i>Acacia auriculiformis</i> .	Granite and rhyolite	3.12.35a	OC	OC
2n	Semi deciduous notophyll vine thicket + <i>Canarium australianum</i> + <i>Antiaris toxicaria</i> var. <i>macrophylla</i> + <i>Acacia auriculiformis</i> + <i>Terminalia subacroptera</i> + <i>Manilkara kauki</i> + <i>Bombax ceiba</i> var. <i>leiocarpum</i> .	Granite and rhyolite	3.12.21a	LC	NCAP
2u	Semi-deciduous vine forest + <i>Manilkara kauki</i> + <i>Terminalia</i> spp. + <i>Sterculia quadrifida</i> + <i>Premna serratifolia</i> + <i>Acacia crassicarpa</i> + <i>Drypetes deplanchei</i> + <i>Millettia pinnata</i> .	Beach ridge	3.2.2b	LC	OC
6a	Low to medium <i>Acacia auriculiformis</i> +/- <i>Terminalia subacroptera</i> +/- <i>Antiaris toxicaria</i> var. <i>macrophylla</i> +/- <i>Bombax ceiba</i> var. <i>leiocarpum</i> open forest / woodland & occasional shrubland.	Granite and rhyolite	3.12.35f	OC	OC
14ab**	<i>Asteromyrtus symphyocarpa</i> low grassy woodland and shrubland	Granite hillslopes	3.12.16	LC	NCAP
14g	<i>Low Alyxia spicata</i> + <i>Manilkara kauki</i> +/- <i>Buchanania arborescens</i> +/- <i>Canarium australianum</i> +/- <i>Diospyros</i> spp. +/- <i>Pandanus</i> sp. low closed shrubland/ rock pavement complex.	Exposed headlands on rhyolite	3.12.31x1a	OC	OC
16h	Low groved notophyll vine thicket/ grassland and herbland complex (2z/17j - 80/20).	Coastal foredunes	3.2.2a/3.2.24	OC	OC
16k	Coastal foredune grassland, herbland, woodland and vine thicket complex (17j/17d/10b/2aa - 50/20/20/10).	Coastal foredunes	3.2.24/3.2.6a/3.2.2a	OC	OC
17c	Open to closed tussock grassland with emergent shrubs.	Rocky headlands	3.12.29	OC	OC
17d	Medium to tall <i>Mnesithea rottboellioides</i> + <i>Heteropogon triticeus</i> + <i>Cymbopogon</i> spp. +/- <i>Imperata cylindrica</i> +/- <i>Themeda triandra</i> grassland.	Coastal dunes and foredunes	3.2.24	OC	OC

Vegetation Community	Description	Geological Association	Regional Ecosystem	VMS ¹	BDS ²
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)
24b	<i>Pemphis acidula</i> + <i>Osbornia octodonta</i> closed shrubland.	Coralline beach ridge	3.1.1	LC	LC

1. Vegetation Management Status and per the Vegetation Management Act, 1999.

2. Biodiversity Status as designated by EHP.

** not recorded in regional assessment undertaken by Stanton *et al.* (2009)

5.2 Flora Species

The composition of the lama flora has been compiled from analysis of Queensland Herbarium data (Herbrechts 2011), 3D Environmental survey data (Stanton *et al.* 2009), and field surveys carried out with lama Rangers in November 2010. The total known flora of 259 species comprises 202 native species (see **Appendix G**) representing approximately 20% of the known flora for the Torres Strait Islands. The 57 introduced species account for 22% of the island flora (see **Appendix D**). 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 lama 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 & Dilleward 1997) and Queensland Flora (Bostock and Holland 2010).

Islands	Families/Species	Pteridophytes	Gymnosperms	Angiosperms	Total
Iama	Families	2	0	79	81
	Species	2	0	257	259
Boigu	Families	3	0	69	72
	Species	4	0	239	243
Mabuiag	Families	2	1	101	104
	Species	4	1	429	434
Badu	Families	11	2	117	130
	Species	17	2	586	592
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
Great Barrier Reef Continental Islands ³	Families	25	5	165	195
	Species	97	7	2,091	2,195
Qld Flora	Species	392	68	9,246	9,706

The 22% of the islands vascular flora that is naturalised compares to 15% for Torres Strait Islands (Stanton *et al.* 2009), 7.4% for Cape York Peninsula (Neldner & Clarkson 2005), and 13% for Queensland (Bostock & Holland 2010).

Acacia dominant open forests/woodlands (109 species), and vine forests and thickets (99 species) support the highest species richness with many species occurring in both habitats (see **Table 4**). The high integrity of remnant habitats on the island is indicated by low numbers of introduced species.

² Cape York flora utilises Henderson (2002).

³ Batianoff & 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.

Additional systematic surveys across the full range of the islands habitats is likely to considerably increase the known flora species composition.

Table 4. Summary of the vascular flora of lama Island in relation to broad vegetation groups

Broad Vegetation Group/Habitat	Area (ha)	Area Contribution (%)	Total Flora Species Recorded (to end 2010)	% Native	% Naturalised
Deciduous / Semi deciduous vine forest and vine thicket (2h, 2n, 2u)	20	10.6	100	98	2
Acacia dominant open forests and woodlands (6a)	54	29.2	108	95	5
Shrublands and shrubland complexes (14g, 14ab)	0.5	0.4	26	100	0
Coastal Dune Complexes (16h, 16k)	0.4	0.2	3	100	0
Grasslands and grassland complexes (17c, 17d)	0.7	0.4	10	99	1
Mangrove forest, woodland and shrubland complexes (24a)	65	34.6	29	100	0
Regrowth/Cleared Areas	33	18	109	49	51
Bamboo	11.6	6.3	6	99	1

5.2.1 Flora Species with Conservation Significance

An assessment of significant flora species draws from the data sources identified above and seeks to identify those habitats that should be considered a priority for future for management actions. 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, additional and complementary species management criteria have been assessed. Species have been broadly categorised into significance categories (i.e. National, State, Regional and Cultural) based on criteria, which include legislative status, status as threatened or sensitive species, restricted, otherwise noteworthy, or species of cultural value. Culturally significant species have been assessed separately. The 17 species identified as having significance at national, state, and regional level are summarised in **Table 5**.

Table 5. Summary of flora with conservation significance on lama Island.

Species	National EPBC	State NC Act	Regionally Significant	Broad Vegetation Group
<i>Arenga australasica</i> (Areaceae)	V	V	-	Mangrove margins with vine thicket.
<i>Dolichandrone spathacea</i> (Bignoniaceae)	-	NT	-	Mangroves.
<i>Neololeba atra</i> (Poaceae)	-	NT	-	Acacia dominant open forests & woodlands.
<i>Operculina brownii</i> (Convolvulaceae)	-	NT	-	Acacia dominant open forests & woodlands.

Species	National EPBC	State NC Act	Regionally Significant	Broad Vegetation Group
<i>Actephila venusta</i> (Phyllanthaceae)	-	-	Disjunct	Deciduous vine thickets; & Acacia dominant open forests & woodlands.
<i>Aristolochia chalmersii</i> (Aristolochiaceae)	-	-	Disjunct	Acacia dominant open forests & woodlands.
<i>Asteromyrtus symphyocarpa</i> (Myrtaceae)	-	-	Disjunct	Shrublands & shrubland complexes.
<i>Cupaniopsis flagelliformis</i> subsp. <i>flagelliformis</i> (Sapindaceae)	-	-	Disjunct	Deciduous vine thickets.
<i>Intsia bijuga</i> (Fabaceae)	-	-	Disjunct	Deciduous vine thickets.
<i>Luvunga monophylla</i> (Rutaceae)	-	-	Disjunct. New record for Qld.	Acacia dominant open forests & woodlands; & deciduous vine thickets.
<i>Lycianthes shanesii</i> (Solanaceae)	-	-	Disjunct	Deciduous vine thickets.
<i>Mallotus ficifolius</i> (Euphorbiaceae)	-	-	Disjunct	Deciduous vine thickets.
<i>Milium traceyi</i> (Annonaceae)	-	-	Disjunct	Acacia dominant open forests & woodlands; & deciduous vine thickets.
<i>Coffea brassii</i> (Rubiaceae)	-	-	Disjunct	Acacia dominant open forests & woodlands.
<i>Rhodamnia australis</i> (Myrtaceae)	-	-	Disjunct	Acacia dominant open forests & woodlands
<i>Syzygium</i> sp. (DGF10208+) (Myrtaceae)	-	-	Disjunct	Acacia dominant open forests & woodlands.
<i>Triflorensia australis</i> (Rubiaceae)	-	-	Disjunct	Acacia dominant open forests & woodlands; & deciduous vine thickets.

V=Vulnerable; NT = Near-Threatened

National Significance (EPBC Act)

Arenga palm (*Arenga australasica*) – Vulnerable: Arenga is a multi-stemmed palm up to 20 m tall with a sometimes-clumping habit comprising numerous basal suckers. The pinnate leaflets are glossy dark green on the upper surface and pale greyish below. It occurs in a series of highly disjunct populations in north-eastern Queensland and the Northern Territory in rainforest and coastal thickets protected from fire. In Queensland it is known from the Torres Strait to south of Innisfail with scattered populations on Cape York Peninsula and within the Wet Tropics Bioregion. In the Torres Strait it is known from Dauan and Mua Islands. The palm is very rare on Iama with one juvenile palm recorded to date. The Iama record represents a disjunct population and a northern limit of the species distribution.

State Significance (NC Act)

Arenga palm (*Arenga australasica*) - Vulnerable: see description above.

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, the Solomon Islands, Vanuatu and Australia. In north-eastern Cape York Peninsula (Olive River and Temple Bay) it may be threatened by Pond apple invasion. 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). It has also been recorded from Boigu Island in the Torres Strait. It is expected to occur also 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 lama Island

***Operculina brownii* - Near-Threatened:** A scrambling or twining annual or perennial climber with white tubular flowers. On lama it has been recorded from vine thickets and vine thicket margins. Additional surveys to determine the extent of the population are required.

Cape bamboo (*Neolebra atra*) – Near-Threatened: A native bamboo known from Torres Strait, Cape York and North Eastern Qld in the understorey of rainforest habitats. Also occurs in New Guinea, the Moluccas, northern Sulawesi and the Philippines (see **Photograph 2**).



Photograph 2. The native bamboo *Neolebra atra*

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. Thirteen species are recognised as being of regional significance on lama Island as identified in **Table 6**.

Table 6. Summary of regionally significant flora species, lama Island.

Species	Comments	Photograph ⁴
<i>Actephila venusta</i> (Phyllanthaceae)	A low understory shrub from 1-2m height. <i>Actephila venusta</i> is a northern Australian endemic known from Northern Territory and Cape York Peninsula (CYP). Disjunct occurrences are located on a number of Torres Strait continental islands including Mabuia, Badu, Mua, Prince of Wales, and Dauan which represents the northern limit of species distribution.	
<i>Asteromyrtus symphyocarpa</i> (Myrtaceae)	<p>It is a multi stemmed tall shrub to small tree from 4-6m height with slightly pendulous leaves (Photograph 3). It is common throughout northern Australia and on the Torres Strait islands of Muralug, Horn, Badu and Mua, and in the western province of Papua New Guinea (PNG). A small stand occupying approximately 0.25ha occurs on an elevated plateau in the island interior. The occurrence on lama represents a new record for the island and should be considered regionally significant given that it; 1) occurs as a disjunct population 2) it is locally rare and restricted on the island 3) the population represents the northern limit of Australian distribution and 4) that the species has cultural values and significance to lama people.</p> <p>It is understood from the rangers that the location where the population occurs has been identified for future residential development. No reference of the species or its significance is available within the fauna and habitat assessment of the island (Conics 2008). A reference to thickets of bamboo with small swathes of kangaroo grass (<i>Themeda triandra</i>) as a restricted but unusual feature on the island, is however consistent with the habitat where asteromyrtus occurs.</p>	
<i>Aristolochia chalmersii</i> (Aristolochiaceae)	A slender twiner endemic to the Cape York Peninsula bioregion. 3D survey records from lama and Mabuia in vine thicket are disjunct and represent the northern limits of distribution. It is a host for the larvae of the Cairns birdwing butterfly (<i>Triodes euphorion</i>), the red swallowtail (<i>Atrophaneura polyorus queenslandicus</i>) and the big greasy (<i>Cressida cressida</i>) (Ross and Halford 2007).	
<i>Coffea brassii</i> (Rubiaceae)	Two low shrubs of this restricted rainforest shrub occur downslope from the Asteromyrtus site (Photograph 5). The occurrence on lama is highly disjunct as it was previously known only from a single record on Dauan Island, from northern and central CYP in vine thickets, and in PNG. The taxon was not recorded on previous surveys and its population and distribution across the island is not known. It occurs in advanced regrowth with a sparse vine thicket species understorey and scattered groves of bamboo.	
<i>Cupaniopsis flagelliformis</i> var. <i>flagelliformis</i> (Sapindaceae)	A small tree to 8m recorded as an occasional sapling shrub in deciduous vine thicket and forest. The species is endemic to the Cape York Peninsula and Wet Tropics Bioregions occurring south to the Tully River. The lama occurrence is disjunct and represents part of the northern limit of distribution. Other disjunct Torres Strait occurrences are from Hammond (2r, 4b, 6e), Badu (4a), and Prince of Wales Islands (2q, 4b).	

⁴ ⁴ All photographs D.Fell & D. Stanton unless otherwise noted.

Species	Comments	Photograph ⁴
<p><i>Intsia bijuga</i> (Fabaceae) – Kwila</p>	<p>This tree is rare on lama occurring as isolated individuals on the vine thicket margins adjacent to mangroves. This is typical of its habitat in Torres Strait where it may be also found on the margins of sand and coral beaches, and in coastal vine forests and thickets. Kwila grows to a large well formed tree in PNG however in the Torres Strait is mostly a poorly formed tree or shrub, other than some better developed specimens observed on Mua Island. It is listed by the IUCN as a Vulnerable species with international conservation significance due to heavy exploitation for its timber.</p>	
<p><i>Luvunga monophylla</i> (Rutaceae)</p>	<p>Collections of <i>Luvunga monophylla</i> from lama made in October 2007 (DGFell 8851 + DJ Stanton) represent a new record for Queensland (Fell & Stanton in press). The disjunct occurrence extends its geographical range eastwards from the eastern Arnhem Land coast of the Northern Territory. <i>Luvunga</i> occurs within open forest dominated by <i>Acacia auriculiformis</i> (RE 3.12.35f) and in deciduous vine forest and semi-deciduous vine thicket (RE3.12.35a and RE3.12.21a). An additional location of this multi stemmed low shrub was recorded in the vicinity of the old water tank during field work with island rangers in November 2010 . It is a facultatively deciduous spiny shrub or climber growing 0.5–3 m in height with white, cream, yellow flowers, obovoid fleshy fruit to 10mm diameter, and 1-2 seeds per fruit. In Australia, it occurs in the North Kimberley and Dampierland bioregions of Western Australia and in the Arnhem Coast, Central Arnhem, Tiwi, Gulf Coastal, Gulf Fall and Uplands and Darwin Coastal Bioregions of the Northern Territory. The habitat includes monsoon forest, deciduous vine thicket and semi-deciduous vine thicket on coastal dunes and basalt scree slopes. It is also found in the Philippines, Indonesia (Java) and East Timor. Vegetation mapping surveys recorded <i>Luvunga</i> at eight survey sites. A conservative estimate of population size is between 50 and 100 individuals. The area of the population extent is approximately 50 hectares</p>	
<p><i>Lycianthes shanesii</i> (Solanaceae)</p>	<p>Two low shrubs were observed along the margins of an ephemeral drainage line in vine thicket vegetation. The disjunct occurrence on lama also represents the species at the limits of its geographical range. It is nowhere common in Torres Strait and known only from vine thickets on Pulu Island, vine thickets on granite boulder slopes and on Badu Island in shrublands on coastal headlands. Other populations are likely to be found given further survey effort.</p>	
<p><i>Mallotus ficifolius</i> (Euphorbiaceae)</p>	<p>A shrub growing to 1-4m that is endemic to Queensland. The population on lama in deciduous vine thickets and forests are disjunct and represent the northern limit of its distribution.</p>	
<p><i>Milium traceyi</i> (Annonaceae)</p>	<p>A shrub to growing to 8m. On lama, it occurs in deciduous vine thickets & forests. It is endemic to northern Australia where it is known from seasonal vine thickets and forests in the Northern Territory and CYP. This species is a common component of welchiodendron forests and vine thickets on the majority of the continental islands within the Torres Strait. All occurrences are disjunct and represent the northern limit of species distribution. The habitat is in good condition and self-maintaining.</p>	

Species	Comments	Photograph ⁴
<i>Rhodamnia australis</i> (Myrtaceae)	An understorey shrub to small tree of 3-6m height. A few individuals were observed along the margins of an ephemeral drainage line in vine thicket vegetation. The occurrence on lama is disjunct and represents the northern limit of the species geographical range in the Torres Strait. It also occurs on Mabuag, Badu and Mua Islands.	
<i>Syzygium</i> sp. (Myrtaceae) – to be identified	A tree 15m. A number of trees were observed along the ephemeral drainage line heading up slope from behind the school. The identity of the species is yet to be confirmed and it has not been previously recorded on lama Island.	
<i>Triflorensia australis</i> (Rubiaceae)	An understorey shrub growing to 2-4m found within vine thicket. It is also known from Mabuag, Badu, Mua, Mer, Dauan, and Prince of Wales Islands. The lama occurrence is one of a number of highly disjunct populations which represent the northern limit of the species distribution. This is a northern Australian endemic which also occurs in the Northern Territory.	

5.2.2 Introduced Plants

Information on weed species has been sourced from Stanton *et al.* (2009), Queensland Herbarium specimen data, field data of Fell (2009, 2010), and personal communication with Barbara Waterhouse from DAFF. With reference to **Appendix D**, 57 introduced species are recorded on the island which accounts for 22% of the island flora. The majority are associated with disturbed and developed areas within and surrounding the lama community and fringing disturbed sites such as major roads and tracks, dump, airfield, recreation areas and the island cemetery. Remnant vegetation throughout the island is generally free of weeds however a number of species pose potential threats.

Declared Weeds

There is one declared species under Queensland's LP Act recorded on lama Island.

Environmental Weeds Present

Remnant vegetation throughout the island is generally free of environmental weeds although species such as stinking passionflower (*Passiflora foetida*), mintweed (*Hyptis suaveolens*), red Natal grass (*Melinis repens*) and Townsville stylos (*Stylosanthes spp.*) are established along access tracks and any disturbed sites. Other common leguminous weeds which are prominent in the vicinity of the community area include siratro (*Macroptilium atropurpureum*), beggar weed (*Desmodium tortuosum*), streaked rattlepod (*Crotalaria pallida* var. *obovata*), sensitive weed (*Mimosa pudica* var. *unijuga*), and alyce

clover (*Alysicarpus vaginalis*). Species such as tridax daisy (*Tridax procumbens*), sida (*Sida acuta*), snake weed (*Stachytarpheta jamaicensis*) may occur throughout disturbed areas and, in combination with the aforementioned, may be rapid colonizers of disturbed areas.

Brazilian joyweed (*Alternanthera brasiliana cv. rubiginosa*) is invading vine thickets on rocky slopes on the edge of the community area and is considered a threat to these habitats given its ability to spread by root nodes and survive in low light conditions. An additional threat to deciduous vine thickets and acacia open forests is yellow bells (*Tecoma stans*) which is well established on the intact forest margins.

Grassy weeds are widespread throughout the disturbed areas and some species pose a threat to intact habitats. Introduced grasses which commonly occur in the community area include Indian couch (*Bothriochloa pertusa*), Mossman River grass (*Cenchrus echinatus*), Rhodes grass (*Chloris gayana*), purpletop Rhodes grass (*Chloris virgata*), couch (*Cynodon dactylon*), crowsfoot (*Eleusine indica*), red Natal grass (*Melinis repens*), button grass (*Dactyloctenium aegyptium*), Sabi grass (*Urochloa mosambicensis*), itchgrass (*Rottboellia cochinchinensis*), and giant panic (*Megathyrsus maximus var. maximus*).

Weed Threats

Table 7 details those weeds not recorded on lama which are capable of causing long-term changes to habitat biodiversity.

Table 7. Weed threats

Species	Comments	Photograph⁵
Leucaena (<i>Leucaena leucocephala</i>)	Leucaena is an exotic small tree up to about 6 m tall with fine bipinnate leaflets. The weed is present on Boigu, Saibai, Mua, Erub, Mer, Thursday Island and Horn Island. Dense infestations on Boigu pose a significant threat to cultural and natural values on the island. Ongoing monitoring and control is required for any occurrences of leucaena in the town area of lama.	 Leucaena on Boigu Is (Nov 10)
Lantana (<i>Lantana camara</i>)	Lantana is a class 3 declared weed and listed as weed of national significance (WONS). It is currently widespread on Mer, Erub and Ugar and poses a potential threat to deciduous vine thickets and forests on lama. Ongoing monitoring and prompt control of any infestations is recommended.	 Lantana on Erub (late dry 07)
Gamba grass (<i>Andropogon gayanus</i>)	Gamba grass is a class 2 declared weed that has not yet been recorded in the Torres Strait. It is however considered a serious potential threat. Together with annual mission grass, it is listed as a Key Threatening Processes under the EPBC Act. It is widespread in the Bamaga district of northern CYP (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>	 Gamba grass near Injinoo (April 09).

⁵ All photographs D.Fell & D. Stanton unless otherwise noted.

Species	Comments	Photograph ⁵
	2003).	
Annual mission grass (<i>Cenchrus pedicellatum</i> subsp. <i>unispiculum</i>)	An aggressive robust annual grass capable of inducing habitat change through altering fire behaviour. Known from Mua (St Pauls), Mabuag, Masig, Poruma and Horn Islands. The invasion of annual mission grass is listed as a Key Threatening Processes under the EPBC Act. It threatens biodiversity in northern savannas by competing with native annual grass species and rapidly occupying disturbed areas with the ability to remain green until the late dry season providing fuel for fires which occur later and are hotter than normal seasonal fires (DEWHA 2011).	 (source NT Govt.) http://www.nt.gov.au/nreta/natres/weeds/find/missiongrass.html
Singapore daisy (<i>Sphagneticola trilobata</i>)	Singapore daisy is Class 3 declared vigorous creeping ground cover that has become established on Badu in a number of locations in and around the community. The plant will out-compete native ground cover species and is a significant threat to beach front, riparian and swampy habitats across the island. Control of existing populations is the highest priority management action.	
Praxelis (<i>Praxelis clematidea</i>)	Praxelis is a highly invasive erect, branched, unpleasant-smelling herb thought to have been introduced as a contaminant of building materials or equipment. It is a native of South America, and known to spread rapidly by wind-blown seeds along roadsides. It can spread into native bushland forming dense monospecific stands that exclude other vegetation. Praxelis is known to invade grasslands, woodlands and rock pavements in the Mareeba and Mt Molloy districts and therefore is considered a serious threat to similar habitats on lama.	 Praxelis on Erub (March, 2010).

5.2.3 Plants with Cultural Significance

Information on useful plants of lama Island compiled in this study is preliminary in nature. It has been sourced from local people through discussion with rangers and from a review of the available literature including Haddon (1912a, 1912b) and notes from specimens lodged with the Queensland Herbarium (mostly collected by M. Lawrie). It is intended as a foundation for the ongoing recording of Traditional Ecological Knowledge (TEK) as part of the Land and Sea Ranger working on country plans. More detailed ethnobotanical studies within a formal TEK system are required to compliment the existing list of useful plants and local language names. This includes information on uses, seasonality, habitat, distribution, abundance, phenology, and the relationships to story and culture.

The preliminary list provided in **Appendix E** recognises 46 species with known uses. This represents 17% of the island flora. Of these, 28 have language names which have been documented to date. Five species are naturalised, some of which [e.g. stinking passionflower (*Passiflora foetida*), bamboo (*Bambusa vulgaris*), and mango (*Mangifera indica*)] may occur within remnant vegetation, the latter two often in the vicinity of old settlement and garden sites. Others such as cassava (*Manihot esculenta*), tree cashew (*Anacardium occidentale*), sisal hemp (*Agave vivipara* var. *vivipara*), ringworm shrub (*Senna alata*), and tridax daisy (*Tridax procumbens*) are abundant in community areas and disturbed

margins. Uzu (*Syzygium branderhorstii*) and bell fruit (*Syzygium aqueum*) are favoured fruit trees often planted in gardens. These two tree species have not been recorded in the vine forest habitats on lama indicating that they have been domesticated. Uzu occurs naturally in remnant vine forest on Erub, Mer, Dauan, and Mua.

Of the useful species, 34% are used as a food resource. The fruits of 11 shrubs and trees and an additional three vines (*Ampelocissus acetosa*, *Cassytha filiformis*, *Passiflora foetida*) are eaten. Two species (*Terminalia catappa*, and *Sterculia quadrifida*) have nut like seeds which are either eaten raw or processed before consumption. A further three species produce tubers which are edible although may require processing (*Tacca leontopetaloides*, *Dioscorea transversa*, and *D. esculenta*).

Material uses for products made from timber (e.g. *Acacia auriculiformis*, *Manilkara kauki*, *Tabernaemontana orientalis*, *Rhizophora* spp., *Exocarpos latifolius*), decoration (e.g. seeds of *Abrus precatorius*, *Erythrina insularis* and *E. variegata*, *Entada phaseoloides*), rope or binding (e.g. *Hibiscus tiliaceus*, *Flagellaria indica*) are numerous, with a small proportion being utilised for both food and material uses. The small proportion of plants used for medicinal purposes and cultural uses may be a reflection of the limitations of the information that has been compiled to date.

6.0 Fauna (Animals)

As for the majority of Torres Strait Islands there is a considerable lack of systematic survey of fauna habitats on the island. Avifauna (birds) have been the most comprehensively studied component of Torres Strait's terrestrial fauna. Other records are incidental, or part of broader regional surveys targeted towards particular groups (e.g. Draffan *et al.* 1983, Clarke 2004, Garnet *et al.* 2000, Hall 2008, Helgen 2004). Recent surveys on lama (Natural Solutions 2008b) while limited represent the most comprehensive data available for the island. In addition, there is little available information on the cultural significance of terrestrial fauna species. Some data on this topic can be found in the *Reports of the Cambridge Anthropological Expedition to Torres Straits* (Haddon 1901-1935). Systematic collecting across the range of habitats is however likely to greatly increase the number of known species and further contribute to the identification and development of management strategies. It is therefore recommended that surveys become an identified ranger work activity, supported by relevant specialists.

A desktop review of previous reports and databases identified 71 animal species that have been reported on lama Island including 1 frog, 15 reptile, 53 bird and 2 mammal species (see **Appendix F**). This can be compared with the 384 terrestrial fauna species that have been reported for the broader Torres Strait Island group which includes 14 frog, 67 reptile, 263 bird and 40 mammal species.

Of the lama fauna, 1 reptile, 1 bird and both mammal species are introduced. An additional 2 species have been identified as possibly occurring. A total of 4 species of conservation significance (threatened species) at either state or federal level have been recorded on the island, with a further 5 species predicted to occur. There are also 19 migratory species considered to have significance at federal level that are known to occur on the island.

Only 1 frog species, green tree frog (*Litoria caerulea*), has been recorded on the island. The frog fauna of the Torres Strait is somewhat depauperate based on known records, and the majority of species are confined to larger islands such as Mua and/or islands close to Cape York Peninsula. A few additional species may yet be found on lama Island, but these are likely to be common, widespread species, particularly those associated with human habitation and modified areas.

The reptile assemblage of 15 species, is large comparative to the overall terrestrial vertebrate assemblage of 72 species, and indicates that further work is required for the other faunal groups. The size and location of lama Island suggest that few unrecorded species of reptile should be expected to be found, though the mangroves and vine forest are likely habitats for some additional reptile 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. It is likely that any additional species reported for lama Island will be highly mobile species, particularly those associated with foreshore habitats.

It is important that the species of rodent on lama Island be identified; as native species, such as grassland melomys, may be present. More importantly, confirmation of the presence of spectacled flying-fox on the island should be a matter of priority as there is no known confirmed record of the species from any island of the Torres Strait.

6.1 Culturally Important Fauna Species

The current information on useful animals of lama Island available to the authors is limited to language names available for nine animal species. Whilst insufficient to provide any detailed account, the familiarity of Torres Strait Islanders' with the natural world was noted over 100 years ago by the English anthropologist Alfred Cort Haddon (1912:230):

[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*). 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 (*Casuaris casuaris* – obtained from Papua New Guinea traders) continue to be used for traditional headdresses.

Further fieldwork by the Land and Sea Rangers coupled with review of literature is required, with all information incorporated into an appropriate TEK system. This includes information on uses, habitat, distribution, abundance, and most importantly the relationships to story and culture. The fauna species list provided in **Appendix H** of this report provides a foundation to incorporate language names and habitats.

6.2 Fauna Habitat Values

There has been limited fauna work conducted on Iama Island with very few documented records of even common species and the faunal values of the island remain poorly known. Natural Solutions (2008b) considered the southern coastline of Iama Island to be in near pristine condition with exceptionally high quality, undisturbed habitat. Mangrove forests in the north are also in very good condition, other than around the village where they are subject to localised disturbance from pollution and wood collection. The intertidal zone generally is relatively undisturbed. Acacia forest, and vine forests and thickets are in good condition and relatively undisturbed; except adjacent to developed areas and human habitation.

As the island is very small (186 ha), somewhat isolated from large land masses, and has a lack of natural permanent freshwater, it is unlikely that many as yet unrecorded species occur on the island. However, the high quality habitat present should provide resources for more species than are currently known to occur on the island; such species are most likely to be associated with the foreshore.

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 Commonwealth's EPBC Act including those listed as Migratory.
- Species listed under 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 Critically Endangered, Endangered, Vulnerable and Near Threatened Species

The following section provides an overview of those species that are known to occur, or potentially occur on Iama Island. Twenty-five of the 389 species reported or predicted for the Torres Strait are listed as Critically Endangered, Endangered, Vulnerable or Near-Threatened under the EPBC Act and/or NC Act. Fifty-eight species are listed as migratory under the EPBC Act (see **Appendix F**). The

islands of the Torres Strait have been inadequately surveyed for fauna so records and predictions from throughout the Strait are included to aid in the identification of additional likely species for lama Island.

lama Island, due to its small size (186 ha), isolation from large land masses, lack of natural permanent freshwater and its skeletal soils, provides resources for only a limited number of EVNT species. The four conservation significant species (threatened species) whose reported occurrence is considered reliable, and the five species whose occurrence is considered likely or possible on lama Island based on habitat suitability and regional distribution are listed in **Table 8**.

It is expected that salt-water crocodile occurs, at least sporadically, and the species is reported by Natural Solutions (2008b) as an anecdotal record. Slender chained gecko is known from a similarly small and isolated island in Masig Island (OZCAM 2011) and may be present on lama Island. Littoral whiptail-skink, given its rafting abilities, may also occur. Although known from only a few Torres Strait Islands the coastal sheathtail bat is considered likely to be present.

Given its mobility, the spectacled flying-fox may also occur, although a lack of database or published records in the Torres Strait for such a readily identifiable species raises some doubts. Spectacled flying-fox does occur in Papua New Guinea; and a number of sources, including Duncan *et al.* (1999) and Churchill (2008), state that the species occurs in the Torres Strait but no location details are provided. Conics (2008a) list spectacled flying-fox as having been recorded during field survey on lama but make no mention of the species in the main body of their report. Due to the uncertainty the record is considered dubious. A recent observation of an unidentified flying fox (Hitchcock pers. obs. Nov 2010) indicates the presence of the animals on lama of a Pteropus species. Profiles for known species are provided in **Section 6.3.2** and for likely species in **Appendix G**.

Table 8. Endangered, Vulnerable and Near Threatened Fauna species reported or predicted to occur on lama Island.

Scientific Name ³	Common Name	EPBC Act	NC Act	BoT ⁵	Broad Habitat & known distribution in Torres Strait	Comments ⁶
SPECIES REPORTED						
<i>Esacus magnirostris</i>	Beach stone-curlew	-	V	high	Estuaries/shorelines/beaches. 34 islands, including Mua, Yam (lama), Erub (Darnley), Mabuiag & Dauan Islands.	Database, published and unpublished records.
<i>Numenius madagascariensis</i>	Eastern curlew	M	NT	-	Estuaries/shorelines/beaches. 18 islands, including Mua, Badu, Murray (Mer), Erub (Darnley), Mabuiag, Boigu and Dauan Islands.	Database and published records.
<i>Sternula albifrons</i>	Little tern	M	E	high	Estuaries/shorelines/beaches. 16 islands, including Mua, Badu, Boigu, Murray (Mer), & (Erub) Darnley Islands.	Published record. Listed under the EPBC Act as <i>Sterna albifrons</i> (Bonn Convention, CAMBA, JAMBA, ROKAMBA).
<i>Haematopus</i>	Sooty	-	NT	-	Estuaries/shorelines/b	Unpublished

<i>fuliginosus</i>	oystercatcher				eaches	record.
SPECIES PREDICTED						
<i>Pteropus conspicillatus</i>	Spectacled flying-fox	V	LC	high	Mangroves, closed forests, swamp forests.	Predicted by the EPBC Protected Matters Search Tool – occurrence considered possible.
<i>Taphozous australis</i>	Coastal sheath-tail bat	-	V	high	Open forest, grasslands, coastal shrublands, mangroves, monsoon forest and Melaleuca swamp forests. Rarely found roosting more than several km from the sea. Roosts / breeds in coastal caves, rock piles / fissures.	Possible based on occurrence on Mabuia and Mua and potential habitat.
<i>Emoia atrocostata</i>	Littoral whiptail-skink	-	NT	-	Mangroves, rocky foreshores	Likely based on occurrence on Mua and potential habitat.
<i>Lepidodactylus Pumilis</i>	Slender chained gecko	-	NT	-	Closed forests, mangroves, woodlands and shrublands.	Likely based on occurrence on Mua and potential habitat.
<i>Crocodylus porosus</i>	Salt-water crocodile	M	V	-	Estuaries/shorelines/b eaches. Boigu, Badu, Saibai, Mabuia and Thursday Islands.	Predicted by the EPBC Protected Matters Search Tool – occurrence considered possible on available habitat.

1. Listed as 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: 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, Watson & Hitchcock in press), WildNet database and/or reports and other grey literature (e.g. Watson 2009). These sources are not necessarily mutually exclusive.

6.3.2 Profiles of Species listed as Endangered or Vulnerable under the EPBC Act and/or NC Act known from Iama Island

Beach stone-curlew (*Esacus magnirostris*)

NC Act: Vulnerable

Beach stone-curlew is also considered of 'Critical' priority under the Back on Track species prioritisation framework (DERM 2011a). Formerly known as beach thick-knee and as *Burhinus neglectus*.

The beach stone-curlew generally occurs singly or in pairs, and occasionally in small groups of up to six birds. The species is exclusively coastal, occurring on all types of beaches, especially near river mouths, on mudflats, near mangroves, and occasionally on coastal lagoons. It is typically more common on islands than the mainland (Lane 1987; Marchant & Higgins 1993). The species is mainly nocturnal or crepuscular and adult birds appear to be sedentary. The species feeds predominately on crabs and

other marine invertebrates in the intertidal zone and a single egg is laid in a scrape in the sand, often in the same area year after year (Clancy 1986; Marchant & Higgins 1993).

Beach stone-curlews are found around eastern and northern Australia from Nambucca Heads in New South Wales (and occasionally south to Victoria) to Port Cloates in Western Australia and extend into Papua New Guinea, the Solomon Islands and Indonesia (Marchant & Higgins 1993). Draffan *et al.* (1983) report the species from 33 Torres Strait Islands in total, in every area except the north-west. The species occurs on Mabuiag Island (Conics 2009b; Watson 2009, Watson & Hitchcock in press).

This species is still found in locations where human activity is high but the lack of young birds in such areas indicates that reproduction is being affected by human disturbance (Freeman 2003). Breeding success may also be significantly reduced from predation by cats, dogs and feral pigs. Much of the species' habitat in Australia, particularly on islands, is secure. However, because beach stone-curlews occur at low densities and occupy linear habitats, the potential for local extinctions to become regional ones is increased (Garnett & Crowley 2000). On Iama Island the species may be threatened by feral species particularly dogs, and disturbance by humans, particularly when nesting.

Little Tern (*Sternula albifrons*)

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

NC Act: Endangered

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 in 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). Draffan *et al.* (1983) reports the species from 13 islands, and describes it as an uncommon summer visitor throughout the Torres Strait.

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). On lama Island it is likely to be threatened only if breeding occurs on the island.

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 Badu, Mua, Murray (Mer), Erub and Boigu, and there is a single WildNet record from Mabuiag (DERM 2010e) and an unpublished record from lama (Conics 2008a). The species is likely, at least on passage, on any island that has suitable foraging habitat.

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).

Draffan *et al.* (1983) provide no detail on local numbers and the two WildNet records (DERM 2010g) are more likely to be a reflection of a lack of formal survey work rather than an accurate indication of their numbers on lama Island. On lama, the species is most likely to be threatened by disturbance from feral dogs when foraging and such a threat would only be significant during passage to northern hemisphere breeding grounds.

Sooty Oystercatcher (*Haematopus fuliginosus*)

NC Act: Near-Threatened

The sooty oystercatcher is restricted to marine coastal habitats, with a preference for rocky headlands and ledges, coral reefs, and sandy beaches near intertidal mudflats and rocky areas, usually within 50 m of the shore line (Blakers *et al.* 1984; Marchant & Higgins 1993). They forage around exposed rocks at low tide for molluscs, crustaceans, other invertebrates and small fish. The species is resident, maintaining territories all year round (Marchant and Higgins 1993).

Sooty oystercatchers are endemic to Australia, not extending north to New Guinea despite records from the Torres Strait. The species breeds in all Australian states and is most common in south-eastern Australia (Pringle 1987; Marchant & Higgins 1993). Draffan *et al.* (1983) reports the species from Coconut, Channel Rock, Twin and Saddle Islands and considered it a non-breeding visitor to Torres Strait. There is also a record from Iama (Natural Solutions 2008b) but no measure of abundance is provided. The sooty oystercatcher can be inconspicuous on rocky shores and if present only sporadically may be under-recorded due to a lack of consistent survey effort.

Breeding occurs mainly October to January and may begin as early as June in the tropics (Pringle 1987; Marchant & Higgins 1993). They often roost and breed on offshore islands, nesting in shallow depressions on a range of substrates including sand, gravel, coral rubble and rocks in quiet, isolated spots above the high-tide mark (Marchant & Higgins 1993). On light coloured beaches sooty oystercatchers place eggs in low visibility nest sites next to and under vegetation (Lauro & Nol 1995).

The species is threatened by human disturbance and damage to feeding, nesting and roosting areas and from predation by feral and domestic animals such as dogs and cats (NSW NPWS 2002).

6.3.3 Migratory Fauna Species

Fifty-seven bird species listed as Migratory under the EPBC Act are known to occur in Torres Strait (**Appendix H**). The Vulnerable (NC Act) salt-water crocodile is also listed as Migratory under the EPBC Act and is expected to occur on Iama 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 19 Migratory species known or predicted to occur on Iama Island. All species are listed as Least Concern under the NC Act unless otherwise noted. Further discussion of these species within groups based on behavioural traits, habitat use and threats is provided in **Appendix H**.

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

Scientific Name³	Common Name	Comments⁴
SPECIES REPORTED		
<i>Ardea modesta</i> ⁵	Eastern great egret	Published record.
<i>Egretta sacra</i>	Eastern reef egret	Database & published records.
<i>Pluvialis fulva</i>	Pacific golden plover	Database record.
<i>Pluvialis squatarola</i>	Grey plover	Unpublished record.

Scientific Name ³	Common Name	Comments ⁴
<i>Charadrius mongolus</i>	Lesser sand plover	Published & unpublished records.
<i>Numenius phaeopus</i>	Whimbrel	Database, published & unpublished records.
<i>Numenius madagascariensis</i> ⁶	Eastern curlew	Unpublished record.
<i>Actitis hypoleucos</i> ⁷	Common sandpiper	Database, published & unpublished records.
<i>Tringa brevipes</i> ⁸	Grey-tailed tattler	Published & unpublished records.
<i>Tringa nebularia</i>	Common greenshank	Published record.
<i>Arenaria interpres</i>	Ruddy turnstone	Published & unpublished records.
<i>Calidris ruficollis</i>	Red-necked stint	Unpublished record.
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	Database record.
<i>Sternula albifrons</i> ⁹	Little tern	Unpublished record.
<i>Sterna sumatrana</i>	Black-naped tern	Published & unpublished records.
<i>Merops ornatus</i>	Rainbow bee-eater	Published record.
<i>Monarcha melanopsis</i>	Black-faced monarch	Published record.
<i>Symposiachrus trivirgatus</i> ¹⁰	Spectacled monarch	Database, published & unpublished records.
SPECIES PREDICTED		
<i>Crocodylus porosus</i> ¹¹	Salt-water crocodile	Predicted by the EPBC Protected Matters Search Tool – expected 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 Storr 1973; Draffan et al. 1983), WildNet database and/or reports and other grey literature (eg Natural Solutions 2008b). These sources are not necessarily mutually exclusive.

5 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).

6 Listed as Near Threatened under the NC Act.

7 Also listed under CAMBA and ROKAMBA as *Tringa hypoleucos*.

8 Also listed under the Bonn Convention and JAMBA as *Heteroscelus brevipes*.

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

10 Listed under the EPBC Act (Bonn Convention) as *Monarcha trivirgatus*.

11 Listed as Vulnerable under the NC Act.

6.3.4 Additional possible Migratory species

Of the other 32 species of Migratory bird known from the Torres Strait, the following are expected to occur on lama Island on a regular basis: white-throated needletail (*Hirundapus caudacutus*), fork-tailed swift (*Apus pacificus*), eastern osprey (*Pandion cristatus*), white-bellied sea-eagle (*Haliaeetus leucogaster*), pacific golden plover (*Pluvialis fulva*), greater sand plover (*Charadrius leschenaultii*), bar-tailed godwit (*Limosa lapponica*), terek sandpiper (*Xenus cinereus*), wandering tattler (*Tringa incana*), great knot (*Calidris tenuirostris*), curlew sandpiper (*Calidris ferruginea*), common noddy (*Anous stolidus*), bridled tern (*Onychoprion anaethetus*), caspian tern (*Hydroprogne caspia*), white-winged black tern (*Chlidonias leucopterus*), common tern (*Sterna hirundo*) and lesser crested tern (*Thalasseus bengalensis*). The remaining 21 species are all possible as sporadic (not annual) visitors except for the double-banded plover (*Charadrius bicinctus*), (which is considered very unlikely based on known movements) and the cattle egret (*Ardea ibis*) and glossy ibis (*Plegadis falcinellus*) (for which there is no suitable habitat).

6.3.5 Fauna Species of Regional Significance

There are WildNet and Natural Solutions (2008b) records of amethyst python (*Morelia amethystina*) for lama Island. The WildNet record is documented as the 'New Guinean form' of the species. *Morelia*

amethystina was formerly considered to occur in both Australia and New Guinea with Australian animals being the subspecies *M. a. kinghorni*. Harvey *et al.* (2000) described *M. kinghorni* (scrub python) as a full species, a taxonomy that has since been accepted by others (e.g. Freeman & Freeman 2009; Wilson & Swan 2010), though it is not currently in use by the *Australian Faunal Directory* (DSEWPC 2011d). The WildNet record presumably refers to the Papua New Guinea species, though the morphological differences between the two are very slight and may be difficult to identify in the field.

There are Australian Museum specimens of both species for Masig (OZCAM 2011). Wilson and Swan (2010) no longer include *M. amethystina* as a species occurring in Australian territory and such apparent discrepancies in distribution may be due to a delay in recognition of the changed taxonomy. The exact identify of any *Morelia* species on lama Island should be ascertained whenever possible in order to resolve the distributional limits of the two species. Specimens or precise descriptions and/or photographs may be required. Permits are required to collect, voucher and import into mainland Australia from the Torres Strait.

No other terrestrial fauna species known from lama Island is considered of particular regional significance at this stage, other than EVNT and Migratory species as already discussed. Future survey work on the island may identify such species (**Section 6.6**).

6.4 Pest Fauna Species

Exotic (introduced) fauna species reported for lama Island are house gecko, house sparrow (*Passer domesticus*), dog and cat. Natural Solutions (2008b) also report black rat and house mouse (*Mus musculus*) as being present on the island based on anecdotal evidence. However, rodent identification can be very difficult, even for trained observers, and these records should not be considered reliable without further detail.

The 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 arboreal geckoes on lama Island, *Gehyra baliola* and *G. dubia*, and slender chained gecko also may occur. Any reptile survey on the island should seek to identify the local distribution of house gecko. Natural Solutions (2008b) only found house gecko in developed areas but the species could spread into natural habitats.

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

Natural Solutions (2008b) state that dogs, and to a lesser extent cats, are present in considerable numbers on the island and pose an environmental health risk. Observations of packs of 5-10 dogs combing the intertidal zone for food at low tide (Stanton & Fell pers. obs. 2007) indicate the likely impacts of dogs to ground nesting birds such as beach stone-curlew and waders and terns. Cats are significant predators of native animals and have been implicated in the extinction of native species both on islands (Bloomer and Bester 1992) and on mainland Australia (Dickman *et al.* 1993). It is not just feral cats that kill native animals. 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). At this stage no native ground-dwelling mammal is known from Iama Island but cats would be killing other native fauna. Surveys of the presence of feral cats and the numbers would aid in determining future management requirements.

In northern Australia the house mouse lives mostly in houses and other buildings storing food. However, the species does move into areas of natural vegetation, especially after fire when native rodent numbers may be low. In dry and temperate Australia, House mouse numbers typically fall as numbers of native species increase with increasing time since fire (Singleton 2008). If it is present on Iama Island then numbers in natural habitats are likely to be tied to disturbance regimes.

Should the rats reported for the island be introduced *Rattus* species it is important to identify which species, though control measures should be implemented regardless. Black rat is likely to be a greater environmental threat than brown rat (*Rattus norvegicus*) given that the latter species is less likely to occur away from human settlements (Watts & Aplin 2008). Pacific rat (*Rattus exulans*) is also a possibility but would appear least likely to be present based on known distribution.

6.5 Threats to Fauna and Habitat

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 indicated 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 Iama Island are the possible introduction of the exotic cane toad and rats (*Rattus* species). 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. Black rats (*Rattus rattus*) are an even greater potential threat given their agility and generalist diet. Should exotic rats be found to be present an extermination, or control, project is recommended.

Hunting may pose a threat to some species. Species likely to be targeted include varanids (goannas), pythons, waterfowl, pigeons and flying-foxes. Hunting should be regulated so as to be sustainable.

6.6 Future Priorities

It is important that the faunal values of Iama 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

- Flying-fox surveys, particularly to identify if spectacled flying-fox is present.
- Implement a rodent trapping program to determine if black rat and/or house mouse are present and to determine the level of threat they pose to native fauna.
- Feral cat survey and monitoring to determine cat numbers and the level of threat they pose to native fauna.

Medium Priority

- Micro-bat surveys, targeting coastal sheathtail bat.
- Population estimate for beach stone-curlew to allow monitoring of breeding success.
- Identification of any breeding areas for terns.
- Identification of the most important foraging and high roost sites for waders.
- Reptile survey, with particular emphasis on littoral whiptail-skink and slender chained gecko.

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 Cape York Peninsula when Europeans arrived was the product of traditional burning practices and land use 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.

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. In many areas 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 Cape York Peninsula and Torres Strait Islands, 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 periods of as little as fifty years than changes that occurred in those in those millennia prior to European arrival. It is not the change itself that is the

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

problem but its rapidity. Species cannot evolve rapidly enough to accommodate it and the inevitable result will be the loss of species.

The reasons that the indigenous people of northern Australia used fire have been well documented (Russell Smith *et al.* 2009). They included 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.

In Torres Strait, the ongoing use of fire is evident on the majority of islands and there is no doubt that it 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 formed 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 & Carter 2003).

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. 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 north 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 lama Island Habitats

The following section presents a summary of current knowledge, management requirements and recommended management actions for the habitats that occur on lama Island. The information presented has been derived from previous 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

This is an extensive habitat on the lower exposed rocky around the island. It is structurally and floristically variable ranging from fully deciduous vine forest to semi deciduous thicket. Vegetation structure is largely dependent on site aspect with habitats occupying exposed south-east facing slopes typically lower, and shrubbier. North facing slopes host the best development of the habitat with fully deciduous vine forests reaching heights to 25m. The best developed vine forest habitat on the island, vegetation community 2h, is fully deciduous resulting in a forest that has an 'open feel' belying the fact that canopy cover is typically greater than 80% during the wet season. Dominant canopy species include *Erythrina insularis*, *Antiaris toxicaria* var. *macrophylla*, *Terminalia subacroptera*, *Canarium australianum*, *Bombax ceiba* var. *leiocarpum*, scattered *Acacia auriculiformis*, and *Manilkara kauki*. The habitat occupies bare rock rubble and pavement with extremely limited soil development, which prevents any serious fire incursion.

On exposed east facing slopes, vine thicket habitats have a low even windswept appearance with canopy heights rarely exceeding 6m. Canopy cover in these habitats is generally 100% and crowns are particularly tightly packed. The forests occur on uneven boulder talus and tree heights vary in response to topographic variation whilst retaining an even canopy height. The canopy is dominated by *Canarium australianum*, *Antiaris toxicaria* var. *macrophylla*, *Gyrocarpus americanus*, *Terminalia subacroptera*, *Manilkara kauki*, *Acacia auriculiformis*, *Diospyros* sp. (Mt White P.I. Forster PIF14415), *Sterculia* sp. (Annan River L.J. Brass 20319) and *Premna dallachyana*.

A minor remnant of beach dune thicket (2u) also occurs in the vicinity of the dump although the majority of this habitat has been cleared for infrastructure development. Minor areas of thicket are associated with beach dune complexes.



Photograph 3 (right). Fully deciduous vine thicket (VC2h) near lama airport, and **Photograph 4.** Low windswept vine thicket (VC2n) on an exposed south facing footslope.

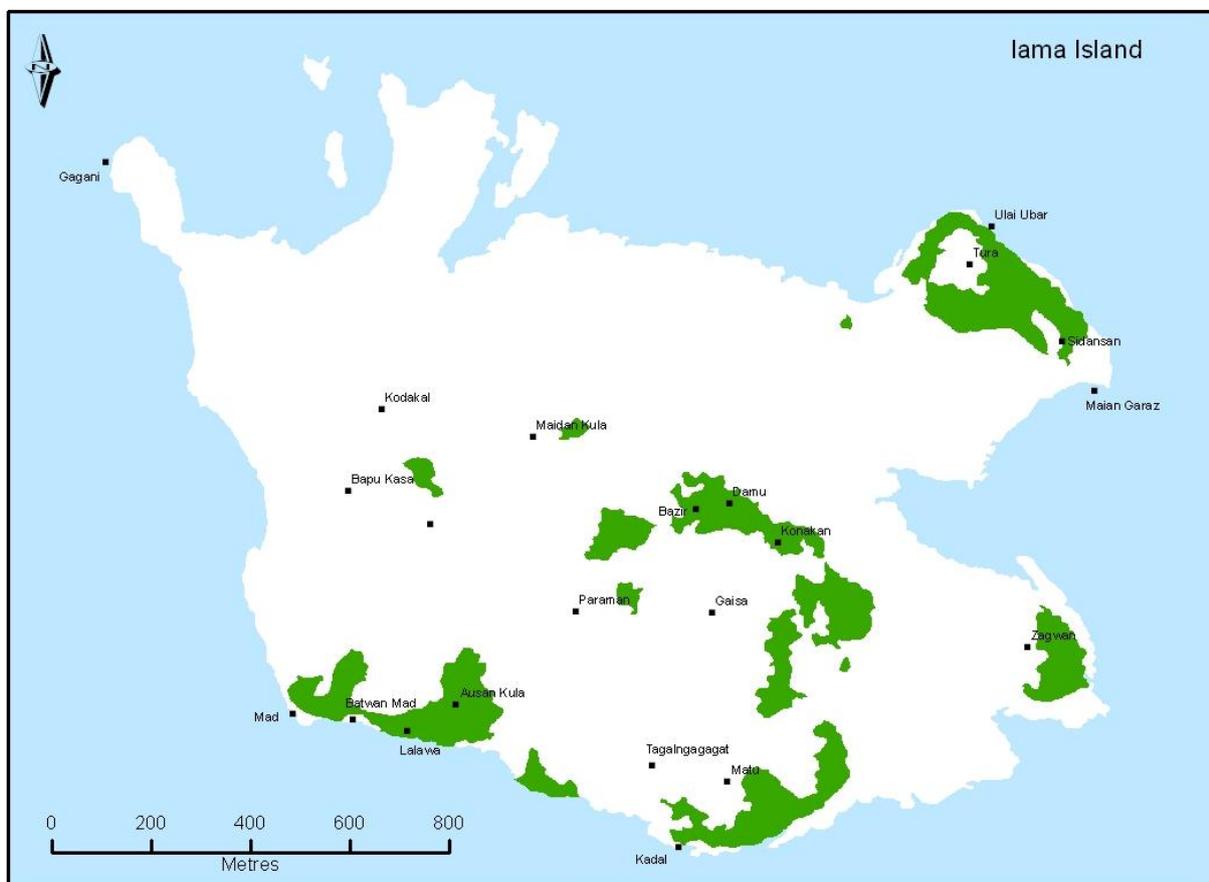


Figure 3. Distribution of deciduous vine forest and thicket (place names after Lawrie, 1970).

8.1.2 Ecological / Cultural Considerations

Habitat Condition: It is expected that large areas of vine thicket associated with sand dunes have been cleared for infrastructure including the airport, dump site and cemetery. Stinking passionflower (*Passiflora foetida*) is one of the few exotic species recorded in this habitat, spread from adjacent cleared areas. The remainder is fragmented by old garden areas and bamboo copses which appear to be expanding rapidly. Vegetation community 2h, owing to its strongly deciduous nature, perhaps has the greatest potential for degradation from weed invasion. Lantana (*Lantana camara*) is a serious

potential threat however has not yet been recorded on the island. Other species with potential to invade include yellow bells (*Tecoma stans*), Brazilian joyweed (*Alternanthera brasiliana* cv. *Rubiginosa**), Poinciana (*Delonix regia**) and butterfly pea (*Clitoria ternatea**) other weed species. These species have potential to significantly alter habitat ecology, altering shrub and ground layer diversity as well as facilitation fire incursion. Shrubier habitats with a denser canopy structure (such as VC2n) are at lower risk of weed infestation.

Fauna: The fauna known to utilise this habitat most extensively are ground dwelling reptiles. The habitat is also likely to provide a seasonal resource for frugivorous birds.

Flora: The habitat is known to support 99 flora species, two of which are naturalised. Significant species known to occur are *Arenga australasica* (Vulnerable EPBC), *Operculina brownie* (Near-Threatened). Regionally significant species known from this habitat are *Luvunga monophylla*, *Actephila venusta*, *Triflorensia australis*, *Lycianthes shanesii*, *Cupaniopsis flagelliformis* subsp. *flagelliformis*, *Miliusa traceyi*, *Mallotus ficifolius* and *Intsia bijuga*.

Cultural Perspectives: The habitat hosts numerous plant resources (refer **Appendix D**). The full extent of resource utilisation within this habitat requires further consideration.

8.1.3 Management Implications

This is a fragile habitat that is currently self-maintaining. There is however a high potential for the introduction of new weeds and the spread of existing weeds into the ground layers of this habitat. Butterfly pea, siratro (*Macroptilium atropurpureum*), Brazilian joyweed and yellow bells are a future threat together with the invasive herbs such as mint weed. Lantana (*Lantana camara*), praxelis (*Praxelis clematidea*) and leucaena (*Leucaena*) are currently not present on lama however they occur on other islands in the region and should be considered a potential threat. Any isolated poinciana trees in or on the margins of vine thicket habitat should be assessed to determine their potential invasiveness.

Minimal active management is required at present although the passive management situation may change rapidly with introduction of invasive exotic species. Regular patrols focusing on disturbed roadside and track margins are required to continuously monitor for introduction of exotic plant species. Plants not previously known to the rangers should be collected, pressed, and retained for identification purposes whilst monitoring species spread and location.

8.1.4 Summary of Recommended Management Actions

The information provided in **Table 10** below aims to summarise the key issues, actions and priorities so as to aid the transfer of information into the lama 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 10. Summary of management actions for deciduous and semi-deciduous vine forest and Thickets.

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 poorly documented and limited to rapid surveys in the dry season. There is a 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/or 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	The habitat is potentially impacted by late season wildfires although the rocky nature of the substrate provides some protection from fire. Any incursion of lantana and grassy weeds on margins, may considerably alter the flammability of deciduous vegetation rendering it susceptible to incursion by severe late season fires.	Ensure fuel loads in surrounding flammable vegetation (including garden areas) are managed to avoid the spread of hot dry season fires.	Moderate
Threatened Species Management	<u>Flora</u> : The habitat is presently robust and self-maintaining. Threats to significant flora species are from weed infestation and potential late season fires. <u>Fauna</u> : Composition of fauna within this habitat is poorly known. See Fauna Section 6.6 .	<u>Flora</u> : Carry out further surveys of the distribution and population size of arenga palm, <i>Opercularia brownii</i> and <i>Luvunga monophylla</i> . Monitor habitat for weed incursions (see monitoring). <u>Fauna</u> : Further baseline information required (see fauna surveys Section 6.6) before discrete management actions can be defined.	Moderate High
Invasive Species	<u>Flora</u> : A number of species from	<u>Flora</u> : No active weed control is	Moderate

Management Category	Context/Issue	Actions	Priority
Management	<p>disturbed areas pose a threat such as Brazilian joyweed, yellow bells and poinciana. Potential weed threats are praxelis and lantana.</p> <p><u>Fauna:</u> The composition of invasive fauna within this habitat requires further study. There is considerable potential for impacts on fauna by feral cats and dogs.</p>	<p>currently required. Carry out monitoring for new weed infestations particularly on habitat edges on an annual or bi-annual basis.</p> <p><u>Fauna:</u> Composition of invasive fauna to be derived from fauna survey results. Assess cat activity and dog levels by installation/monitoring of sand pads on nearby tracks, nocturnal spotlighting consultation with community members. Develop a trapping/ structured control program based on results.</p>	Immediate
Monitoring	<p>Observations relating to any changes to habitat condition should be documented so that the risk these changes pose to long-term habitat stability can be assessed and appropriate management responses formulated.</p>	<p>Carry out monitoring of selected locations for infestation of weed species on a six monthly basis including observations taken late in the wet season at maximum growing season. Establishment of formal monitoring and photographic sites in selected vine thicket habitats is recommended starting with those in closest vicinity to disturbed areas. Monitoring sites can be marked with a star picket with photographs taken towards designated directions.</p>	High

8.2 *Acacia Dominant Open Forests and Woodlands*

8.2.1 *Status of Ecological Knowledge*

This is a unique habitat type found only on lama, representing an open forest dominated by earlobe wattle (*Acacia auriculiformis*) (*thulup* in local dialect) with a height range from 12 to 23m. Associated canopy trees are typically vine forest species including *Canarium australianum*, *Terminalia subacroptera*, *Bombax ceiba* var. *leiocarpum*, and *Diospyros hebecarpa*. Groves of *Mangifera indica* are dispersed throughout the habitat.

Discussions with lamalgal elders (Sam Kepa) verify that this is a transitional habitat developed from a former copped shrubland. Habitat transition was prompted by removal of fire from the habitat in an effort to protect the numerous bamboo groves which provide an important cultural resource value. Transition from low woodland to closed forest has likely occurred over a period of 30 – 40 years. It is understood that gardens occurred on hillsides of the interior and that people would cut down the trees in a garden area, then burn them and move on the following year (Kepa/Hitchcock pers. com 2008). Although there is evidence from burnt stumps that fire still occurs within this habitat, it is understood that these are local garden fires.

That this community is found only on lama Island presents another puzzle. The nearby continental islands of Mabuiag and Gebbar are dominated by Welchiodendron forests, although not a single

individual of *Welchiodendron* was found on lama. It is clear that despite a close proximity, forests on lama have developed independently from forest types on neighbouring islands.



Photograph 5 (left). Interior of open forest type 6a on lama, and **Photograph 6 (right).** Tulup/Earlobe Wattle (*Acacia auriculiformis*).

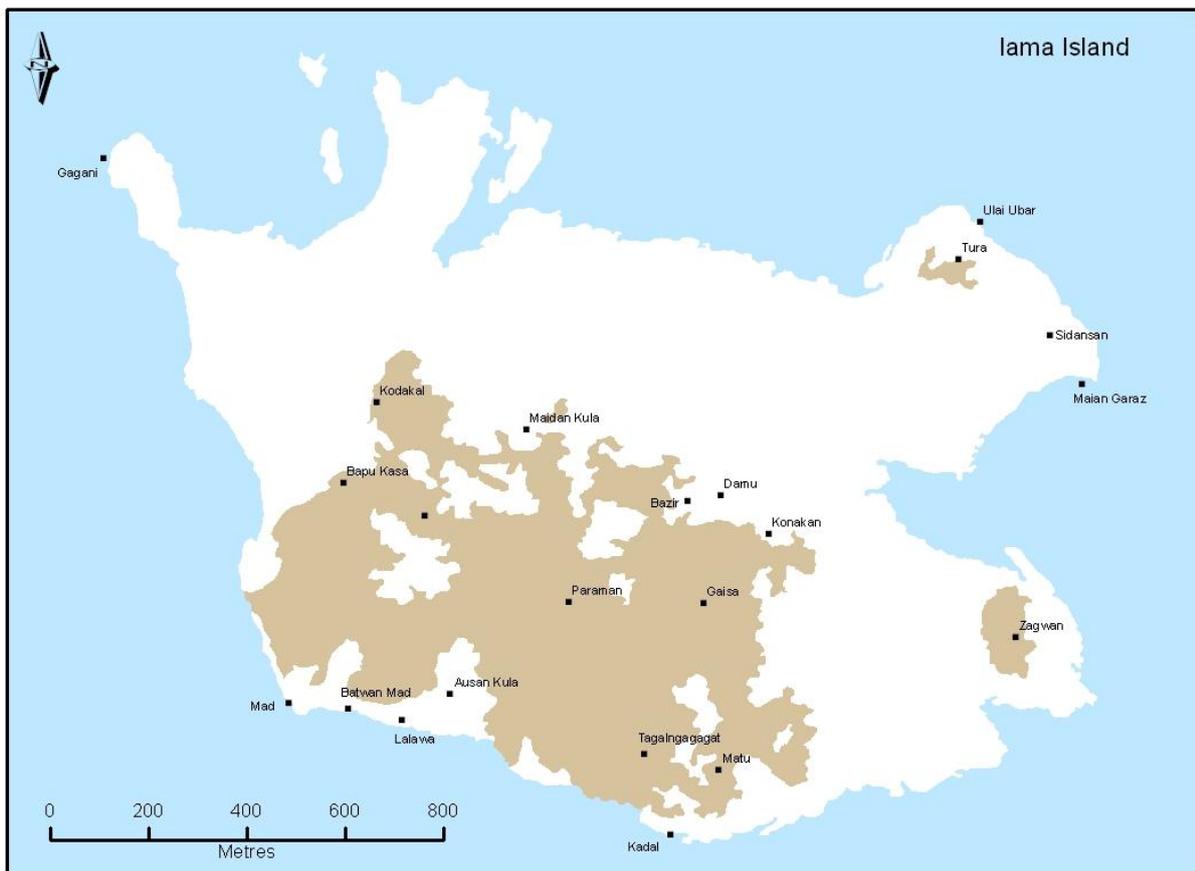


Figure 4. Distribution of acacia dominant forest (place names after Lawrie, 1970).

8.2.2 Ecological / Cultural Considerations

Habitat Condition and Threats: This is a transitional forest type that has been subject to long-term anthropogenic habitat alteration and it is important to consider this when commenting on habitat condition in terms of intactness or degree of naturalness. Despite this alteration, the habitat is

considered remnant (as per the VMA) and has been assigned a biodiversity and vegetation management status of 'of concern'. With the exception of scattered cultivated resource plants (papaya, cassava, mango), the habitat is remarkably free from exotic weeds although broad copses of exotic bamboo (*Bambusa vulgaris*) are dispersed throughout the habitat and apparently expanding based on evidence from early and recent aerial photography. As with vine thicket habitat, the numerous canopy openings present a significant opportunity for weeds such as lantana to establish and proliferate. Any such incursion poses a significant threat to habitat integrity as well as a number of its unique floristic values.

Fauna: The fauna known to utilise this habitat most extensively are ground dwelling reptiles (refer Natural Solutions, 2008b) although it may provide roosting sites and foraging ground for the spectacled flying-fox and coastal sheath-tail bat. The habitat is also likely to provide a seasonal resource for frugivorous birds.

Flora: Of the 109 species recorded from this habitat only four are naturalised. The high species diversity is attributed to the robust vine thicket understorey with the majority of species shared with deciduous vine thicket. Significant species identified within the habitat are *Neololeba atra* and *Operculina brownii*, both identified as Near-Threatened under the NC Act. Regionally significant species identified include *Actephila venusta*, *Aristolochia chalmersii*, *Luvunga monophylla*, *Coffea brassii*, *Lycianthes shanesii*, *Miliusa traceyi*, *Rhodamnia australis*, *Syzygium* sp. (DGF10208).

Cultural Perspectives: The habitat hosts numerous plant resources (refer **Appendix D**). The full extent of resource utilisation within this habitat requires further consideration. The dominant canopy tree thulup (*Acacia auriculiformis*) is utilised for firewood and features extensively in traditional folklore. The significance of this species and to the lamalgal is interesting when it is considered that the habitat is restricted to lama, indicating strong traditional ties between people and land. Historically, the area was extensively utilised for traditional gardening purposes and rock piles and mounds used to contain soil remain scattered across the ground surface.

8.2.3 Management Implications

Minimal active management is required at present although the passive management situation may change rapidly with introduction of invasive exotic species. Regular patrols focusing on disturbed roadside and track margins is required to continuously monitor for introduction of exotic plant species. Plants not previously known to the rangers should be collected and pressed and/or photographed, and retained for identification purposes whilst monitoring for spread and location.

Documentation of all animals observed (including invasive/exotic species) should be undertaken with photographs and possible collections (preserved in freezer) where possible for future formal identification. Any observed proliferation in population of exotic fauna species, particularly feral cats and dogs should be documented and appropriate feral animal management actions developed.

8.2.4 Summary of Recommended Management Actions

Table 11. Summary of management actions for deciduous and semi-deciduous vine forest and thickets.

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 poorly documented and limited to rapid surveys in dry season. There is a 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/or 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	This is a transitional habitat that has developed following removal of traditional burning and gardening regimes. It has developed to the degree that fire incursion would be detrimental to habitat condition and diversity and as such, fires should be excluded to a degree that is practically and culturally feasible. The habitat is potentially impacted by late season wildfires although the rocky nature of the substrate provides some protection from fire. Any incursion of lantana and grassy weeds on margins, may considerably alter the flammability of deciduous vegetation rendering it susceptible to incursion by severe late season fires.	Ensure fuel loads in surrounding flammable vegetation (including garden areas) are managed to avoid the spread of hot dry season fires. Exclude fire from the habitat to a degree that is practically and culturally feasible.	Moderate
Threatened Species Management	<u>Flora:</u> The habitat is presently robust and self-maintaining. Threats to significant flora species are from weed infestation and late season fires. <u>Fauna:</u> Composition of fauna within this habitat is poorly known. See Fauna Section 6.6 .	<u>Flora:</u> Carry out further surveys of the distribution and population size of <i>Opercularia brownii</i> and <i>Luvunga monophylla</i> . Monitor habitat for weed incursions (see monitoring). <u>Fauna:</u> Further baseline information required (see fauna surveys Section 6.6) before discrete management actions can be defined.	Moderate High
Invasive Species Management	<u>Flora:</u> A number of species from disturbed areas pose a threat such as Brazilian joyweed, yellow bells and poinciana. Potential threats are praxelis and lantana.	<u>Flora:</u> No active weed control is currently required. Carry out monitoring for new weed infestations particularly on habitat edges on an annual or bi annual	Moderate

Management Category	Context/Issue	Actions	Priority
	<u>Fauna</u> : The composition of invasive fauna within this habitat requires further study. There is considerable potential for impacts on fauna by feral cats and dogs.	basis. <u>Fauna</u> : Composition of invasive fauna to be derived from fauna survey results. Assess cat activity and dog levels by installation/monitoring of sand pads on nearby tracks, nocturnal spotlighting and consultation with community members. Develop a trapping/ structured control program based on results.	Immediate
Monitoring	Observations relating to any changes to habitat condition should be documented so that the risk these changes pose to long-term habitat stability can be assessed and appropriate management responses formulated.	Carry out monitoring of selected locations for infestation of weed species on a six monthly basis including observations taken late in the wet season at maximum growing season. Monitoring sites can be chosen to include those in closest vicinity to disturbed areas.	High

8.3 Shrublands and Shrubland Complexes

8.3.1 Status of Ecological Knowledge

This habitat is represented by two highly restricted and ecologically dissimilar communities. Vegetation community 14g forming an area of <1ha, represents an extension of vine thicket pruned by prevailing trade winds. The habitat is essentially a low, dense and largely impenetrable thicket that rarely exceeds 1m in height. Species representative of the dominant upper stratum (S1 layer) include *Buchanania arborescens*, *Manilkara kauki*, *Alyxia spicata* and *Pouteria sericea*. On lama, the unit includes coastal vine thicket species such as *Terminalia subacroptera*, *Canarium australianum*, *Eugenia reinwardtiana*, *Sarcostemma viminale* subsp. *brunonianum*, *Alyxia spicata*, and *Drypetes deplanchei*. Emergent *Pandanus* sp. is also scattered within the habitat.

Vegetation community 14ab was not represented in the original vegetation mapping produced by Stanton *et al.* (2009) due to its limited extent (approximately 0.25ha). This is an interesting community, being a disjunct representation of a shrubland habitat more typically associated with the Near Western and Inner Island groups. The canopy is dominated by *Asteromyrtus symphyocarpa*, generally in coppiced form, mixing with *Acacia auriculiformis* forming an average canopy height of 6m. The secondary shrub layer is poorly developed with the ground layer formed almost exclusively by kangaroo grass (*Themeda triandra*). As further discussed in Section 7.3.1 (cultural perspectives), this habitat is likely the result of traditional resource cultivation.



Photograph 7. Shrubland of *Asteromyrtus symphyocarpa* on the hill behind the airstrips, and; **Photograph 8.** Low windswept thicket on east facing headland of lama.

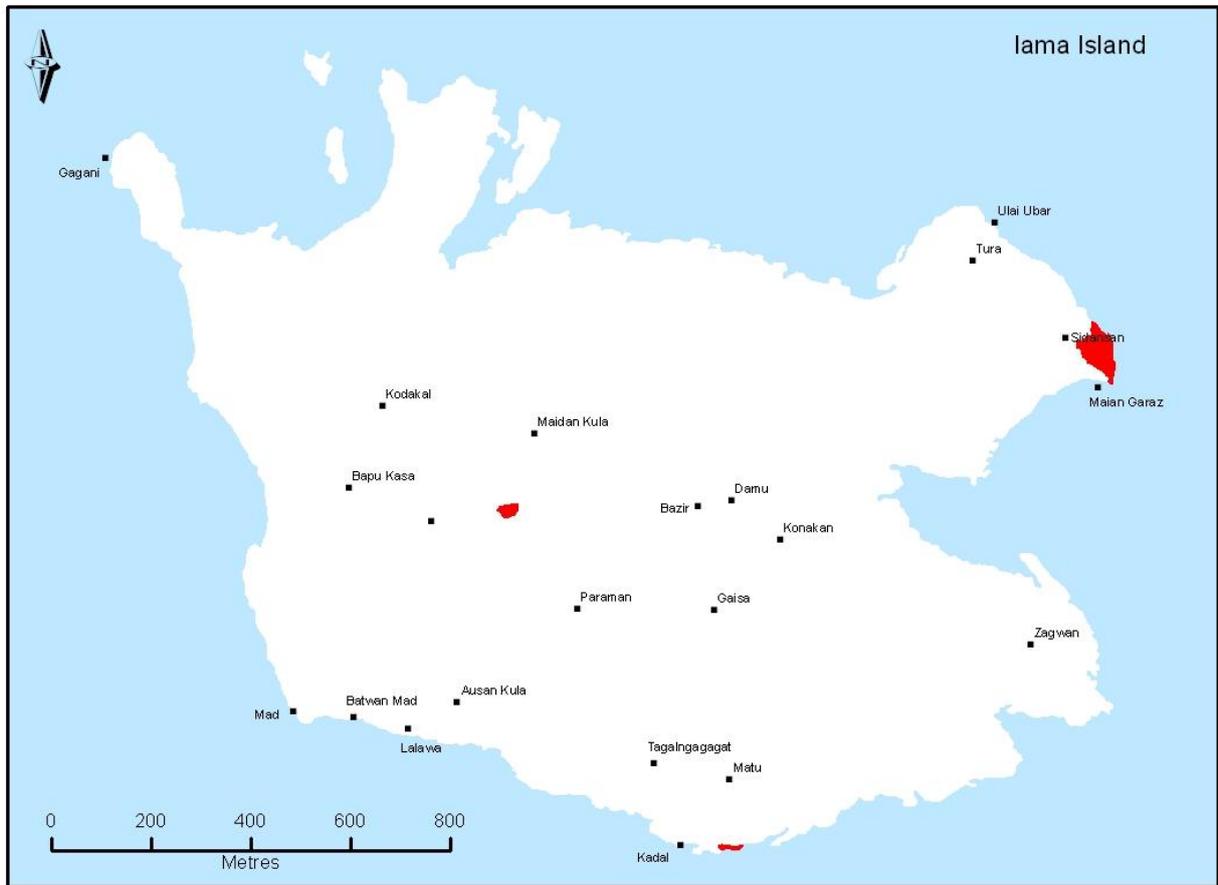


Figure 5. Distribution of shrubland habitats (place names after Lawrie, 1970).

8.3.2 Ecological / Cultural considerations

Habitat Condition and Threats: Shrubland habitat 14g is largely impervious to most forms of disturbance due to the density of the predominant shrub layer and harsh environmental conditions which limit proliferation of all but the hardiest weed species. Whilst VC14ab is currently dominated by native species, ground layers within this habitat are susceptible for disturbance and invasion from a range of herbaceous ground covers and grasses. The location of this habitat is earmarked for future development and without intervention in the short-term, this culturally significant habitat will be cleared for infrastructure purposes.

Fauna: The fauna values associated with this habitat are unknown and are expected to be limited due to the restricted nature of the habitat and simple floristic composition.

Flora: Twenty-six species have been recorded from this habitat, all of which are native. The occurrence of *Asteromyrtus symphyocarpa* is disjunct and considered regionally significant.

Cultural Perspectives: The geographically disjunct nature and limited spatial extent of habitat sub-type 14ab, when considered in conjunction with the coppiced nature of the constituent trees and floristic dissimilarities with broader vegetation types on lama suggest that it is the likely result of traditional cultivation. *Asteromyrtus symphyocarpa* is widely distilled in Papua New Guinea’s Western Province for its oils which possess antiseptic qualities. It is thus possible that the species is a purposeful introduction from adjacent islands and maintained within a discrete grove for traditional medicinal usage. Thus in a cultural context, the habitat should be considered highly significant.

8.3.3 Management Implications

Both habitat sub-types are currently self-maintaining although *Asteromyrtus symphyocarpa* dominant shrubland is susceptible to degradation of native ground cover. The most imminent threat is from clearing for residential development in the absence of due consideration to cultural heritage values. Minimal active management is required at present although the passive management situation may change rapidly with introduction of invasive exotic species. Urgent additional study is required on the cultural significance of the *Asteromyrtus symphyocarpa* dominant habitat in the central portion of lama. As this area is earmarked for urban expansion, full consideration of cultural information may necessitate the need to reconsider the current development footprint to allow for habitat conservation.

8.3.4 Summary of Recommended Management Actions

Table 12. Summary management recommendations 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. The limited extent of these habitats means that targeting them specifically for structured fauna survey (trapping) is not necessary. Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK.	High
Plant Surveys	The floristic composition has been subject to limited survey work.	Future surveys should focus on conservation significant species and those which are important cultural resource species. This habitat possesses a simple floristic assemblage.	Moderate
Traditional Ecological Knowledge	Cultural sites are likely to occur in the dune habitat.	Undertake further survey to confirm the location of cultural sites and record these by GPS for incorporation into a GIS database for future reference. Documentation of traditional land	High

Management Category	Context/Issue	Actions	Priority
		management practices, particularly in relation to fire management practice should be undertaken through collaboration with knowledgeable members of the local community.	
Fire Management	Fire will not carry into shrubland habitat 14g. The role of fire and event frequency in the management of <i>Asteromyrtus symphyocarpa</i> dominant shrublands is unknown. The habitat does however depend on fire to maintain its current shrubland structure.	Documentation of all fires events including timing and extent within habitat sub-type 14ab would be useful for future reference. This habitat would also benefit from some early season mosaic burning to maintain the grassy nature of the sub-canopy, particularly if the habitat is suffering from shrubby encroachment.	Low
Threatened Species Management	<u>Flora</u> : The majority of threatened flora species found within the habitat are not threatened by existing land management regimes. The population of <i>Asteromyrtus symphyocarpa</i> on the island appears threatened by future infrastructure development.	<u>Flora</u> : No actions required at present.	High
	<u>Fauna</u> : The composition of this habitat in regard to threatened fauna species is poorly known.	<u>Fauna</u> : Further baseline information is required before discrete management actions can be defined.	High
Invasive Species Management	<u>Flora</u> : There are no existing weed issues identified in these habitats.	<u>Flora</u> : No active weed control or management is currently required although shrubland habitats should be regularly inspected for invasive weeds where they occur in the vicinity of access tracks. Track logs indicating areas of survey should be retained for future reference.	Moderate
	<u>Fauna</u> : The extent to which feral animals utilise this habitat is unknown.	<u>Fauna</u> : The extent of usage by other exotic pests will be informed by results of ongoing fauna survey. Management actions can be formulated once major threats are identified.	Moderate

8.4 Coastal Dune Complexes

8.4.1 Status of Ecological Knowledge

This habitat is restricted to a number of extremely minor occurrences, generally associated with small coral rubble mounds on the margins of mangrove communities. The coral mounds have been moved into place by tidal and wave action and are transient, highly mobile features which host poorly developed thicket types comprising *Premna serratifolia*, *Cordia subcordata* and occasional *Manilkara kauki*. The mangrove shrub *Pemphis acidula* occurs on the habitat margins.



Photograph 9. Deciduous vine thicket species on a low coral beach ridge amongst mangrove forest.

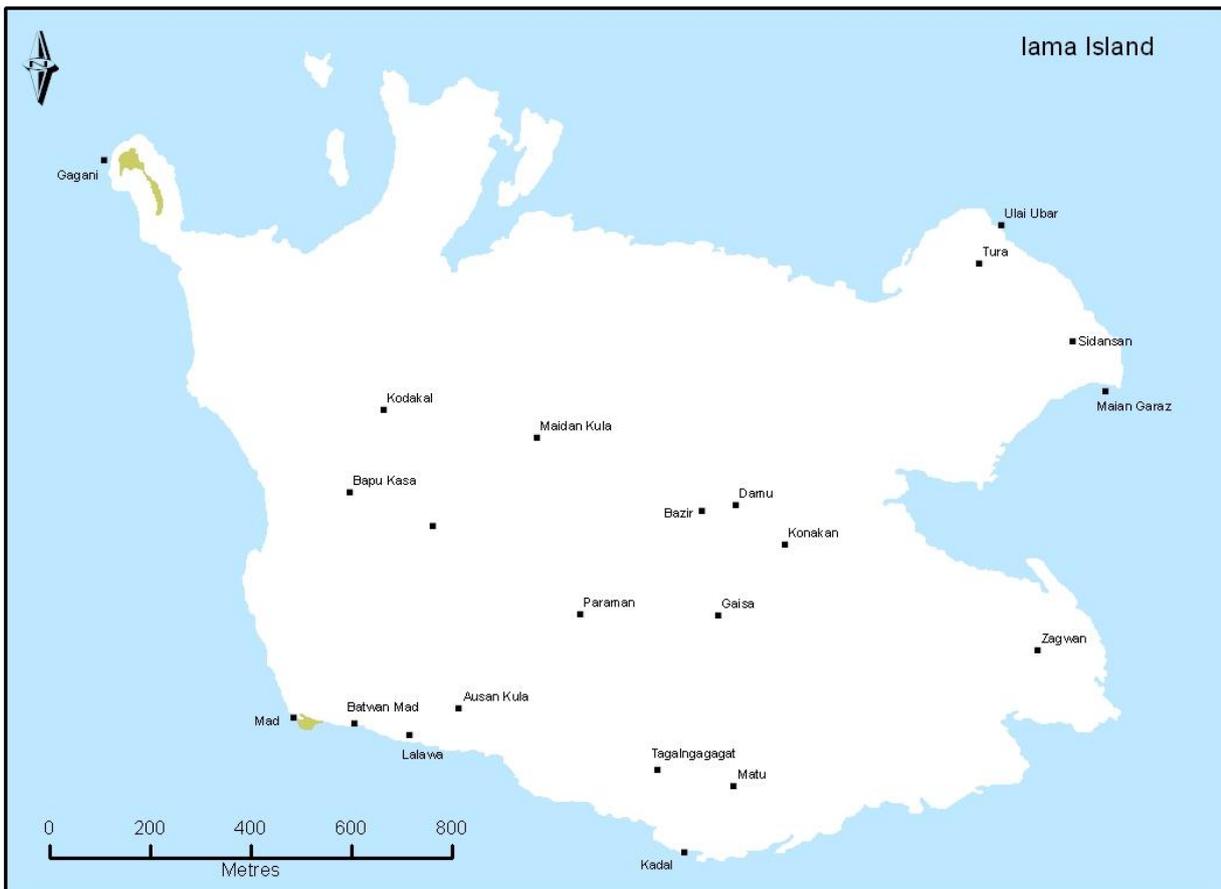


Figure 6. Distribution of coastal dune complexes (place names after Lawrie, 1970).

8.4.2 Ecological/ Cultural Considerations

Habitat Condition and Threats: This habitat has an extremely limited distribution on the island although habitats examined are generally in good condition and free from exotic weeds. It should however be considered that occupancy pressures have severely fragmented this habitat and those remaining may provide extremely valuable niche habitat for a range of species. On lama, the habitat is threatened by ongoing foredune erosion and sea level rise.

Fauna: The community is likely to provide habitat for the beach stone curlew, eastern curlew, little tern, sooty oystercatcher as well as a range of migratory bird species and nesting sites for marine turtles.

Flora: The habitat has not been subject to detailed floristic surveys.

Cultural Perspectives: Beach dune habitats provide an important focal point for settlement, recreational and hunting activities.

8.4.3 Management Implications

Due to often intensive recreational pressure and the tendency for rubbish to accumulate (due to tidal emplacement), habitats generally require intensive maintenance to ensure habitat values are preserved. Whilst measures to stabilise fore-dune erosion will compromise habitat integrity, it would be appropriate to monitor these habitats so the impacts of erosion and sea-level rise on natural habitats can be documented.

A regular program of rubbish collection would enhance habitat value and recreational amenity. An appropriately sited permanent photographic monitoring point would allow documentation of habitat change in response to erosion and sea level rise. Records of fauna occupation, particularly in relation to the ‘beach stone-curlew’ and other significant migratory species, should be documented with photographic evidence where possible. The habitat will suffer a relatively consistent replenishment of rubbish as a result of tidal emplacement.

8.4.4 Summary of Recommended Management Actions

Table 13. Summary management recommendations for coastal beach complexes.

Management Category	Context/Issue	Actions	Priority
Cultural Heritage	Cultural heritage values may occur within the habitat.	Implement systematic surveys of the cultural heritage values of this habitat zone with consideration given to protecting/managing any significant sites.	Immediate
Fauna Surveys	No previous surveys.	Fauna survey specifically targeting occurrences and populations of beach stone curlew, migratory bird species and nesting sites for turtles. Information on species occurrence should be used to define habitat management zones or specific management actions.	Immediate
Plant Surveys	Information of flora composition is incomplete and limited to rapid surveys in dry season. The floristic assemblage within this habitat is relatively simple.	Carry out additional flora field surveys across seasons with focus on wet season herbs and grasses. Collect specimens and photograph plants with known uses/values and that may have been used in the past, and catalogue.	Moderate
Threatened Species Management	<u>Flora:</u> No significant species known.	<u>Flora:</u> No actions.	Moderate
	<u>Fauna:</u> Composition of significant fauna within this habitat is poorly known.	<u>Fauna:</u> Further baseline information required (see fauna surveys) before discrete management actions can be defined.	High

Management Category	Context/Issue	Actions	Priority
Traditional Ecological Knowledge	Composition of TEK within this habitat is poorly known. Plant and animal lists provided in the Appendices provide a foundation for increasing TEK and ethnotaxonomy.	Collect and collate TEK knowledge through fauna and flora survey actions, and from interviews with elders on an ongoing basis.	High
Fire Management	Not subject to burning due to limited habitat extent.	No actions /Fire exclusion	Moderate
Invasive Species Management	<u>Flora</u> : Information on weeds is limited. <u>Fauna</u> : Populations and composition of invasive fauna within this habitat requires further study. There is considerable potential for impacts on sensitive fauna species, particularly nesting birds, by feral cats and dogs.	<u>Flora</u> : Carry out survey of existing weeds and monitoring for new weed infestations on an annual or bi annual basis and implement control where necessary. <u>Fauna</u> : Invasive fauna to be derived from fauna survey results. Assess cat activity levels by installation/monitoring of sand pads, nocturnal spotlighting, and consultation with community members. Implement control where appropriate.	High High
Monitoring	Observations relating to any changes to habitat condition should be documented so that the risk these changes pose to long-term habitat stability can be assessed and appropriate management responses formulated.	Carry out monitoring for erosion, changes to vegetation structure and infestation of weed species on a six monthly basis including observations taken late in the wet season at maximum growing season. Due to the restricted nature of these habitats, it is viable to comprehensively survey all habitats on a regular basis.	High

8.5 Grassland and Grassland Complexes

8.5.1 Status of Ecological Knowledge

Grassland is restricted to two minor occurrences, existing on beach ridges in the Gagani area, and a single occurrence at the top of a rocky headland (known locally as Tura), occupying approximately 1ha. The habitat is formed by a range of grasses including *Imperata cylindrica*, *Themeda triandra*, *Chrysopogon fallax* and *Mnesithea rottboellioides*. Neldner *et al.* (1997) acknowledge the bioregional conservation value of native grassland habitat and the state assigns an 'of concern' biodiversity and vegetation management status to these ecosystems. It should however be acknowledged that the majority of these habitats in the Torres Strait Island context are products of a cultural burning practice that has been maintained since earliest island occupation. The provenance of this grassland habitat is unknown. Development is influenced by extreme wind exposure, salt, skeletal soils and possible traditional burning events.



Photograph 10. Grassland habitat on lama's rocky eastern headland (Tura).

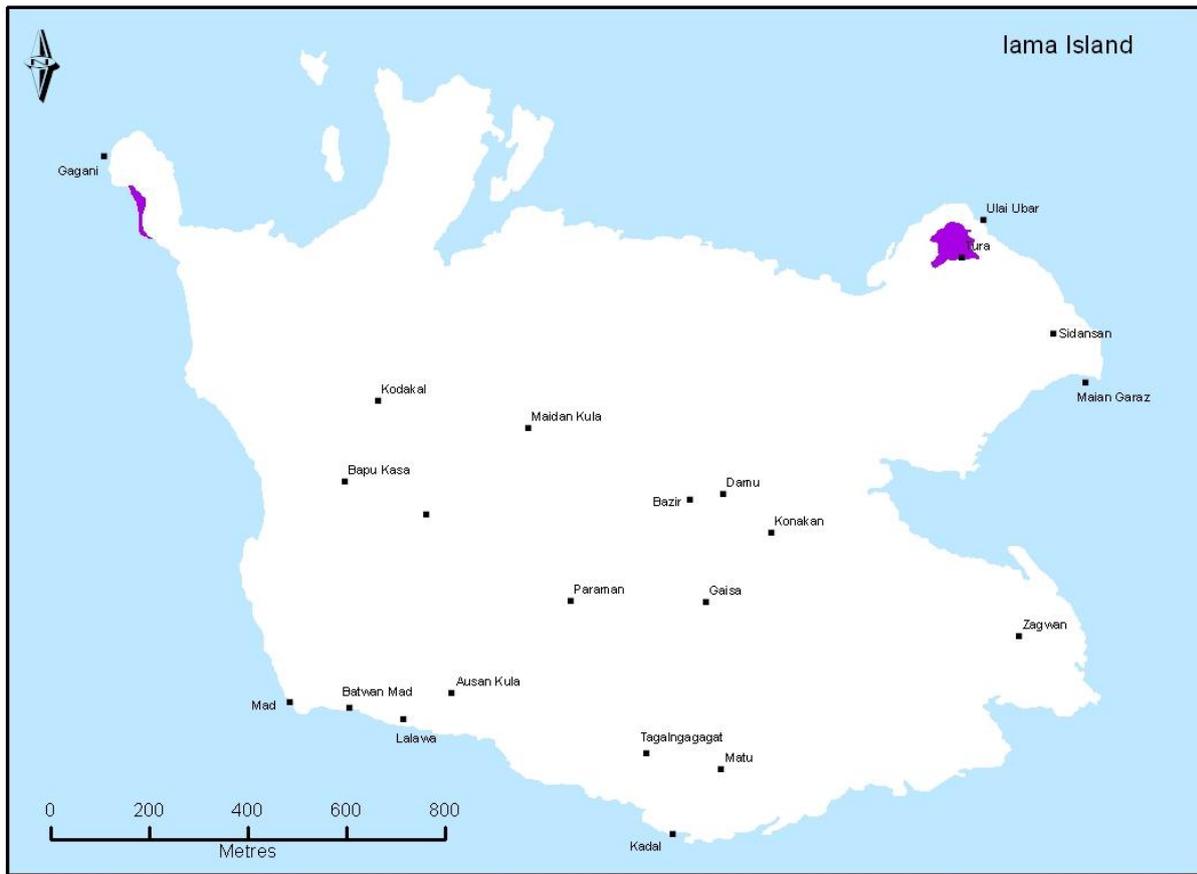


Figure 7. Distribution of grassland habitats (place names after Lawrie, 1970).

8.5.2 Ecological/ Cultural Considerations

Habitat Condition and Threats: lama's only grassland habitat (with the exception of a limited area of grassland on foredunes near Gagani) is the location of the islands radio transmission tower and has thus suffered moderate disturbance. The habitat is however relatively free from exotic weeds with the exception of stinking passionflower (*Passiflora foetida*). Habitat integrity is however threatened by invasion by a range of existing exotic species such as mintweed (*Hyptis suaveolens*), and red natal grass (*Melinis repens*). Other weeds not recorded from the island such as molasses grass (*Melinis minutiflora*) and lantana (*Lantana camara*) are considered potential threats. Introduction of these

invasive species can often be attributed to use of machinery or other equipment and spread is facilitated by ground disturbance or inappropriate fire regimes in the case of exotic grasses.

Fauna: The fauna values associated with this habitat are unknown but are expected to be limited due to the restricted nature of the habitat and simple floristic composition.

Flora: The diversity of the habitat is low with species composition currently limited to 10 species.

Cultural Perspectives: The cultural significance of this habitat in regards to usage, geography and traditional management practice is unknown.

8.5.3 Management Implications

The habitat is currently self-maintaining which tends to indicate edaphic conditions are a major control on habitat development. As such, a program of active fire maintenance is not considered necessary at present although the timing, conditions and severity of all incidental fire events should be documented. Regular inspection of the habitat for weed incursion is a priority management requirement, and weed control programs must be developed and initiated immediately when an infestation is noted.

8.5.4 Summary of Recommended Management Actions

Management action 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 14. Summary of management actions for grasslands and grassland complexes.

Management Category	Context/Issue	Actions	Priority
Cultural Heritage	Cultural heritage values may occur in the vicinity of the habitat.	Further information on the cultural significance, usage and traditional management of this habitat should be collected and documented in the course of the rangers duties.	Immediate
Fauna Surveys	Not subject to a previous fauna survey.	Incorporate grassland habitats into broader fauna survey requirements across the island. Due to the limited extent of this habitat, a structured fauna survey focusing on this habitat as an individual entity is likely to be unproductive.	Moderate
Plant Surveys	Information of flora composition is incomplete and limited to rapid surveys in dry season.	Carry out additional flora field surveys across seasons with focus on herbs and grasses. Collect leaf specimens and photograph plants with known uses/values and that may have been used in the past, and catalogue.	Moderate
Threatened Species Management	<u>Flora:</u> No threatened species known to occur.	<u>Flora:</u> No action.	NA
	<u>Fauna:</u> Composition of significant fauna within this habitat is poorly known although is not expected to	<u>Fauna:</u> Further baseline information required (see fauna surveys) before discrete	Moderate

Management Category	Context/Issue	Actions	Priority
	be rich in regards to species diversity.	management actions can be defined.	
Traditional Ecological Knowledge	TEK in regard to species within this habitat is poorly known. Plant and animal lists provided in appendices provide a good foundation for increasing TEK and ethnotaxonomy.	Collect and collate TEK through fauna and flora survey actions, and from interviews with elders on an ongoing basis.	High
Fire Management	The habitat may require fire management to prevent broad scale change to habitat structure.	Mosaic burning of this habitat starting early in the dry season will prevent severe late season fires and assist management of the habitat in regards to weed invasion.	Moderate
Invasive Species Management	<u>Flora</u> : Grasslands are currently free of major invasive species however, potential weeds are known from disturbed areas within and on the vicinity of the lama community, and elsewhere in the region.	<u>Flora</u> : Monitoring for invasive pest species particularly exotic grasses should be undertaken every six months. Collect, record location using GPS, and photograph weeds that cannot be identified in the field so as formal identification can be achieved. Any nucleation points should be subject to immediate eradication.	Immediate
	<u>Fauna</u> : The composition of invasive fauna within this habitat is unknown. There is potential for impacts on fauna by feral cats and dogs.	<u>Fauna</u> : Composition of invasive fauna to be derived from fauna survey results. Implement control where appropriate.	Moderate
Monitoring	Observations relating to any changes to habitat condition should be documented so that the risk these changes pose to long-term habitat stability can be assessed and appropriate management responses formulated.	Establish a permanent monitoring points in grassland areas to monitor for changes in habitat structure and weed invasion. Carry out monitoring for weed species on a six monthly basis including observations taken late in the wet season.	Immediate

8.6 Mangrove Forest, Woodland and Shrubland Complexes

8.6.1 Status of Ecological Knowledge

An extensive area of mangrove forest exists within a sheltered embayment on the islands northern side. The habitat has been largely unsurveyed floristically although observation suggests that the habitat comprises a complex mix of species and zonations, including some well developed forests of the deciduous cedar mangrove (*Xylocarpus granatum*). Associated with this habitat are small areas of *Pemphis acidula* dominant shrubland.



Photograph 11. Tall specimens of *Xylocarpus granatum* forming emergents over mangrove canopy.

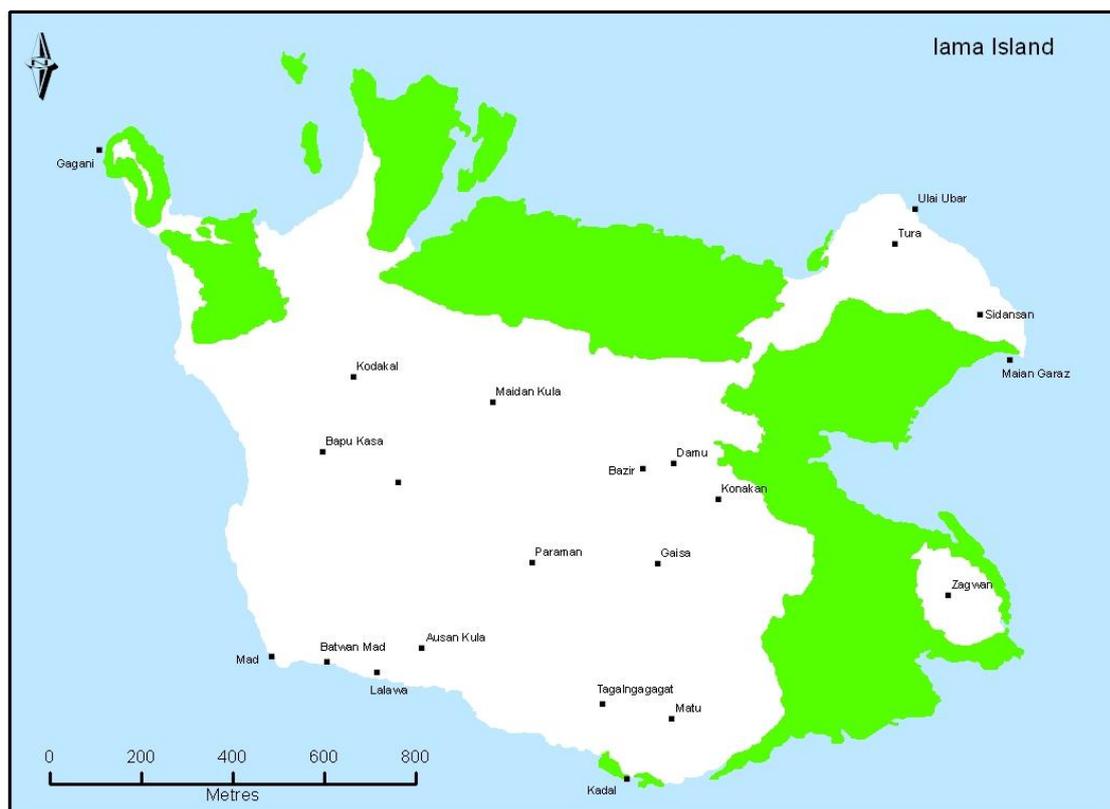


Figure 8. Distribution of mangrove forests, woodlands and shrublands.

8.6.2 Ecological / Cultural Considerations

Habitat Condition: The habitat exhibits high integrity although harvesting of specific mangrove species for firewood is occurring in accessible locations. Areas of mangrove forest have been reclaimed for airport development.

Fauna: Mangrove ecosystems provide habitat and foraging values for a range of avifauna and reptiles including the littoral whiptail skink and estuarine crocodile (*Crocodylus porosus*). The habitat may also provide foraging ground for the spectacled flying-fox and coastal sheath-tail bat.

Flora: The mangrove trumpet tree (*Dolichandrone spathacea*) is a Near-Threatened species recorded from mangrove margins. The 29 species recorded within this habitat to date is likely to increase with further survey.

Cultural Perspectives: Mangrove communities provide an important cultural resource for the lamalgal people, both as hunting grounds and as foraging areas for timber. A large number of mangrove species are utilised for firewood, building material, food and medicinal purposes.

8.6.3 Management Implications

These habitats are largely self maintaining although excessive timber extraction may be altering the ecology of the habitat in accessible locations. Rotation of areas harvested for timber will prevent over utilisation and subsequent degradation of the resource in accessible stands. Recommendations for management and monitoring of mangrove ecosystems within the *Mangrove Watch* program are identified by Burrows *et al.* (2010).

8.6.4 Summary of Recommended Management Actions

Table 15. Summary of management actions for mangrove (*thag*) habitats.

Management Category	Context/Issue	Actions	Priority
Cultural Heritage	Specific cultural heritage values may occur throughout or on the margins of this habitat.	In consultation with the community, incorporate survey data of cultural heritage sites in this habitat zone and consider appropriate protection/management of sites.	Immediate
Fauna Surveys	Not subject to previous comprehensive fauna survey.	Design and implement a structured fauna survey and trapping program supported by specialists. Maintain focus on culturally significant species and ethnotaxonomy to feed into TEK. Focus should be on priority survey actions including confirmation of spectacled flying-fox on the island and microbat surveys.	Immediate
Plant Surveys	Information on flora composition is incomplete and limited to rapid surveys.	Carry out additional flora field surveys. Collect leaf specimens and photograph plants with known uses/values and that may have been used in the past, and catalogue.	Moderate
Threatened Species Management	<u>Flora:</u> The mangrove trumpet tree (<i>Dolichandrone spathacea</i>) is a Near threatened species with potential to occur. <u>Fauna:</u> Numerous Migratory birds and a number of potential EVNT fauna species are known to utilise this habitat.	<u>Flora:</u> Field surveys required to determine the population of mangrove trumpet tree. <u>Fauna:</u> Further baseline information required (see fauna surveys) before discrete management actions can be defined.	Moderate High
Traditional Ecological Knowledge	Composition of TEK within this habitat is poorly known. Plant and animal lists provided in the Appendices provide a foundation for increasing TEK and ethnotaxonomy.	Collect and collate TEK through fauna and flora survey actions, and from interviews with elders on an ongoing basis.	High
Fire Management	No issues evident.	No actions.	NA
Invasive Species Management	<u>Flora:</u> A number of weeds are known from the disturbed margins of mangroves areas within and on the vicinity of the community. The highly invasive weed pond apple (<i>Annona glabra</i>) has been recorded from Horn island and is considered a potential threat to sensitive margins of this habitat. <u>Fauna:</u> Composition of invasive fauna within this habitat is poorly known. Potential for impacts on fauna by feral cats, dogs and rats.	<u>Flora:</u> Undertake monitoring for invasive species on mangrove margins near the community and refuse site. Train rangers on identification of pond apple. <u>Fauna:</u> Composition of invasive fauna to be derived from fauna survey results. Assess cat and dog activity levels by installation and monitoring of sand pads on nearby tracks, nocturnal spotlighting, and	High Immediate

Management Category	Context/Issue	Actions	Priority
		consultation with community members. Implement control where appropriate.	
Monitoring	Observations relating to any changes to habitat condition should be documented so that the risk these changes pose to long-term habitat stability can be assessed and appropriate management responses formulated.	Detailed recommendations for mangrove monitoring are detailed in Burrows et al (2010).	Immediate
Other	<p>Ghost nests may occur on the margins of mangrove vegetation.</p> <p>Plastic bags originating from the dump blow into adjoining mangroves.</p> <p>Mangroves are being over harvested in some locations, particularly near settlement areas.</p>	<p>Carry out ongoing surveys for ghost nets along the lama.</p> <p>Limit impacts of plastic bags by fencing along margins of mangroves.</p> <p>Implement a mangrove harvesting management program which designates specific harvesting areas for rotation.</p>	Immediate

8.7 Cleared / Degraded Areas

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. Pest species recorded in the township have a significant potential to propagate and spread into natural habitats include. A comprehensive program of weed survey, control and eradication around the township is required to minimise this risk.

9.0 References and Bibliography

- Baittinoff, G.N. and Dillewaard, H.A. (1997). Floristic analysis of the Great Barrier Reef continental islands. Queensland Herbarium, Department of Environment, Indooroopilly, Qld.
- Bani, E. (2004). Evidence of cultural custodianship. In R. Davis (ed.), *Woven Histories Dancing Lives: Torres Strait Islander Identity, Culture and History*, pp. 31-32. Aboriginal Studies Press, Canberra.
- Baker-Gabb, D.J. (1986). Ecological release and behavioural and ecological flexibility in marsh harriers on islands. *Emu*, **86**: 71-81.
- Barratt, D.G. (1997). Predation by house cats, *Felis catus* (L.), in Canberra, Australia. I. Prey composition and preference. *Wildlife Research*, **24**: 263-277.
- Barrett, G., A. Silcocks, S. Barry, R. Cunningham & R. Poulter (2003). *The new atlas of Australian birds*. Birds Australia, Melbourne.
- Baxter, R. (2010). Trip report Torres Strait (Boigu-Saibai-Dauan) 16th-23rd Oct 2008. <http://www.birdingtours.com.au/ts.html>
- BirdLife International (2011). Species factsheet: *Apus pacificus*. Downloaded from <http://www.birdlife.org> on 04/01/2011.
- Blakers, M., Davies, S.J.J.F. and Reilly, P.N. (1984). The atlas of Australian birds. *Melbourne University Press, Melbourne*.
- Boland, C.R.J. (2004a). Breeding biology of rainbow bee-eaters (*Merops ornatus*): a migratory, colonial, cooperative bird. *Auk*, **121**: 811-823.
- Boland, C.R.J. (2004b). Introduced cane toads are active nest predators and competitors of rainbow bee-eaters *Merops ornatus*: observational and experimental evidence. *Biological Conservation*, **120**: 53-62.
- Borsboom, A. (2007). Nomination to re-classify the 'rare' *Varanus prasinus* to 'near threatened' under the Nature Conservation Act 1992. *Biodiversity Sciences Environmental Sciences Division, Environmental Protection Agency*.
- Bostock, P.D. and Holland, A.E. (eds.) (2010). Census of the Queensland Flora 2010. *Queensland Herbarium, Department of Environment and Resource Management, Brisbane*.
- Bradley, J. J. (2005). 'Same time poison, same time good tucker': The cycad palm in the south west Gulf of Carpentaria'. *Journal of Australian Studies* 29: 86, 119 – 133
- Buden, D.W. (2007). Reptiles of Satawan Atoll and the Mortlock Islands, Chuuk State, Federated States of Micronesia. *Pacific Science*, **61**: 415-428.
- Bureau of Meteorology (BOM) (2008a). Rainfall Statistics, Recording Station 027025 – Iama Island. Available at www.bom.gov.au/climate/averages.
- Bureau of Meteorology (BOM) (2008b). Rainfall Statistics, Recording Station 027001 – Badu Island. Available at www.bom.gov.au/climate/averages.
- Bureau of Meteorology (BOM) (2008c). Rainfall Statistics, Recording Station 027011 – Dauan Island. Available at www.bom.gov.au/climate/averages.
- Case, T.J., Bolger, D.T. & Petren, K. (1994). Invasions and competitive displacement among house geckos in the tropical Pacific. *Ecology*, **75**: 464-477.

- Chantler, P. (1999). 'Apodidae (Swifts),' in Handbook of the Birds of the World. Vol. 5. Barn-owls to hummingbirds, eds. J. del Hoyo, A. Elliott & J. Sargatal, Lynx Edicions, Barcelona.
- Christidis, L. & Boles, W.E. (2008). Systematics and taxonomy of Australian birds. *CSIRO Publishing, Collingwood*.
- Churchill, S. (2008). Australian bats. Second Edition. *Allen & Unwin, Crows Nest*.
- Clancy, G.P. (1986). Observations of nesting beach thick-knees *Burhinus neglectus* at Red Rock, New South Wales. *Corella*, **10**: 114-118.
- Clarke, R.H. (2004a). A record of the emerald monitor *Varanus prasinus* from Boigu Island, Torres Strait, Australia. *Herpetofauna*, **34**: 70-71.
- Clarke, R.H. (2004b). The avifauna of northern Torres Strait: Notes on a wet-season visit. *Australian Field Ornithology*, **21**: 49-66.
- Clarke, R.H. 2006. Papuan spine-tailed swifts *Meamsia novaeguineae* on Boigu Island, Torres Strait, Queensland. *Australian Field Ornithology*, **23**: 125-129.
- Clarke, R.H. 2006. Papuan spine-tailed swifts *Meamsia novaeguineae* on Boigu Island, Torres Strait, Queensland. *Australian Field Ornithology*, **23**: 125-129.
- Conics (2009a). Mabuiag Island Environmental Report: Torres Strait Sustainable Land Use Plan Habitat and Fauna Assessment. *Unpublished Report to Torres Strait Regional Authority*.
- Churchill, S. (2008). Australian Bats (2nd Edition) Jacana Books, Crows Nest.
- Clancy, G.P. (1986). Observations of nesting beach thick-knees *Burhinus neglectus* at Red Rock, New South Wales. *Corella*, **10**: 114-118.
- Clancy, G.P. (2010). Causes of mortality in the black-necked stork *Ephippiorhynchus asiaticus* in New South Wales. *Australian Field Ornithology*, **27**: 65-75.
- Clarke, R.H. (2004a). A record of the emerald monitor *Varanus prasinus* from Boigu Island, Torres Strait, Australia. *Herpetofauna*, **34**: 70-71.
- Clarke, R.H. (2004b). The avifauna of northern Torres Strait: Notes on a wet-season visit. *Australian Field Ornithology*, **21**: 49-66.
- Clarke, R.H. (2006). Papuan spine-tailed swifts *Meamsia novaeguineae* on Boigu Island, Torres Strait, Queensland. *Australian Field Ornithology*, **23**: 125-129.
- Clarke, R.H. (2007). Orange-bellied fruit-dove *Ptilinopus iozonus* on Boigu Island, Torres Strait: The first record for Australian Territory. *Australian Field Ornithology*, **24**: 44-48.
- Clarke, R.H., Gosford, R., Boyle, A., Sisson, L. & Ewens, J.G. (2010). A specimen record of the little paradise-kingfisher *Tanysiptera hydrocharis* from Torres Strait, Queensland: A new bird for Australian Territory. *Australian Field Ornithology*, **27**: 165-173.
- Cogger, H.G. (2000). Reptiles & amphibians of Australia. *Reed New Holland, Sydney*.
- Commonwealth of Australia (1995). Regional Forest Agreements – The Commonwealth Position. *Commonwealth of Australia: Canberra*.

- Conics 2008a. Kubin environmental report: Torres Strait sustainable land use plan habitat and fauna assessment – Kubin Community, Mua Island. *Unpublished Report to Torres Strait Regional Authority.*
- Conics (2008b). St Pauls environmental report: Torres Strait sustainable land use plan habitat and fauna assessment – St Pauls Community, Mua Island. *Unpublished Report to Torres Strait Regional Authority.*
- Conics 2009a. Badu environmental report: Torres Strait sustainable land use plan habitat and fauna assessment – Badu. *Unpublished Report to Torres Strait Regional Authority.*
- Conics 2009b. Iama Island Environmental Report: Torres Strait Sustainable Land Use Plan Habitat and Fauna Assessment. *Unpublished Report to Torres Strait Regional Authority.*
- Conics 2009c. Mabuiag (Mabuiag Island) environmental report: Torres Strait sustainable land use plan habitat and fauna assessment – Mabuiag (Mabuiag Island). *Unpublished Report to Torres Strait Regional Authority.*
- Covacevich, J., Ingram, G.J. & Czechura, G.V. (1982). Rare frogs and reptiles of Cape York Peninsula, Australia. *Biological Conservation*, **22**: 283-294.
- Debus, S. (1998). The birds of prey of Australia: A field guide to Australian raptors. *Oxford University Press, Melbourne.*
- Department of Environment and Resource Management (2010). Torres Strait Natural Resource Management Region Back on Track Biodiversity Planning Tool, *Department of Environment and Resource Management, Brisbane.*
- DERM (2010a). Wildlife Online Extract. Latitude: 9.2622 Longitude: 142.2095 Distance: 6 km. *Department of Environment and Resource Management. Extracted 15 October 2010.*
- DERM (2010b). Wildlife Online Extract. Latitude: 9.5874 Longitude: 143.7703 Distance: 9 km. *Department of Environment and Resource Management. Extracted 18 October 2010.*
- DERM (2010c). Wildlife Online Extract. Latitude: 9.8999 Longitude: 142.7747 Distance: 12 km. *Department of Environment and Resource Management. Extracted 15 October 2010.*
- DERM (2010d). Wildlife Online Extract. Latitude: 9.9149 Longitude: 144.052 Distance: 25 km. *Department of Environment and Resource Management. Extracted 15 October 2010.*
- DERM (2010e). Wildlife Online Extract. Latitude: 9.9534 Longitude: 142.1817 Distance: 10 km. *Department of Environment and Resource Management. Extracted 18 October 2010.*
- DERM (2010f). Wildlife Online Extract. Latitude: 10.1846 Longitude: 142.266 Distance: 9 km. *Department of Environment and Resource Management. Extracted 15 October 2010.*
- DERM (2010g). Wildlife Online Extract. Latitude: 10.1149 Longitude: 142.156 Distance: 7 km. *Department of Environment and Resource Management. Extracted 15 October 2010.*
- DERM (2011a). 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.
- DERM (2011b). Wildlife and ecosystems: Fawn leaf-nosed bat. Department of Environment and Resource Management, Brisbane. <http://www.derm.qld.gov.au/wildlife->

ecosystems/wildlife/az_of_animals/micro_bats_the_insect_terminators/fawn_leafnosedbat.html.
Last updated 1 December 2010.

- Department of Sustainability, Environment, Water, Population and Communities (2011). Advice to the Minister for the Environment, Water, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendments to the List of Key Threatening Processes under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Online @ <http://www.environment.gov.au/index.html>. Accessed 16 Feb 2011.
- Draffan, R.D.W., Garnett, S.T. and Malone, G.J. (1983). Birds of the Torres Strait: An annotated list and biogeographical analysis. *Emu* 83: 207-234.
- Driscoll, P.V. & Ueta, M. (2002). The migration route and behaviour of eastern curlews *Numenius madagascariensis*. *Ibis*, **144**: 119-130.
- DSEWPC (2011a). *Apus pacificus* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>.
- DSEWPC (2011b). *Ardea ibis* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>.
- DSEWPC (2011c). *Ardea modesta* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>.
- DSEWPC (2011d). Australian Faunal Directory. *Department of Sustainability, Environment, Water, Population and Communities, Canberra*. <http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/afd/index.html>.
- DSEWPC (2011e). *Conilurus penicillatus* — Brush-tailed Rabbit-rat, Brush-tailed Tree-rat. *Species Profile and Threats Database. Department of Sustainability, Environment, Water, Population and Communities, Canberra*. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=132
- DSEWPC (2011f). *Hirundapus caudacutus* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>.
- DSEWPC (2011g). *Protected Matters Search Tool*. Department of Sustainability, Environment, Water, Population and Communities. <http://www.environment.gov.au/epbc/pmst/index.html>.
- Duncan, A., Barker, G.B. & Montgomery, N. (1999). The action plan for Australian bats. Environment Australia, Canberra.
- Ehmann, H. (1992). Encyclopedia of Australian animals: Reptiles. *Angus and Robertson, Sydney*.
- EPA (2007). *Nature conservation (Estuarine Crocodile) plan 2007 and management program 2007-2017*. Environmental Protection Agency, Queensland.
- Freeman, A.N.D. (2003). The distribution of beach stone-curlews and their response to disturbance on far north Queensland's Wet Tropical Coast. *Emu*, **103**: 369-372.
- Frith, H.J. (1977). *Waterfowl in Australia*. A.H. and A.W. Reed, Sydney.
- Fukuda, Y., Whitehead, P. & Boggs, G. (2007). Broad-scale environmental influences on the abundance of saltwater crocodiles (*Crocodylus porosus*) in Australia. *Wildlife Research*, **34**: 167-176.

- Fell, D.G. (2009). Report on the Vegetation and Flora of Pulu Islet: DG Fell Flora Surveys May 2009. Unpublished report to Arafura Consulting.
- Fell D.G., Lifu M., McIntyre-Tamwoy S., Roberts C., Leung L., Lynch A.J.J., Charlie B. and Lifu T. (2009). *Significant Species and Habitats of Greater Lockerbie Scrub, Cape York Peninsula, Queensland*. Unpublished report to the Queensland Government Department of Environment and Resource Management, Brisbane.
- Franklin, D. C., Matthews, R. and Lawes, J. (2010). History of the East Point monsoon forest. *Northern Territory Naturalist* (2010) 22: 2-16.
- Freeman, A.N.D. 2003. The distribution of beach stone-curlews and their response to disturbance on far north Queensland's Wet Tropical coast. *Emu*, **103**: 369-372.
- Freeman, A. and Freeman, A. 2009. Habitat use in a large rainforest python (*Morelia kinghorni*) in the Wet Tropics of North Queensland, Australia. *Herpetological Conservation and Biology*, **4**: 252-260.
- Fukuda, Y., Whitehead, P. & Boggs, G. 2007. Broad-scale environmental influences on the abundance of saltwater crocodiles (*Crocodylus porosus*) in Australia. *Wildlife Research*, **34**: 167-176.
- Garnett, S.T. and Crowley, G.M. (2000). The Action Plan for Australian Birds. *Environment Australia, Canberra*.
- Geering, A., Agnew, L. & Harding, S. (2007). Shorebirds of Australia. *CSIRO Publishing, Collingwood*.
- Gynther, I.C. & Janetzki, H. (2008). 'Water Mouse *Xeromys myoides*,' in *The mammals of Australia*, Third Edition. eds. S. Van Dyck, & R. Strahan, Reed New Holland, Sydney.
- Haddon, A.C. (ed.) (1901-1935). *Reports of the Cambridge Anthropological Expedition to Torres Straits. 6 Volumes. Cambridge University Press, Cambridge*.
- Haddon, A.C. (1908). Religion. Pp. 241-280. In Haddon, A.C. (ed.) *Reports of the Cambridge Anthropological Expedition to Torres Straits. Volume 6: Sociology, Magic and Religion of the Eastern Islanders*. Cambridge: Cambridge University Press.
- Haddon, A.C. (1912a). Food and its preparation and narcotics. In A.C. Haddon (ed.), *Reports of the Cambridge Anthropological Expedition to Torres Straits. Volume 4: Arts and Crafts*, pp. 130-143. Cambridge University Press, Cambridge.
- Haddon, A.C. (1912b). Horticulture. In A.C. Haddon (ed.), *Reports of the Cambridge Anthropological Expedition to Torres Straits. Volume 4: Arts and Crafts*, pp. 144-151. Cambridge University Press, Cambridge.
- Haddon, A.C. (1912c). Science. Pp. 218-237. In Haddon, A.C. (ed.) *Reports of the Cambridge Anthropological Expedition to Torres Straits. Volume 4: Arts and Crafts*. Cambridge: Cambridge University Press.
- Haddon, A.C. & Rivers, W.H.R. (1904). Totemism. Pp. 153-193. In Haddon, A.C. (ed.) *Reports of the Cambridge Anthropological Expedition to Torres Straits. Volume 5: Sociology, Magic and Religion of the Western Islanders*. Cambridge: Cambridge University Press.
- Hall, L.S. (2008). Large-eared Flying-fox, *Pteropus macrotis*. In: S. Van Dyck and R. Strahan (eds), *The Mammals of Australia*, pp. 441-442. Third Edition. Reed New Holland, Sydney.
- Harvey, M.B., Barker, D.G., Ammerman, L.K. & Chippindale, P.T. 2000. Systematics of pythons of the *Morelia amethystina* complex (Serpentes: Boidae) with the description of three new species. *Herpetological Monographs*, **14**: 139-185

- Heatwole, H. (1975). Biogeography of reptiles on some of the islands and cays of eastern Papua-New Guinea. *Atoll Research Bulletin*, No. **180**.
- Hediger, H. (1933-34). Beitrag zur herpetologie und zoogeographie neu Britanniens und einiger umliegender Gebiete. *Jahrbücher*, **65**: 441-582.
- Higgins, P.J. ed. (1999). Handbook of Australian, New Zealand and Antarctic birds, Vol. 4, Parrots to dollarbird. *Oxford University Press, Melbourne*.
- Higgins, P.J. & Davies, S.J.J.F. eds. (1996). Handbook of Australian, New Zealand and Antarctic birds, Vol. 3, Snipe to pigeons. *Oxford University Press, Melbourne*.
- Higgins, P.J, Peter, J.M. & Cowling, S.J eds. (2006a). Handbook of Australian, New Zealand and Antarctic birds. Vol. 7. Boatbill to starlings. Part A: Boatbill to larks. *Oxford University Press, South Melbourne*.
- Higgins, P.J, Peter, J.M. & Cowling, S.J eds. (2006b). Handbook of Australian, New Zealand and Antarctic birds. Vol. 7. Boatbill to starlings. Part B: Dunnock to starlings. *Oxford University Press, South Melbourne*.
- Hoskin, C.J. (2010). The invasion and potential impact of the Asian house gecko (*Hemidactylus frenatus*) in Australia. *Austral Ecology*, DOI: 10.1111/j.1442-9993.2010.02143.x.
- Kushlan, J.A. & Hancock, J. (2005). Herons. *Oxford University Press, Oxford*.
- Henderson, R.J.F. (2002) (Ed.). Names and Distribution of Queensland Plants, Algae and Lichens. *Queensland Herbarium Environmental Protection Agency, Brisbane*.
- Hitchcock, G., McNiven, I.J. and the Pulu Indigenous Protected Area (IPA) Committee (2009). Pulu Indigenous Protected Area Plan of Management. *Melbourne: Arafura Consulting. June 2009*.
- Ingram, G.J. (2008). The terrestrial vertebrates of . In B. David, L. Manas and M. Quinnell (eds), *Gelam's Homeland: Cultural and Natural History on the Island of , Torres Strait*, pp. 619-628. *Memoirs of the Queensland Museum (Cultural Heritage Series) 4(2)*.
- Ingram, G.J. (2008). The terrestrial vertebrates of , western Torres Strait. *Memoirs of the Queensland Museum, Cultural Heritage Series, 4*: 619-628.
- Landsberg, J. and Clarkson, J. R. (2004). Threatened Plants of Cape York Peninsula. Queensland Parks and Wildlife Service, Environmental protection Agency, Cairns.
- Lane, B. A. (1987). *Shorebirds in Australia*. Nelson Publishers, Melbourne.
- Lauro, B. & Nol, E. (1995). Patterns of habitat use for pied and sooty oystercatchers nesting at the Furneaux Islands, Australia. *Condor*, **97**: 920-934.
- Lawrie, M. (1970). Myths and Legends of the Torres Strait. *University of Queensland Press, St Lucia Brisbane*.
- Low, T. (1995). *The animals of Brisbane: A vertebrate status review*. Unpublished report prepared for Brisbane City Council.
- Maddock, M. (2000). 'Hérons in Australasia and Oceania,' in *Heron Conservation*, eds. J.A. Kushlan & H. Hafner, Academic Press, Sydney.
- Marchant, S. & Higgins, P.J. eds. (1990). Handbook of Australian, New Zealand and Antarctic birds, Vol. 1, Ratites to Ducks, Part B, Australian pelican to ducks. *Oxford University Press, Melbourne*.

- Marchant, S. & Higgins, P.J. eds. (1993). Handbook of Australian, New Zealand and Antarctic birds, Vol. 2, Raptors to lapwings. *Oxford University Press, Melbourne*.
- McKilligan, N. (2005). Herons, egrets and bitterns: Their biology and conservation in Australia. *CSIRO Publishing, Collingwood*.
- Menkhorst, P.W. & Knight, F. (2004). A field guide to the mammals of Australia. *Oxford University Press, Melbourne*.
- McNiven, I.J. and Hitchcock, G. (2004). Torres Strait Islander marine subsistence specialisation and terrestrial animal translocation. *Memoirs of the Queensland Museum (Cultural Heritage Series)* 3(1): 105-162.
- McNiven, I.J. & D. Wright (2008). Ritualised marine midden formation in Western Zenadh Kes (Torres Strait). In G. Clark, F. Leach and S. O'Connor (eds), *Islands of Inquiry: Colonisation, Seafaring and the Archaeology of Maritime Landscapes*. *Terra Australis* 29: 133-147.
- Natural Solutions 2008a. Torres Strait Sustainable Land Use Plan Habitat and Fauna Assessment – Erub (Darnley) Island. *Natural Solutions Environmental Consultants Pty Ltd. Report prepared for the Torres Strait Regional Authority*.
- Natural Solutions 2008b. Torres Strait Sustainable Land Use Plan Habitat and Fauna Assessment – Iama Island. *Natural Solutions Environmental Consultants Pty Ltd. Report prepared for the Torres Strait Regional Authority*.
- Neal, R.A. (1989). An Archaeological Inspection of Alternative Telecom Locations on Mabuiag and Yam Islands, Torres Strait. *Unpublished report to Queensland Department of Community & Ethnic Affairs*. Pirripoint Pty Ltd, Helidon, Queensland.
- Neldner, V. J., Fensham, R. J. Clarkson, J. R. and Stanton, J. P. (1997). The natural grasslands of Cape York Peninsula, Australia. Description, distribution and conservation status. *Biological Conservation* 81: 121-136.
- Neldner, V.J. and Clarkson, J.R. (1995). Vegetation Survey Mapping of Cape York Peninsula. In: Cape York Peninsula Land Use Strategy. *Office of the Co-ordinator General and Department of Environment and Heritage, Government of Queensland, Brisbane*.
- Neldner, V. J., Wilson, B. A., Thompson, E. J. and Dilleward, H. A. (2005). Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland. *Version 3.1. Updated September 2005. Queensland Herbarium, Environmental Protection Agency, Brisbane*.
- NSW NPWS (2002). Threatened species of the upper north coast of New South Wales: *Fauna*. *NSW Parks and Wildlife Service, Coffs Harbour*.
- Olsen, P. (1998). Australia's raptors: diurnal birds of prey and owls. *Supplement to Wingspan*, 8: I-XVI.
- OZCAM (2011). BioMaps. Online *Zoological Collections of Australian Museums*. <http://www.biomaps.net.au/biomaps2/>. Searched 11-18/2/2011.
- Pavey, C.R. & Kutt, A.S. (2008). 'Large-eared Horseshoe Bat *Rhinolophus philippinensis*,' in *The mammals of Australia*, Third Edition. eds. S. Van Dyck & R. Strahan, Reed New Holland, Sydney.
- Pringle, J.D. (1985). The waterbirds of Australia: The National Photographic Index of Australian wildlife. Angus and Robertson, North Ryde.
- Pringle, J.D. (1987). The shorebirds of Australia: *The National Photographic Index of Australian wildlife*. Angus and Robertson, North Ryde.

- QPWS (2007). Distribution and abundance of the estuarine crocodile (*Crocodylus porosus* Schneider, 1801) in waterways of Queensland's populated east coast. *Report to Hon. Lindy Nelson-Carr MP Minister for the Environment and Multiculturalism. Queensland Parks and Wildlife Service.*
- Read, M.A., Miller, J.D., Bell, I.P. & Felton, A. (2004). The distribution and abundance of the estuarine crocodile, *Crocodylus porosus*, in Queensland. *Wildlife Research*, **31**: 527-534.
- Reid, T. & Park, P. (2003). Continuing decline of eastern curlew, *Numenius madagascariensis*, in Tasmania. *Emu*, **103**: 279-283.
- Richards, G.C. (2008). 'Coastal Sheath-tailed Bat *Taphozous australis*,' in *The mammals of Australia*, Third Edition. eds. S. Van Dyck, & R. Strahan, Reed New Holland, Sydney.
- Ross, E. M. & Halford, D. A. (2007). Aristolochiaceae. *Flora of Australia* 2: 244-258. Australian Government Publishing Service, Canberra.
- Rossiter N. A., Setterfield. S. A., Douglas, M.M. and Hutley, L. B. (2003). Testing the fire grass cycle: alien grass invasion in the tropical savannas of northern Australia. *Diversity and Distributions* 9, 169-176.
- Russell-Smith, J., Stanton, J. P., Edwards, A. C. and Whitehead, J. P. (2004). Rainforest invasion of Eucalypt-dominated woodland savanna, Iron Range, north-eastern Australia: II. Rates of landscape change. *Journal of Biogeography* 31: 1305-1316.
- Russell-Smith, J, Whitehead, J. P., Williams, R. J. and Flannigan, M. (eds) (2003). Fire and savanna landscapes in northern Australia: regional lessons and global challenges. *International Journal of Wildland Fire* 12 247-440.
- Russell-Smith, J, Whitehead, Cooke, P. (eds) (2009). Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurk Tradition. *Tropical Savannas CRC, CSIRO Publishing, Collingwood, Victoria.*
- Schaffer, J. 2010. Wetland assessment of Boigu Island, Torres Strait: Part B – reptiles. *Report No. 10/06. Australian Centre for Tropical Freshwater Research, James Cook University, Townsville.*
- Singleton, G.R. 2008. 'House Mouse *Mus musculus*,' in *The mammals of Australia, Third Edition.* eds. S. Van Dyck & R. Strahan, Reed New Holland, Sydney.
- Smith, N.M. (2003). Weeds of the Wet/Dry tropics of Australia. *Environment Centre of the Northern Territory, Darwin.*
- Smith, P. & Smith, J. 2006. Plants and birds of Erub Island, Torres Strait. *Report for Erub Island Council.*
- Space J. C. and Flynn, T. (2002). Report to the Government of SaMua on Invasive Plant Species of Environmental Concern. U.S.D.A. Forest Service Pacific Southwest Research Station Institute of Pacific Islands Forestry Honolulu, Hawai'i, USA.
- Stanton, D. J, Fell, D. G., and Gooding, D. O. (2009). Vegetation Communities and Regional Ecosystems of the Torres Strait Islands, Queensland, Australia. *Unpublished report to the Torres Strait Regional Authority, land and Sea Management Unit.*
- Storr, G.M. 1973. List of Queensland birds. *Western Australian Museum Special Publication No. 5.*
- Tidemann, C.R., Yorkston, H.D. & Russack, A.J. (1994). The diet of cats, *Felis catus*, on Christmas Island, Indian Ocean. *Wildlife Research*, **21**: 279-285.

- Tucker, A.D., Limpus, C.J., McCallum, H.I. & McDonald, K.R. (1997). Movements and home ranges of *Crocodylus johnstoni* in the Lynd River, Queensland. *Wildlife Research*, **24**: 379-396.
- Tyler, M.J. (1972). 'An analysis of the lower vertebrate faunal relationships of Australia and New Guinea,' in: *Bridge and barrier: The natural and cultural history of Torres Strait*, ed. D. Walker, Australian National University, Canberra.
- Ueta, M., Antonov, A., Artukhin, Y. & Parilov, M. (2002). Migration routes of eastern curlews tracked from far east Russia. *Emu*, **102**: 345-348.
- Van Dyck, S. (1996). *Xeromys myoides* Thomas, 1889 (Rodentia: Muridae) in mangrove communities of North Stradbroke Island, southeast Queensland. *Memoirs of the Queensland Museum*, **42**: 337-366.
- Warham, J. 1962. Bird islands within the Barrier Reef and Torres Strait. *Emu*, **62**: 99-111.
- Watson, J.J. (2009). Terrestrial vertebrate fauna of the Pulu Indigenous Protected Area, *Torres Strait. Report to Arafura Consulting.*
- Watts, C.H.S. & Aplin, K.P. 2008. 'Brown Rat *Rattus norvegicus*,' in *The mammals of Australia, Third Edition*. eds. S. Van Dyck & R. Strahan, Reed New Holland, Sydney.
- Watson, J.J. & Hitchcock, G. in prep: The terrestrial vertebrate fauna of Mabuia. *Memoirs of the Queensland Museum, Cultural Heritage Series.*
- Webb, G.J.W., Sack, G.C., Buckworth, R. & Manolis, S.C. (1983). An examination of *Crocodylus porosus* nests in two Northern Australian freshwater swamps, with an analysis of embryo mortality. *Australian Wildlife Research*, **10**: 571-605.
- Whittier, J.M. & Moeller, D.R. (1993). *Varanus prasinus* (the emerald goanna) on Mua Island, Torres Strait, Australia. *Memoirs of the Queensland Museum*, **34**: 130.
- Wilson, S. (2005). A field guide to reptiles of Queensland. *Reed New Holland, Sydney.*
- Wilson, S. & Swan, G. (2010). A complete guide to reptiles of Australia. *Third Edition. New Holland Publishers, Sydney.*
- Wink, M., Sauer-Gürth, H. & Witt, H.-H. (2004). 'Phylogenetic differentiation of the osprey *Pandion haliaetus* inferred from nucleotide sequences of the mitochondrial cytochrome b gene.' in *Raptors Worldwide*, eds. R.D. Chancellor & B.-U. Meyberg, WWGBP/MME, Budapest.

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 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. cotton tree *Bombax ceiba*).

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

Endemic: A plant or animal that has at least 75% of its known range within a bioregion or which has a total range of 100,000 square km or less (Commonwealth of Australia 1995).

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

Holocene: The current geological epoch, which began approximately 11 thousand years ago. Between five thousand years ago and the present 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 the Pleistocene and Holocene epochs.

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.

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 (NAILSMA)	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	Biodiversity Assessment and Management	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	EHP - Qld Herbarium	Taxonomy and distribution of Qld flora.	<ul style="list-style-type: none"> Threatened flora distribution Conservation and listing context.
Keith Macdonald	EHP 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	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 Government 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 Iama

Family	Botanical Name	MANGRU Mangrove forest, woodland and shrubland complexes	Deciduous vine forests and thickets	THULUP Acacia dominant open forests and woodlands	Coastal Dune Complexes	Shrublands and shrubland complexes	Grasslands and grassland complexes	Bamboo	Regrowth/Cleared	Grand Total
Acanthaceae	<i>Dipteracanthus prostratus</i> *								1	1
Agavaceae	<i>Agave vivipara</i> var. <i>vivipara</i> *								1	1
Amaranthaceae	<i>Alternanthera brasiliana</i> cv. <i>Rubiginosa</i> *								1	1
	<i>Alternanthera brasiliana</i> *								1	1
	<i>Celosia argentea</i> *								1	1
	<i>Gomphrena celosioides</i> *								1	1
Anacardiaceae	<i>Anacardium occidentale</i> *								1	1
	<i>Mangifera indica</i> *		1	1						1
	<i>Catharanthus roseus</i> *								1	1
Arecaceae	<i>Cocos nucifera</i> *								1	1
Asteraceae	<i>Bidens pilosa</i> *								1	1
	<i>Calyptocarpus vialis</i> *								1	1
	<i>Synedrella nodiflora</i> *								1	1
	<i>Tridax procumbens</i> *								1	1
Bignoniaceae	<i>Tecoma stans</i> var. <i>stans</i> *								1	1
Caesalpiniaceae	<i>Delonix regia</i> *								1	1
	<i>Senna alata</i> *								1	1

Family	Botanical Name	MANGRU Mangrove forest, woodland and shrubland complexes	Deciduous vine forests and thickets	THULUP Acacia dominant open forests and woodlands	Coastal Dune Complexes	Shrublands and shrubland complexes	Grasslands and grassland complexes	Bamboo	Regrowth/Cleared	Grand Total
	<i>Senna occidentalis</i> *								1	1
Caricaceae	<i>Carica papaya</i> *			1					1	1
Convolvulaceae	<i>Ipomoea hederifolia</i> *			1						1
	<i>Ipomoea nil</i> *								1	1
	<i>Ipomoea quamoclit</i> *								1	1
Cyperaceae	<i>Cyperus rotundus</i> *								1	1
Dioscoreaceae	<i>Dioscorea esculenta</i> *		1							1
Euphorbiaceae	<i>Euphorbia cyathophora</i> *								1	1
	<i>Euphorbia heterophylla</i> *			1					1	1
	<i>Manihot esculenta</i> *								1	1
Fabaceae	<i>Alysicarpus ovalifolius</i> *								1	1
	<i>Chamaecrista rotundifolia</i> *								1	1
	<i>Clitorea ternatea</i> *								1	1
	<i>Desmodium tortuosum</i> *								1	1
	<i>Desmodium triflorum</i> *								1	1
	<i>Macroptilium atropurpureum</i> *								1	1
	<i>Stylosanthes humilis</i> *								1	1
	<i>Vigna adenantha</i> *								1	1
Lamiaceae	<i>Hyptis suaveolens</i> *						1		1	1
Passifloraceae	<i>Passiflora foetida</i> *		1			1	1		1	1

Family	Botanical Name	MANGRU Mangrove forest, woodland and shrubland complexes	Deciduous vine forests and thickets	THULUP Acacia dominant open forests and woodlands	Coastal Dune Complexes	Shrublands and shrubland complexes	Grasslands and grassland complexes	Bamboo	Regrowth/Cleared	Grand Total
Poaceae	<i>Bambusa sp.*</i>							1	1	1
	<i>Bothriochloa pertusa*</i>								1	1
	<i>Chloris gayana*</i>								1	1
	<i>Cynodon dactylon*</i>								1	1
	<i>Dactyloctenium aegyptium*</i>								1	1
	<i>Megathyrsus maximus var. maximus*</i>								1	1
	<i>Rottboellia cochinchinensis*</i>								1	1
	<i>Sporobolus virginicus</i>	1								1
Portulacaceae	<i>Talinum triangulare*</i>								1	1
Scrophulariaceae	<i>Scoparia dulcis*</i>								1	1
Solanaceae	<i>Capsicum frutescens*</i>								1	1
	<i>Physalis angulata*</i>								1	1
Verbenaceae	<i>Stachytarpheta jamaicensis*</i>								1	1
Zygophyllaceae	<i>Tribulus cistoides*</i>								1	1

Appendix D. Preliminary List Of Useful Plants Of Iama, Torres Strait, Qld.

Collated by G. Hitchcock & D. Fell - Dec 2010

Language names and uses recorded on 9 Nov 2010 direct from information supplied by Mr. Sam Kepa (born 1942), Iamalgal Rangers and vouchered specimen collections notes of M. Lawrie.

Language Name	Common Name	Scientific Name	Habit	Habitat	Use/s
aipi		<i>Beorhavia mutabilis</i>	Herb	Coastal dunes, mangrove margins	Unknown
akar	A basil	<i>Ocimum sp.</i>	Herb	Town	Juice from leaves used on sores; culinary (info supplied by Jack David)
aubayn	Noni Fruit	<i>Morinda citrifolia</i>	Shrub	Edge of Mangrru	Fruit eaten for medicine
bibi	Macaranga	<i>Macaranga tanarius</i>	Shrub	Edge of Tulup scrub	Leaves used to cover earth ovens. Red resin in broken stems for glue.
biyu	Mangrove	<i>Rhizophora sp.</i>	Tree	Mangrru (Mangroves)	Used for house construction. Resin from under bark used for glue.
budi	Native Arrowroot	<i>Tacca leontopetaloides</i>	Tuber	Tulup scrub	Edible tuber eaten in the past
buuz	Whip Vine	<i>Flagellaria indica</i>	Vine	Tulup scrub	Rope used for carrying fish and construction.
Darnley Tree	Garuga	<i>Garuga floribunda var. floribunda</i>	Tree	Vine thicket	Eat when fruit is green, a bit sour
diner	?	?	?		Burnt as mosquito control
ero	Bell Fruit	<i>Syzygium aqueum</i>	Shrub	Town	Fruit eaten
grab	Cardwell Lilly	<i>Proiphys amboinensis</i>	Tuber	Tulup scrub	Edible tuber?
Kapai	Helicopter Tree	<i>Gyrocarpus americanus</i>	Tree	Vine thicket	Soft wood, used for carvings, canoe
kuiup					Calendar plant: when seed pod falls, mackerel (dubui) are running [note slightly different spelling to that obtained from Sam Kepa]
ketai	Yam	<i>Dioscorea esculenta</i>	Vine	Tulup scrub	Yam (eaten)
kausar	Pandanus	<i>Pandanus sp.</i>	Pandan	Edge of town	Leaves for fibre
Mergay	Currant Bush	<i>Antidesma parviflora</i>	Shrub	Tulup scrub	Edible fruit
mipa	Terminalia	<i>Terminalia subacroptera</i>	Tree	Tulup scrub	Fruit eaten
Murr	Mangrove	<i>Ceriops tagal</i>	Shrub in mangroves	Mangrru	Firewood
mur	Pemphis	<i>Pemphis acidula</i>	Shrub in mangroves	Mangrru	TBD
pedi	Coffee bush	<i>Breynia cernua</i>	Shrub	Tulup scrub	Smash leaf, squeeze juice on sores
pelet	A Cheese tree	<i>Glochidion apodogynum</i>	Shrub	Tulup Scrub	? Red wood inside
pidil	?	?	?		Fruit eaten

Language Name	Common Name	Scientific Name	Habit	Habitat	Use/s
pissor?	White Mangrove	<i>DF to identify (DGF10576)</i>	Tree	Mangrru	Favoured mangrove for firewood and construction.
tulup	Hickory Wattle	<i>Acacia auriculiformis</i>	Tree	Tulup scrub	Calendar plant – when in flower, time to cut bush for gardens.
uzu	Lockerbie SatinAsh	<i>Syzygium branderhorstii</i>	Tree	Town gardens	Edible fruit borne from trunk
warkar	Coral tree	<i>Erythrina variegata</i> <i>Erythrina insularis</i>	Tree	Vine thicket	Firewood, used when straightening bamboo spears. Red seeds used for necklaces.
arakakur	Peanut tree	<i>Sterculia quadrifida</i>	Tree	Tulup scrub	Fruit eaten
zanga	Grey mangrove	<i>Avicennia marina</i> var. <i>eucalyptifolia</i>	Tree	Mangrru	Used for firewood, leaves for kup muri
zarr zarr?	Burny Vine	<i>Trophis scandens</i> subsp. <i>scandens</i>	Vine	Tulup scrub	Rope for tying
TBD	Broad leaf Ballart	<i>Exocarpos latifolius</i>	Shrub	Tulup scrub	Yellow wood – used for walking sticks
TBD	Holly Mangrove	<i>Acanthus ilicifolius</i>	Shrub	Mangrru	Buds used as a medicine.
TBD	Wild Grape	<i>Ampelocissus acetosa</i>	Vine	Tulup scrub	Fruit eaten
TBD	Eucalyptus (island common name)	<i>Asteromyrtus symphyocarpa</i>	Shrub	Edge of Tulup scrub in saddle	Leaves crushed, steam used for sickness.
TBD	Bamboo	<i>Bambusa sp.</i>	Bamboo	Bamboo	Construction
TBD	Cotton Tree	<i>Bombax ceiba</i> var. <i>leiocarpum</i>	Tree	Vine thicket	TBD
TBD	Kerosene Wood	<i>Clerodendrum longiflorum</i> var. <i>glabrum</i>	Shrub	Tulup scrub	Good firewood
TBD	Cotton bush	<i>Cocholepermum gillivraei</i>	Shrub	Vine thicket	Soft cotton around fruit for pillows
TBD	Black mangrove	<i>DF to ID</i>	Tree	Mangrru	Used for house construction
TBD	Cedar Bay Cherry	<i>Eugenia reinwardtiana</i>	Shrub	Tulup scrub	Edible red fruit
TBD	Sandpaper fig	<i>Ficus aculeata</i>	Shrub	Tulup scrub	Present on lama; Sam says not eaten
TBD	Beach Cottonwood	<i>Hibiscus tiliaceus</i>	Tree	Edge of Mangrru	Fibrous outer bark for tying
TBD	Mango	<i>Mangifera indica</i> *	Tree (3 types on island)	Tulup scrub and edges	Fruit
TBD	Nonda Plum	<i>Parinari nonda</i>	Tree	Tulup scrub	Edible fruit
TBD	Wild Passionfruit	<i>Passiflora foetida</i> *	Vine	Tulup scrub	Edible fruit
TBD	Gooseberry	<i>Physalis angulata</i> *	Herb	Old well clearing	Edible fruit
TBD	Lady Apple	<i>Syzygium suborbiculare</i>	Tree		Edible fruit
TBD	Shangai Tree	<i>Tabernaemontana orientalis</i>	Shrub	Tulup scrub	Used for making shanghais
TBD	Thespesia	<i>Thespesia populneoides</i>	Tree	Edge of Mangrru	Circular woody fruit used for a toy.
TBD	Cedar Mangrove Puzzle Tree	<i>Xylocarpus granatum</i>	Tree	Mangrru	Woody fruit used as toy.

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

D.G. Fell & D.J. Stanton 3D Environmental_3 May 2011 Version 3

Nomenclature follows Bostock & Holland (2010) 'Census of the Queensland Flora'.

* Denotes naturalised or doubtfully naturalised taxa according to Bostock & Holland (2010).

Denotes culturally significant species

Unnamed taxa are followed by a collection number (i.e. DGF10153) pending formal identification at Qld Herbarium.

LIFE FORM

F Fern
G Graminoid
Ge Geophyte
H Herb
H(a) Herb aquatic
O(e) Orchid (epiphyte)
E Epiphyte
V Vine
S Shrub
S/T Shrub/Tree
T Tree
Se Sedge

BROAD VEGETATION GROUPS (BVG) (from Stanton, Fell & Gooding 2009)

2 Deciduous/Semi deciduous vine forest and thicket
6 Acacia dominant open forests and woodlands
14 Shrublands and shrubland complexes
16 Coastal dune complexes
17 Grasslands and grassland complexes
18 Rock pavements
24 Mangroves
B Bamboo groves
Cl/Re Cleared and heavily disturbed regrowth

SUMMARY

259 species (2 ferns, 257 angiosperms)
202 native (78%)
57 naturalised (22%)
81 families
212 genera

Major families (native)

Fabaceae 10 (5%)
Poaceae 10 (5%)
Phyllanthaceae 10 (5%)
Apocynaceae 11 (5.5%)
Rubiaceae 9 (4.5%)
Myrtaceae 8 (4.0%)
Other 71%

PRELIMINARY FLORA SPECIES LIST – IAMA ISLAND, TORRES STRAIT, QUEENSLAND⁸.

Family	Botanical Name	Life Form	Broad Vegetation Group Habitat							Total	
			2	6	14	16	17	24	Bamboo		Regr/ Cleared
Pteridophytes	(Ferns and fern allies)										
Polypodiaceae	<i>Drynaria quercifolia</i>	F	1		1						1
Pteridiaceae	<i>Acrostichum aureum</i>	F						1			1
Angiosperms	(Flowering Plants)										
Acanthaceae	<i>Acanthus ilicifolius</i>	S						1			1
	<i>Achyranthes aspera</i>	H		1					1		1
	<i>Asystasia australasica</i>	H	1								1
	<i>Dipteracanthus prostratus*</i>	H							1		1
	<i>Hypoestes floribunda</i>	H	1	1							1
	<i>Pseuderanthemum variabile</i>	H	1	1							1
Agavaceae	<i>Agave vivipara</i> var. <i>vivipara*</i>	S								1	1
	<i>Pleomele angustifolia</i>	S	1	1	1						1
Amaranthaceae	<i>Alternanthera brasiliana</i> cv. <i>Rubiginosa*</i>	H								1	1
	<i>Alternanthera brasiliana*</i>	H								1	1
	<i>Celosia argentea*</i>	H								1	1
	<i>Deeringia amaranthoides</i>	V	1								1
	<i>Gomphrena celosioides*</i>	H								1	1
Amaryllidaceae	<i>Priophys amboinensis</i>	G	1	1							1
Anacardiaceae	<i>Anacardium occidentale*</i>	S								1	1
	<i>Buchanania arborescens</i>	T	1	1							1
	<i>Mangifera indica*</i>	T	1	1							1

⁸ Species list valid up to May 2011.

Family	Botanical Name	Life Form	Broad Vegetation Group Habitat							Total	
			2	6	14	16	17	24	Bamboo		Regr/ Cleared
	<i>Semecarpus australiensis</i>	T								1	1
Annonaceae	<i>Miliusa traceyi</i>	T	1	1							1
Apocynaceae	<i>Alstonia spectabilis</i> subsp. <i>spectabilis</i>	T		1						1	1
	<i>Alyxia spicata</i>	V	1		1						1
	<i>Catharanthus roseus</i> *	H								1	1
	<i>Cynanchum carnosum</i>	V						1			1
	<i>Ichnocarpus frutescens</i>	V		1							1
	<i>Marsdenia</i> sp. (DGF8853+)	V		1							1
	<i>Marsdenia tricholepis</i>	V		1							1
	<i>Sarcostemma viminale</i> subsp. <i>brunonianus</i>	V	1		1						1
	<i>Secamone elliptica</i>	V	1	1							1
	<i>Secamone lineata</i>	V		1							1
	<i>Tabernaemontana orientalis</i>	S	1	1					1	1	1
	<i>Wrightia pubescens</i> subsp. <i>penicillata</i>	S	1	1							1
Araliaceae	<i>Polyscias macgillivraei</i>	S		1						1	1
Arecaceae	<i>Arenga australasica</i> (Vulnerable)	P	1								
	<i>Cocos nucifera</i> *	P								1	1
Aristolochiaceae	<i>Aristolochia acuminata</i>	V		1						1	1
	<i>Aristolochia chalmersii</i>	V		1							1
Asteraceae	<i>Bidens pilosa</i> *	H								1	1
	<i>Blainvillea dubia</i>	H								1	1
	<i>Calyptocarpus vialis</i> *	H								1	1
	<i>Cyanthilleum cinereum</i>	H								1	1
	<i>Pluchea indica</i>	S						1			1
	<i>Synedrella nodiflora</i> *	H								1	1
	<i>Tridax procumbens</i> *	H								1	1
	<i>Wallastonia biflora</i>	H	1			1					1
Bignoniaceae	<i>Dolichandrone spathacea</i> (Near	S						1			1

Family	Botanical Name	Life Form	Broad Vegetation Group Habitat							Total	
			2	6	14	16	17	24	Bamboo		Regr/ Cleared
	<i>Threatened)</i>										
	<i>Tecoma stans</i> var. <i>stans</i> *	S								1	1
Bixaceae	<i>Cochlospermum gillivraei</i>	S		1							1
Bombaceae	<i>Bombax ceiba</i> var. <i>leiocarpa</i>	T	1	1	1						1
	<i>Campostemon schultzii</i>	T							1		1
Boraginaceae	<i>Cordia subcordata</i>	T	1								1
Burseraceae	<i>Canarium australianum</i> var. <i>australianum</i>	T	1	1	1						1
	<i>Garuga floribunda</i> var. <i>floribunda</i>	T	1	1							1
Caesalpiniaceae	<i>Caesalpinia bonduc</i>	S				1				1	1
	<i>Delonix regia</i> *	T								1	1
	<i>Senna alata</i> *	S								1	1
	<i>Senna occidentalis</i> *	S								1	1
Capparaceae	<i>Capparis lucida</i>	S		1							1
	<i>Capparis quiniflora</i>	S	1	1						1	1
	<i>Capparis sepiaria</i>	S	1	1						1	1
	<i>Cleome viscosa</i>	H								1	1
Caricaceae	<i>Carica papaya</i> *	S		1						1	1
Casuarinaceae	<i>Casuarina equisetifolia</i>	T								1	1
Celastraceae	<i>Gymnosporia inermis</i>	V								1	1
	<i>Salacia chinensis</i>	S		1							1
	<i>Salacia discipala</i>	S	1	1	1						1
Chrysobalanaceae	<i>Parinari nonda</i>	T		1							1
Clusiaceae	<i>Garcinia warrenii</i>	T		1							1
Combretaceae	<i>Lumnitzera racemosa</i>	T							1		1
	<i>Terminalia arenicola</i>	T	1								1
	<i>Terminalia catappa</i>	T								1	1
	<i>Terminalia muelleri</i>	T	1								1

Family	Botanical Name	Life Form	Broad Vegetation Group Habitat							Total	
			2	6	14	16	17	24	Bamboo		Regr/ Cleared
	<i>Terminalia subacroptera</i>	T	1	1	1					1	1
Commelinaceae	<i>Commelina diffusa</i>	H								1	1
Convolvulaceae	<i>Evolvulus alsinoides</i>	H								1	1
	<i>Ipomoea hederifolia*</i>	V		1							1
	<i>Ipomoea mauritiana</i>	V		1							1
	<i>Ipomoea nil*</i>	V								1	1
	<i>Ipomoea pes-capre</i> subsp. <i>brasiliensis</i>	V									1
	<i>Ipomoea quamoclit*</i>	V								1	1
	<i>Jacquemontia paniculata</i>	V	1		1			1		1	1
	<i>Operculina brownii</i> (Near -threatened)	V	1							1	1
	Convolvulaceae (DGF10552+)	V		1							1
Cucurbitaceae	<i>Muellerargia timorensis</i>	V		1							1
Cyperaceae	<i>Cyperus rotundus*</i>	Se								1	1
	<i>Cyperus tetracarpus</i>	Se								1	1
	<i>Fimbristylis</i> sp. (DGF10215)	Se						1			1
Dioscoreaceae	<i>Dioscorea esculenta*</i>	V	1								1
Ebenaceae	<i>Diospyros compacta</i>	S/T	1	1							1
	<i>Diospyros hebecarpa</i>	T	1	1							1
	<i>Diospyros maritima</i>	T		1						1	1
	<i>Diospyros</i> sp. (Mt White P.I.Forster PIF111)	S/T	1	1							1
Euphorbiaceae	<i>Croton arnhemicus</i>	S/T		1							1
	<i>Dimorphocalyx australiensis</i>	S	1								1
	<i>Euphorbia cyathophora*</i>	H								1	1
	<i>Euphorbia heterophylla*</i>	H		1						1	1
	<i>Excoecaria agallocha</i>	S/T	1							1	1
	<i>Macaranga tanarius</i>	S	1	1				1		1	1
	<i>Mallotus ficifolius</i>	S	1								1

Family	Botanical Name	Life Form	Broad Vegetation Group Habitat							Total	
			2	6	14	16	17	24	Bamboo		Regr/ Cleared
	<i>Manihot esculenta*</i>	H								1	1
Fabaceae	<i>Abrus precatorius subsp. precatorius</i>	V	1	1	1						1
	<i>Alysicarpus ovalifolius*</i>	H								1	1
	<i>Chamaecrista rotundifolia*</i>	H								1	1
	<i>Clitorea ternatea*</i>	V								1	1
	<i>Crotalaria pallida var. obovata*</i>	H								1	1
	<i>Dalbergia densa var. australis</i>	V		1							1
	<i>Derris trifoliata</i>	V	1						1		1
	<i>Desmodium tortuosum*</i>	H								1	1
	<i>Desmodium triflorum*</i>	H								1	1
	<i>Erythrina insularis</i>	T	1		1					1	1
	<i>Erythrina variegata</i>	T	1								1
	<i>Indigofera colutea</i>	S								1	1
	<i>Intsia bijuga</i>	T	1								1
	<i>Lysiphyllum binatum</i>	S							1		1
	<i>Macroptilium atropurpureum *</i>	V								1	1
	<i>Millettia pinnata</i>	T								1	1
	<i>Ormocarpum orientale</i>	S								1	1
	<i>Stylosanthes humilis*</i>	H								1	1
	<i>Vigna adenantha*</i>	V								1	1
Flagellariaceae	<i>Flagellaria indica</i>	V	1	1						1	1
Hemerocallidaceae	<i>Dianella longifolia</i>	G		1							1
Hernandiaceae	<i>Gyrocarpus americanus subsp. americanus</i>	T	1	1							1
Lamiaceae	<i>Anisomeles malabrica</i>	H								1	1
	<i>Clerodendrum floribundum</i>	S		1					1		1
	<i>Clerodendrum inerme</i>	S							1		1
	<i>Hyptis suaveolens*</i>	H						1		1	1

Family	Botanical Name	Life Form	Broad Vegetation Group Habitat							Total	
			2	6	14	16	17	24	Bamboo		Regr/ Cleared
Lauraceae	<i>Cassytha filiformis</i>	V		1							1
	<i>Cryptocarya exfoliata</i>	S	1	1							1
	<i>Litsea glutinosa</i>	S	1	1						1	1
Lecythidaceae	<i>Barringtonia acutangula</i> subsp. <i>acutangula</i>	S								1	1
Lythraceae	<i>Pemphis acidula</i>	S	1		1				1		1
	<i>Sonneratia</i> sp. (DGF)	T							1		1
Malvaceae	<i>Hibiscus meraukensis</i>	S		1							1
	<i>Hibiscus rosasinensis</i> *	S		1							1
	<i>Hibiscus tiliaceus</i>	T								1	1
	<i>Sida acuta</i> *	H								1	1
	<i>Thespesia populneoides</i>	T	1							1	1
Melastomataceae	<i>Memecylon pauciflorum</i> var. <i>pauciflorum</i>	S	1	1							1
Meliaceae	<i>Aglaia eleagnoidea</i>	T	1	1	1						1
	<i>Dysoxylum acutangulum</i> subsp. <i>foveolatum</i>	T		1							1
	<i>Turraea pubescens</i>	S	1	1							1
	<i>Xylocarpus granatum</i>	T							1	1	1
	<i>Xylocarpus moluccensis</i>	T							1		1
Menispermaceae	<i>Pachygone ovata</i>	V		1							1
	<i>Stephania japonica</i> var. <i>discolor</i>	V	1								1
	<i>Tinospora smilacina</i>	V		1							1
Mimosaceae	<i>Acacia auriculiformis</i>	T	1	1				1		1	1
	<i>Archidendron grandiflorum</i>	T	1	1							1
Moraceae	<i>Antiaris toxicaria</i> var. <i>macrophylla</i>	T	1	1						1	1
	<i>Ficus obliqua</i>	T	1	1							1
	<i>Ficus opposita</i>	S								1	1
	<i>Ficus virens</i> var. <i>sublanceolata</i>	T	1	1							1

Family	Botanical Name	Life Form	Broad Vegetation Group Habitat							Total	
			2	6	14	16	17	24	Bamboo		Regr/ Cleared
	<i>Streblus brunonianus</i>	S	1	1							1
	<i>Trophis scandens subsp. scandens</i>	V	1	1	1						1
Myrsinaceae	<i>Aegiceras corniculatus</i>	S							1		1
Myrtaceae	<i>Asteromyrtus symphyocarpa</i>	S			1						1
	<i>Eugenia reinwardtiana</i>	S	1	1	1						1
	<i>Osbornia octodonta</i>	S							1		1
	<i>Rhodamnia australis</i>	S		1							1
	<i>Syzygium aqueum (planted)</i>	T								1	1
	<i>Syzygium branderhorstii (planted)</i>	T								1	1
	<i>Syzygium sp. (DGF10208+)</i>	T		1							1
	<i>Syzygium suborbiculare</i>	T		1				1		1	1
Nyctaginaceae	<i>Boerhavia mutabilis</i>	H								1	1
Olacaceae	<i>Ximenia americana</i>	S			1						1
Oleaceae	<i>Chionanthus ramiflorus</i>	S/T	1	1							1
	<i>Jasminum sp. (DGF8846+)</i>	V	1	1							1
Onagraceae	<i>Ludwigia octovalvis</i>	H								1	1
Opiliaceae	<i>Opilia armentacea</i>	V	1	1							1
Pandanaceae	<i>Pandanus sp.</i>	P			1					1	1
Passifloraceae	<i>Passiflora foetida*</i>	V	1		1			1		1	1
Phyllanthaceae	<i>Actephila venusta</i>	S	1	1							1
	<i>Antidesma parvifolium</i>	S	1	1	1						1
	<i>Antidesma sp. (DGF8834+)</i>	S		1							1
	<i>Breynia cernua</i>	S		1						1	1
	<i>Breynia oblongifolia</i>	S		1							1
	<i>Cleistanthus peninsularis</i>	S/T	1								1
	<i>Flueggea virosa subsp. melanthesoides</i>	S	1								1
	<i>Glochidion apodogynum</i>	S						1		1	1

Family	Botanical Name	Life Form	Broad Vegetation Group Habitat							Total	
			2	6	14	16	17	24	Bamboo		Regr/ Cleared
	<i>Glochidion disparipes</i>	S		1							1
	<i>Phyllanthus novae-hollandiae</i>	S		1							1
Plumbaginaceae	<i>Aegialitis annulata</i>	S						1			1
Poaceae	<i>Bambusa sp.*</i>	G							1	1	1
	<i>Bothriochloa pertusa*</i>	G								1	1
	<i>Cenchrus echinatus*</i>	G								1	1
	<i>Cenchrus elymoides</i> var. <i>brevisetosus</i>	G								1	1
	<i>Chloris gayana*</i>	G								1	1
	<i>Cynodon dactylon*</i>	G								1	1
	<i>Dactyloctenium aegyptium*</i>	G								1	1
	<i>Heteropogon triticeus</i>	G					1				1
	<i>Imperata cylindrica</i>	G								1	1
	<i>Megathyrsus maximus</i> var. <i>maximus*</i>	G								1	1
	<i>Melinis repens*</i>	G								1	1
	<i>Mnesithea rottboellioides</i>	G					1				1
	<i>Neololeba atra</i> (Near Threatened)	G		1							1
	<i>Oplismenus sp.</i> (DGF8856+)	G		1							1
	<i>Paspalidium sp.</i> (DGF10913+)	G		1							1
	Poaceae (DGF10221+)*	G								1	1
	Poaceae (DGF10222+)*	G								1	1
	<i>Rottboellia cochinchinensis*</i>	G								1	1
	<i>Sporobolus virginicus</i>	G						1			1
	<i>Themeda triandra</i>	G					1				1
	<i>Thuarea involuta</i>	G				1					1
Portulacaceae	<i>Talinum triangulare*</i>	H								1	1
	<i>Sesuvium portulacastrum</i>	H						1			1
Putranjivaceae	<i>Drypetes deplanchei</i>	T	1	1	1					1	1

Family	Botanical Name	Life Form	Broad Vegetation Group Habitat							Total	
			2	6	14	16	17	24	Bamboo		Regr/ Cleared
Rhamnaceae	<i>Colubrina asiatica</i>	S							1		1
Rhizophoraceae	<i>Bruguiera gymnorrhiza</i>	T							1		1
	<i>Bruguiera parviflora</i>	T							1		1
	<i>Rhizophora apiculata</i>	T							1		1
	<i>Rhizophora stylosa</i>	T							1		1
Rubiaceae	<i>Aidia racemosa</i>	T	1	1							1
	<i>Coffea brassii</i>	S		1							1
	<i>Guettarda speciosa</i>	T	1								1
	<i>Ixora timorensis</i>	S	1	1							1
	<i>Pavetta brownii</i> var. <i>glabrata</i>	S		1							1
	<i>Psydrax odorata</i> (DGF8844+)	S	1	1						1	1
	<i>Scyphiphora hydrophylacea</i>	S							1		1
	<i>Spermacoce brachystema</i>	H							1		1
	<i>Triflorensia australis</i>	S	1								1
Rutaceae	<i>Glycosmis trifoliata</i>	S	1	1						1	1
	<i>Luvunga monophylla</i>	S	1	1							1
	<i>Micromelum minutum</i>	S/T	1	1						1	1
	<i>Murraya ovatifoliolata</i>	S	1	1							1
	<i>Xanthoxylon parviflora</i>	T		1							1
Santalaceae	<i>Exocarpos latifolius</i>	S	1	1	1					1	1
Sapindaceae	<i>Arytera bifoliolata</i>	S	1	1							1
	<i>Cupaniopsis anacardioides</i>	T	1	1							1
	<i>Cupaniopsis flagelliformis</i> subsp. <i>flagelliformis</i>	S	1								1
	<i>Ganophyllum falcatum</i>	T	1	1							1
Sapotaceae	<i>Manilkara kauki</i>	T	1	1	1					1	1
	<i>Pouteria sericea</i>	S/T	1		1						1
Scrophulariaceae	<i>Scoparia dulcis</i> *	H								1	1
Simaroubaceae	<i>Brucea javanica</i>	S	1	1							1

Family	Botanical Name	Life Form	Broad Vegetation Group Habitat							Total	
			2	6	14	16	17	24	Bamboo		Regr/ Cleared
Smilacaceae	<i>Smilax australis</i>	V	1	1							1
Solanaceae	<i>Capsicum frutescens*</i>	H								1	1
	<i>Lycianthes shanesii</i>	S	1								1
	<i>Physalis angulata*</i>	H								1	1
	<i>Solanum viridifolium</i>	H		1							1
Sparmanniaceae	<i>Grewia oxyphylla</i>	S	1								1
Sterculiaceae	<i>Heritiera littoralis</i>	T						1			1
	<i>Sterculia quadrifida</i>	T	1								1
	<i>Sterculia sp. (Annan River)</i>	T	1								1
Taccaceae	<i>Tacca leontopetaloides</i>	Ge	1	1							1
Thymeliaceae	<i>Phaleria octandra</i>	S	1	1							1
Ulmaceae	<i>Celtis philippensis</i>	T	1							1	1
	<i>Trema tomentosa</i>	S	1								1
Verbenaceae	<i>Avicennia marina</i> subsp. <i>eucalyptifolia</i>	T						1			1
	<i>Premna acuminata</i>	S	1								1
	<i>Premna dallachiana</i>	S	1								1
	<i>Premna serratifolia</i>	S	1								1
	<i>Stachytarpheta jamaicensis*</i>	H								1	1
Vitaceae	<i>Ampelocissus acetosa</i>	V	1	1	1						1
	<i>Cissus repens</i>	V		1							1
	<i>Cissus trifolia</i>	V	1								1
Zingiberaceae	<i>Curcuma australasica</i>	Ge		1							1
Zygophyllaceae	<i>Tribulus cistoides*</i>	H								1	1
Unknown	<i>Vine (DGF8827+)</i>	V			1						1
Totals			100 (98% native); 2% naturalise d.	108 (95% native); 5% naturalise d.	26 (100% native)	3 (100% native)	10 (99% native)	29 (100% native)	6 (99% native)	109 (49% native; 51% naturalise d).	259

Appendix F. Fauna of Iama, Torres Strait, Qld.

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama 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		WildNet & unpublished records.
Hylidae	<i>Litoria gracilentata</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		
Hylidae	<i>Litoria rubella</i>	Red Tree Frog			LC		
Microhylidae	<i>Austrochaperina gracilipes</i>	Slender Frog			LC		
Microhylidae	<i>Cophixalus</i> sp.						
Ranidae	<i>Rana daemeli</i>	Wood Frog			LC		
Bufoidea	<i>Rhinella marina</i>	Cane Toad			I		
REPTILES							
Crocodylidae	<i>Crocodylus porosus</i>	Salt-water Crocodile		M	V		Predicted by the EPBC Protected Matters Search Tool; anecdotal record in Natural Solutions (2008).
Chelidae	<i>Emydura subglobosa</i>	Jardine River Turtle			NT		
Chelidae	<i>Macrochelodina rugosa</i>	Northern Long-necked Turtle			LC		
Gekkonidae	<i>Cyrtodactylus louisianensis</i>	Ring-tailed Gecko			LC		
Gekkonidae	<i>Gehyra baliola</i>	Short-tailed Dtella			LC		Unpublished record.
Gekkonidae	<i>Gehyra dubia</i>	Dubious Dtella			LC		WildNet record.
Gekkonidae	<i>Gehyra variegata</i>	Tree Dtella			LC		
Gekkonidae	<i>Hemidactylus frenatus</i>	House Gecko	Sis		I		Australian Museum (AMS R42399-400, R61708-16, R61737-8, R61789-95, R61796-8, R61804, R61818-22, R61828); WildNet & unpublished records.
Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's Gecko			LC		
Gekkonidae	<i>Lepidodactylus lugubris</i>	Mourning Gecko			LC		
Gekkonidae	<i>Lepidodactylus pumilis</i>	Slender Chained Gecko			NT		
Gekkonidae	<i>Nactus eboracensis</i>	no common name			LC		Unpublished record.
Gekkonidae	<i>Nactus 'pelagicus'</i>	Pelagic Gecko			LC		

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama Island
				EPBC Act	NC Act	BoT	
Gekkonidae	<i>Oedura rhombifer</i>	Zigzag Velvet Gecko			LC		
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	Kupakupa		LC		Australian Museum (AMS R43915, R61742, R61806, R61972, R61846-7, R62339-41, R62708); WildNet & unpublished records.
Scincidae	<i>Carlia coensis</i>	Coen Rainbow-skink			LC		
Scincidae	<i>Carlia longipes</i>	Closed-litter Rainbow-skink	Moegay		LC		Australian Museum (AMS R42366-7, 42392, R61663-4, R61739-41, R61753-63, R62395); & unpublished records. Torres Strait animals now considered <i>C. sexdentata</i> .
Scincidae	<i>Carlia quinquecarinata</i>	no common name			LC		
Scincidae	<i>Carlia sexdentata</i>	no common name	Moegay		LC		Australian Museum, Qld Museum (QMJ89280); WildNet & unpublished records. Formerly included within <i>C. longipes</i> .
Scincidae	<i>Carlia storri</i>	Brown Bicarinate Rainbow-skink			LC		
Scincidae	<i>Cryptoblepharus litoralis litoralis</i>	Supralittoral Shinning-skink			LC		WildNet record.
Scincidae	<i>Cryptoblepharus virgatus</i>	Cream-striped Shinning-skink			LC		Australian Museum record (AMS R42374, R42388, R61666, R61683, R61802, R61874); Qld Museum (QM J89281).
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		
Scincidae	<i>Emoia longicauda</i>	Shrub Whiptail-skink			LC		Australian Museum (AMS R62333); & unpublished records.
Scincidae	<i>Eremiascincus pardalis</i>	Lowlands Bar-lipped Skink			LC		
Scincidae	<i>Eugongylus rufescens</i>	Bar-lipped Sheen-skink			LC		Australian Museum record.
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 Pumilis</i>	Dwarf Mulch-skink			LC		
Scincidae	<i>Lygisaurus foliorum</i>	Tree-base Litter-skink			LC		
Scincidae	<i>Lygisaurus macfarlani</i>	Translucent Litter-skink			LC		Australian Museum record (AMS R42365, R61665, R61764-75, R61805, R61829-32, R61873, R62470).
Agamidae	<i>Chlamydosaurus kingii</i>	Friiled Lizard			LC		
Agamidae	<i>Diporiphora bilineata</i>	Two-lined Dragon			LC		

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama Island
				EPBC Act	NC Act	BoT	
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		Australian Museum (AMS R62306-7); & WildNet records.
Varanidae	<i>Varanus mertensi</i>	Mertens' Water Monitor	Goanna		LC		
Varanidae	<i>Varanus panoptes</i>	Yellow-spotted Monitor			LC		
Varanidae	<i>Varanus prasinus</i>	Emerald Monitor			NT		
Varanidae	<i>Varanus scalaris</i>	Spotted Tree Monitor	Karum		LC		Australian Museum (AMS R61662, R61834, R61848-9, R62425-6, R62427); & unpublished records.
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	Thabu		LC		Australian Museum (AMS R43916, R62430-5, R62438, R62495, R76232); WildNet & unpublished records.
Boidae	<i>Morelia kinghorni</i>	Scrub Python			LC		
Colubridae	<i>Boiga irregularis</i>	Brown Tree Snake			LC		
Colubridae	<i>Cerberus australis</i>	Bockadam			LC		
Colubridae	<i>Dendrelaphis calligastra</i>	Northern Tree Snake			LC		
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		
Colubridae	<i>Tropidonophis mairii</i>	Freshwater 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>Oxyuranus scutellatus</i>	Taipan			LC		
Elapidae	<i>Pseudechis papuanus</i>	Papuan Black Snake			LC		
BIRDS							
Megapodiidae	<i>Alectura lathami</i>	Australian Brush-turkey			LC		
Megapodiidae	<i>Megapodius reinwardt</i>	Orange-Footed Scrubfowl			LC		
Phasianidae	<i>Coturnix ypsilophora</i>	Brown Quail			LC		

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama Island
				EPBC Act	NC Act	BoT	
Anseranatidae	<i>Anseranas semipalmata</i>	Magpie Goose			LC		
Anatidae	<i>Dendrocygna guttata</i>	Spotted Whistling-Duck			LC		
Anatidae	<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck			LC		
Anatidae	<i>Dendrocygna arcuata</i>	Wandering Whistling-Duck			LC		
Anatidae	<i>Tadorna radjah</i>	Radjah Shelduck			NT		
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		
Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck			LC		
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		
Columbidae	<i>Geopelia striata</i>	Peaceful Dove			LC		
Columbidae	<i>Geopelia humeralis</i>	Bar-shouldered Dove			LC		WildNet, published & unpublished records.
Columbidae	<i>Ptilinopus magnificus</i>	Wompoo Fruit-Dove			LC		
Columbidae	<i>Ptilinopus superbus</i>	Superb Fruit-Dove			LC		
Columbidae	<i>Ptilinopus regina</i>	Rose-crowned Fruit-Dove			LC		WildNet, published & unpublished records.
Columbidae	<i>Ptilinopus iozonus</i>	Orange-Bellied Fruit-Dove			LC		
Columbidae	<i>Ducula mullerii</i>	Collared Imperial-Pigeon			LC		
Columbidae	<i>Ducula bicolor</i>	Pied Imperial-Pigeon			LC		WildNet, published & unpublished 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		
Eurostopodidae	<i>Eurostopodus mystacalis</i>	White-throated Nightjar			LC		
Eurostopodidae	<i>Eurostopodus argus</i>	Spotted Nightjar			LC		
Caprimulgidae	<i>Caprimulgus macrurus</i>	Large-tailed Nightjar			LC		
Apodidae	<i>Collocalia esculenta</i>	Glossy Swiftlet			LC		
Apodidae	<i>Aerodramus terraereginae</i>	Australian Swiftlet			NT		
Apodidae	<i>Aerodramus vanikorensis</i>	Uniform Swiftlet			LC		
Apodidae	<i>Hirundapus caudacutus</i> ⁵	White-throated Needletail		M	LC		
Apodidae	<i>Mearnsia novaeguineae</i>	Papuan Spine-tailed Swift			LC		
Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift		M	LC		
Apodidae	<i>Apus affinis</i>	House Swift			LC		
Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian Darter			LC		
Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant			LC		

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama Island
				EPBC Act	NC Act	BoT	
Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Great Cormorant			LC		
Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant			LC		
Phalacrocoracidae	<i>Phalacrocorax varius</i>	Pied Cormorant			LC		
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican			LC		Published & unpublished records.
Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork			NT		
Ardeidae	<i>Ixobrychus dubius</i>	Australian Little Bittern			LC		
Ardeidae	<i>Ixobrychus flavicollis</i>	Black Bittern			LC		
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron			LC		
Ardeidae	<i>Ardea modesta</i> ⁶	Eastern Great Egret		M	LC		Published record.
Ardeidae	<i>Ardea intermedia</i>	Intermediate Egret			LC		WildNet & published records.
Ardeidae	<i>Ardea sumatrana</i>	Great-billed Heron			LC		
Ardeidae	<i>Ardea ibis</i> ⁷	Cattle Egret		M	LC		
Ardeidae	<i>Butorides striata</i>	Striated Heron			LC		Published record.
Ardeidae	<i>Egretta picata</i>	Pied Heron			LC		
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron			LC		
Ardeidae	<i>Egretta garzetta</i>	Little Egret			LC		
Ardeidae	<i>Egretta sacra</i>	Eastern Reef Egret		M	LC		WildNet, published & unpublished records.
Ardeidae	<i>Nycticorax caledonicus</i>	Nankeen Night-Heron			LC		Unpublished record.
Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy Ibis		M	LC		
Threskiornithidae	<i>Threskiornis molucca</i>	Australian White Ibis			LC		Published record.
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis			LC		Published record.
Threskiornithidae	<i>Platalea regia</i>	Royal Spoonbill			LC		
Accipitridae	<i>Pandion cristatus</i> ⁸	Eastern Osprey		M	LC		
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		
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		M	LC		
Accipitridae	<i>Haliastur sphenurus</i>	Whistling Kite			LC		
Accipitridae	<i>Haliastur indus</i>	Brahminy Kite			LC		Published record.
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		
Accipitridae	<i>Circus approximans</i>	Swamp Harrier			LC		
Accipitridae	<i>Erythrotriorchis radiatus</i>	Red Goshawk		V	E	high	

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama Island
				EPBC Act	NC Act	BoT	
Accipitridae	<i>Aquila gurneyi</i>	Gurney's Eagle			LC		
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel			LC		
Falconidae	<i>Falco berigora</i>	Brown Falcon			LC		
Falconidae	<i>Falco longipennis</i>	Australian Hobby			LC		
Falconidae	<i>Falco peregrinus</i>	Peregrine Falcon			LC		
Gruidae	<i>Grus rubicunda</i>	Brolga			LC		
Rallidae	<i>Porphyrio porphyrio</i>	Purple Swamphen			LC		
Rallidae	<i>Eulabeornis castaneiventris</i>	Chestnut Rail			LC		
Rallidae	<i>Rallina tricolor</i>	Red-necked Crake			LC		
Rallidae	<i>Gallirallus philippensis</i>	Buff-banded Rail			LC		
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		
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	Published & unpublished records.
Haematopodidae	<i>Haematopus longirostris</i>	Australian Pied Oystercatcher			LC		Unpublished record.
Haematopodidae	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher			NT		Unpublished record.
Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged Stilt			LC		
Charadriidae	<i>Pluvialis fulva</i>	Pacific Golden Plover		M	LC		WildNet record.
Charadriidae	<i>Pluvialis squatarola</i>	Grey Plover		M	LC		Unpublished 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		Published & unpublished records.
Charadriidae	<i>Charadrius leschenaultii</i>	Greater Sand Plover		M	LC		
Charadriidae	<i>Erythrogonyx cinctus</i>	Red-kneed Dotterel			LC		
Charadriidae	<i>Vanellus miles</i>	Masked Lapwing			LC		WildNet & unpublished records.
Scolopacidae	<i>Gallinago hardwickii</i>	Latham's Snipe		M	LC		
Scolopacidae	<i>Gallinago megala</i>	Swinhoe's Snipe		M	LC		
Scolopacidae	<i>Limosa limosa</i>	Black-tailed Godwit		M	LC		
Scolopacidae	<i>Limosa lapponica</i>	Bar-tailed Godwit		M	LC		
Scolopacidae	<i>Numenius minutus</i>	Little Curlew		M	LC		
Scolopacidae	<i>Numenius phaeopus</i>	Whimbrel		M	LC		WildNet, published & unpublished records.

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama Island
				EPBC Act	NC Act	BoT	
Scolopacidae	<i>Numenius madagascariensis</i>	Eastern Curlew		M	NT		Unpublished record.
Scolopacidae	<i>Xenus cinereus</i>	Terek Sandpiper		M	LC		
Scolopacidae	<i>Actitis hypoleucos</i> ⁹	Common Sandpiper		M	LC		WildNet, published & unpublished records.
Scolopacidae	<i>Tringa brevipes</i> ¹⁰	Grey-tailed Tattler		M	LC		Published & unpublished records.
Scolopacidae	<i>Tringa incana</i> ¹¹	Wandering Tattler		M	LC		
Scolopacidae	<i>Tringa nebularia</i>	Common Greenshank		M	LC		Published record.
Scolopacidae	<i>Tringa stagnatilis</i>	Marsh Sandpiper		M	LC		
Scolopacidae	<i>Tringa glareola</i>	Wood Sandpiper		M	LC		
Scolopacidae	<i>Arenaria interpres</i>	Ruddy Turnstone		M	LC		Published & unpublished records.
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		Unpublished record.
Scolopacidae	<i>Calidris melanotos</i>	Pectoral Sandpiper		M	LC		
Scolopacidae	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper		M	LC		WildNet record.
Scolopacidae	<i>Calidris ferruginea</i>	Curlew Sandpiper		M	LC		
Turnicidae	<i>Turnix maculosus</i>	Red-backed Button-quail			LC		Unpublished record.
Turnicidae	<i>Turnix pyrrhorostrax</i>	Red-chested Button-quail			LC		
Glareolidae	<i>Glareola maldivarum</i>	Oriental Pratincole		M	LC		
Glareolidae	<i>Stiltia isabella</i>	Australian Pratincole			LC		
Laridae	<i>Anous stolidus</i>	Common Noddy		M	LC		
Laridae	<i>Anous minutus</i>	Black Noddy			LC		WildNet & published records.
Laridae	<i>Onychoprion anaethetus</i> ¹³	Bridled Tern		M	LC		
Laridae	<i>Onychoprion fuscata</i>	Sooty Tern			LC		
Laridae	<i>Sternula albifrons</i> ¹⁴	Little Tern		M	E	high	Unpublished record.
Laridae	<i>Gelochelidon nilotica</i>	Gull-billed Tern			LC		
Laridae	<i>Hydroprogne caspia</i>	Caspian Tern		M	LC		
Laridae	<i>Chlidonias hybrida</i>	Whiskered Tern			LC		
Laridae	<i>Chlidonias leucopterus</i>	White-winged Black Tern		M	LC		
Laridae	<i>Sterna dougallii</i>	Roseate Tern		M	LC		
Laridae	<i>Sterna striata</i>	White-fronted Tern			LC		
Laridae	<i>Sterna sumatrana</i>	Black-naped Tern		M	LC		Published & unpublished records.
Laridae	<i>Sterna hirundo</i>	Common Tern		M	LC		
Laridae	<i>Thalasseus bengalensis</i> ¹⁵	Lesser Crested Tern		M	LC		
Laridae	<i>Thalasseus bergii</i>	Crested Tern			LC		Unpublished record.

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama Island
				EPBC Act	NC Act	BoT	
Laridae	<i>Chroicocephalus novaehollandiae</i>	Silver Gull			LC		WildNet & unpublished records.
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</i>	Rainbow Lorikeet			LC		
Psittacidae	<i>Cyclopsitta</i> species	fig-parrot species					
Psittacidae	<i>Eclactus roratus polychloros</i>	Eclectus Parrot			LC		
Psittacidae	<i>Geoffroyus geoffroyi</i>	Red-cheeked Parrot			LC		
Cuculidae	<i>Centropus phasianinus</i>	Pheasant Coucal			LC		
Cuculidae	<i>Eudynamys orientalis</i>	Eastern Koel			LC		
Cuculidae	<i>Urodynamys taitensis</i>	Long-tailed Cuckoo					
Cuculidae	<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo			LC		
Cuculidae	<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo			LC		
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		
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		WildNet record.
Cuculidae	<i>Cuculus optatus</i> ¹⁶	Oriental Cuckoo		M	LC		
Strigidae	<i>Ninox connivens</i>	Barking Owl			LC		
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		
Alcedinidae	<i>Ceyx pusilla</i>	Little Kingfisher			LC		
Halcyonidae	<i>Tanysiptera sylvia</i>	Buff-breasted Paradise-Kingfisher			LC		
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		
Halcyonidae	<i>Todiramphus sanctus</i>	Sacred Kingfisher			LC		WildNet & published records.
Halcyonidae	<i>Todiramphus chloris</i>	Collared Kingfisher			LC		

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama Island
				EPBC Act	NC Act	BoT	
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater		M	LC		Published record.
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		WildNet, published & unpublished records.
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</i>	Large-billed Gerygone			LC		
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 & unpublished 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		
Meliphagidae	<i>Myzomela obscura</i>	Dusky Honeyeater			LC		
Meliphagidae	<i>Myzomela erythrocephala</i>	Red-headed Honeyeater			LC		Unpublished record.
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 argenticeps</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</i>	Tawny-breasted Honeyeater			LC		
Pomatostomidae	<i>Pomatostomus temporalis</i>	Grey-crowned Babbler			LC		
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike			LC		Published record.
Campephagidae	<i>Coracina papuensis</i>	White-bellied Cuckoo-shrike			LC		Unpublished record.
Campephagidae	<i>Coracina lineata</i>	Barred Cuckoo-shrike			LC		
Campephagidae	<i>Coracina tenuirostris melvillensis</i>	(Melville) Cicadabird		M	LC		
Campephagidae	<i>Lalage tricolor</i>	White-winged Triller			LC		
Campephagidae	<i>Lalage leucomela</i>	Varied Triller			LC		
Pachycephalidae	<i>Pachycephala melanura</i>	Mangrove Golden Whistler			LC		Published & unpublished 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		

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama Island
				EPBC Act	NC Act	BoT	
Oriolidae	<i>Oriolus flavocinctus</i>	Yellow Oriole			LC		
Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed Oriole			LC		
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow			LC		Published record.
Artamidae	<i>Artamus cinereus</i>	Black-faced Woodswallow			LC		
Artamidae	<i>Artamus minor</i>	Little Woodswallow			LC		
Artamidae	<i>Cracticus quoyi</i>	Black Butcherbird			LC		
Dicruridae	<i>Dicrurus bracteatus</i>	Spangled Drongo			LC		Unpublished record.
Rhipiduridae	<i>Rhipidura rufifrons</i>	Rufous Fantail		M	LC		
Rhipiduridae	<i>Rhipidura phasiana</i>	Mangrove Grey Fantail			LC		
Rhipiduridae	<i>Rhipidura rufiventris</i>	Northern Fantail			LC		
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail			LC		
Corvidae	<i>Corvus orru</i>	Torresian Crow			LC		
Monarchidae	<i>Myiagra ruficollis</i>	Broad-billed Flycatcher			LC		
Monarchidae	<i>Myiagra rubecula</i>	Leaden Flycatcher			LC		
Monarchidae	<i>Myiagra cyanoleuca</i>	Satin Flycatcher		M	LC		
Monarchidae	<i>Myiagra alecto</i>	Shining Flycatcher			LC		WildNet, published & unpublished records.
Monarchidae	<i>Myiagra inquieta</i>	Restless Flycatcher			LC		
Monarchidae	<i>Monarcha melanopsis</i>	Black-faced Monarch		M	LC		Published record.
Monarchidae	<i>Monarcha frater</i>	Black-winged Monarch		M	LC		
Monarchidae	<i>Symposiachrus trivirgatus</i> ¹⁷	Spectacled Monarch		M	LC		WildNet, published & unpublished records.
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark			LC		
Monarchidae	<i>Arses telescopthalmus</i>	Frilled Monarch			LC		
Paradisaeidae	<i>Phonygamus keraudrenii</i>	Trumpet Manucode			LC		
Paradisaeidae	<i>Ptiloris magnificus</i>	Magnificent Riflebird			LC		
Petroicidae	<i>Microeca flavigaster</i>	Lemon-bellied Flycatcher			LC		
Petroicidae	<i>Peneoanthe pulverulenta</i>	Mangrove Robin			LC		
Petroicidae	<i>Drymodes superciliaris</i>	Northern Scrub-robin			LC		
Cisticolidae	<i>Cisticola exilis</i>	Golden-headed Cisticola			LC		
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 & unpublished records.
Timaliidae	<i>Zosterops lateralis</i>	Silveryeye			LC		
Hirundinidae	<i>Hirundo rustica</i>	Barn Swallow		M	LC		
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow			LC		

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama Island
				EPBC Act	NC Act	BoT	
Hirundinidae	<i>Petrochelidon ariel</i>	Fairy Martin			LC		
Hirundinidae	<i>Petrochelidon nigricans</i>	Tree Martin			LC		
Hirundinidae	<i>Cecropis daurica</i> ¹⁹	Red-rumped Swallow		M	LC		
Turdidae	<i>Zoothera</i> sp.	thrush species			LC		
Sturnidae	<i>Aplornis cantoroides</i>	Singing Starling			LC		
Sturnidae	<i>Aplornis metallica</i>	Metallic Starling			LC		
Sturnidae	<i>Sturnus tristis</i>	Common Myna			I		
Nectariniidae	<i>Dicaeum geelvinkianum</i>	Red-capped Flowerpecker			LC		
Nectariniidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird			LC		
Nectariniidae	<i>Nectarinia jugularis</i>	Olive-backed Sunbird			LC		WildNet, published & unpublished records.
Estrildidae	<i>Poephila personata</i>	Masked Finch			LC		
Estrildidae	<i>Lonchura punctulata</i>	Nutmeg Mannikin			I		
Estrildidae	<i>Lonchura castaneothorax</i>	Chestnut-breasted Mannikin			LC		WildNet & unpublished records.
Passeridae	<i>Passer domesticus</i>	House Sparrow			I		WildNet & unpublished records.
Motacillidae	<i>Motacilla</i> sp.	Yellow Wagtail species		M	LC		
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		
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		
Pteropodidae	<i>Pteropus conspicillatus</i>	Spectacled Flying-fox		V	LC	high	Predicted by the EPBC Protected Matters Search Tool; Reported by Natural Solutions (2008) but not included in the Iama Sustainable Land Use Plan: Part 2. (Conics 2009c). Occurrence uncertain and record disregarded until confirmed.
Pteropodidae	<i>Pteropus macrotis</i>	Large-eared Flying-fox			LC		
Pteropodidae	<i>Pteropus scapulatus</i>	Little Red Flying-fox			LC		
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			LC		

Family	Scientific Name ³	Common Name	Language Name	Status ⁴			Iama Island
				EPBC Act	NC Act	BoT	
		Bat					
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	
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		Listed as an anecdotal record by Natural Solutions (2008). Not accepted due to uncertainty of identification.
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		Listed as an anecdotal record by Natural Solutions (2008) with no detail. Not accepted due to uncertainty of identification.
Muridae	<i>Xeromys myoides</i>	Water Mouse		V	V	high	
Canidae	<i>Canis lupus</i>	Dingo, Domestic Dog	Umay		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		
Bovidae	<i>Capra hircus</i>	Goat			I		
Cervidae	<i>Cervus timorensis</i>	Rusa Deer			I		

Appendix G. Profiles of Terrestrial Fauna Species Potentially occurring on Iama Island and Surrounding Islets

Coastal sheathtail bat (*Taphozous australis*)

Status: NC Act Vulnerable

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

The coastal sheathtail bat is seldom found more than a few kilometres from the ocean, where it roosts in sea caves, rock fissures, boulder piles and, occasionally, in buildings (Churchill 2008; Richards 2008). Colonies are usually of two to 25 individuals, though up to 100 have been recorded. The species is often found on islands and will forage on nearby mainland (Churchill 2008). Foraging occurs in a wide range of habitats, including open eucalypt forest, coastal heathlands, grasslands, sand dune scrub, monsoon forests and mangroves (Duncan *et al.* 1999; Churchill 2008). Little is known of its breeding biology but most births probably occur from September to November (Churchill 2008; Richards 2008).

The coastal sheathtail bat occurs from Shoalwater Bay on the central Queensland coast north to Torres Strait and extraliminally in New Guinea (Duncan *et al.* 1999; Churchill 2008). In the Torres Strait there are 15 Australian Museum specimens from Possession Island (OZCAM 2011), two WildNet records (DERM 2010f) and Queensland Museum specimen (reported in Conics 2008b) from Mua Island, and observations and Anabat recordings from Pulu (Watson 2009, Hitchcock *et al.* 2009). The proximity of Badu and Mua islands means that individuals would move between the islands even if there were no suitable roost sites on Badu Island. It is expected, however, that roosts will be located if searches are conducted.

Major threats to the species probably include loss of foraging habitat from coastal development and roost disturbance, particularly in the southern part of their range (Duncan *et al.* 1999). On Badu Island the coastal sheathtail bat would be threatened by disturbance to any roosts and maternity sites and by loss of foraging habitat including mangroves, forest, woodland and shrubland.

Slender chained gecko (*Lepidodactylus Pumilis*)

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 Murray (Mer) Island (DERM 2010d), and a Queensland Museum specimen (reported in Conics 2008b) and a record by Ingram (2008) from Mua Island. There are also Australian Museum specimens from Saibai, Yorke, Murray, Hammond and Prince of Wales islands (OZCAM 2011) and it is likely the species occurs more widely through the region than is yet documented.

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). It is likely to occur on Mabuiag Island in habitats other than grasslands and on coastal dunes.

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 Asian house gecko (*Hemidactylus frenatus*), in both natural habitats and on buildings (Case 1994; Buden 2007; Hoskin 2010). Asian house gecko is present on Mabuiag Island but is unlikely to pose a threat to any possible population of slender chained gecko unless the introduced species spreads into natural habitats.

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 Mua but the species was not returned by a search of the database in 2010 (DERM 2010f) and the validity of the record is uncertain. It is a common mangrove species in some areas and is especially abundant on rocky foreshores (Cogger 2000). *Emoia* species are efficient rafters and colonise islands on floating debris (Wilson 2005) and it is likely to occur on Torres Strait islands other than Boigu. If not already present on Mabuiag Island there is an on-going likelihood of colonisation.

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. The littoral whiptail-skink would be threatened by any loss of mangroves due to clearing or storm damage.

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 Badu Island (T. Stow pers. comm. Nov 2010) and also known from Saibai and Thursday Islands (OZCAM 2011) and Boigu Island (Schaffer 2010). The species is likely to occur throughout the Torres Strait.

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 Iama Island the salt-water crocodile may be threatened by clearing of mangroves, entanglement in fishing nets, and by direct human persecution. These threats are however likely to be minor.

Appendix H. Profiles of Migratory Fauna Species Potentially occurring on Iama 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, 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).

Eleven of the 28 species of Migratory wader known for the Torres Strait have been recorded from Iama Island. This may reflect a comparative lack of survey effort but is probably also indicative of a lack of variety of foraging habitats and a lack of substantial areas of habitat on the island.

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). There appears to be little freshwater habitat on Iama Island and threats to waders appear limited to disturbance on mudflats, beaches, rocky shores and around mangroves. This will be most relevant prior to return passage in autumn.

Terns

Life history: Terns, with gulls, belong to the family Laridae. The terns include the noddies, a group of largely tropical pelagic species. Four Migratory tern and one noddy species have been recorded from Mabuia 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 lama 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).

Eastern great egrets are not likely to breed on lama Island and threats appear minor. Eastern reef egret may breed and would be susceptible to disturbance at its nest. The level of threat is likely to be minor. Cattle egret is not likely to occur except possibly as a very occasional short term visitor.

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). Despite the lack of records both species are expected to occur on lama Island at times, particularly on passage. Neither species would be subject to any significant level of threat.

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). Despite the lack of records both species are expected to occur on Iama Island at times, and may breed on the island. Neither species would be subject to any significant level of threat.

Oriental Cuckoo (*Cuculus optatus*)

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). Oriental cuckoo is possibly an irregular visitor to Iama Island, and could occur in almost any habitat other than grasslands and cleared areas. 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, Papua 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 (*Rhinella marina*) have been found to prey on the eggs and nestlings (Boland 2004b). Rainbow bee-eater could occur in, or over, all habitats on Iama 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 Iama Island, at least occasionally, and would use a majority of the wooded habitats present. Breeding by any species would be limited, if any breeding occurs. *Rattus* species are reported anecdotally from Iama Island (Natural Solutions 2008b) but these bird species are more threatened by habitat loss should land use practices change and by the spread of cats into natural habitats.

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. None of these species is known from Iama Island and should they occur threats would be minimal. Other than Australian reed-warbler, increased clearing of wooded areas would actually benefit the species.

