



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

January 2013

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



Australian Government



**TSRA**  
[www.tsra.gov.au](http://www.tsra.gov.au)

**3D Environmental**  
vegetation analysis and mapping specialists

Cover image: TSRA (2013)

## EXECUTIVE SUMMARY

Along with the nearby island of Boigu and the granite rock pile that forms Dauan, Saibai forms part of the Northern Island group of the Torres Strait. The island is a remnant of the Fly Platform, with the Papua New Guinea mainland clearly visible and within four kilometres from Saibai's northern coastline. Located approximately 150 km north of Thursday Island it has an area of 11 211 hectares.

The entire island is low lying and swampy, particularly the interior and southern portions. The majority of the island landscape is formed from recent estuarine sediments, with an extensive remnant of a Pleistocene age alluvial plain located on the island's northern coastline and extending into the island's interior where it becomes increasingly dissected by broad drainage swamps. A narrow sliver of indurated ironstone caprock (laterite) is exposed along the island's northern coastline on which Saibai village is situated, and numerous beach ridges (or strandlines) parallel the island's south-eastern and southern coastline forming low linear rises and supporting littoral rainforest.

The island supports a rich and diverse cultural tradition which includes traditional food gardening and plant and animal utilisation. Archeological studies have documented extensive prehistoric relict mound-and-ditch horticultural field systems which extend across 650 hectares of the island together with associated irrigation channels, wells and constructed access routes into the interior of the island for canoes. Traditional knowledge systems regarding the natural environment particularly gardening, the use of fire, and plant and animals use, remains robust within the community. Integration of traditional ecological knowledge and biodiversity information of 'western science' is critical toward achieving land management programs that will benefit to Saibai Island people in the long term.

A total of 12 vegetation communities, within ten broad vegetation groups and twelve regional ecosystems occur on the island. Four of the regional ecosystems are restricted to the Northern Island Group although these are likely to be more extensive on the nearby PNG mainland. The vegetation of the island has been shaped by the soil and drainage conditions together with generations of human use, which have developed and maintained extensive areas of tropical savanna grassland throughout the interior of the island.

There are currently 344 flora species recorded on the island comprising 10 ferns and 334 angiosperms. Native species make up 81% of the flora with 84 species considered naturalised, two of which are declared weeds. There are 90 families of which nine are wholly naturalised. Major native plant families are Poaceae, Fabaceae, Cyperaceae, Rubiaceae, Apocynaceae and Rhizophoraceae. Five plant species are considered threatened at either federal or state level, four of which are orchids, and a further ten species are significant at the regional level.

As for the majority of Torres Strait Islands there is a lack of systematic survey of fauna habitats on the island. A desktop review identified 150 fauna species that are reported to occur on Saibai Island (**Appendix G**). This includes one amphibian, 11 reptile, 130 bird and 8 mammal species. This can be compared with the 384 terrestrial fauna species that have been reported for the broader Torres Strait Island group. Of these, one reptile, one bird and four mammal species are introduced. Three bird species and two reptile species are listed as threatened under either state or federal legislation with an additional five species considered either likely to occur or predicted to occur according to relevant database searches and assessments of habitat suitability. There are also an additional 23 migratory species considered to have significance at federal level that are reported to occur on the island.

Although recent reports have added significant information to what is known of the fauna on Saibai Island there undoubtedly remains much to learn. The low lying and swampy nature of the island means that opportunistic recording of fauna will always be limited to the more easily accessible, and often disturbed, parts of the island. Well-planned and systematic survey work is required across all of the islands' habitats in order to adequately assess the island's fauna in its entirety. The proximity of the Papua New Guinea mainland means that bird and bat species are likely to be added to the island's species list each time any substantial survey effort is undertaken.

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

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

It is important that any future surveys on Saibai Island are undertaken in collaboration with the Saibai people and include study of Saibai traditional ecological knowledge and ethnotaxonomy. Furthermore all mapping and assessment work must comply with Saibai research protocols (to be finalised), must be approved by the Saibai Mura Buway (Torres Strait Islanders) Corporation, and involve and be guided by the Saibai Island Rangers.

## ACKNOWLEDGEMENTS

The project has been funded by through the Land and Sea Management Unit of the Torres Strait Regional Authority. Our thanks are extended for the support and guidance of Tony O’Keefe of TSRA who administered the project and provided valuable input throughout. 3D Environmental also wish to acknowledge all Saibai Elders and thank the Saibai Mura Buway (Torres Strait Islanders) Corporation for their access to the land. Appreciation is also given to the Saibai Island Rangers Mark Herbert Warusam, Karl Tabuai and TSRA Ranger Supervisor Karl Goetze for assistance in the field.

Initial fauna information and text was provided by Terry Reis although was adapted for the purpose of this report. It should be noted that Terry was not involved in the compilation of this document other than provision of raw data and preparation of species profiles. Peter Stanton provided the text for fire in the ecological landscape. Staff of the Queensland Herbarium assisted with identification of plant specimens and provided advice on the ecology and distribution of significant species. Barbara Waterhouse and Stephen Mckenna of the Department of Agriculture, Forestry and Fisheries (DAFF) provided valuable information on the occurrence and distribution of weeds.

# Table of Contents

|                                                                                                            |           |
|------------------------------------------------------------------------------------------------------------|-----------|
| <b>1.0 Introduction.....</b>                                                                               | <b>8</b>  |
| 1.1 Cultural Setting .....                                                                                 | 8         |
| 1.2 Geographic Setting .....                                                                               | 8         |
| 1.3 Geological Context.....                                                                                | 9         |
| <b>2.0 Methods .....</b>                                                                                   | <b>10</b> |
| <b>3.0 Aims and Objectives .....</b>                                                                       | <b>10</b> |
| <b>4.0 Legislative and Policy Considerations.....</b>                                                      | <b>11</b> |
| <b>5.0 Vegetation .....</b>                                                                                | <b>14</b> |
| 5.1 Vegetation Groups and Mapping .....                                                                    | 14        |
| 5.2 Flora Species .....                                                                                    | 17        |
| 5.2.1 Flora Species with Biodiversity Significance .....                                                   | 19        |
| 5.2.2 Flora with Cultural Significance .....                                                               | 24        |
| 5.2.3 Introduced Plants.....                                                                               | 24        |
| <b>6.0 Fauna(Animals).....</b>                                                                             | <b>29</b> |
| 6.1 Culturally Important Fauna Species.....                                                                | 30        |
| 6.2 Fauna Habitat Values .....                                                                             | 30        |
| 6.3 Fauna Species with Conservation Significance.....                                                      | 32        |
| 6.3.1 Endangered, Vulnerable and Near-Threatened Species .....                                             | 32        |
| 6.3.2 Additional possible EVNT species.....                                                                | 36        |
| 6.3.3 Migratory Species.....                                                                               | 38        |
| 6.3.4 Species of Regional Significance .....                                                               | 40        |
| 6.4 Pest Fauna Species.....                                                                                | 41        |
| 6.5 Threats.....                                                                                           | 42        |
| 6.6 Future work .....                                                                                      | 42        |
| <b>7.0 The Role of Fire in Savanna Landscapes .....</b>                                                    | <b>43</b> |
| <b>8.0 Profiles for Saibai Island Habitats .....</b>                                                       | <b>45</b> |
| 8.1 Deciduous / Semi-deciduous Vine Forest and Thicket.....                                                | 45        |
| 8.1.1 Status of Ecological Knowledge .....                                                                 | 45        |
| 8.1.2 Ecological / Cultural Considerations.....                                                            | 47        |
| 8.1.3 Management Implications.....                                                                         | 48        |
| 8.1.4 Summary of Recommended Management Actions.....                                                       | 49        |
| 8.2 Lophostemon Dominant Woodlands and Open forests / Melaleuca Dominant<br>Woodland and Open Forest ..... | 51        |
| 8.2.1 Status of Ecological Knowledge .....                                                                 | 51        |
| 8.2.2 Ecological / Cultural Considerations.....                                                            | 51        |
| 8.2.3 Management Implications.....                                                                         | 52        |
| 8.2.4 Summary of Recommended Management Actions.....                                                       | 52        |
| 8.3 Melaleuca Dominant Shrublands and Woodlands.....                                                       | 54        |
| 8.3.1 Status of Ecological Knowledge .....                                                                 | 54        |
| 8.3.2 Ecological / Cultural Considerations.....                                                            | 54        |

|         |                                                                                    |           |
|---------|------------------------------------------------------------------------------------|-----------|
| 8.3.3   | <i>Management Implications</i> .....                                               | 55        |
| 8.3.4   | <i>Summary of Recommended Management Actions</i> .....                             | 56        |
| 8.4     | Grassland / Grassland Complexes and Pandanus Dominant Woodland and Shrubland ..... | 58        |
| 8.4.1   | <i>Status of Ecological Knowledge</i> .....                                        | 58        |
| 8.4.2   | <i>Ecological / Cultural Considerations</i> .....                                  | 59        |
| 8.4.3   | <i>Management Implications</i> .....                                               | 60        |
| 8.4.4   | <i>Summary of Recommended Management Actions</i> .....                             | 61        |
| 8.5     | Wetland Complexes and Mosaics (Freshwater) .....                                   | 64        |
| 8.5.1   | <i>Status of Ecological Knowledge</i> .....                                        | 64        |
| 8.5.2   | <i>Ecological / Cultural Considerations</i> .....                                  | 64        |
| 8.5.3   | <i>Management Implications</i> .....                                               | 65        |
| 8.5.4   | <i>Summary of Recommended Management Actions</i> .....                             | 66        |
| 8.6     | Samphire Grasslands .....                                                          | 68        |
| 8.6.1   | <i>Status of Ecological Knowledge</i> .....                                        | 68        |
| 8.6.2   | <i>Ecological / Cultural Considerations</i> .....                                  | 68        |
| 8.6.3   | <i>Management Implications</i> .....                                               | 68        |
| 8.6.4   | <i>Summary of Recommended Management Actions</i> .....                             | 68        |
| 8.7     | Samphire Herblands, Shrublands and Salt Pans .....                                 | 72        |
| 8.7.1   | <i>Status of Ecological knowledge</i> .....                                        | 72        |
| 8.7.2   | <i>Ecological / Cultural Considerations</i> .....                                  | 73        |
| 8.7.3   | <i>Management Implications</i> .....                                               | 73        |
| 8.7.4   | <i>Summary of Recommended Management Actions</i> .....                             | 73        |
| 8.8     | Estuarine Wetland Complexes/ Wetland Complexes and Mosaics.....                    | 75        |
| 8.8.1   | <i>Status of Ecological Knowledge</i> .....                                        | 75        |
| 8.8.2   | <i>Ecological / Cultural Considerations</i> .....                                  | 76        |
| 8.8.3   | <i>Management Implications</i> .....                                               | 76        |
| 8.8.4   | <i>Summary of Recommended Management Actions</i> .....                             | 77        |
| 8.9     | Saline Transitional Communities .....                                              | 79        |
| 8.9.1.  | <i>Status of Current Ecological Knowledge</i> .....                                | 79        |
| 8.9.2   | <i>Ecological / Cultural Considerations</i> .....                                  | 80        |
| 8.9.3   | <i>Management Implications</i> .....                                               | 80        |
| 8.9.4   | <i>Summary of Recommended Management Actions</i> .....                             | 80        |
| 8.10    | Mangrove Forest, Woodland and Shrubland Complexes.....                             | 82        |
| 8.10.1. | <i>Status of Current Ecological Knowledge</i> .....                                | 82        |
| 8.10.2  | <i>Ecological / Cultural Considerations</i> .....                                  | 82        |
| 8.10.3  | <i>Management Implications</i> .....                                               | 83        |
| 8.10.4  | <i>Summary of Recommended Management Actions</i> .....                             | 83        |
| 8.11    | Cleared Areas and Regrowth .....                                                   | 85        |
| 8.11.1  | <i>Status of Ecological Knowledge</i> .....                                        | 85        |
| 8.11.2  | <i>Summary of Recommended Management Actions</i> .....                             | 86        |
| 9.0     | <b>References</b> .....                                                            | <b>87</b> |

|                                                                                                                                                                          |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>10.0 Glossary .....</b>                                                                                                                                               | <b>96</b> |
| <b>11.0 Appendices .....</b>                                                                                                                                             | <b>98</b> |
| Appendix A. Queensland Govt. vegetation structural classification .....                                                                                                  | 99        |
| Appendix B. Preliminary Flora Species List – Saibai Island, Torres Strait, Queensland. ....                                                                              | 100       |
| Appendix C. Preliminary List of Useful Plants for Saibai Island.....                                                                                                     | 114       |
| Appendix D. Terrestrial vertebrates known <sup>1</sup> or predicted <sup>2</sup> to occur on the islands of<br>Torres Strait and their occurrence on Saibai Island. .... | 120       |
| Appendix E. Species profiles for Endangered, Vulnerable and Near-Threatened<br>animals predicted to occur on Saibai Island.....                                          | 133       |
| Appendix F. Profiles of Migratory Fauna Species Potentially occurring on Saibai Island<br>and Surrounding Islets.....                                                    | 138       |

## List of Figures

|                                                                                                                                                                                                                                    |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Figure 1.</b> Location of Saibai Island. ....                                                                                                                                                                                   | <b>9</b>  |
| <b>Figure 2.</b> Diagrammatic illustration of the hierarchy and relationship between components of the<br>vegetation classification system used in the Torres Strait Island vegetation mapping<br>study (Stanton et al. 2009)..... | <b>15</b> |
| <b>Figure 3.</b> Distribution of semi-deciduous vine forest on Saibai Island (place names after Lawrie,<br>1970). ....                                                                                                             | <b>46</b> |
| <b>Figure 4.</b> Distribution of lophostemon dominant woodland and open forest Saibai Island (place<br>names after Lawrie, 1970). ....                                                                                             | <b>52</b> |
| <b>Figure 5.</b> Distribution of melaleuca dominant shrublands and woodlands on Saibai Island (place<br>names after Lawrie, 1970). ....                                                                                            | <b>55</b> |
| <b>Figure 6.</b> Distribution of grassland habitats on Saibai Island (place names after Lawrie, 1970). ....                                                                                                                        | <b>58</b> |
| <b>Figure 7.</b> Distribution of pandanus dominant woodland communities (place names after Lawrie,<br>1970). ....                                                                                                                  | <b>59</b> |
| <b>Figure 8.</b> Distribution of wetland complexes and mosaics (freshwater) on Saibai Island (place<br>names after Lawrie, 1970). ....                                                                                             | <b>65</b> |
| <b>Figure 9.</b> Distribution of samphire grassland habitats on Saibai Island (place names after<br>Lawrie, 1970). ....                                                                                                            | <b>69</b> |
| <b>Figure 10.</b> Distribution of samphire herblands, shrublands and salt pans on Saibai Island (place<br>names after Lawrie, 1970). ....                                                                                          | <b>72</b> |
| <b>Figure 11.</b> Distribution of estuarine wetland habitats on Saibai Island (place names after Lawrie,<br>1970). ....                                                                                                            | <b>75</b> |
| <b>Figure 12.</b> Distribution of saline transitional habitats on Saibai Island (place names after Lawrie,<br>1970). ....                                                                                                          | <b>79</b> |
| <b>Figure 13.</b> Distribution of Mangrove dominant habitats on Saibai Island (place names after<br>Lawrie, 1970).....                                                                                                             | <b>83</b> |

## List of Tables

|                                                                                                                                                                                                                                                                                                                       |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Table 1.</b> Broad vegetation groups and relative contributions to island vegetation. ....                                                                                                                                                                                                                         | 15 |
| <b>Table 2.</b> Descriptions of component vegetation communities and association with regional ecosystems currently recognised on Saibai Island (from Stanton <i>et al.</i> 2009). ....                                                                                                                               | 16 |
| <b>Table 3.</b> Summary of the vascular flora of the Saibai Island in relation to Torres Strait Islands (Stanton <i>et al.</i> 2009), CYP (Neldner and Clarkson 1995 in Neldner 1998) and Great Barrier Reef Continental Islands (Batianoff and Dilleward 1997) and Queensland Flora (Bostock and Holland 2010). .... | 18 |
| <b>Table 4.</b> Summary of the vascular flora of the Saibai Island in relation to Broad Vegetation Groups. ....                                                                                                                                                                                                       | 19 |
| <b>Table 5.</b> Summary of flora with conservation significance on Saibai Island. ....                                                                                                                                                                                                                                | 19 |
| <b>Table 6.</b> Regionally significant flora species on Saibai Island. ....                                                                                                                                                                                                                                           | 22 |
| <b>Table 7.</b> Environmental weeds on Saibai Island – high and moderate Threat. ....                                                                                                                                                                                                                                 | 26 |
| <b>Table 8.</b> Major weed threats ....                                                                                                                                                                                                                                                                               | 28 |
| <b>Table 9.</b> Endangered, Vulnerable and Near-Threatened fauna species <sup>1</sup> reported to occur on Saibai. ....                                                                                                                                                                                               | 32 |
| <b>Table 10.</b> Critically Endangered, Endangered, Vulnerable and Near-Threatened fauna species <sup>1</sup> predicted <sup>2</sup> to occur on Saibai Island. ....                                                                                                                                                  | 36 |
| <b>Table 11.</b> Migratory species reported or predicted to occur on Saibai Island. ....                                                                                                                                                                                                                              | 38 |
| <b>Table 12.</b> Species considered Near-Threatened <sup>1</sup> known or expected to occur on Saibai Island. ....                                                                                                                                                                                                    | 40 |
| <b>Table 13.</b> Summary of management actions for evergreen and semi evergreen vine forests. ....                                                                                                                                                                                                                    | 49 |
| <b>Table 14.</b> Summary recommendations for management of lophostemon dominant woodland and open forest. ....                                                                                                                                                                                                        | 53 |
| <b>Table 15.</b> Summary recommendations for management of melaleuca dominant shrublands and low woodlands. ....                                                                                                                                                                                                      | 56 |
| <b>Table 16.</b> Summary of recommended management actions for grassland and pandanus dominated woodland habitats. ....                                                                                                                                                                                               | 62 |
| <b>Table 17.</b> Summary of recommended management actions for wetland complexes and mosaics. ....                                                                                                                                                                                                                    | 66 |
| <b>Table 18.</b> Summary of recommended management actions for samphire grassland habitat. ....                                                                                                                                                                                                                       | 70 |
| <b>Table 19.</b> Summary of recommended management actions for samphire herblands and shrublands. ....                                                                                                                                                                                                                | 73 |
| <b>Table 20.</b> Summary of recommended management actions for samphire herblands and shrublands. ....                                                                                                                                                                                                                | 77 |
| <b>Table 21.</b> Summary of recommended management actions for saline transitional communities. ....                                                                                                                                                                                                                  | 80 |
| <b>Table 22.</b> Summary of recommended management actions for samphire herblands and shrublands. ....                                                                                                                                                                                                                | 84 |
| <b>Table 23.</b> Summary of recommended management actions for disturbed areas. ....                                                                                                                                                                                                                                  | 86 |

## **1.0 Introduction**

Saibai Island represents one of six islands selected for a supplementary stage of funding for development of a biodiversity management profile. The document aims to identify the biodiversity features, landscape processes, and introduce cultural values (from both a landscape and site specific perspective) that are intrinsic to the island and identify management actions to assist preservation of these features into the future. The plan also aims to identify at a preliminary level those sites and landscape features of specific cultural importance to the Saibai Island people where these are known.

### **1.1 Cultural Setting**

The population of Saibai Island consists of 403 Indigenous and 15 non-Indigenous people (2010 census). Land tenure is DOGIT (Deed of Grant in Trust) with Native Title determined on 10/12/2004. The Registered Native Title Body Corporate<sup>1</sup> (RNTBC) is the Malu Ki'ai (Torres Strait Islanders) Corporation who hold the title of the land on behalf of the traditional owners. The local dialect is Kalaw Kawaw Ya.

### **1.2 Geographic Setting**

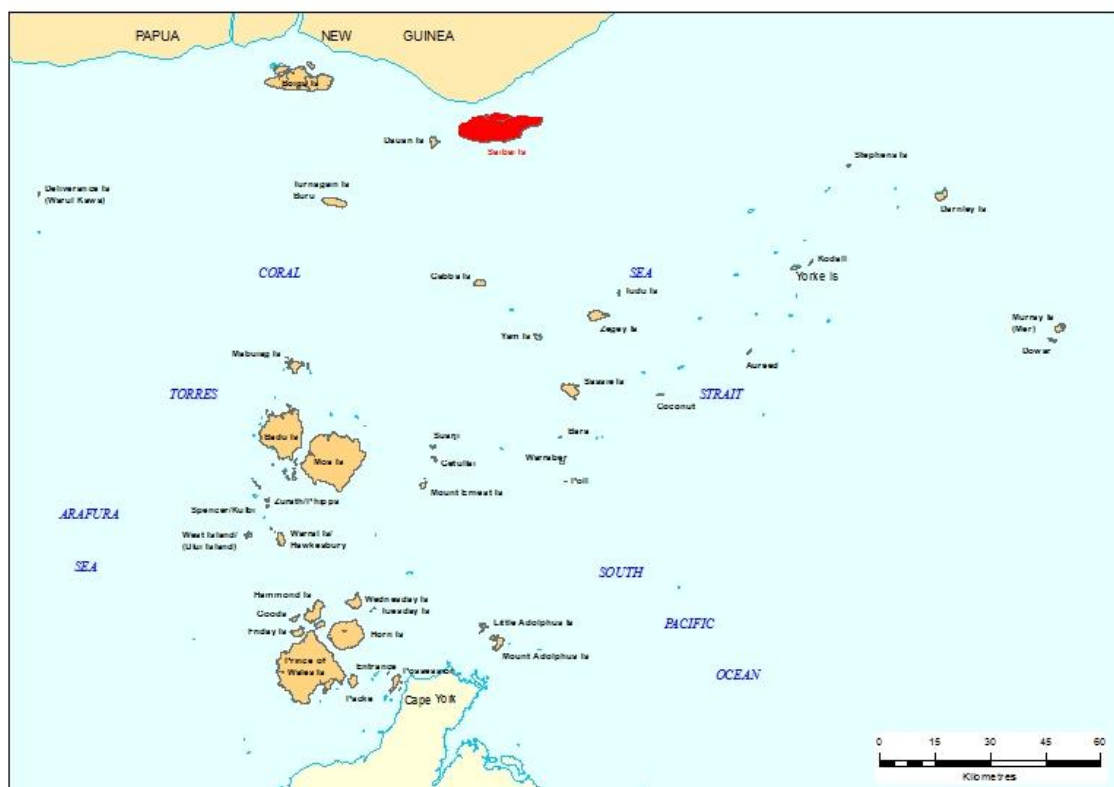
Saibai Island, along with the nearby island of Boigu and the nearby granite rock pile that forms Dauan Island, is part of the Northern Island Group and is located approximately 150 km north of Thursday Island (see **Figure 1**). Saibai and Boigu Island are extensions of the Papua New Guinea mainland which is clearly visible from the islands northern coastline<sup>2</sup>. Saibai, with an area of 11 211 hectares (ha), is low lying and swampy particularly in the interior and southern portions of the island. The most elevated portion of the island coincides with the islands township which sits 1.7m above sea level. It is 22.7km at its longest point and 8.1 km at its widest, and is described by Haddon *et al.* (1892) as “*roughly ellipsoid in shape*”.

The mean annual rainfall of 1 484.3 mm (BOM 2008a) compares with 1 983 mm on Badu Island, the wettest recording station in the Torres Strait Islands (BOM 2008b) and Dauan, the driest recording station at 1 082 mm (BOM 2008c). There are no currently known areas of natural permanent fresh water on the island although the extensive interior system of swampland is likely to be seasonally fresh.

---

<sup>1</sup> 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.

<sup>2</sup> Haddon *et al.* (1892) refers to Saibai and neighbouring Boigu as “The Delta Islands of New Guinea” (pg 465).



**Figure 1.** Location of Saibai Island.

### **1.3 Geological Context**

The Fly Platform is the largest tract of low-lying country in PNG (PNG) (Loffler 1977), and terminates on PNG's southern coast with an extensive system of estuarine wetlands. Saibai Island represents a remnant of this platform, separated from the PNG mainland through the erosive actions of major PNG river systems under tidal influence. The island is formed predominantly from recent estuarine sediments, although a relatively extensive remnant of a Pleistocene age alluvial plain is located on the islands northern coastline, extending into the islands interior where it becomes increasingly dissected by broad drainage swamps. Many alluvial remnants in the islands central and southern interior have been reduced to narrow vegetated slivers which barely emerge above a much broader expanse of saline flats and swamps. A narrow band of indurated ironstone caprock (laterite) is exposed along the islands northern coastline of which underlies the Saibai village, and extends westwards toward the cemetery. The landform is being rapidly eroded by wave action associated with seasonal northerly trade winds and under-cut laterite slabs are clearly visible along the settlement waterfront.

A number of linear shell and coralline rubble beach ridges (or strandlines) parallel the islands coastal line forming low linear rises over estuarine sediment. The best developed of these is located on the south-eastern tip of the island where the beach ridge supports extremely well

developed littoral rainforest, although they fringe the majority of the island with the exception of the north-eastern coastline.

## **2.0 Methods**

This document provides a compendium of information that has been compiled from a range of data sources. Numerous surveys relevant to flora, fauna and to a lesser extent cultural heritage matters have contributed to the compilation of this document. Desktop resources utilised include but are not limited to:

- Vegetation Communities and Regional Ecosystems of the Torres Strait Islands (Stanton *et al.* 2009);
- Queensland Herbarium's Herbrecks Database;
- Queensland Museum fauna record extracts;
- Birds Australia database extract;
- WildNet database extracts;
- Conics Land Use Management Plan for Saibai Island (Conics 2008a);
- Various technical papers relating to both flora and fauna (see references section).

Following the preparation of a draft preliminary report, a field visit in June 2012 allowed for input regarding values and issues from the newly appointed Saibai Rangers, the TSRA land team, and community members. Information derived from the visit has been incorporated into the final report.

## **3.0 Aims and Objectives**

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

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

Owing to the long term occupancy of the islands (>4 000 years) (McNiven & Wright 2008), the apparent stability of the majority of landscapes, and general lack of detailed ecological information pertaining to these landscapes, it is assumed that maintaining the existing landscape condition and process (in all but a few cases) is the safest management option.

Habitat maintenance has therefore been a primary consideration during the compilation of this document. The specific actions that are adopted and direction of island-scale ecological management will however be ultimately up to the discretion of the Saibai Island Rangers and the Saibai people, who are represented by their Registered Native Title Body Corporate, the Saibai Mura Buway (Torres Strait Islanders) Corporation.

## **4.0 Legislative and Policy Considerations**

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

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

- Extinct in the wild.
- Endangered.
- Vulnerable.
- Near-Threatened.
- Least concern.

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

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

Queensland with the Torres Strait Islands being a sub-province of the broader Cape York Peninsula bioregion.

Land zones are geological and geomorphic categories that describe the major geologies and landforms of Queensland. The system is based primarily on geology, with geologic age considered an important determinant. The classification of land zone generally utilises available geological information (Neldner *et al.* 2005) although field inspection is utilised as a supplementary measure where geological mapping is inadequate.

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

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

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

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

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

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

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

Status (BS) to REs, a non-statutory indicator of a regional ecosystems susceptibility to elements of degradation.

**Land Protection (Pest and Stock Route Management) Act 2002:** The *Land Protection (Pest and Stock Route Management) Act 2002* (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 species of plant and animal considered not native to Queensland (exotic or invasive) and which degrade natural resources, threaten conservation of biodiversity, threaten remnant vegetation, reduce rural production and interfere with human health and recreational activities. Exotic species that pose a threat are declared under one of the following three categories:

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

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

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

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

- Extinct in the Wild.
- Critically Endangered.
- Endangered.
- Vulnerable.

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

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

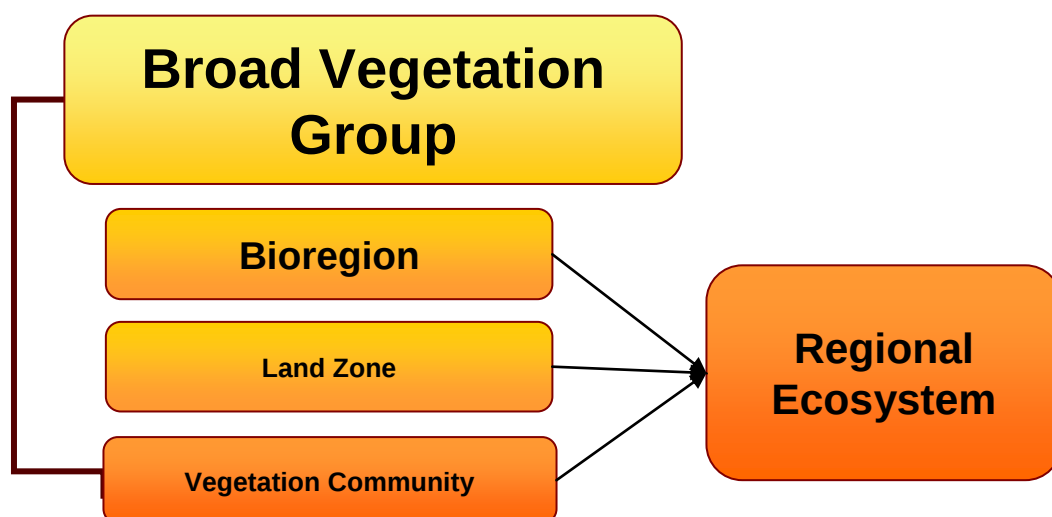
Interference or destruction of plants, animals or areas of habitat for species listed as threatened under the EPBC act requires specific authorisation from regulator who are likely to provide conditions under which the interference can take place. Interference (such as removal of protected orchid species)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

## 5.0 Vegetation

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

### 5.1 Vegetation Groups and Mapping

The hierarchy of vegetation classification used in the Torres Strait Islands is described below with relationships illustrated in **Figure 2**. At the highest level, the classification of plant assemblages is based on vegetation structure considering the dominant life form (tree or grass), height of the tallest strata, and canopy closure. The structural classification used by the Queensland Government is included within **Appendix A**. Vegetation structural groupings (e.g. shrubland and woodlands) 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) which can be described as 'a unit of vegetation that demonstrates similarities in both structure and floristic composition' 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. The REs described in **Section 5.1** represent a group of vegetation communities, although unlike BVGs, consider regional distribution and geology within the classification. Regional ecosystems must be considered in vegetation management matters due to their legislative implications although in this document, BVGs provide a more readily usable management grouping and have been used to define habitat management units.



**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).

**Vegetation Classification on Saibai Island:** For management purposes, the islands vegetation is classified into broad vegetation groups (BVGs), herein referred to as habitats, as derived from Stanton *et al.* (2009). The spatial extent and relative contribution of these groupings is provided in **Table 1**, descriptions of component vegetation communities and associated regional ecosystems provided in **Table 2**. Further characterisation of habitat types is provided in the following text.

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

| Broad Vegetation Group/ Habitat**                       | Component Vegetation Communities** | Area (ha) | Contribution (%) |
|---------------------------------------------------------|------------------------------------|-----------|------------------|
| Deciduous / Semi-deciduous vine forest and vine thicket | 2a, 2c                             | 54.0      | 0.5              |
| Melaleuca dominant woodland and open forest             | 7a                                 | 9.5       | 0.1              |
| Lophostemon dominant woodland and open forest           | 8a                                 | 82.0      | 0.2              |
| Pandanus dominant woodland and shrubland                | 11a                                | 625.7     | 5.6              |
| Melaleuca dominant shrublands.                          | 13a                                | 45.0      | 0.5              |

| Broad Vegetation Group/ Habitat**                 | Component Vegetation Communities** | Area (ha)    | Contribution (%) |
|---------------------------------------------------|------------------------------------|--------------|------------------|
| Grasslands and grassland complexes                | 17a, 17e                           | 495.5        | 4.5              |
| Wetland Complexes and Mosaics                     | 20a                                | 103.0        | 0.9              |
| Saline Transitional Communities                   | 23a                                | 20.0         | 0.2              |
| Samphire grasslands                               | 26a, 26b<br>(component of)         | 215.7        | 1.9              |
| Samphire herblands and shrublands and salt pans   | 25a, 25b                           | 2374.7       | 21.2             |
| Estuarine wetland complexes and mosaics           | 27a, 27b                           | 132.2        | 1.2              |
| Mangrove forest, woodland and shrubland complexes | 24a, 24c                           | 6989.9       | 62.5             |
| Cleared Areas                                     | CI (Pre disturbance 17e)           | 51.9         | 0.5              |
| Exotic Species                                    | EX                                 | 11.5         | 0.1              |
| <b>Total</b>                                      |                                    | <b>11211</b> | <b>100</b>       |

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

| Vegetation Community | Description                                                                                                                                                                                                                    | Geological Association             | Regional Ecosystem | VMS | BDS  |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------|-----|------|
| 2a                   | Deciduous/Semi-deciduous vine forest + <i>Erythrina variegata</i> + <i>Manilkara kauki</i> + <i>Terminalia subacoptera</i> + <i>Mimusops elengi</i> + <i>Cordia subcordata</i> .                                               | Calcareous Beach Ridges - Cheniers | 3.2.2b             | LC  | OC   |
| 2c                   | Semi-deciduous vine thicket + <i>Mimusops elengi</i> + <i>Acacia auriculiformis</i> + <i>Terminalia subacoptera</i> + <i>Diospyros</i> spp. + <i>Manilkara kauki</i> + +/- <i>Melaleuca cajuputi</i> subsp. <i>platyphylla</i> | Alluvial Plains                    | 3.3.68             | OC  | OC   |
| 7a                   | Low <i>Melaleuca cajuputi</i> subsp. <i>platyphylla</i> open forest.                                                                                                                                                           | Alluvial Plains                    | 3.3.70             | OC  | OC   |
| 8a                   | <i>Lophostemon suaveolens</i> + <i>Melaleuca cajuputi</i> subsp. <i>Platyphylla</i> +/- <i>Pandanus</i> sp. +/- <i>Livistona muelleri</i> woodland and open forest                                                             | Alluvial Plains                    | 3.3.70             | OC  | OC   |
| 11a                  | <i>Pandanus</i> sp. +/- <i>Melaleuca cajuputi</i> subsp. <i>platyphylla</i> +/- <i>Acacia leptocarpa</i> +/- <i>Melaleuca acacioides</i> shrubland and low woodland.                                                           | Alluvial Plains                    | 3.3.62             | OC  | OC   |
| 13c                  | <i>Melaleuca cajuputi</i> subsp. <i>platyphylla</i> +/- <i>Pandanus</i> sp. shrubland                                                                                                                                          | Alluvial Plains                    | 3.3.42c            | LC  | NCAP |
| 17a                  | Tall <i>Ischaemum australe</i> +/- <i>Imperata cylindrica</i> +/- <i>Themeda triandra</i> +/-                                                                                                                                  | Alluvial Plains                    | 3.3.62             | OC  | OC   |

| Vegetation Community | Description                                                                                 | Geological Association                  | Regional Ecosystem | VMS | BDS             |
|----------------------|---------------------------------------------------------------------------------------------|-----------------------------------------|--------------------|-----|-----------------|
|                      | <i>Mnesithea rottboellioides</i> +/- <i>Heteropogon triticeus</i> grassland.                |                                         |                    |     |                 |
| 17e                  | Relic cultivated alluvial plains with anastomosing channel morphology                       | Alluvial Plains                         | 3.3.62             | OC  | OC              |
| 20a                  | <i>Eleocharis</i> sp. closed sedgeland                                                      | Alluvial plains - wetland               | 3.3.63             | LC  | NCAP            |
| 26a                  | Closed <i>Sporobolus virginicus</i> grassland.                                              | Saline Alluvial Plains                  | 3.1.5              | LC  | NCAP            |
| 26b                  | <i>Sporobolus</i> sp. grassland / Chenopod forbland and herbland complex (26a/25a - 50/50). | Saline Alluvial Plains                  | 3.1.5/ 3.1.6       | LC  | NCAP            |
| 25a                  | Dwarf halophytic shrubland and saltpan.                                                     | Hypersaline Alluvium                    | 3.1.6              | LC  | NCAP            |
| 25b                  | Salt pan.                                                                                   | Hypersaline Alluvium                    | 3.1.6              | LC  | NCAP            |
| 27a                  | <i>Schoenoplectus</i> sp. sedgeland.                                                        | Estuarine muds (periodically inundated) | 3.1.7              | OC  | OC              |
| 27b                  | Tall <i>Schoenoplectus</i> sp. sedgeland / Estuarine wetland complex                        | Estuarine muds (periodically inundated) | 3.1.7              | OC  | OC              |
| 24a                  | Mangrove closed and open forest, woodland and shrubland complexes (24d/24c – 80/20).        | Estuarine muds (periodically inundated) | 3.1.1/ 3.1.2       | LC  | OC Sub-dominant |

OC = Of Concern, LC = Least Concern, NCAP = No Concern at Present.

## 5.2 Flora Species

The composition of the Saibai flora has been compiled from 3D Environmental survey data collected during vegetation mapping surveys in October 2007 and a rapid field survey associated with the biodiversity planning project in June 2012. It has been supplemented by specimen data from the Queensland Herbarium (DERM 2011c) and the Australian Tropical Herbarium (2012), together with lists provided by Barbara Waterhouse and Stephen McKenna (DAFF 2012) and information within on a limited number of previous reports relevant to the islands flora.

There are currently 344 flora species recorded on the island comprising 10 ferns and 334 angiosperms (**Appendix B**). Native species make up 81% of the flora with 84 species (19%) considered naturalised, two of which are declared weeds. There are 90 families of which nine are wholly naturalised. Major native plant families are Poaceae, Fabaceae, Cyperaceae, Rubiaceae, Apocynaceae and Rhizophoraceae. Five plant species are considered threatened at either Federal or State level, four of which are orchids, and a further ten species are significant at the regional level.

An indication of the integrity of remnant habitats on the island is indicated by a relatively low number of introduced species. Additional systematic surveys in grasslands, pandanus woodlands and estuarine wetlands are likely to increase the species list for the island.

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

| Islands                                             | Families/Species      | Pteridophytes | Gymnosperms | Angiosperms | Total |
|-----------------------------------------------------|-----------------------|---------------|-------------|-------------|-------|
| <b>Saibai Is</b>                                    | Families              | 6             | 0           | 84          | 90    |
|                                                     | Species               | 10            | 0           | 334         | 344   |
| <b>Mabuiag Is.</b>                                  | Families              | 2             | 1           | 101         | 104   |
|                                                     | Species               | 4             | 1           | 429         | 434   |
| <b>Badu Is.</b>                                     | Families              | 11            | 2           | 117         | 130   |
|                                                     | Species               | 17            | 2           | 586         | 605   |
| <b>Iama Is.</b>                                     | Families              | 2             | 0           | 78          | 80    |
|                                                     | Species               | 2             | 0           | 266         | 268   |
| <b>Boigu Is.</b>                                    | Families              | 3             | 0           | 69          | 72    |
|                                                     | Species               | 4             | 0           | 239         | 243   |
| <b>Mua Is.</b>                                      | Families              | 10            | 3           | 127         | 140   |
|                                                     | Species               | 17            | 3           | 652         | 672   |
| <b>Torres Strait Islands (Combined)<sup>3</sup></b> | Families              | 15            | 1           | 158         | 174   |
|                                                     | Species               | 39            | 1           | 1,289       | 1,330 |
| <b>Cape York Peninsula</b>                          | Families <sup>4</sup> | 30            | 5           | 183         | 218   |
|                                                     | Species               | 157           | 6           | 3,173       | 3,338 |
| <b>GBR Continental Islands<sup>5</sup></b>          | Families              | 25            | 5           | 165         | 195   |
|                                                     | Species               | 97            | 7           | 2,091       | 2,195 |
| <b>Qld Flora<sup>6</sup></b>                        | Species               | 396           | 70          | 9,424       | 9,890 |

The high percentage of naturalised (exotic) species (27% of island flora) is heavily influenced by a concentration of botanical surveys and collections in and around the settled areas. This figure compares to 15% for Torres Strait Islands (Stanton *et al.* 2009), 7.4% for Cape York Peninsula (Neldner & Clarkson 2005) and 15.6% for Queensland (Bostock & Holland 20010). Disturbed areas support the greatest number of naturalised species with 93 species recorded (see **Table 4**).

Vine forests and thickets (87 species) and mangroves (55 species) support the greatest species richness. The relatively low number of introduced species indicates that remnant habitats on the island are generally in natural condition. Additional systematic surveys in grasslands,

<sup>3</sup> This figure should be regarded as a draft and likely to increase following additional data analysis.

<sup>4</sup> Cape York flora utilises Henderson (2002).

<sup>5</sup> Batianoff and Dilleward (1997) identify 552 continental islands along the east coast of Queensland within the Great Barrier Reef Marine Park (GBRMP), a total land area of about 1,627 km<sup>2</sup>.

<sup>6</sup> Bostock and Holland (2010).

pandanus woodlands and estuarine wetlands are likely to increase the known species composition.

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

| Broad Vegetation Group                                                                           | Total Species Recorded<br>(to end 2010) | % Native | % Naturalised |
|--------------------------------------------------------------------------------------------------|-----------------------------------------|----------|---------------|
| Cleared land and non remnant regrowth (CI/Re)                                                    | 52                                      | 36       | 64            |
| 2. Deciduous and semi-deciduous vine forest and vine thickets (RE3.3.2b – VC2a, RE3.3.68 – VC2c) | 87                                      | 93       | 7             |
| 24. Mangroves and mangrove complexes (VC24a, 24b, RE3.1.1/3.3.2)                                 | 57                                      | 100      | 0             |
| 7. Melaleuca dominant open forest (VC7a – RE3.3.70)                                              | 27                                      | 100      | 0             |
| 13. Melaleuca dominant shrublands and woodlands                                                  | 19                                      | 100      | 0             |
| 17. Grasslands and grassland complexes (VC17a – RE3.3.62)                                        | 24                                      | 100      | 0             |
| 11. Pandanus dominant woodland and shrubland (VC11a – RE3.3.62)                                  | 24                                      | 100      | 0             |
| 27. Estuarine wetland complexes and mosaics (VC27a – RE3.1.7)                                    | 18                                      | 100      | 0             |
| 26. Samphire grasslands (VC26a/26b – RE 3.1.5/3.1.6)                                             | 9                                       | 100      | 0             |
| 25. Samphire herblands, shrublands and saltpans (VC25a, 25b – RE3.1.6)                           | 3                                       | 100      | 0             |

### 5.2.1 Flora Species with Biodiversity Significance

An assessment of significant flora species draws from the data sources identified above and seeks to provide details sufficient to document additional flora and habitats which should be considered a priority and focus for management actions. Additional and complementary species management criteria have been assessed with consideration of the existing Torres Strait Region Back on Track Species Prioritisation program (DERM 2009) and ongoing assessments of the status of Queensland flora by the Queensland Herbarium. Species have been broadly categorised into significance categories (i.e. national, state, regional and cultural) based on criteria which include legislative status, keystone/focal, threatened or sensitive, restricted, otherwise noteworthy or of cultural interest value. Culturally significant species are assessed separately. The 15 species identified as having significance at the national, state, and regional level are summarised in **Table 5** below.

**Table 5.** Summary of flora with conservation significance on Saibai Island.

| Species | National<br>EPBC | State<br>NC<br>Act | Regionally<br>Significant | BVG | VC | RE |
|---------|------------------|--------------------|---------------------------|-----|----|----|
|---------|------------------|--------------------|---------------------------|-----|----|----|

| Species                                        | National EPBC | State NC Act | Regionally Significant                     | BVG                                                     | VC       | RE          |
|------------------------------------------------|---------------|--------------|--------------------------------------------|---------------------------------------------------------|----------|-------------|
| <i>Apluda mutica</i>                           | -             | NT           | -                                          | Grasslands, Pandanus woodlands                          | 11a, 17a | 3.3.62      |
| <i>Dendrobium antennatum</i> <sup>1</sup>      | E             | E            | -                                          | Mangroves                                               | 24a      | 3.1.1/3.1.2 |
| <i>Didymoplexis pallens</i>                    | -             | NT           | -                                          | Grasslands, Pandanus woodlands                          | 11a, 17a | 3.3.62      |
| <i>Habenaria rumphii</i>                       | -             | NT           | -                                          | Grasslands, Pandanus woodlands                          | 11a, 17a | 3.3.62      |
| <i>Nervilia crociformis</i>                    | -             | NT           | -                                          | Grasslands, Pandanus woodlands                          | 11a, 17a | 3.3.62      |
| <i>Diospyros littorea</i>                      | -             | -            | Disjunct; Restricted habitat               | Semi-deciduous notophyll-microphyll vine forest/thicket | 2c       | 3.3.68      |
| <i>Eulalia</i> sp. (Saibai J.R. Clarkson 7801) | -             | -            | Undescribed                                | Grasslands, Pandanus woodlands                          | 11a, 17a | 3.3.62      |
| <i>Helicteres semiglabrata</i>                 | -             | -            | Disjunct; Restricted habitat               | Shrublands                                              | 13b      | 3.3.70      |
| <i>Intsia bijuga</i>                           | -             | -            | Disjunct; Restricted habitat               | Open forest (partially cleared)                         | 2e       | 3.7.1x1b    |
| <i>Kopsia arborea</i>                          | -             | -            | Disjunct; Restricted habitat               | Semi-deciduous notophyll-microphyll vine forest/thicket | 2c       | 3.3.68      |
| <i>Livistona benthamii</i>                     | -             | -            | Disjunct<br>Locally rare                   | Semi-deciduous notophyll-microphyll vine forest/thicket | 2c       | 3.3.68      |
| <i>Lophostemon suaveolens</i>                  | -             | -            | Northern limit of Australian distribution. | Lophostemon dominant woodland and open forest           | 8a       | 3.3.70      |
| <i>Lysiphyllum binatum</i>                     | -             | -            | Disjunct; Restricted habitat               | Open forest (partially cleared)                         | 2e       | 3.7.1x1b    |
| <i>Nypa fruticans</i>                          | -             | -            | Disjunct                                   | Mangroves                                               | 24a      | 3.1.1/3.1.2 |
| <i>Synima cordieriorum</i>                     | -             | -            | Disjunct<br>Locally rare                   | Transitional open forest                                | 23a      | 3.1.4       |

1; listed as *Ceratobium antennatum* under the EPBC Act.

E = Endangered, NT = Near-Threatened

### **National Significance**

One species listed on the EPBC Act is known to occur.

**Antelope orchid (*Dendrobium antennatum*) - Endangered:** An epiphytic orchid which has been reported to occur on the island by Lavarack (1989) who cites a reliable observation by Stocker who collected on the island in July 1975. The orchid is widespread in PNG however rare in Queensland and known only from well-developed and remote rainforests in north-eastern Cape York Peninsula. Further targeted surveys on the margins of mangroves and vine forest and thicket are required to confirm the orchid's occurrence on

the island and to determine population status and threatening processes. The species is listed as *Ceratobium antennatum* under the EPBC Act.

### **State Significance**

Five species listed on the amended regulations of the Queensland NC Act 1992 are known to occur with another considered as likely to occur.

**Antelope orchid (*Dendrobium antennatum*) - Endangered:** See above

**Mauritian Grass (*Apluda mutica*) (Poaceae) – Near-Threatened:** A perennial grass known from India through southeast Asia to the Torres Strait where it has been recorded from Saibai Is in pandanus woodlands and in grasslands on Mer (Clayton *et al.* 2011), Erub and Dauan (Fell pers. obs.). Information on its ecology, population size on the island is currently lacking. Conversion of grassland into shrubland in association with deer grazing and changed fire regimes are identified as threatening processes.

***Didymoplexis pallens* (Orchidaceae) – Near-Threatened:** A leafless terrestrial orchid known from rainforests and bamboo groves in northern Australia from the Kimberley through the Northern Territory, north-eastern Queensland including some Torres Strait Islands, and from PNG and parts of Asia. The plants are difficult to detect given that they are above ground for between three and five weeks usually at the onset of the wet season, and with flowers lasting less than a day (Jones *et al.* 2012).

***Habenaria rumphii* (Orchidaceae) – Near-Threatened:** This attractive terrestrial orchid with white flowers and a rosette of basal leaves occurs in north-eastern Queensland, the Northern Territory and PNG. It occurs in grassland open forest and woodland habitats which may be seasonally flooded. Ground Orchids may be impacted by grazing animals such as deer, and require careful fire management as they are often vulnerable to intense late dry season fires and to vegetation thickening as a result of infrequent burning. Woody weeds such as leucaena, and invasive grasses such as grader grass (*Themeda quadrivalvis*) and annual mission grass (*Pennisetum* spp.) have the potential to out-compete native groundcover and transform habitat.

***Nervilia crociformis* (Orchidaceae) – Near-Threatened:** A terrestrial orchid which occurs on rainforest margins in Cape York Peninsula south to about Cooktown and some Torres Strait Islands and in Indonesia, PNG and the Philippines (Jones *et al.* 2012). It occurs in colonies and is reported to flower between November and December.

### ***Likely to Occur***

**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, PNG, New Caledonia, Solomon Islands, Vanuatu and Australia. In north-eastern Cape York Peninsula (Olive River and Temple Bay). 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 is better adapted for dispersal by ocean currents (van Steenis 1977). In Torres Strait it has also been recorded from Lama and Boigu Islands however is expected to occur on other islands with extensive mangrove habitats. Cultural uses and values known from PNG, Solomon's, Java and the Philippines include various medicinal uses and as a fish poison.

### **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. Ten species are recognised on Saibai Island and one species is considered as likely to occur (refer **Table 6**).

**Table 6.** Regionally significant flora species on Saibai Island.

| Species                                        | Regionally Significant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Known</b>                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>Diospyros littorea</i>                      | Ebony mangrove is a tree or shrub with alternate leaves which are narrowly elliptic to obovate or ovate in shape with a rounded or slightly notched tip. The fruit is an oval-elliptic shaped berry which is orange-yellow when ripe, 10 mm long and 4 mm wide. On Saibai it has been recorded on the margins of semi-deciduous notophyll-microphyll vine forest/thicket (VC2c/RE3.3.68) and also in mangroves. It is also known from parts of the Kimberley and Northern Territory (NT) coast and along the east coast of Cape York Peninsula (CYP). Outside Australia, it occurs in Thailand, and Papua New Guinea (PNG). Information on its ecology and population size on the island is currently lacking. No threatening processes are currently known for the species. |
| <i>Eulalia</i> sp. (Saibai J.R. Clarkson 7801) | This undescribed perennial grass is only known from a single collection on Saibai Island in grassland habitat. The collection was made in February 1989 in grassland about one km from the Saibai village. Further surveys are required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>Helicteres semiglabrata</i>                 | This low shrub was recorded on Saibai Island in shrublands and grasslands (VC17a, 17e, 13b/RE3.3.70). The occurrence is disjunct and represents the northern limit of its Australian distribution. It is rarely collected on CYP with its distribution extending south to the North Kennedy, South Kennedy and Leichhardt districts. It also occurs in PNG. Information on its ecology and the size of the population on the island is currently lacking. <i>Leucaena</i> invasion into viable habitat for the species is a potentially threatening process.                                                                                                                                                                                                                 |
| <i>Intsia bijuga</i>                           | This tree is rare on Saibai Island occurring as isolated individuals on the margins of disturbed vine thicket on laterite (VC2e, RE3.7.1x1b). Elsewhere in Torres Strait it may be also found on the margins of sand and coral beaches, in coastal vine forests and thickets, and rainforest on granite hills with records known from Dauan, Mua, and Lama (D. Fell pers. obs.). Kwila grows to a large well-formed tree in PNG. On Saibai however, it is a poorly formed tree. It is listed by the International Union for the Conservation of Nature (IUCN) as a Vulnerable species.                                                                                                                                                                                       |
| <i>Kopsia arborea</i>                          | A rainforest shrub with attractive fragrant white flowers and milky                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Species                       | Regionally Significant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | exudate from broken leaves and stems. It occurs in rainforest and vine thicket habitats along coastal parts of north-eastern Qld with a disjunct occurrence in north-eastern CYP. The Saibai occurrence from semi-deciduous notophyll-microphyll vine forest/thicket is highly disjunct and representing its northern limit of occurrence in Australian territory. It is also known from Malesia. The extent of the Saibai population is not known.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>Livistona benthamii</i>    | Known from PNG (Western, Central Districts), NT, Torres Strait (Saibai, Boigu, Badu, Mua), and CYP. The Saibai occurrence in semi-deciduous notophyll-microphyll vine forest/thicket (VC2c/RE3.3.68) is disjunct and represents the northern limit of the species Qld and Australian distribution. Populations are potentially threatened by rising sea levels. Cultural uses and values are known from other regions although have not been documented for Saibai Island.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>Lophostemon suaveolens</i> | A tree with thick papery outer bark known from CYP to NSW within moist seasonally inundated habitats including floodplains and swamps. It also occurs in PNG. It occurs on the larger continental islands of Torres Strait. Saibai populations represent the northern limit of Australian distribution. Significance is also attributed to the fact that on Saibai it forms a vegetation community that is unique to Queensland.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>Lysiphyllum binatum</i>    | As the common name suggests, the species sometimes grows as a large vine but also flowers and fruits as a shrub. It has distinctive compound leaves which resemble butterflies, each leaf consisting of two leaflets. It occurs in the Northern Territory, CYP and coastal central Queensland. Its habitat on Saibai within disturbed vine thicket (VC2e, RE3.7.1x1b) is close to mangrove forest, a habitat more typical of its usual habitat preference in Qld, NT, SE Asia and Malesia. Its habitat on Saibai is highly restricted and in a degraded state.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>Nypa fruticans</i>         | A palm known from Pacific Islands, Asia, India, PNG, Malesia, and Northern Territory. Occurs in CYP in a number of disjunct populations (e.g. Jardine, Olive, Claudie, Mclvor Rivers) and on the wet tropical coast at the mouth of the Herbert River. Torres Strait populations are rare and limited to a small patch on Prince of Wales, and on Boigu and Saibai Islands. These represent disjunct occurrences and northern limit of Australian distribution, yet are part of a continuous distribution between northern Australia and Asia-Pacific. No threatening processes are apparent. Cultural uses are known from other regions however these have not been documented for Torres Strait populations.                                                                                                                                                                                                                                                                                                          |
| <i>Synima cordieriorum</i>    | A small tree that occurs on Saibai Island in transitional open forest (VC23a/RE3.1.4). The species is also known from PNG, CYP and Boigu Island. Saibai and Boigu populations are disjunct and represent the northern limit of Australian distribution. Threatening processes include habitat change associated with rising sea levels and changed fire regimes. The cultural resource utilisation and values of this species is not known.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Likely to Occur</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>Sonneratia ovata</i>       | A mangrove tree recorded by Duke (2010 in Burrows 2010) in mangroves on Boigu Island. Known from scattered in widely separate localities along tidal areas and seashores from China and Thailand through Peninsula Malaysia, the Riau Archipelago, Java, and Borneo, to Sulawesi, the Moluccas, and Daru Island and Milne Bay in New Guinea. The recent recording on Boigu represented a new record for the Australian territory (Duke 2010 in Burrows 2010) and a southern limit of distribution. The species is expected to occur on Saibai Island however the extent of the population is not known. It typically occurs as scattered individuals amongst mangrove communities. No threats are currently known. Cultural uses and values not documented for Saibai however uses known from PNG and Indonesia include: firewood; tannin or dyestuff (bark); food (sour but edible fruit); medicine (fruit applied in poultices to relieve sprain and fermented juice is believed to check hemorrhages) (Othman 1997). |

### 5.2.2 Flora with Cultural Significance

Information on useful plants of Saibai Island is currently held within the community. More detailed ethnobotanical studies are required to derive baseline information of useful plants and the local language names. This should include information on uses, seasonality, habitat, distribution, abundance, phenology, and most importantly the relationships to story and culture.

Based on information recorded on other islands there are a number of plants that are likely to have recorded usage (refer **Appendix C**). These include naturalised species such as stinking passionflower (*Passiflora foetida*), bamboo (*Bambusa vulgaris*), mango (*Mangifera indica*), coconut (*Cocos nucifera*) which may occur within remnant vegetation, often in vicinity of old settlement and garden sites. Others such as cassava (*Manihot esculenta*), tree cashew (*Anacardium occidentale*), ringworm shrub (*Senna alata*), and tridax daisy (*Tridax procumbens*) may be abundant in community areas. Uzu (*Syzygium branderhorstii*) and bell fruit (*Syzygium azeum*) are favoured bush fruit trees which are often planted in house gardens. These are considered domesticated native species as neither have been recorded in the vine forests of Saibai. They occur naturally in remnant vine forests on Erub, Mer, Dauan, and Mua. Other species likely to be used for material purposes include products made from timber (e.g. *Acacia auriculiformis*, *Manilkara kauki*), decoration (*Erythrina insularis*, *E. variegata*, and *Entada phaselioides*), rope or binding (*Hibiscus tiliaceus*, and *Flagellaria indica*).

### 5.2.3 Introduced Plants

Information on weed species has been sourced from 3D Environmental 2007 field data incorporated within Stanton *et al.* (2009), Qld Herbarium voucher data, the land use planning report of Conics (2008a), personal communication with Barbara Waterhouse and Stephen McKenna from the Department of Agriculture, Forestry and Fisheries (DAFF 2012), and 3D Environmental survey data of June 2012.

A number of plants which are not native to Saibai are present on the island. These introduced plants are referred to as 'environmental weeds' or 'naturalised plants'. Most have been brought to the island as garden plants, and others may have been imported by natural means for example by birds, wind and tides. Others may have been brought in by people, boats and barges within freight items, and in soil, gravel and machinery. While many of them pose no real problem to the natural environment, others can spread into bush areas and have serious impacts to natural and cultural values if not controlled. As for the majority of the inhabited islands in the Torres Strait, the developed town areas and disturbed margins around settlements are a major dispersal point for weeds.

A number of introduced plants are however valued by local people on the basis of their various uses. For example these plants include the food plants yams (*Dioscorea* spp.), coconut (*Cocos nucifera*), cassava (*Manihot esculenta*) and wild passionfruit (*Passiflora foetida*), together with

useful plants such as Manilla rope (*Agave sisalana*), six o'clock (*Senna alata*), tropical kudzu (*Pueraria montana* var. *lobata*) and tridax daisy (*Tridax procumbens*). As for the majority of the inhabited islands in the Torres Straits, the developed and disturbed areas are a major dispersal point for weeds.

With reference to **Appendix B**, there are 84 species (19% of the island flora) that are considered naturalised, two of which are declared weeds. Field surveys coupled with review of flora species data indicate that the remnant vegetation is generally free of introduced weeds. Those species considered a potential threat to biodiversity on the island and requiring management action are summarized below.

### **Declared Weeds**

Two species declared on the LP Act are known to occur on Saibai Island and have the potential to degrade the islands natural and cultural resources.

**Singapore daisy - *Sphagneticola trilobata* (Class 3):** Singapore daisy is a vigorous creeping ground cover that has become established on Saibai Island in a number of locations in and around the community. The plant will out-compete native species and is a significant threat to riparian and swampy habitats across the island. Identification of the location of existing populations and implementation of control measures is a priority management action.

**Yellow bells - *Tecoma stans* var. *stans* (Class 3):** A medium to tall shrub with attractive yellow flowers which is common throughout the community in house gardens and community areas. It has a papery wind-blown seed which readily germinates in disturbed areas and native bushland. The species is currently known from disturbed habitats near the islands settlement.

### **Environmental Weeds**

Environmental weeds are capable of causing long-term changes to biodiversity although are not currently declared under state legislation. The distribution of these plants on the island is concentrated on disturbed areas. Remnant vegetation is however increasingly susceptible to impacts from a number of environmental weeds. Weeds which are not currently declared under state legislation are categorized according to their invasiveness, dispersibility and potential threat under the following criteria:

**High:** These plants are considered to be the highest threat to the islands cultural and biodiversity values because they have a high potential to expand beyond existing infestations and could occupy a much larger area if not controlled. These plants have a high likelihood to spread and establish in new areas and are able to invade reasonably intact ecosystems areas.

**Moderate:** These plants are considered to be of secondary importance at present, although some could become a problem in the future. They are not considered as invaders yet, but are known to be invasive elsewhere in the region and/or are showing signs of extension (species which are in an early stage of invasion), or may be present on the island in disturbed areas. These plants have a moderate potential to spread and establish in new areas, both within native bush and disturbed areas.

**Low:** These are naturalised plants which are not considered as invaders given their low dispersal potential. They have a low potential to expand beyond existing areas of infestations and may already occupy as much area as they are likely to infest.

**Table 7** below summarises weeds considered to be of high and moderate threat.

**Table 7.** Environmental weeds on Saibai Island – high and moderate threat.

| Species                                          | Life Form       | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>HIGH</b>                                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Leucaena<br>( <i>Leucaena leucocephala</i> )     | Shrub           | Leucaena is the most pressing weed threat to island with the potential to severely impact and transform the remaining natural ecosystems. It is a small tree up to about six metres tall with fine bipinnate leaflets, spherical creamy yellow flower heads, dense clusters of flattened pods up to 15 cm long with 20 glossy brown, and flat seeds that scatter when ripe (Biosecurity Queensland 2007). Its origins on Saibai are not known although it is likely to have been brought in from other islands as an ornamental. On nearby Boigu, leucaena has rapidly become established in and around the margins of the community and poses a significant threat to the islands cultural and natural values.                                                                                                                                     |
| Sisal, manilla rope<br>( <i>Agave sisalana</i> ) | Succulent shrub | A robust succulent plant that is widely cultivated as a garden ornamental. The species has had traditional usage on the Torres Strait Islands providing a natural source of fibre. It generally occurs in coastal areas where it may form dense impenetrable thickets covering dune swales and riparian areas. It is also listed as one of the 35 most troublesome weed species in the state, occurring on sandy beaches and dunes along Queensland (Biosecurity Queensland 2011).                                                                                                                                                                                                                                                                                                                                                                  |
| Butterfly pea<br>( <i>Clitoria ternatea</i> )    | Vine            | This vigorous sprawling herbaceous perennial vine is one of a number of leguminous vines and herbs which occur throughout the disturbed parts of the island. Butterfly pea is a tropical perennial legume adapted to a range of soils and climates in northern (tropical and subtropical) Australia. It is promoted by the pastoral industry as a legume that establishes quickly to produce a relatively cheap but high-quality, productive pasture on soils previously considered 'difficult to establish'. Current infestations are restricted to disturbed areas however its potential to invade Saibai grasslands and shrublands warrants concern. Seeds are likely to be dispersed by vectors such as machinery, water and grazing deer. Ongoing monitoring and prompt control of any infestations outside the community area is recommended. |
| Grader grass<br>( <i>Themeda quadrivalvis</i> )  | Grass           | An annual erect and clumping grass forming dense swards to 2m in height. Typically colonises on track and road margins where it is dispersed by vehicle and machinery movement such as roadworks and slashing. It can reduce biodiversity by replacing native ground covers and when established competes strongly with existing and establishing perennial grass tussocks, particularly in disturbed areas.                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Species                                                                     | Life Form     | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             |               | Further, the grass can generate large fuel loads which increases the risk of wild fires and the frequency and intensity of dry season fires. Grader grass has been recorded around the community and the refuse site. Further surveys are required on Saibai to establish the extent of the area of infestation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>MODERATE</b>                                                             |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Painted spurge<br>( <i>Euphorbia heterophylla</i> )                         | Herb          | An introduced weed originally from tropical America naturalised in Qld and NSW. Widespread throughout Torres Strait in particular on sand dunes and coral cays. Invades native grassland and herblands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Mossman River grass<br>( <i>Cenchrus echinatus</i> )                        | Grass         | Mossman River grass is a prostrate spreading grass with a spiny seed head that adheres to clothing and can penetrate the skin. The species has potential to become a troublesome dominant cover on grassy dune systems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Siratiro<br>( <i>Macroptileum atropurpureum</i> )                           | Vine          | Siratiro is widespread throughout Torres Strait occurring in community areas and on the margins of tracks and roads. It is a vigorous sprawling leguminous climber that establishes rapidly and is considered capable of invading the groundcover of shrublands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Calotropis<br>( <i>Calotropis gigantea</i> )                                | Shrub         | The plant has milky sap which exudes from broken leaves and stems. Its occurrence on the island has been identified from a single collection in the Qld Herbarium. The location and extent of infestation is not known. Another species <i>Calotropis procera</i> is a recognised environmental weed in northern Queensland and the Northern Territory with an ability to form dense thickets on alluvial flats. It is possible that the species has been present for some years with no noticeable spread. Given its toxicity and potential for spread, any calotrope plants should be located and controlled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Centro<br>( <i>Centrosema molle</i> )                                       | Vine          | This vigorous sprawling vine is one of a number of leguminous vines and herbs which occur throughout the disturbed parts of the island. It is a tropical perennial legume adapted to a range of soils and climates in northern (tropical and subtropical) Australia. Current infestations are restricted to disturbed areas however it has the potential to invade native vegetation. Seeds are likely to be dispersed by vectors such as machinery, and water. Ongoing monitoring and prompt control of any infestations outside the community area is recommended.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Tropical kudzu<br>( <i>Pueraria phaseoloides</i> var. <i>phaseoloides</i> ) | Vine          | Tropical Kudzu is a robust and aggressive tropical legume with large hairy trifoliate leaves and a large edible underground tuber. Kudzu is originally from Asia, and is naturalised in New Guinea, other parts of Malesia and the Pacific Islands where it is utilised as a forage crop, a food resource, and for medicinal purposes. It is now naturalised in CYP, NEQ and southwards as far as north-eastern New South Wales usually growing on disturbed sites and agricultural land, and sometimes on rain forest margins. On mainland Queensland the vine is a Class 2 declared weed and is listed as noxious in NSW. The IUCN has listed kudzu among the world's 100 worst invasive species (IUCN Global Invasive Species Database 2002) and it is a severe problem in the USA and Japan. Kudzu has been present in Queensland since at least 1941 and its origin is unclear. The Torres Strait recorded occurrences are from Dauan, Mua, Hammond, Erub and Hammond Islands (Herbrechs Data 2011). Torres Strait Islanders consider it to be native and there is evidence that it has a long history of use and transportation as a source of food, possibly originating in Asia but then taken south through Indonesia and across the Pacific (Csurhes 2008). On Mer the tuber is a traditional food resource known as 'Weskapu'. |
| Glory lily ( <i>Gloriosa superba</i> )                                      | Climbing herb | A tuberous climbing plant with brilliant wavy-edged yellow and red flowers. It is a serious weed on sandy coastal soils in south-eastern Queensland and along the north coast of NSW, and is known to be fatally toxic to humans with the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Species | Life Form | Comments                                                                                                                                                                                                                                                                                                                                                                          |
|---------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |           | rootstock is the most toxic part of the plant. The plant has underground tubers and is difficult to control. It has been observed in gardens on a number of islands in the Torres Strait including Masig, Mer, Ugar, Erub, Warraber and Poruma. It is likely that it has been introduced as an ornamental for house gardens. There is a potential for it to escape into bushland. |

### Weed Threats

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

**Table 8.** Major weed threats

| Species                                                                                     | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Gamba grass</b><br>( <i>Andropogon gayanus</i> )                                         | Gamba is a Class 2 Declared Weed that has not yet been recorded in Torres Strait however, it is considered a serious potential threat. Together with annual mission grass it is listed as a Key Threatening Processes under the EPBC Act. 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> 2003). | <br>Gamba grass near Injinoo (April 09).                                                                                                                                |
| <b>Annual mission grass</b><br>( <i>Pennisetum pedicellatum</i> subsp. <i>unispiculum</i> ) | Annual mission grass is considered a serious potential threat and is listed as a Key Threatening Processes under the EPBC Act. It occurs on Mua and Mabuiag Islands.                                                                                                                                                                                                                                                                                                                                       | <br>(source NT Govt.)<br><a href="http://www.nt.gov.au/nreta/natres/weeds/find/missiongrass.html">http://www.nt.gov.au/nreta/natres/weeds/find/missiongrass.html</a> ) |
| <b>Lantana</b><br>( <i>Lantana camara</i> )                                                 | Lantana is a Class 3 declared weed and listed as a Weed of National Significance (WONS) species. It is currently widespread on a number of Torres Strait Islands including Erub, Mer and Ugar. The species poses a potential threat to deciduous vine thickets on the island                                                                                                                                                                                                                               | <br>Lantana camara growing at Erub airstrip.                                                                                                                           |
| <b>Praxelis</b><br>( <i>Praxelis clematidea</i> )                                           | A highly invasive erect, branched, unpleasant smelling herb with hairy stems and foliage. This species has been observed in native grassland habitats on Erub as well as rock pavement habitats on Mabuiag. The species is known also from Badu, Mua, and Mabuiag.                                                                                                                                                                                                                                         | <br>Praxelis recorded on Erub                                                                                                                                          |

| Species                                            | Comments                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                     |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Bellyache bush<br>( <i>Jatropha gossypifolia</i> ) | Bellyache bush is a Class 2 declared weed that has been recorded on nearby Boigu Island. Introduction of the species poses a serious threat to grasslands, shrublands and vine thicket habitats.                                                                                                                                                                                                 |  |
|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                  | Bellyache bush on Badu                                                              |
| Barliera ( <i>Barliera prionitis</i> )             | This plant is considered an emerging environmental weed, which has the potential to seriously degrade habitats on coral cay islands, particularly in vine thickets and shrublands on sand dunes where there are canopy openings or disturbance. It is recognised as one of 28 weeds on the <i>Alert List for Environmental Weeds</i> (NHT 2003). The plant is currently known from Boigu Island. |                                                                                     |
| Pond Apple<br>( <i>Annona glabra</i> )             | A deciduous shrub that infests swamplands and the brackish margins of mangrove habitats. The species is spread by dispersal of fruit and seeds which are ingested by animal or float on tidal currents. Severe infestations occur on Queensland's wet tropical coast. The species, which has been recorded on Horn Island, is a WONS species.                                                    |                                                                                     |

## 6.0 Fauna (Animals)

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

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

The desktop review identified 150 fauna species that have been reported for Saibai Island (**Appendix E**). This includes 11 reptile, 130 bird, eight mammal species and one amphibian. This can be compared with the 384 terrestrial fauna species that have been reported for the

broader Torres Strait Island group. Of these, one reptile, one bird and four mammal species are introduced. An additional two species have been identified by the Protected Matters Search Tool as possibly occurring.

## **6.1 Culturally Important Fauna Species**

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

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

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

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

## **6.2 Fauna Habitat Values**

Saibai Island presents a vast mosaic of grassland, mangrove, wetland and vine forest habitats that are, except for a limited area near the island's major settlement, essentially undisturbed.

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

The extensive mangrove and vine forest system that forms a broad fringe around the island provides habitat for a number of reptile, bird and mammal species. It is likely that with targeted

fauna survey within these habitats, a number of additional species will be added to the island list, with considerable potential for new records of threatened species such as water mouse and emerald monitor. Reptile survey work requires a greater level of expertise than for birds and many mammals, given the difficulty in identification for many species. Some Papua New Guinea species, not yet recorded in Australian territory, may be present on the island.

Saibai Island hosts an extensive system of wetland habitats, both brackish and freshwater, that provide representation of a habitat that is otherwise restricted to Australia's northern neighbour, PNG. The wetlands host abundant high quality habitat for an extensive number of bird species, both permanent and transient residence, including threatened species such as radjah shelduck and black necked stork. Reptile survey within such habitats is also likely to identify a number of aquatic snakes and possibly turtles that are resident in similar habitats on the adjacent PNG mainland.

Comprehensive bird survey across a range of seasons is likely to significantly increase the known bird assemblage as well as potentially identify a number of PNG species that have not previously been recorded in Australia. Similarly the islands known bat fauna is likely to be expanded significantly with dedicated survey. Most of the bird species recorded in the Torres Strait are highly mobile and many are migratory, including species that are not listed as Migratory under the EPBC Act. Habitat specificity is less likely among the species that do, and may, occur on Saibai Island. The restricted area of vine forest limits the number of species that may occur, though many species that occur in vine forest will frequent mangroves as a secondary habitat.

Four native mammal species have been reported for Saibai Island, three of which are mega-bats, i.e. blossom bats and flying-foxes. It is very likely that a number of micro-bat species are present but this will require dedicated survey work for any confirmation beyond a very coarse scale, such as family level, or perhaps even suborder, the microchiroptera. Vine forest and mangrove habitats are considered most likely to host previously unrecorded bat species.

Grassland habitats, which form a broad swathe in the central western portions of the island are known to host a range of generalist species although considering the extent and well preserved nature of the habitat, it means that some ground-dwelling species found in the coastal lowlands of PNG could conceivably occur. This includes short-beaked echidna (*Tachyglossus aculeatus*), which occurs on many islands around the Australian mainland, Papuan planigale (*Planigale novaeguineae*), red-cheeked dunnart (*Sminthopsis virginiae*) and common echymipera (*Echymipera kalubu*). The echidna and echymipera, a bandicoot species that is a popular food item in Papua New Guinea, should be known to the local community if they occur and although possible, its occurrence is considered unlikely.

There is a noticeable lack of frog fauna records from the island. The frog fauna of the Torres Strait overall is somewhat depauperate based on known records, and the majority of species are confined to larger islands and/or islands close to Cape York Peninsula. Given the saline

nature of the wetland habitats, other than after heavy rains, the actual frog assemblage for Saibai Island is likely to be limited, despite the rich frog fauna of Papua New Guinea. Other than around human habitation, vine thicket appears the habitat most likely to support species. But the area of this habitat is comparatively small and salt affected, being difficult for frogs to colonise.

### 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 Endangered, Vulnerable and Near-Threatened Species

A total of five species of conservation significance (threatened species) at either state or federal level have been recorded on the island, with an additional eleven species either predicted or possibly occurring. There are also an additional 32 migratory species considered to have significance at federal level that are reported to occur on the island (**Appendix F**). Those EVNT species reported to occur on Saibai Island are also listed in **Table 9**.

**Table 9.** Endangered, Vulnerable and Near-Threatened fauna species<sup>1</sup> reported to occur on Saibai.

| Scientific Name <sup>3</sup>      | Common Name           | Status <sup>4</sup> |        |                  | Source <sup>6</sup>             |
|-----------------------------------|-----------------------|---------------------|--------|------------------|---------------------------------|
|                                   |                       | EPBC Act            | NC Act | BoT <sup>5</sup> |                                 |
| <b>SPECIES REPORTED</b>           |                       | -                   | -      | -                |                                 |
| <i>Crocodylus porosus</i>         | Salt-water crocodile  | M                   | V      | -                | Unpublished record.             |
| <i>Lepidodactylus pumilis</i>     | Slender chained gecko | -                   | NT     | -                | Database record                 |
| <i>Tadorna radjah</i>             | Radjah shelduck       | -                   | NT     | -                | Database & unpublished records. |
| <i>Ephippiorhynchus asiaticus</i> | Black-necked stork    | -                   | NT     | -                | Database & published records.   |
| <i>Numenius madagascariensis</i>  | Eastern curlew        | M                   | NT     | -                | Database & published records.   |

1. Listed as Endangered, Vulnerable, Near-Threatened or Migratory under the EPBC Act 1999 and/or the NC Act 1992 or of critical or high priority under the Back on Track prioritisation framework (DERM 2011a).
2. Predicted by the EPBC Protected Matters Search Tool maintained by DSEWPC (2011g). Only noted if not recorded from another source.
3. Nomenclature follows the Australian Faunal Directory (DSEWPC 2011d).
4. Status: E = Endangered, V = Vulnerable, NT = Near-Threatened, M = Migratory, LC = Least Concern (Common).
5. BoT = Back on Track priority species.

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

### **Salt-water Crocodile (*Crocodylus porosus*)**

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

Listed as estuarine crocodile under the Queensland Nature Conservation (Wildlife) Regulation 2006. The salt-water crocodile occurs in tidal rivers, coastal floodplains and swamps, extending hundreds of kilometres inland along major drainage systems, but is also seen regularly in the open ocean (Webb *et al.* 1983; Read *et al.* 2004; Wilson & Swan 2010). The species is found from India through south-east Asia to the western Pacific and northern Australia (Wilson & Swan 2010). In Australia the species is most common in large areas of productive wetlands and estuaries (Fukuda *et al.* 2007). In Queensland, salt-water crocodiles are mainly found in coastal areas north of the Fitzroy River (QPWS 2007) with the highest densities in Queensland found in north-west Cape York Peninsula (Read *et al.* 2004; EPA 2007). Salt-water crocodile is known from Boigu Island (Schaffer 2010) and is also known from Saibai and Thursday Islands (OZCAM 2011) and Mabuiag Island (Watson 2009). The species is likely to occur throughout the Torres Strait. On Saibai Island salt-water crocodiles could occur along all shorelines and mangroves, and throughout much of the islands estuarine wetlands, depending on water levels.

The salt-water crocodile is still threatened by drowning in fishing nets (Ehmann 1992) with juveniles more likely to become entangled. This does not appear to pose a major threat to the species (EPA 2007). A lack of suitable nesting habitat appears to be the most significant limiting factor for the recovery of the species in Queensland (Read *et al.* 2004). On Saibai Island the salt-water crocodile may be threatened by clearing of mangroves, entanglement in fishing nets, and by direct human persecution. These threats are likely to be minor.

### **Slender Chained Gecko (*Lepidodactylus pumilis*)**

**NC Act:** Near-Threatened

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

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

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

### **Radjah Shelduck (*Tadorna radjah*)**

**NC Act:** Near-Threatened

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

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

The species is threatened by reclamation of habitat for agricultural activities and infrastructure (Marchant & Higgins 1990) as well as indiscriminate shooting (Pringle 1985) but despite the decline of some sub-populations the species is not considered to be threatened nationally (Garnett & Crowley 2000) and may be increasing in some areas (Pringle 1985). Local threats to the species on Saibai Island would appear minimal.

### **Black-necked Stork (*Ephippiorhynchus asiaticus*)**

**NC Act:** Near-Threatened

The black-necked stork occurs in swamps, estuarine mudflats and other littoral habitats and on floodplains, in irrigated crops and occasionally open grassy woodland. The species is most

frequently associated with open freshwater rather than saline habitats (Pringle 1985; Marchant & Higgins 1990).

The black-necked stork occurs from Pakistan through south-east Asia to Papua New Guinea and Australia. It is widespread in northern and eastern Australia and occurs through much of Queensland (Marchant & Higgins 1990), though is not abundant anywhere. The sparse distribution of the species is probably due to the requirement of large areas of freshwater swamps for the maintenance of even one pair (Pringle 1985). Black-necked stork has been recorded on Saibai (Conics 2008a, Stanton and Fell personal observation 2007, 2012), Boigu (Draffan *et al.* 1983; Clarke 2004b; DERM 2010a) and Badu Islands (Draffan *et al.* 1983; DERM 2010g). Ingram (2008) refers to a WildNet record from Mua but the species was not returned by a search of the database in 2010 (DERM 2010f), though it is likely to occur. Draffan *et al.* (1983) reports the species from a further seven Torres Strait Islands, all in the south-western group of islands and including Horn, Prince of Wales and Thursday Islands. There is a large amount of suitable habitat for black-necked stork on Saibai Island, though this will vary with inundation levels.

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

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

#### **Eastern Curlew (*Numenius madagascariensis*)**

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

The eastern curlew is mostly confined to coastal habitats, particularly estuaries, harbours and coastal lagoons. They mainly forage on open intertidal mudflats, sandflats and saltmarsh, often near mangroves, and occasionally on ocean beaches. Roosting occurs on sandy spits and islets, in mangroves and saltmarsh, and along high water mark on beaches (Pringle 1987; Higgins & Davies 1996). The species usually feeds individually or in small groups (Pringle 1987), though large numbers may congregate at high tide roosts (Lane 1987).

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

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

### 6.3.2 Additional Possible EVNT Species

**Table 10** lists the 11 Critically Endangered, Endangered, Vulnerable and Near-Threatened species that are predicted to occur on Saibai Island. The island has been inadequately surveyed for fauna so predictions from throughout the Torres Straits are included to aid in the identification of additional likely species for Saibai Island. Species profiles for the EVNT species predicted to occur are provided in **Appendix E**.

**Table 10.** Critically Endangered, Endangered, Vulnerable and Near-Threatened fauna species<sup>1</sup> predicted<sup>2</sup> to occur on Saibai Island.

| Scientific Name                        | Common name              | Status <sup>3</sup> |        |                  | Known Distribution in Torres Strait <sup>5</sup> |
|----------------------------------------|--------------------------|---------------------|--------|------------------|--------------------------------------------------|
|                                        |                          | EPBC Act            | NC Act | BoT <sup>4</sup> |                                                  |
| <b>REPTILES</b>                        |                          |                     |        |                  |                                                  |
| <i>Emoia atrocostata</i>               | littoral whiptail skink  |                     | NT     |                  | Boigu Island, Ugar                               |
| <i>Varanus prasinus</i>                | emerald monitor          |                     | NT     |                  | Mua, Mer Boigu,                                  |
| <b>BIRDS</b>                           |                          |                     |        |                  |                                                  |
| <i>Sternula albifrons</i> <sup>6</sup> | little tern              | M                   | E      |                  | 13 Torres Strait Islands including Boigu Island  |
| <b>MAMMALS</b>                         |                          |                     |        |                  |                                                  |
| <i>Dobsonia magna</i> <sup>7</sup>     | bare-backed fruit-bat    |                     | NT     |                  | Mua Island.                                      |
| <i>Nyctimene cephalotes</i>            | torresian tube-nosed bat |                     | NT     |                  | Mua Island.                                      |

| Scientific Name                                | Common name                       | Status <sup>3</sup> |        |                  | Known Distribution in Torres Strait <sup>5</sup>                              |
|------------------------------------------------|-----------------------------------|---------------------|--------|------------------|-------------------------------------------------------------------------------|
|                                                |                                   | EPBC Act            | NC Act | BoT <sup>4</sup> |                                                                               |
| <i>Pteropus conspicillatus</i>                 | spectacled flying-fox             | V                   | LC     | high             | No record. Protected Matters Search Tool only. Occurrence considered unlikely |
| <i>Rhinolophus philippinensis</i> (large form) | greater large-eared horseshoe bat | E                   | E      | high             | No record. Protected Matters Search Tool only. Occurrence considered unlikely |
| <i>Hipposideros cervinus</i>                   | fawn leaf-nosed bat               |                     | V      | high             | Mua and Thursday Islands.                                                     |
| <i>Saccolaimus saccolaimus nudicluniatus</i>   | bare-rumped sheath-tail bat       | CE                  | E      | high             | No record. Protected Matters Search Tool only. Occurrence considered unlikely |
| <i>Taphozous australis</i>                     | coastal sheath-tail bat           |                     | V      | high             | Mua, Mabuiag and Possession islands.                                          |
| <i>Xeromys myoides</i>                         | water mouse                       | V                   | V      | high             | Boigu Island (unconfirmed).                                                   |

1. Listed under listed as Critically Endangered, Endangered, Vulnerable and/or Near-Threatened (EVNT) under the Commonwealth's Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and/or Queensland's Nature Conservation Act 1992 (NC Act).
2. Predicted by the EPBC Protected Matters Search Tool maintained by DSEWPC (2011g).
3. Status: CE = Critically Endangered, E = Endangered, V = Vulnerable, NT = Near-Threatened, M = Migratory, LC = Least Concern (Common).
4. Back on Track (BoT) species considered of 'critical' or 'high' priority under the Back on Track framework (DERM 2011a).
5. May include records that require verification.
6. Listed under the EPBC Act (Bonn Convention, CAMBA, JAMBA, ROKAMBA) as *Sterna albifrons*.
7. Listed under the NC Act as *Dobsonia moluccensis*.

## Reptiles

It is likely, given its occurrence on nearby Boigu Island, it is likely that the littoral whiptail skink (*Emoia atrocostata*) will also occur on Saibai Island. There have been no formal records of the emerald monitor on Saibai Island. It is however common on Boigu Island and suitable habitat exists for the species on Saibai. There is the possibility that it does occur and confirmation of this species on the island is considered to be of high importance.



**Photograph 1.** Littoral whiptail skink on Ugar (Photograph by D. Stanton).

## Birds

Given that little tern is known from Boigu Island, it is also expected to occur on Saibai. The proximity of the PNG mainland means that Boigu Island is a likely location for threatened Papua New Guinea species not yet recorded in Australian territory. Such species will be listed as Critically Endangered, Endangered, Vulnerable, or Near-Threatened by the International Union for Conservation of Nature and Natural Resources (IUCN).

## Mammals

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

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

### 6.3.3 Migratory Species

Fifty-seven bird species listed as Migratory under the EPBC Act are known to occur in Torres Strait (**Appendix F**). The Vulnerable (NC Act) salt-water crocodile is also listed as Migratory under the EPBC Act and is also known from nearby Boigu Island. A number of other species also migrate into or through the Torres Strait but are not listed under the EPBC Act. Unless otherwise stated it should be assumed that reference to Migratory species in this report refers only to those species listed as such under the EPBC Act. **Table 11** lists the 23 Migratory species known to occur on Saibai Island, with an additional 27 birds that are likely to occur based on records on adjacent islands and suitable habitat. All species are listed as Least Concern under the NC Act unless otherwise noted.

**Table 11.** Migratory species reported or predicted to occur on Saibai Island.

| Scientific Name                           | Common name               | Comments                      |
|-------------------------------------------|---------------------------|-------------------------------|
| <b>SPECIES REPORTED</b>                   |                           |                               |
| <i>Crocodylus porosus</i> <sup>1</sup>    | salt-water crocodile      | Unpublished record.           |
| <i>Hirundapus caudacutus</i> <sup>2</sup> | white-throated needletail | Database record.              |
| <i>Apus pacificus</i>                     | fork-tailed swift         | Published record.             |
| <i>Ardea modesta</i> <sup>3</sup>         | eastern great egret       | Database & published records. |
| <i>Ardea ibis</i>                         | cattle egret              | Database & published records  |

| Scientific Name                               | Common name             | Comments                                                                          |
|-----------------------------------------------|-------------------------|-----------------------------------------------------------------------------------|
| <i>Egretta sacra</i>                          | eastern reef egret      | Database & published records.                                                     |
| <i>Plegadis falcinellus</i>                   | glossy ibis             | Database & published records.                                                     |
| <i>Pandion cristatus</i> <sup>4</sup>         | eastern osprey          | Database & published records.                                                     |
| <i>Haliaeetus leucogaster</i>                 | white-bellied sea-eagle | Database & published records.                                                     |
| <i>Pluvialis fulva</i>                        | pacific golden plover   | Database & published records.                                                     |
| <i>Arenaria interpres</i>                     | ruddy turnstone         | Database record.                                                                  |
| <i>Charadrius mongolus</i>                    | lesser sand plover      | Database & published records.                                                     |
| <i>Charadrius leschenaultii</i>               | greater sand plover     | Database & published records.                                                     |
| <i>Gallinago hardwickii</i>                   | Latham's snipe          | Published record.                                                                 |
| <i>Numenius phaeopus</i>                      | whimbrel                | Database & published records.                                                     |
| <i>Calidris acuminata</i>                     | sharp-tailed sandpiper  | Database & published records.                                                     |
| <i>Merops ornatus</i>                         | rainbow bee-eater       | Database & published records.                                                     |
| <i>Coracina tenuirostris melvillensis</i>     | (Melville) cicadabird   | Database & published records. Subspecies not identified in records.               |
| <i>Rhipidura rufifrons</i>                    | rufous fantail          | Database record.                                                                  |
| <i>Myiagra cyanoleuca</i>                     | satin flycatcher        | Published record.                                                                 |
| <i>Monarcha melanopsis</i>                    | black-faced monarch     | Database & published records.                                                     |
| <i>Symposiachrus trivirgatus</i> <sup>5</sup> | spectacled monarch      | Database record.                                                                  |
| <i>Sterna hirundo</i>                         | common tern             | Published record.                                                                 |
| <b>Additional possible migratory species</b>  |                         |                                                                                   |
| <i>Gallinago megala</i>                       | swinhoe's snipe         | No Records                                                                        |
| <i>Limosa limosa</i>                          | black-tailed godwit     | No Records                                                                        |
| <i>Numenius minutus</i>                       | little curlew           | No Records                                                                        |
| <i>Pluvialis squatarola</i>                   | grey plover             | No Records                                                                        |
| <i>Numenius madagascariensis</i> <sup>6</sup> | eastern curlew          | No Records                                                                        |
| <i>Xenus cinereus</i>                         | terek sandpiper         | No Records                                                                        |
| <i>Actitis hypoleucos</i> <sup>7</sup>        | common sandpiper        | No Records                                                                        |
| <i>Tringa brevipes</i> <sup>8</sup>           | grey-tailed tattler     | No Records                                                                        |
| <i>Tringa nebularia</i>                       | common greenshank       | No Records                                                                        |
| <i>Tringa stagnatilis</i>                     | marsh sandpiper         | No Records                                                                        |
| <i>Tringa glareola</i>                        | wood sandpiper          | No Records                                                                        |
| <i>Calidris ruficollis</i>                    | red-necked stint        | No Records                                                                        |
| <i>Calidris melanotos</i>                     | pectoral sandpiper      | No Records                                                                        |
| <i>Calidris ferruginea</i>                    | curlew sandpiper        | No Records                                                                        |
| <i>Glareola maldivarum</i>                    | oriental pratincole     | No Records                                                                        |
| <i>Onychoprion anaethetus</i> <sup>9</sup>    | bridled tern            | No Records                                                                        |
| <i>Sternula albifrons</i> <sup>10</sup>       | little tern             | No Records                                                                        |
| <i>Hydroprogne caspia</i>                     | caspian tern            | No Records                                                                        |
| <i>Chlidonias leucopterus</i>                 | white-winged black tern | No Records                                                                        |
| <i>Sterna sumatrana</i>                       | black-naped tern        | No Records                                                                        |
| <i>Cuculus optatus</i> <sup>11</sup>          | oriental cuckoo         | No Records                                                                        |
| <i>Limosa lapponica</i>                       | bar-tailed godwit       | No Records                                                                        |
| <i>Calidris tenuirostris</i>                  | great knot              | No Records                                                                        |
| <i>Calidris canutus</i>                       | red knot                | No Records                                                                        |
| <i>Anous stolidus</i>                         | common noddy            | No Records                                                                        |
| <i>Sterna dougallii</i>                       | roseate tern            | No Records                                                                        |
| <i>Thalasseus bengalensis</i>                 | lesser crested tern     | No Records                                                                        |
| <i>Monarcha frater</i>                        | black-winged monarch    | Predicted by the EPBC Protected Matters Search Tool – considered likely to occur. |

1. Listed as Vulnerable under the NC Act.
2. Also listed under the EPBC Act (ROKAMBA) as *Chaetura caudacuta*.
3. 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).
4. Listed under the EPBC Act (Bonn Convention) as osprey (*Pandion haliaetus*). Australian birds have been elevated to species level as *P. cristatus* (Wink *et al.* 2004; Christidis & Boles 2008).
5. Listed under the EPBC Act (Bonn Convention) as *Monarcha trivirgatus*.
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. Nomenclature follows the Australian Faunal Directory (DSEWPC 2011d).
10. Listed under the EPBC Act (Bonn Convention, CAMBA, JAMBA, ROKAMBA) as *Sterna albifrons*. Listed as Endangered under the NC Act.

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

### 6.3.4 Species of Regional Significance

The *Action Plan for Australian Birds 2000* lists 16 bird species or subspecies that occur on Boigu and Saibai islands and meet the criteria for listing as Vulnerable under the EPBC Act (Table 12). However, due to likely genetic exchange with PNG, these birds are regarded as Near-Threatened and are not listed under the EPBC Act (Garnett & Crowley 2000). This EPBC category of Near-Threatened is not the same as the Near-Threatened status under the NC Act.

**Table 12.** Species considered Near-Threatened<sup>1</sup> known or expected to occur on Saibai Island.

| Scientific Name                            | Common name               | Comments <sup>2</sup>                      |
|--------------------------------------------|---------------------------|--------------------------------------------|
| <i>Geopelia striata papua</i>              | peaceful dove             | Published record.                          |
| <i>Eclectus roratus polychloros</i>        | eclectus parrot           | Published record.                          |
| <i>Ceyx pusilla pusilla</i>                | little kingfisher         | Published record.                          |
| <i>Gerygone magnirostris brunneipectus</i> | large-billed gerygone     | Published record.                          |
| <i>Myzomela obscura fumata</i>             | dusky honeyeater          | Database & published records.              |
| <i>Myzomela erythrocephala infuscata</i>   | red-headed honeyeater     | Published record.                          |
| <i>Xanthotis flaviventer saturator</i>     | tawny-breasted honeyeater | Database & published records.              |
| <i>Cracticus quoyi alecto</i>              | black butcherbird         | Database & published records.              |
| <i>Dicrurus bracteatus carbonarius</i>     | spangled drongo           | Database & published records.              |
| <i>Rhipidura rufiventris gularis</i>       | northern fantail          | Database & published records.              |
| <i>Rhipidura leucophrys melaleuca</i>      | willie wagtail            | Database & published records.              |
| <i>Corvus orru orru</i>                    | torresian crow            | Database & published records.              |
| <i>Myiagra rubecula papuana</i>            | leaden flycatcher         | Database record. Subspecies not provided.  |
| <i>Arses telescopthalmus harterti</i>      | frilled monarch           | Unconfirmed record (Clarke 2004b).         |
| <i>Phonygammus keraudrenii jamesii</i>     | trumpet manucode          | Published record. Subspecies not provided. |
| <i>Aplornis cantoroides</i>                | singing starling          | Database & published records.              |

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

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

All of these species are listed as Least Concern under the NC Act but, with the exception of singing starling, are considered of some conservation significance, as they are subspecies that occur in Papua New Guinea but which, in Australia, are restricted to Boigu, Saibai and/or Dauan Islands. Singing starling is included because it is similarly restricted within Australia to these islands, but at the species level. None of these species is considered threatened in Torres Strait except perhaps by the effects of climate change (Garnett & Crowley 2000). Conics (2008a) reports eclectus parrot (*Eclectus roratus macgillivrayi*), listed as Vulnerable under the NC Act, as occurring on Saibai Island. However, the subspecies present is *E. r. polychloros* (Garnett & Crowley 2000; Clarke 2004b), which is listed as "Least Concern". The listing of *Eclectus roratus macgillivrayi* in the WildNet database search for the island should be considered an error.

Orange-footed scrubfowl (*Megapodius reinwardt duperryi*), rainbow lorikeet (*Trichoglossus haematodus caeruliceps*) and red-cheeked parrot (*Geoffroyus geoffroyi aruenesis*) would also be considered Near-Threatened under Garnett and Crowley's (2000) *Action Plan for Australian*

*Birds.* That these common species are considered of conservation significance on Saibai Island is a reflection of political, not biogeographical boundaries.

#### **6.4 Pest Fauna Species**

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

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

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

Dogs are reportedly present in considerable numbers on the island and are a threat to ground nesting birds as well as a disturbance factor for waders, terns and radjah shelduck and black-necked stork.

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

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

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

## 6.5 Threats

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

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

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

## 6.6 Future work

It is important that the faunal values of Saibai 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

1. A targeted trapping survey for water mouse. The *Draft Recovery Plan for the Water Mouse* (DERM 2009b) included the following key recovery actions:
  - Identify habitats potentially supporting populations of the water mouse and map the current habitat distribution.
  - Confirm occurrence and current distribution of the water mouse.
  - Conduct surveys and ecological assessments of potential water mouse habitat.
  - Describe key biological and ecological features of the water mouse and its habitat.
  - Determine whether genetic variation exists across populations of the water mouse.

2. Confirmation of the occurrence of the emerald monitor on Saibai Island is considered high priority.
3. Population assessments of introduced deer potentially utilising aerial surveys on an annual or biannual basis is high priority.

#### **Medium Priority**

- Bat survey, both mega-bats and micro-bats.
- Identification of any breeding areas for terns, particularly little tern, which is predicted to occur on the island.
- Identification of the most important foraging and high roost sites for waders.
- Survey for slender chained gecko and, if so, identification of any overlap in habitat use with house gecko.

#### **Low Priority**

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

## ***7.0 The Role of Fire in Savanna Landscapes***

Most of Cape York Peninsula, and hence Torres Strait Island plant communities will burn if enough fuel is present. The exceptions are rainforest communities, communities of rocky areas and some wetland areas such as mangroves and the deeper permanent swamps. We know from the historical record and anthropological studies that the landscape of Torres Strait and Cape York Peninsula when Europeans arrived was the product of traditional burning practices that had changed little over many thousands of years and had led to stability in the nature of the plant communities and the way they were distributed across the landscape. In many areas the loss of traditional burning practices in recent times has led to a loss of that stability as vegetation types that had evolved under particular fire regimes were subjected to new regimes<sup>7</sup>. This destabilisation has led to widespread loss of plant communities and inevitably will be found to have led to serious loss of the species of plants and animals that depend upon them.

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

---

<sup>7</sup> Fire regimes are defined by the frequency of fires and their season of occurrence, both of which have relationship to their relative severity

The past and present use of fire in the Torres Strait Islands is evident on the majority of islands and there is no doubt that its ongoing use has been fundamental in shaping and modifying vegetation cover and influencing habitat diversity across the islands. McNiven & Wright (2008) note the ethnographic record of Haddon (1935) where fire use forms an integral part of garden preparation and land cleaning in the late 1800's, and evidence of fire is also in the pollen and phytolith record (Rowe 2006, Parr and Carter 2003, Barnham 1999).

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

The fire dependence of the non-rainforest communities is related largely to the regeneration strategies of the species within them. Some have woody fruits which have to be cracked by heat to release the seed and most require bare ground and sunlight for those seeds to germinate and grow. Many perennial grasses begin to decline and die after several years without fire. Some species will only generate from seed and others are capable of resprouting after fire. Of those species that will germinate and grow through heavy litter, all still require sunlight to survive and most will not persist under a wildfire regime of infrequent hot fires.

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

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

## 8.0 Profiles for Saibai Island Habitats

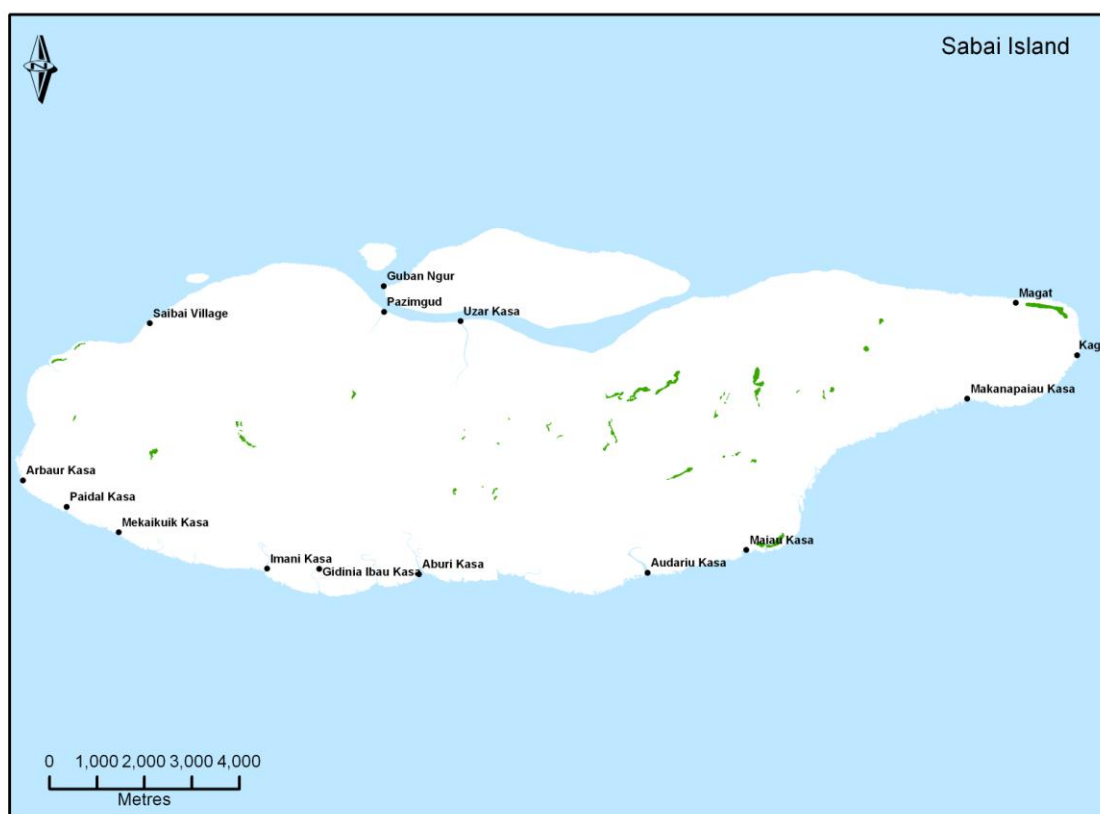
This section presents a summary of current knowledge, management issues and recommended management actions for the habitats that occur on Saibai Island. The information presented has been derived from prior and recent field survey efforts, review of previous reports, input from experts at technical workshops,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

### 8.1 Deciduous / Semi-deciduous Vine Forest and Thicket

#### 8.1.1 Status of Ecological Knowledge

Three variations of deciduous/semi-deciduous vine forest occur on Saibai Island. Vegetation Community 2a forms discontinuous linear bands on the islands south-eastern coast, above the upper margins of tidal limits. The grouping occupies suppressed ridges of calcareous sand and shell grit, representative of former tidal strandlines. Hence, the distribution of the grouping parallels and occurs in close proximity to the present coastline. A second, drier variant represented as Vegetation Community 2c occurs as discontinuous patches and fringes on the margins of broad drainage swamps. These swamps dissect the central portions of Saibai Island. A third variation is associated with a laterite ridge on the islands northern coastline, running westward from the Saibai township to the cemetery. The distribution of semi-deciduous vine forest and thicket, derived from Stanton *et al.* (2009), is represented in **Figure 3**.

Vine forests on sand dunes (2a) are a minor component of the islands southern coastline although are generally well represented on other Torres Strait Islands. A well-developed occurrence is located at Maiau Kasa on the islands south-east coast. This example forms backdrop to a seasonal camp and is dominated by tall specimens of *Erythrina insularis*. Other species include *Terminalia catappa*, *Terminalia subacrotia*, *Cordia subcordata*, *Antiaris toxicaria* var. *macrophylla* and *Milletia pinnata* mixed with evergreen species such as *Manilkara kauki*, *Mimusops elengi*, *Guettarda speciosa*, *Thespesia populneoides*, and *Aglaiia elaeagnoidea*. The occasional presence of *Heritiera littoralis*, *Xylocarpus granatum* and *Excoecaria agallocha* is associated with an often sharp transition to mangrove forest. Dense thickets of the sprawling vines *Cesalpinia bonduc*, and *Carissa laxiflora*, and the shrubs *Clerodendrum inerme*, *Colubrina asiatica*, *Dendrolobium arbuscula*, *Gymnosporia inermis*, *Pemphis acidula* and *Ximenia americana* are often associated with the transition from vine thicket to mangrove communities. Vines include *Flagellaria indica* and *Derris trifoliata* and *Gymnanthera oblonga*.



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

Vine thicket habitat 2c is unique to Saibai Island, occurring on hard, clay rich alluvium which forms low rises above adjacent swamplands. This habitat type is highly restricted, generally occurring as isolated, discontinuous pockets. The canopy is uneven, ranging in height from 13m to 18m with dominant species including *Terminalia subacroptera*, *Acacia auriculiformis*, *Manilkara kauki*, *Mimusops elengi*, *Heritiera littoralis*, *Excoecaria agallocha*, *Hibiscus tiliaceus* and *Thespesia populneoides*. The regionally significant palm, *Livistona benthamii*, occurs within this habitat.

Vine thicket habitat 2e is one of the most unique and restricted habitat types within the Torres Strait Island group. The unique nature is attributed to the lateritic substrate on which the habitat is found, being the only known representation of this landform type in the broader Torres Strait Island group. The vine thicket type has however been highly fragmented, dissected by an access road that was constructed through the central portion of the thicket. All that remains of the habitat are thin, linear strips on the margins of the cemetery access road. The habitat is typified by a mix of salt-tolerant trees, shrubs, and vine thicket species including; *Thespesia populneoides*, *Hibiscus tiliaceus*, *Intsia bijuga*, *Terminalia subacroptera*, *Manilkara kauki*, *Cordia subcordata* and *Excoecaria agallocha*.

### 8.1.2 Ecological / Cultural Considerations

**Habitat Condition:** The coastal dune vine forest habitats (VC2a) have been utilised by the Saibai people as seasonal camps for generations and are generally accessible only by boat. They continue to provide important living and camping sites for traditional owners and as a result, the better developed vine forest areas on dunes are often interspersed with small clearings for occupation and gardens. Despite this utilisation, there was little evidence that exotic species are occupying these habitats when they were assessed on the ground in October 2007. Rusa deer were observed to be utilizing this habitat type on nearby Boigu Island and it is expected that they will be similarly utilizing these habitats on Saibai. The foredune areas also appear more resilient to tidal erosion than those observed on Boigu Island, with the beach ridges on Saibai generally being higher and better developed.



**Photograph 2 & Photograph 3.** Typical vine forest occurrence from the air (left); Large specimen of *Erythrina insularis* (right) at Waiau Kasu on the southern coast of Saibai Island.



**Photograph 4 (Left) and Photograph 5.** Semi-deciduous vine thicket habitat 2c on alluvium (left) and highly semi-evergreen vine thicket on laterite (VC2e) near the islands cemetery.

Vine thickets on alluvium are largely intact and unaffected by elements of human disturbance, weed invasion, or disturbance by feral animals. They are however likely to provided shelter and possibly fodder for rusa deer and any increase in feral deer population is likely to be highly detrimental to this habitat. Changes to the salinity of adjacent swamplands may also influence

the condition and distribution of this habitat. An increase to salinity of the swamplands resultant from sea level rise may see a gradual replacement of vine thicket species with mangroves.

The severe fragmentation of the vine thicket on laterite has been previously noted although observations made in November 2007 suggest that at the time, remnants were largely free from exotic weeds. Although there is little that can be done to salvage the original extent of this habitat, ensuring that it remains free from invasive pest will aid the long-term viability of the existing remnants.

**Fauna:** The fauna assemblage associated with this habitat is poorly sampled and as such, poorly known. Further structured survey effort and opportunistic sampling/observation would greatly improve the current knowledge of baseline fauna assemblage. If present on the island, emerald monitor (*Varanus prasinus*) will likely utilise this habitat as well as a number of bats including brown flying fox (*Cebu sapu*), and a black flying fox (*Kupi sapu*).

**Flora:** Vine thicket habitats support the highest species richness on the island with 64 species recorded to date. Only three introduced species have been recorded.

**Cultural Perspectives:** The well-drained sandy soils on which dunal vine forests (VC2a) occur continue to be utilised for seasonal habitation providing food, material items and medicinal resources from the plants and animals which occur. This utilisation has had some impact on the natural structure of this habitat although disturbance generally occurs in isolated pockets and is not pervasive throughout the vine forest community. Vine thickets occurring on alluvial fringes (VC2c) are not known to be utilised by the people of Saibai Island. Language names and traditional utilisation for flora species are listed in **Appendix D**.

### **8.1.3 Management Implications**

Vine forests on dunes (VC2c) are a restricted and fragile habitat requiring highly specific edaphic conditions, where a threshold depth of well-drained calcareous drained sand is necessary for survival. The major long-term risk to the habitat is considered to be sea level rise and its associated erosion and salinisation of the sandy soil profile, which will result in the ultimate replacement of vine forest habitat with mangrove species. The apparent proliferation of rusa deer also presents a major threat to habitat integrity, significantly increasing the potential for introduction of exotic plant species such as leucaena (*Leucaena leuccephala*) into already disturbed areas as well as having an unknown impact on overall habitat stability and species diversity. At present, minimal active management is required although the passive management situation may change rapidly with the introduction of invasive exotic species. Regular patrols, focusing initially on disturbed areas should continuously monitor for introduction of exotic species such as leucaena.

Vine thickets on alluvium (VC2c) are imminently threatened by changes to salinity in the adjacent wetlands. Increasing salinity within the adjacent wetland, through either sea level rise or changing climatic regimes, is likely to result in a gradual replacement of vine thicket shrubs

by mangroves. There is little that can be done to mitigate these changes although photographic monitoring points may assist to detect any structural or floristic changes to vegetation that would otherwise go unnoticed.

Vine thickets on laterite (VC2e) exist in a highly fragmented state and are highly susceptible to edge effects including degradation by weeds, roadside fires, or simple gradual attrition through clearing alongside the existing road. Efforts are required to alert the community to the sensitive nature of this habitat and ensure regular monitoring for invasive species, leucaena in particular.

There is considerable scope for a structured fauna survey program to be undertaken within vine thickets, particularly those on sand dunes and alluvium. Techniques employed may include nocturnal spotlighting, mist-netting, and Anabat recording. This program would however require expert guidance with support from the rangers on the ground.

#### **8.1.4 Summary of Recommended Management Actions**

The information provided in **Table 13** below aims to summarise the key issues, actions and priorities so as to aid the transfer of information into the Saibai 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 13.** Summary of management actions for evergreen and semi evergreen vine forests

| Management Category  | Context/Issue                                                                                      | Actions                                                                                                                                                                                                                                 | Priority |
|----------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Fauna Surveys</b> | Fauna composition within this habitat is poorly known.                                             | Design and implement a structured fauna survey and trapping program utilising collaborative research and incorporating training of rangers. Maintain focus on ethnotaxonomy to feed into Traditional Ecological Knowledge System (TEK). | High     |
| <b>Plant Surveys</b> | Flora composition is documented although limited to rapid surveys in dry season. Potential for new | Carry out additional flora field surveys with focus on collection of new records for the island and                                                                                                                                     | Moderate |

| Management Category                     | Context/Issue                                                                                                                                                                                                                                                                                                          | Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Priority                               |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
|                                         | records for the island of significant species particularly during the wet season.                                                                                                                                                                                                                                      | important cultural resource species.<br><br>Collect leaf specimens and photograph plants with known uses/values and that may have been used in the past, and catalogue.<br><br>Update island species list as new information becomes available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |
| <b>Traditional Ecological Knowledge</b> | 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                                   |
| <b>Fire Management</b>                  | Changing fire regimes in association with feral deer grazing may be occurring in adjoining habitats.                                                                                                                                                                                                                   | No actions identified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Moderate                               |
| <b>Threatened Species Management</b>    | <u>Flora</u> : The ecology, population status and threats to significant flora species are poorly known.<br><br><u>Fauna</u> : Composition of fauna within this habitat is poorly known.                                                                                                                               | <u>Flora</u> : Further baseline information is required before discrete management actions can be defined for individual species. Survey work to determine the presence of threatened terrestrial orchids is considered a high priority.<br><br><u>Fauna</u> : Further baseline information is required (see fauna surveys) before discrete management actions can be defined. Survey work to determine the presence of emerald monitor within this habitat is high priority.                                                                                                                                                                                                                                                   | High<br><br>High                       |
| <b>Invasive Species Management</b>      | <u>Flora</u> : A number of species known from disturbed areas pose a threat in the long term particularly leucaena.<br><br><u>Fauna</u> : The impacts that feral deer are having on vine forest and thicket habitats are unknown and the extent of utilisation by other exotic animal species needs to be ascertained. | <u>Flora</u> : Mapping of existing infestations of high priority weeds and monitoring for new weed infestations, particularly for weeds including lantana and barleria, is required on a regular basis. The utilisation of these habitats by rusa deer dramatically increases the risk of weed introduction.<br><br>Monitoring the margins of vine thickets on laterite that occur in the vicinity of the cemetery for exotic species requires ongoing attention.<br><br><u>Fauna</u> : Areas are known to be utilised by rusa deer and this is likely to have a long term impact on habitat diversity. An island specific program for management of the feral deer population should be considered by the rangers as priority. | High<br><br>Immediate<br><br>Immediate |
| <b>Monitoring</b>                       | Observations relating to any changes to habitat condition, particularly those arising from changed fire regimes, and                                                                                                                                                                                                   | Carry out informal observation of habitat condition including health of canopy (monitoring for dieback) and presence of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Moderate                               |

| Management Category | Context/Issue                                                                                 | Actions                                                                                                                                                                                                                                                                                                                                                          | Priority  |
|---------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|                     | utilisation by feral animals or exotic flora species, are a long term management requirement. | invasive weed species, on a regular annual to bi-annual basis in all vine thicket habitats across the island.<br><br>Permanently mark monitoring sites in selected accessible habitats for photographic monitoring on an annual basis. Particular monitoring attention required for vine thickets on alluvium which may be affected by changes in soil salinity. | Immediate |

## 8.2 *Lophostemon* Dominant Woodlands and Open forests / *Melaleuca* Dominant Woodland and Open Forest

### 8.2.1 Status of Ecological Knowledge

*Lophostemon* dominant woodlands are scattered throughout the broader grassland savannas within the interior portions of Saibai Island. The habitat is unique to Saibai Island, and not known to occur on other islands within the Torres Strait group. It is however likely to be more extensive in the Trans-Fly region of the PNG. The habitat, represented by VC8a comprises open forest and woodland communities which are dominated by *Lophostemon suaveolens*. Paperbark (*Melaleuca cajaputi* var. *platyphylla*) occasionally contributes to the canopy, although is more prominent as a shrub or sub-canopy tree, as is *Livistona muelleri*, *Pandanus* sp. and *Acacia leptocarpa*. Ground covers are typically dense comprising *Ischaemum australe*, *Imperata cylindrica* and *Vandasina retusa*. A profusion of epiphytic plants inhabit the canopy and sub-canopy including mats of rattle skulls (*Dischidia major*), button orchid (*Dischidia nummularia*), and ant plant (*Myrmecodia platytyrea* var. *antoinii*). *Melaleuca cajaputi* occasionally separates into a distinctive open forest community (VC7a) in swampy areas, although these are grouped with the broader *lophostemon* dominant woodland habitats which they are intimately associated with.

### 8.2.2 Ecological / Cultural Considerations

**Habitat Condition and Threats:** All communities observed are in undisturbed natural condition. Structurally, the habitat comprises a variable mix of shrubs at various stages of recruitment including juvenile and mature plants with an abundance of epiphytes throughout upper and mid-level structural layers.

**Cultural Perspectives:** The cultural usage and significance of this habitat is largely unknown.

**Flora:** The composition of the ground flora and epiphytes is poorly known due to inadequacy of previous sampling. The habitat potentially supports threatened terrestrial orchids.

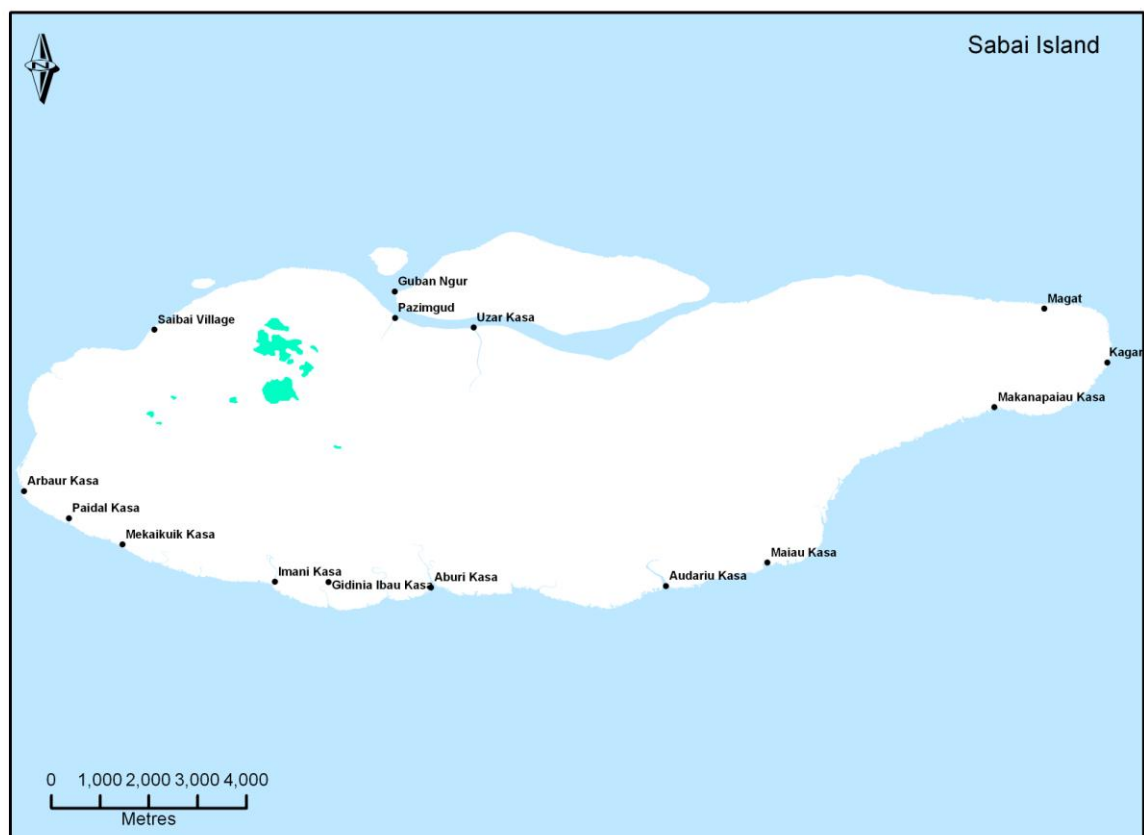
**Fauna:** The fauna utilisation and assemblage associated with this habitat is largely unknown.

### 8.2.3 Management Implications

The habitat is subject to regular firing associated with seasonal burning of the surrounding grassland habitats. Occasional hot fires within this habitat may be required to halt excessive thickening in the lower structural layers. Hot fires should be targeted toward those areas where shrubby thickening is apparent, yet only after mosaic burns have been carried out in the broader surrounding grassland habitats during the preceding months. A more regular pattern of mosaic burning undertaken across the broader island landscape can be encouraged for long term habitat maintenance.

### 8.2.4 Summary of Recommended Management Actions

In compiling these recommendations, it is considered that any management action should aim to maintain the current landscape function which is considered important from both an ecological and cultural perspective. Recommendations for landscape maintenance are provided below although it should be considered that current management regimes, from evidence taken across the islands full range of habitats, are broadly satisfying habitat maintenance objectives. This habitat does however require hot fires targeted in those areas where shrubby thickening is intense. Mosaic burning of the surrounding landscape from early in the season will ensure that any targeted hot fires in this habitat will not risk firing of large areas of the island in a single destructive late season fire event.



**Figure 4.** Distribution of lophostemon dominant woodland and open forest Saibai Island (place names after Lawrie, 1970).



**Photograph 6.** *Lophostemon suaveolens* dominant woodland on Saibai Island.

**Table 14.** Summary recommendations for management of lophostemon dominant woodland and open forest.

| Management Category                     | Context/Issue                                                                                                                                                                                  | Actions                                                                                                                                                                                                                                                                                                                                                                                           | Priority |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Fauna Surveys</b>                    | 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. A structured fauna survey involving nocturnal surveys (particularly during periods of melaleuca flowering) and pitfall trapping should be undertaken within this habitat.<br><br>Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK. | High     |
| <b>Plant Surveys</b>                    | The floristic composition of the ground flora is poorly known and limited to surveys undertaken during drier seasonal periods. Epiphytic species and annual herbs have been poorly documented. | Botanical survey needs to focus on collection and identification of ground covers which may be particularly diverse at periods of peak productivity (March to May). Surveys of the diverse array of orchids and epiphytes should also be undertaken.                                                                                                                                              | Moderate |
| <b>Traditional Ecological Knowledge</b> | Composition of TEK within this habitat is poorly known. No formal survey of this habitat has been undertaken.                                                                                  | Collect and collate TEK knowledge within this habitat gained through fauna and flora survey actions on an ongoing basis.<br><br>Documentation of traditional land management practices, particularly in relation to fire management practice should be undertaken through collaboration with knowledgeable members of the local community.                                                        | High     |
| <b>Fire Management</b>                  | There is evidence of shrubby thickening within this habitat which requires a prescriptive fire management regime.                                                                              | Hot late season fires should be targeted in this habitat where shrubby thickening is noted. This burning should only be undertaken when surrounding habitats have been subject to mosaic burning in the preceding months.                                                                                                                                                                         | High     |

| Management Category                  | Context/Issue                                                                                                   | Actions                                                                                                                                                                                                                                                    | Priority |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|                                      |                                                                                                                 | The timing, frequency and conditions (temperature, wind and humidity) for all fires within these habitats should be recorded for future reference and maintenance of traditional habitat management knowledge.                                             |          |
| <b>Threatened Species Management</b> | <u>Flora</u> : No threatened flora species have been recorded in this habitat.                                  | <u>Flora</u> : Targeted seasonal surveys are required to adequately document species composition.                                                                                                                                                          | Moderate |
|                                      | <u>Fauna</u> : The composition of this habitat in regard to threatened fauna species is unknown                 | <u>Fauna</u> : Further baseline information is required (see fauna surveys) before forming discrete management actions.                                                                                                                                    | High     |
| <b>Invasive Species Management</b>   | <u>Flora</u> : There are no existing weed issues identified in this habitat.                                    | <u>Flora</u> : No active weed control or management is currently required. The relative infertility of the substrate limits the degree to which exotic flora can invade the habitat.                                                                       | 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 fauna surveys. Management actions can be formulated once major threats are identified.                                                                             | Moderate |
| <b>Monitoring</b>                    | This habitat may be subject to thickening of the shrubby understory if burning is excluded from this community. | Permanently mark sites in selected accessible sites for photographic monitoring to be undertaken on an annual basis. Representative examples of this habitat should be examined regularly by rangers to identify areas requiring targeted fire management. | Moderate |

### 8.3 *Melaleuca* Dominant Shrublands and Woodlands

#### 8.3.1 Status of Ecological Knowledge

This is a relatively extensive habitat that occurs on the north-central portion of Saibai Island where it is associated with poorly drained alluvial flats. The habitat, represented by VC13a comprises low woodlands and shrublands which are dominated by *Melaleuca cajaputi* with associated species including *Pandanus* sp., *Acacia leptocarpa* and occasional *Livistona muelleri*. Ground covers are typically sparse although comprise *Ischaemum australe* and *Vandasina retusa*. At the time of initial survey (October 2007), the habitat had been recently fired and hence groundcover diversity is likely to be considerably more diverse than initially apparent and the habitat was not examined during June 2012 surveys. The habitat is intimately associated with lophostemon dominant woodlands (VC8a) which are discussed in **Section 8.2**.

#### 8.3.2 Ecological / Cultural Considerations

**Habitat Condition and Threats:** All communities observed are in undisturbed natural condition. Structurally, the habitat comprises a variable mix of shrubs at various stages of recruitment

including juvenile and mature plants. The degree of canopy scorch indicates that the recent fire was extremely hot and fire interval is not regular.

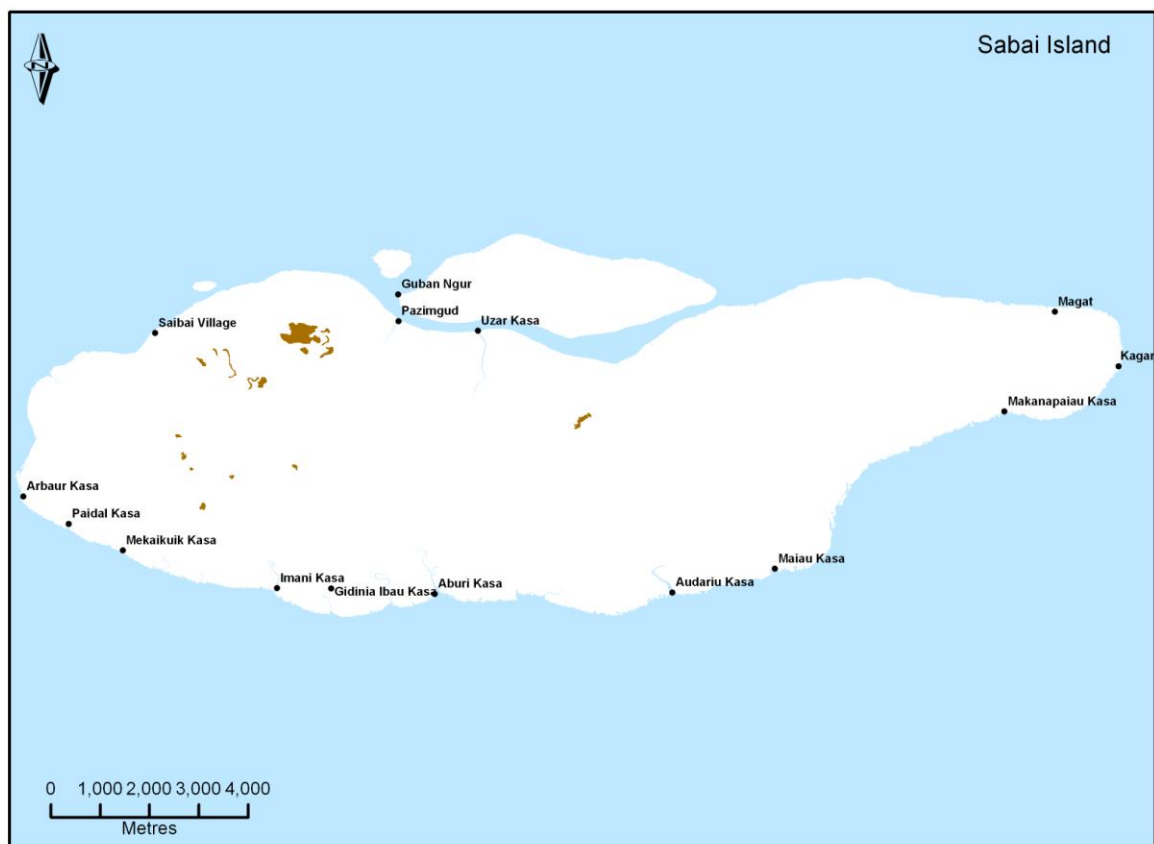
**Cultural Perspectives:** The cultural usage and significance of this habitat is largely unknown.

**Flora:** The composition of the ground flora is poorly known due to the inadequacy of previous sampling regimes. The habitat potentially supports threatened terrestrial orchids.

**Fauna:** Largely unknown although the habitat would provide a valuable seasonal nectar source for a range of birds and mammals.

### **8.3.3 Management Implications**

The uneven nature and sizes of component shrubs suggest that the habitat is subject to irregular firing, with firing will only occur under extremely hot conditions when the habitat burns with great intensity. This habitat most likely requires hot fires to reduce the impacts of shrubby thickening. A high frequency of cool fires (or fire exclusion) will stimulate shrub regeneration leading to irreversible shrubby thickening in the long term. Whilst a late season burning pattern might not be appropriate for the majority of savanna communities on the island, it is most likely appropriate for this particular habitat. When shrubby thickening is contained, a more regular pattern of mosaic burning can be encouraged for habitat maintenance.



**Figure 5.** Distribution of melaleuca dominant shrublands and woodlands on Saibai Island (place names after Lawrie, 1970).



**Photograph 7.** Recently burnt *Melaleuca cajaputi* var. *platyphylla* dominant shrubland on Saibai Island.

### 8.3.4 Summary of Recommended Management Actions

In compiling these recommendations, it is considered that any management action should aim to maintain the current landscape function which is considered important from both an ecological and cultural perspective. Recommendations for landscape maintenance are provided below although it should be considered that current management regimes, from evidence taken across the islands full range of habitats, are broadly satisfying habitat maintenance objectives. This habitat does however require hot fires targeted in those areas where shrubby thickening is intense. Mosaic burning of the surrounding landscape from early in the season will ensure that any targeted hot fires in this habitat will not risk firing of large areas of the island in a single late season fire event.

**Table 15.** Summary recommendations for management of melaleuca dominant shrublands and low woodlands.

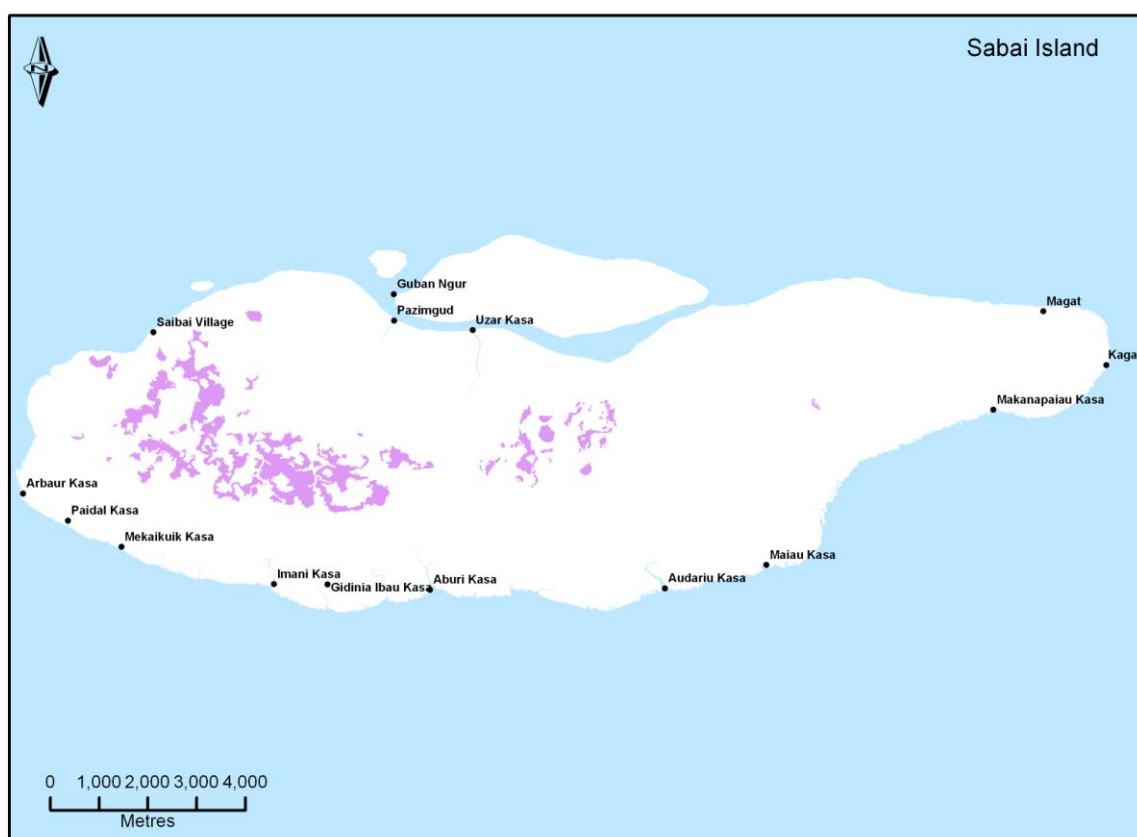
| Management Category  | Context/Issue                                                                                                                                                                                  | Actions                                                                                                                                                                                                                                                                                                                                                                                           | Priority |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Fauna Surveys</b> | 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. A structured fauna survey involving nocturnal surveys (particularly during periods of melaleuca flowering) and pitfall trapping should be undertaken within this habitat.<br><br>Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK. | High     |
| <b>Plant Surveys</b> | The floristic composition of the ground flora is poorly known and limited to surveys undertaken during drier seasonal periods. Epiphytic species and annual herbs have been poorly documented. | Botanical survey needs to focus on collection and identification of ground covers which may be particularly diverse at periods of peak productivity (March to May). Surveys of the diverse array of orchids and epiphytes should also be undertaken.                                                                                                                                              | Moderate |
| <b>Traditional</b>   | Composition of TEK within this                                                                                                                                                                 | Collect and collate TEK                                                                                                                                                                                                                                                                                                                                                                           | High     |

| Management Category                  | Context/Issue                                                                                                                                 | Actions                                                                                                                                                                                                                                                                                                                                                                                                                                         | Priority |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Ecological Knowledge</b>          | habitat is poorly known. No formal survey of this habitat has been undertaken.                                                                | knowledge within this habitat gained through fauna and flora survey actions on an ongoing basis.<br><br>Documentation of traditional land management practices, particularly in relation to fire management practice should be undertaken through collaboration with knowledgeable members of the local community.                                                                                                                              |          |
| <b>Fire Management</b>               | There is evidence of shrubby thickening within this habitat which requires a prescriptive fire management regime.                             | Hot late season fires should be targeted in this habitat where shrubby thickening is noted. This burning should only be undertaken when surrounding habitats have been subject to mosaic burning in the preceding months.<br><br>The timing, frequency and conditions (temperature, wind and humidity) for all fires within these habitats should be recorded for future reference and maintenance of traditional habitat management knowledge. | High     |
| <b>Threatened Species Management</b> | <u>Flora</u> : No threatened flora species have been recorded in this habitat. Provides potential habitat for threatened terrestrial orchids. | <u>Flora</u> : Targeted seasonal surveys within this habitat are required to adequately document species composition. Further baseline information is required before discrete management actions can be defined.                                                                                                                                                                                                                               | Moderate |
|                                      | <u>Fauna</u> : The composition of this habitat in regard to threatened fauna species is unknown                                               | <u>Fauna</u> : Further baseline information is required (see fauna surveys) before discrete management actions can be defined.                                                                                                                                                                                                                                                                                                                  | High     |
| <b>Invasive Species Management</b>   | <u>Flora</u> : There are no existing weed issues identified in this habitat.                                                                  | <u>Flora</u> : No active weed control or management is currently required. The relative infertility of the substrate limits the degree to which exotic flora can invade the habitat.                                                                                                                                                                                                                                                            | 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 fauna surveys. Management actions can be formulated once major threats are identified.                                                                                                                                                                                                                                                                  | Moderate |
| <b>Monitoring</b>                    | This habitat may be subject to broadscale structural change if burning is excluded from this community.                                       | A number of permanently marked photographic monitoring points should be placed in representative habitats which are accessible. Photographic reference material should be captured on an annual to bi-annual basis to detect any broadscale changes to habitat structure or condition.                                                                                                                                                          | Moderate |

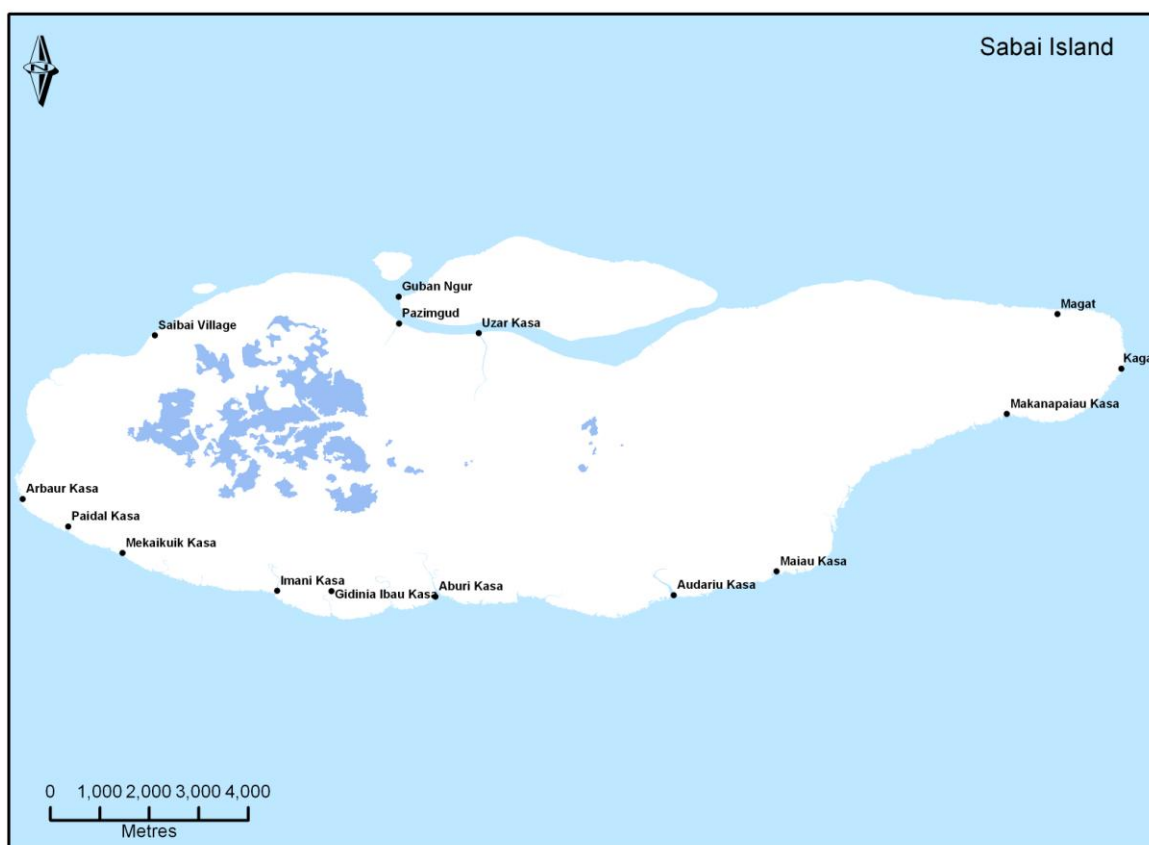
## 8.4 Grassland / Grassland Complexes and Pandanus Dominant Woodland and Shrubland

### 8.4.1 Status of Ecological Knowledge

This habitat combines pandanus dominant woodlands and grasslands into a single management unit, which is justifiable on the grounds that both communities frequently form mosaics that are intrinsically linked through both edaphic controls and fire history. On Saibai, the habitat extends across the broad central interior of the island, broken only by attenuated wetland habitats lined with vine thicket and mangrove fringes. The habitat is reportedly widespread on the Morehead-Kiunga area of the PNG lowlands identified in the Bula and Mibini Land Systems (Bleaker 1983). Neldner *et al.* (1997) acknowledge the bioregional conservation value of native grassland habitats which are assigned an 'Of Concern' biodiversity and vegetation management status under the Qld VMA (1999). Grasslands on the northern Torres Strait Islands are in particularly good condition, unaffected by many of the landscape scale processes of shrubland invasion and exotic species incursions affecting habitats in the broader Cape York Peninsula bioregional area and on the eastern islands Erub and Mer.



**Figure 6.** Distribution of grassland habitats on Saibai Island (place names after Lawrie, 1970).



**Figure 7.** Distribution of pandanus dominant woodland communities (place names after Lawrie, 1970).

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

#### **8.4.2 Ecological / Cultural Considerations**

**Habitat Condition:** This habitat is largely free from exotic species and appears in excellent condition throughout its broader range. In some locations, this habitat is affected by a thickening of *Melaleuca cajuputi* and *Acacia leptocarpa* shrubs.



**Photograph 8.** Pandanus dominant shrubland in the interior of Saibai Island, and; **Photograph 9.** A mosaic of grassland and pandanus dominant shrubland in the central region of Saibai Island.

The population of rusa deer on Saibai Island is currently unknown. Whilst sitings in 2007 field surveys indicated the animals were extremely sparse on the ground, more recent observations by helicopter in June 2012 suggested otherwise. Observations made on nearby Boigu Island indicate that the feral deer population has expanded and it is expected that populations on Saibai Island are following the same general trend. An increase in deer population on Saibai will be problematic to long term management of grassland habitats. Introduction of rusa deer into savanna ecosystems of the Trans-Fly region of PNG has resulted in a dramatic shrubby thickening of grassland communities, facilitated through the capacity of feral deer to reduce grassy fuel loads by grazing pressure, and subsequent changes to fire regimes (Bartolo *et al.* 2002). This fuel load reduction lowers the intensity of seasonal burning events which favours development of shrubland at the expense of grassland habitats (Jeremy Russell-Smith, pers. comm.).

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

**Flora:** The species recorded for this habitat are all native, indicating its high integrity. Additional surveys are required to fully document the habitats floristic diversity. There is a potential that grasslands provide habitat for threatened terrestrial orchids.

**Cultural Perspectives:** Grassland habitats are of considerable cultural significance to the Saibai people. An extensive prehistoric mound and ditch agricultural system (Barnham 1999) has been constructed in some portions of this habitat, the remnants of which remain visible in todays landscape. Fire has been a fundamental management tool used for maintenance of grassland habitats.

#### **8.4.3 Management Implications**

Shrubby thickening and weed invasion are considered the greatest threats to survival of this habitat on Saibai Island. The use of late season fire (hot) is a fundamental requirement for the control of shrubby thickening in grassland habitats although prescribed burning efforts for this purpose will be futile if the feral deer population is not effectively controlled. An increasing deer

population will promote continued degradation of these habitats as grazing intensity increases over time and the grassy fuel load is ultimately reduced. It should also be considered that whilst fire is a necessary tool for grassland maintenance, the promotion of new areas of green pick will concentrate grazing pressure on recently burnt areas which will in turn reduce the effectiveness of fire as a tool to prevent shrubby invasion. In addition to impacts through grazing and browsing, deer are known to damage trees and shrubs by antler rubbing and degrade water quality and wetland habitat by wallowing (Biosecurity Queensland 2010).

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

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

#### **8.4.4 Summary of Recommended Management Actions**

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

**Table 16.** Summary of recommended management actions for grassland and pandanus dominated woodland habitats.

| Management Category                     | Context/Issue                                                                                                                                                                                                                | Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Priority |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Fauna Surveys</b>                    | The fauna composition within this habitat is poorly known although the assemblage is likely to be relatively simple.                                                                                                         | Ongoing collection and documentation of observed wildlife is critical to providing greater insight into the habitats fauna assemblage and utilisation.<br><br>Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | High     |
| <b>Plant Surveys</b>                    | Flora composition is poorly documented and limited to surveys in accessible habitats.                                                                                                                                        | Flora field surveys should focus on collection and identification of important cultural resource species. The most immediate action is to collect leaf specimens and photograph plants with known uses/values, in particular those that may have been used in the past, and catalogue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Moderate |
| <b>Traditional Ecological Knowledge</b> | 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.<br><br>Documentation of traditional land management practices, particularly in relation to fire management practice should be undertaken through collaboration with knowledgeable members of the local community.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | High     |
| <b>Fire Management</b>                  | Fire management is required to maintain current extent and condition of grassland communities and adjacent shrubland habitats although management is complicated considerably by the presence of rusa deer in the landscape. | Management should focus on maintaining current extent and occurrence of grassland habitats in the landscape although this should be guided by requirements and wishes of the Saibai people.<br><br>At the discretion of the Saibai rangers, areas being subject to shrubby thickening should be identified and be the focus of prescribed late season (hot) burns.<br><br>Hot fires should be a component of a broader seasonal mosaic of fire events, the majority being cooler early season mosaic burns. Removal of fire from the landscape will ultimately result in loss of grassland habitat from the Saibai landscape.<br><br>The frequency and usage of late dry season fires as a tool to manage shrubby invasion can be reduced once thickening is controlled and a more consistent cycle of mid-dry season fires (August to October) completed | High     |

| Management Category                  | Context/Issue                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Priority                       |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>on a 2 – 3 year cycle dependant on an assessment of developing fuel loads.</p> <p>Timing and frequency of fires should be recorded for future reference. This will allow practice to be adjusted and refined to improve management outcomes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |
| <b>Threatened Species Management</b> | <p><u>Flora</u>: Grasslands provide potential habitat for threatened terrestrial orchids. The undescribed grass <i>Eulalia</i> sp. is only known from a single collection on Saibai.</p> <p><u>Fauna</u>: No threatened flora or fauna species are known to occur within or utilise these habitats for foraging.</p>                                                                                                                                                                    | <p><u>Flora</u>: Further baseline information is required before discrete management actions can be defined.</p> <p><u>Fauna</u>: Further baseline information is required (see fauna surveys) before discrete management actions can be defined.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>Moderate</p> <p>High</p>    |
| <b>Invasive Species Management</b>   | <p><u>Flora</u>: There are no existing weed issues currently identified within this habitat. A number of species known from disturbed areas pose a threat to habitat condition in the long term. The utilisation of these habitats by rusa deer dramatically increases the risk of weed introduction.</p> <p><u>Fauna</u>: The impacts that feral deer are having on this habitat are unknown and the extent of utilisation by other exotic animal species needs to be ascertained.</p> | <p><u>Flora</u>: No active weed control or management is currently required in areas away from the township. Monitoring for new weed infestations, particularly for weeds including leucaena and lantana, is required on a regular basis.</p> <p><u>Fauna</u>: Areas are known to be utilised by rusa deer although the composition of invasive fauna can be further assessed from the results of ongoing fauna surveys.</p> <p>Ranger assisted research to more accurately define the feral deer problem and find effective management solutions should be considered a priority action.</p> <p>At a minimum, rangers should be part of any regular population assessments carried out by agencies such as DAFF.</p> <p>Control strategies should consider those prescribed in the <i>Feral Deer Management Strategy 2010 – 2015</i> (Biosecurity Queensland 2010).</p> | <p>Medium</p> <p>Immediate</p> |
| <b>Monitoring</b>                    | <p>Observations relating to any changes in habitat structure or condition, particularly those arising from utilisation by feral animals or exotic species needs ongoing assessment and monitoring.</p>                                                                                                                                                                                                                                                                                  | <p>A number of permanently marked photographic monitoring points should be placed in representative habitats which are accessible. Photographic reference material should be captured on an annual to bi-annual basis to detect any broadscale changes to habitat structure or condition. Also carry out informal observation of habitat condition including identification of those areas where shrubby thickening</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>High</p>                    |

| Management Category | Context/Issue | Actions                                                                                                                                                                                                                                                                                                                                      | Priority |
|---------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|                     |               | <p>is in an advanced stage. Monitoring invasive weed species should be undertaken on a regular annual to bi-annual basis, concentrating particularly along major access tracks and roads.</p> <p>A record of those areas informally surveyed utilising GPS tracks should be kept to ensure comprehensive ongoing coverage of the island.</p> |          |

## 8.5 Wetland Complexes and Mosaics (Freshwater)

### 8.5.1 Status of Ecological Knowledge

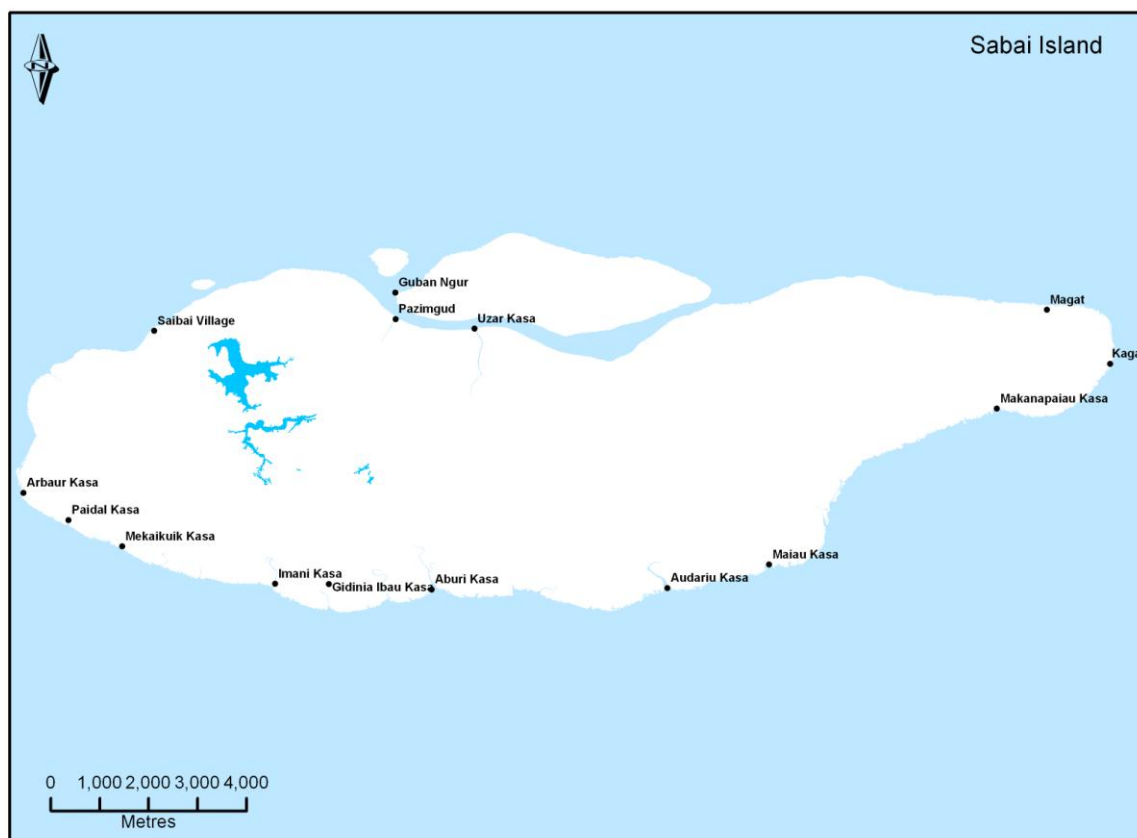
Saibai Island is dissected by a number of broad drainage depressions which attenuate and separate into numerous small branches as they pass landward through the island landscape. These drainage depressions host extensive sedgeland communities which are dominated by the freshwater sedge *Eleocharis dulcis*. The wetlands are fed through fresh groundwater seepage, most likely through exposure of a shallow fresh groundwater table that sits above an impervious clay soil horizon. During wetter seasonal periods, these sedges form an emerald green carpet which desiccates in the later part of the year to form what appears to be a uniform brown straw. Freshwater seepage zones provide a source of recharge for the estuarine wetlands (see **Section 8.8**) which are formed through the mixing of fresh and saline tidal water. The water chestnuts (*Eleocharis dulcis*) has only limited tolerance of salinity and is replaced by the more robust sedge *Schoenoplectus littoralis* in more saline wetland habitats.

### 8.5.2 Ecological / Cultural Considerations

**Habitat Condition:** The habitat exhibits high integrity although there may be minor impacts associated with grazing of feral deer. The potential for the interior wetlands to become hypersaline (higher salt content than seawater) as indicated by Burrows (2010) for Boigu Island is increased by the likelihood of sea level rise. As such, Burrows (2010) considers that further understanding of the salinity dynamics of the wetlands is important to monitoring any changes that are likely to result from sea level rise.

**Fauna:** Estuarine sedgeland provides valuable habitat for a range of significant fauna species including black-necked stork (*Ephippiorhynchus asiaticus*), radjah shelduck (*Tadorna radjah*), and also the estuarine crocodile (*Crocodylus porosus*).

**Flora:** This habitat is floristically simple, generally dominated by a single species of sedge (*Eleocharis dulcis*) although species diversity requires more detailed investigation in appropriate seasonal conditions (February to May).



**Figure 8.** Distribution of wetland complexes and mosaics (freshwater) on Saibai Island (place names after Lawrie, 1970).



**Photograph 10.** A freshwater wetland characterised by *Eleocharis dulcis* which has desiccated in dry seasonal conditions (October 2007).

**Cultural Perspectives:** The extent to which this habitat is utilised as a traditional resource is unknown. They undoubtedly provided habitat for traditional hunting practices.

### **8.5.3 Management Implications**

This is a self-regulating habitat that requires minimal input in terms of active management. It may however be sensitive to changes in salinity and as such that the boundary between freshwater and brackish wetland habitats is metastable, changing in response to prevailing

seasonal conditions. The habitat may also be sensitive to disturbance by feral animals, in particular pigs and rusa deer.

Sea level rise and changes to tidal regime will almost certainly affect the distribution of these wetland habitats with *eleocharis* being replaced by *Schoenoplectus littoralis* sedgelands and eventually mangroves as habitats become more saline. Whilst mitigation against this impact will not be possible, consideration should be given to implementation of monitoring programs to ensure changes to wetland water quality and chemistry are detected, and broader ecological responses documented. Surveys to detect the presence of climbing perch on the island (especially in the dry season), should also be undertaken, in conjunction with a community education program.

#### 8.5.4 Summary of Recommended Management Actions

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

**Table 17.** Summary of recommended management actions for wetland complexes and mosaics.

| Management Category                     | Context/Issue                                                                                                                                                             | Actions                                                                                                                                                                                                                                            | Priority             |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>Fauna Surveys</b>                    | The fauna composition and utilisation within this habitat is poorly documented.                                                                                           | Ongoing collection and documentation of observed wildlife is critical to providing greater insight into the habitats fauna assemblage and utilisation.<br><br>Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK. | High                 |
| <b>Plant Surveys</b>                    | Flora composition is relatively well documented and simple both in composition and structure.                                                                             | Flora field surveys should focus on the collection and identification of important cultural resource species. There is limited potential for exotic species invasion within this habitat due to the regulatory affect of frequent inundation.      | Moderate             |
| <b>Traditional Ecological Knowledge</b> | 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.<br><br>Documentation of traditional habitat utilisation is a fundamental information requirement.                         | Moderate             |
| <b>Fire Management</b>                  | This habitat will not generally carry fire and there is no requirement for active fire management or monitoring.                                                          | No action required.                                                                                                                                                                                                                                | Non-priority         |
| <b>Threatened Species Management</b>    | No threatened flora species are known to occur within this habitat. Wetland habitats however provide habitat and foraging ground for a range of threatened fauna species. | <u>Flora</u> : No management actions required. Carry out ongoing surveys as identified in flora and actions above.<br><br><u>Fauna</u> : Further baseline                                                                                          | Moderate<br><br>High |

| Management Category                | Context/Issue                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Priority  |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>information is required (see fauna surveys) before discrete management actions can be defined. Particular attention should be paid to recording site locations of threatened species including black-necked stork, radjah shelduck and estuarine crocodile.</p> <p>Survey for false water mouse should also be considered in a structured fauna survey program.</p>                                                                                                                                                                                                                                     |           |
| <b>Invasive Species Management</b> | <p><u>Flora</u>: There are no existing weed issues identified within this habitat and weed incursions are likely to be regulated by saline incursion which limits the potential for aggressive weed invasion.</p>                                                                                                                                                                                                                                              | <p><u>Flora</u>: No active weed control or management required at present.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Moderate  |
|                                    | <p><u>Fauna</u>: The degree of utilisation and impacts that feral deer is having on this habitat is unknown although it is likely that considerable ground disturbance may occur during drier periods when water level is low.</p> <p>Other invasive species including both domesticated and feral dogs and cats may have a significant impact on populations and habitats of threatened fauna species which utilise or potentially utilise wetland areas.</p> | <p><u>Fauna</u>: Habitat utilisation and impacts of feral deer should be recorded (including photographic reference) as component of general ranger duties. Monitoring and control requirements should be guided by the <i>Feral Deer Management Strategy 2010 – 2015</i> (Biosecurity Queensland 2010).</p> <p>Survey of habitat usage by other exotic species should be an ongoing component of the ranger program with sitings recorded and populations monitored informally. Indications of population expansions, particularly feral cats and dogs will require a structured eradication program.</p> | Immediate |
|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p><u>Aquatic Fauna</u>: Conduct surveys targeted to detect climbing perch on the island. This should be undertaken in the dry season when limited surface water is present and can be completed in conjunction with a community education program.</p>                                                                                                                                                                                                                                                                                                                                                    | Immediate |
| <b>Monitoring</b>                  | <p>Wetland areas may be particularly prone to rapid changes in water chemistry, quality and habitat structure/ composition due to sea level rise. Observations relating to any changes in habitat structure or condition, particularly those arising from utilisation by feral animals.</p>                                                                                                                                                                    | <p>Permanent long-term photographic monitoring points should be established in accessible wetland locations and photographic information collected consistently over a number of seasonal periods. Photographic evidence may be an important means of documenting ecological responses within wetlands to sea level and broader seasonal fluctuations in rainfall.</p>                                                                                                                                                                                                                                     | Moderate  |

## **8.6 Samphire Grasslands**

### **8.6.1 Status of Ecological Knowledge**

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

### **8.6.2 Ecological / Cultural Considerations**

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

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

**Flora:** Low species diversity.

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

### **8.6.3 Management Implications**

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

### **8.6.4 Summary of Recommended Management Actions**

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

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



**Photograph 11.** Extensive sporobolus dominant grassland occurs on the margins of grassland habitats on Saibai Island.



**Figure 9.** Distribution of samphire grassland habitats on Saibai Island (place names after Lawrie, 1970).

**Table 18.** Summary of recommended management actions for samphire grassland habitat.

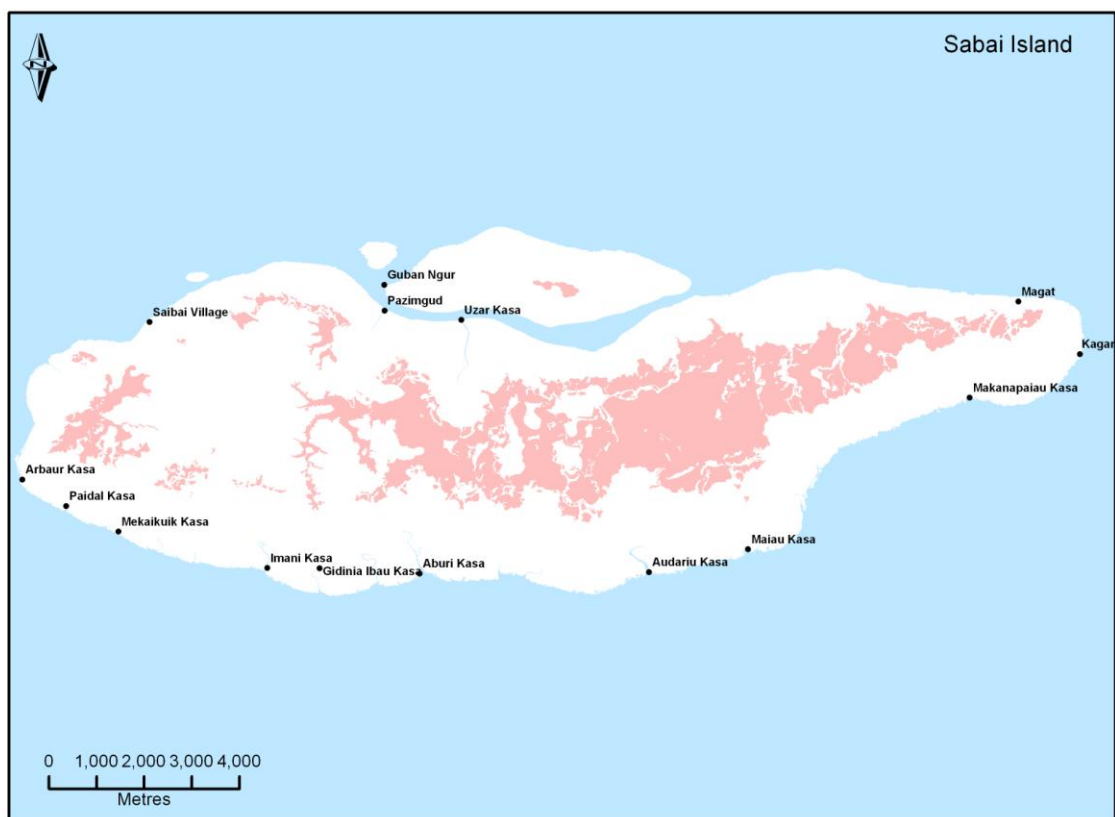
| Management Category                     | Context/Issue                                                                                                                                                                                                                | Actions                          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

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

## 8.7 Samphire Herblands, Shrublands and Salt Pans

### 8.7.1 Status of Ecological knowledge

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



**Figure 10.** Distribution of samphire herblands, shrublands and salt pans on Saibai Island (place names after Lawrie, 1970).



**Photograph 12.** A typical saline scald in an extensive saline complex behind the Saibai township (Oct. 2007).

### 8.7.2 Ecological / Cultural Considerations

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

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

**Flora:** Low species diversity is apparent in this habitat.

**Cultural Perspectives:** Traditional usage is unknown.

### 8.7.3 Management Implications

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

### 8.7.4 Summary of Recommended Management Actions

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

**Table 19.** Summary of recommended management actions for samphire herblands and shrublands.

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

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

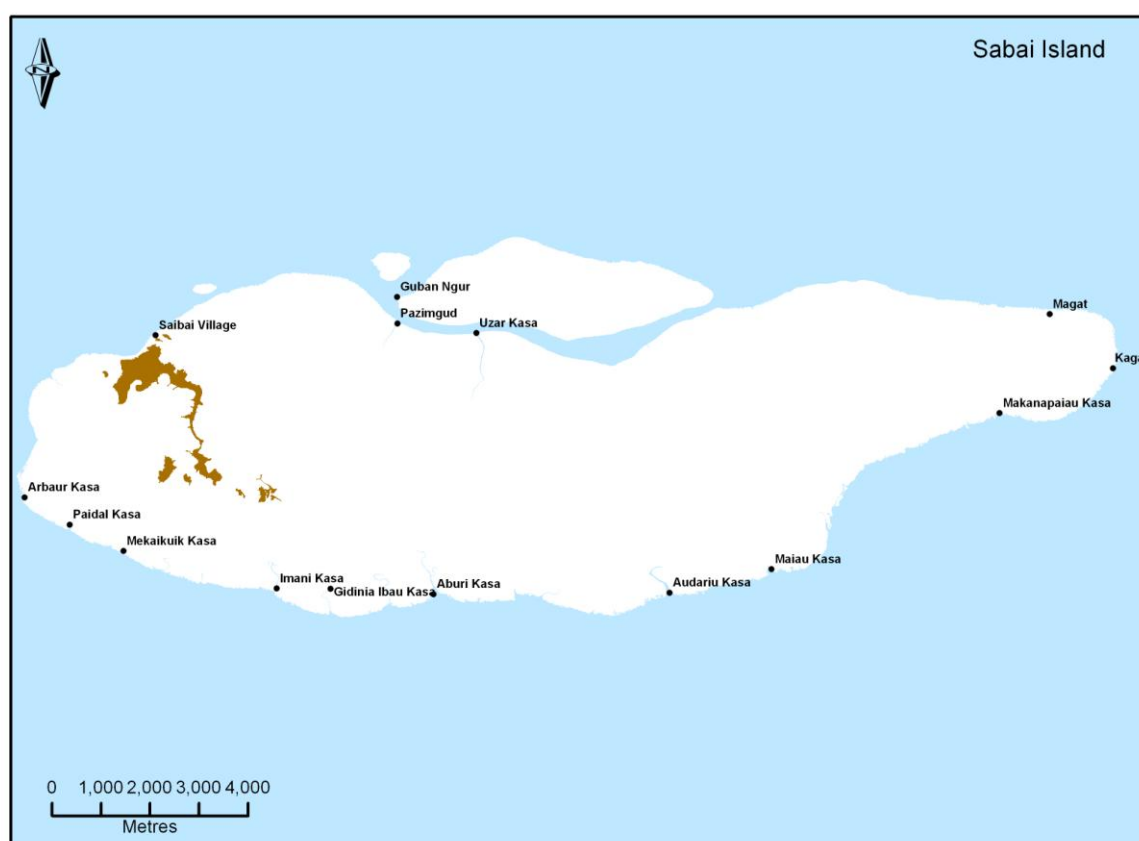
## 8.8 Estuarine Wetland Complexes/ Wetland Complexes and Mosaics

### 8.8.1 Status of Ecological Knowledge

Estuarine wetland habitats are represented by a number of variations on Saibai Island. Vegetation community 27a is the more extensive of the two habitats, occurring on both Boigu and Saibai Islands, where it represents a low sedgeland dominated by *Schoenoplectus littoralis*. The community occupies seasonally inundated drainage depressions on tidal flats which accumulate freshwater during the wet season. Surface water progressively evaporates during drier seasonal periods progressively increasing the salinity of surface water.

Vegetation community 27b, which is unique to Saibai Island, is a better-developed variant of the sedgeland habitat. It represents an open wetland/sedgeland mosaic forming an extensive system of brackish swamps on the landward fringe of mangrove communities. These swamps form drainage catchments to the numerous freshwater seepage zones that occur across the islands interior and remain inundated and brackish throughout the year.

The extent of similar ecosystems on the Fly Platform of mainland PNG is unknown yet they are likely to occur in association with the Wunji Land System (Bleaker 1983).



**Figure 11.** Distribution of estuarine wetland habitats on Saibai Island (place names after Lawrie, 1970).



**Photograph 13.** Brackish wetland community 27b fringing mangrove habitats on the southern side of Saibai Island; **Photograph 14.** A desiccated *Schoenoplectus littoralis* dominant sedgeland near the Saibai Island township in the late dry season of 2007.

### 8.8.2 Ecological / Cultural Considerations

**Habitat Condition:** The habitat exhibits high integrity although there may be minor impacts associated with grazing of feral deer. The potential for the interior wetlands to become hypersaline (higher salt content than seawater) as indicated by Burrows (2010) for Boigu Island is increased by the likelihood of sea level rise. As such, Burrows (2010) considers that further understanding of the salinity dynamics of the wetlands is important to monitoring any changes that are likely to result from sea level rise.

**Fauna:** Estuarine sedgeland provides valuable habitat for a range of significant fauna species including black-necked stork (*Ephippiorhynchus asiaticus*), radjah shelduck (*Tadorna radjah*), and also the estuarine crocodile (*Crocodylus porosus*). Burrows (2010) recorded bockadams (*Cerberus australis*) a reddish coloured snake, from the interior swamps on Boigu Island. It is unknown if this species also occurs in similar swamplands on Saibai Island. Similarly the presence of the aquatic pest climbing perch has not been confirmed on Saibai Island although it is known to occur on nearby Boigu Island.

**Flora:** This habitat is floristically simple although species diversity requires more detailed investigation. Floristic survey completed by Burrows *et al.* (2010) in similar habitats on Boigu Island recorded 17 aquatic flora species.

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

### 8.8.3 Management Implications

This is a self-regulating habitat that requires minimal input in terms of active management although may be sensitive to a range of disturbance factors including impacts to water quality and disturbance by feral animals including pigs and rusa deer.

Sea level rise and changes to tidal regime will almost certainly affect the salinity of within-island wetlands, potentially having a significant impact to ecological function across large areas of the

island. Whilst mitigation against this impact will not be possible, consideration should be given to implementation of monitoring programs to ensure changes to wetland water quality and chemistry are detected, and broader ecological responses documented. Monitoring should cover several full seasonal cycles and also include assessments of salinity in the wetlands before and immediately after king tides (see Burrows 2010).

Surveys to detect the presence of climbing perch on the island (especially in the dry season), should also be undertaken, in conjunction with a community education program.

#### 8.8.4 Summary of Recommended Management Actions

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

**Table 20.** Summary of recommended management actions for samphire herblands and shrublands.

| Management Category                     | Context/Issue                                                                                                                                                             | Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Priority     |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Fauna Surveys</b>                    | The fauna composition and utilisation within this habitat is poorly documented.                                                                                           | <p>Ongoing collection and documentation of observed wildlife is critical to providing greater insight into the habitats fauna assemblage and utilisation.</p> <p>Targeted survey for false water mouse should be considered a priority action. This can be completed using Elliot Traps (A or B) baited with sardines placed on the interface between wetland areas and other habitats (mangroves, samphire grasslands etc.).</p> <p>Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK.</p> | High         |
| <b>Plant Surveys</b>                    | Flora composition is relatively well documented and simple both in composition and structure.                                                                             | Flora field surveys should focus on the collection and identification of important cultural resource species. There is limited potential for exotic species invasion within this habitat due to the regulatory affect of frequent inundation and salinity. Pond apple ( <i>Annona glabra</i> ) is however a potential future threat.                                                                                                                                                                                          | Moderate     |
| <b>Traditional Ecological Knowledge</b> | 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. | <p>Collect and collate TEK knowledge within this habitat gained through fauna and flora survey actions on an ongoing basis.</p> <p>Documentation of traditional habitat utilisation is a fundamental information requirement.</p>                                                                                                                                                                                                                                                                                             | Moderate     |
| <b>Fire Management</b>                  | This habitat will not generally carry fire and there is no                                                                                                                | No action required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Non-priority |

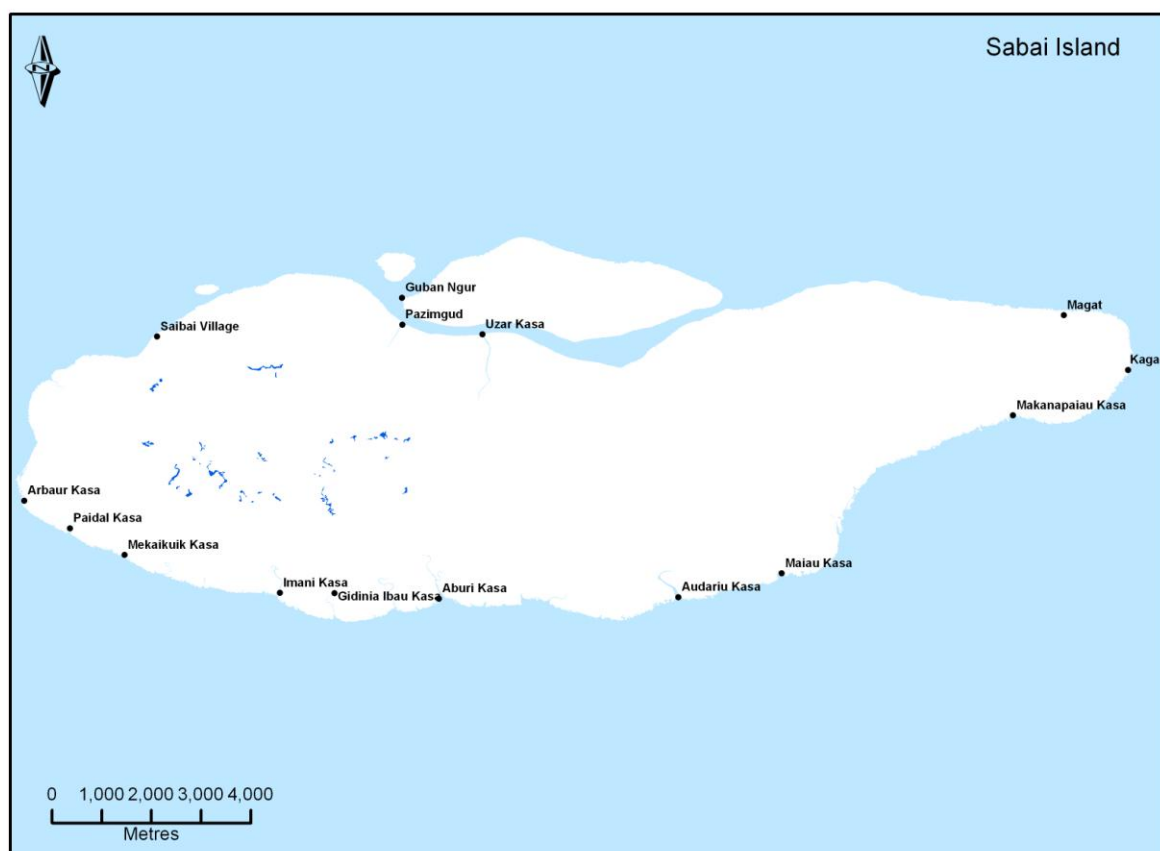
| Management Category                  | Context/Issue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Priority  |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|                                      | requirement for active fire management or monitoring.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |
| <b>Threatened Species Management</b> | No threatened flora species are known to occur within this habitat. The wetland habitats however provide habitat and foraging ground for a range of threatened fauna species.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <u>Flora</u> : No management actions required. Carry out ongoing surveys as identified in flora and actions above.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Moderate  |
|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <u>Fauna</u> : Further baseline information is required (see fauna surveys) before discrete management actions can be defined.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | High      |
|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Particular attention should be paid to recording site locations of threatened species including black-necked stork, radjah shelduck and estuarine crocodile.<br><br>Targeted survey for false water mouse should be considered priority and inform management requirements.                                                                                                                                                                                                                                                                                                                            |           |
| <b>Invasive Species Management</b>   | <u>Flora</u> : There are no existing weed issues identified within this habitat and weed incursions are likely to be regulated by saline incursion which limits the potential for aggressive weed invasion. Vigilance should be maintained to detect early any introduction of pond apple.<br><br><u>Fauna</u> : The degree of utilisation and impacts that feral deer and pigs are having on this habitat is unknown although it is likely that considerable ground disturbance may occur during drier periods when water level is low.<br><br>Other invasive species including both domesticated and feral dogs and cats may have a significant impact on populations and habitats of threatened fauna species which utilise or potentially utilise wetland areas. | <u>Flora</u> : No active weed control or management required at present.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Moderate  |
|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <u>Fauna</u> : Habitat utilisation and impacts of feral deer should be recorded (including photographic reference) as component of general ranger duties. Monitoring and control requirements should be guided by the <i>Feral Deer Management Strategy 2010 – 2015</i> (Biosecurity Queensland 2010).<br><br>Survey of habitat usage by other exotic species should be an ongoing component of the ranger program with sightings recorded and populations monitored informally. Indications of population expansions, particularly feral cats and dogs will require a structured eradication program. | Immediate |
|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <u>Aquatic Fauna</u> : Conduct surveys targeted to detect climbing perch on the island. This should be undertaken in the dry season when limited surface water is present and can be completed in conjunction with a community education program.                                                                                                                                                                                                                                                                                                                                                      | Immediate |
| <b>Monitoring</b>                    | Wetland areas may be particularly prone to rapid changes in water chemistry, quality and habitat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Permanent long-term photographic monitoring points should be established in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Moderate  |

| Management Category | Context/Issue                                                                                                                                                                       | Actions                                                                                                                                                                                                                                           | Priority |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|                     | structure/ composition due to sea level rise. Observations relating to any changes in habitat structure or condition, particularly those arising from utilisation by feral animals. | accessible wetland locations and photographic information collected consistently over a number of seasonal periods. Photographic evidence may be an important means of documenting ecological responses within wetlands to sea level fluctuation. |          |

## 8.9 Saline Transitional Communities

### 8.9.1. Status of Current Ecological Knowledge

This is another habitat type that appears largely restricted to Saibai Island, although it is expected that minor occurrences may also be present on Boigu. The habitat represents the transition from saline mangrove habitats to freshwater dependant vine thicket/shrubland communities. Transitional forest communities and attenuate along the upper tidal reaches of swamplands and narrow drainage features. The dominant species include *Excoecaria agallocha*, *Avicennia marina*, *Bruguiera* sp., *Hibiscus tiliaceus*, *Thespesia populneoides*, *Terminalia subacroptera*, *Melaleuca cajaputi* var. *platyphylla* and *Acacia leptocarpa*. Ground cover is variable although the mangrove fern *Acrostichum aureum* plus the holly mangrove *Acanthus ilicifolius* are generally present.



**Figure 12.** Distribution of saline transitional habitats on Saibai Island (place names after Lawrie, 1970).



**Photograph 15.** Transitional shrublands on the margins of an estuarine wetland complex.

### 8.9.2 Ecological / Cultural Considerations

**Habitat Condition:** There is considerable floristic variation within this habitat due to responses to local variations in salinity. The habitat however exhibits a high degree of integrity and has suffered little from human interference or the impacts of exotic weed invasion.

**Fauna:** Similar to mangrove habitats, transitional woodland and forest communities provide habitat for estuarine crocodiles. Little is known about the usage of this habitat by other fauna species and further survey is required.

**Flora:** The habitat supports a relatively simple floristic assemblage. A comprehensive account of the associated flora assemblage can be obtained through detailed seasonal investigation. The habitat is likely to host the 'Near-Threatened' species *Dolichandrone spathacea*.

**Cultural Perspectives:** The habitat is expected to provide only limited cultural resource value.

### 8.9.3 Management Implications

This is a self-regulating habitat that requires minimal input in terms of active management.

### 8.9.4 Summary of Recommended Management Actions

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

**Table 21.** Summary of recommended management actions for saline transitional communities.

| Management Category  | Context/Issue                                                                   | Actions                                                                                                                                                  | Priority |
|----------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Fauna Surveys</b> | The fauna composition and utilisation within this habitat is poorly documented. | Ongoing collection and documentation of observed wildlife is critical to providing greater insight into the habitats fauna assemblage and utilisation.   | High     |
| <b>Plant Surveys</b> | Floristic composition has been poorly documented.                               | Floristic survey should focus on the collection and identification of important cultural resource species and traditional nomenclature. There is limited | Moderate |

| Management Category                     | Context/Issue                                                                                                                                                                                                                                                                                                                                                                              | Actions                                                                                                                                                                                                                                                                                                                                                                                                         | Priority                  |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                         |                                                                                                                                                                                                                                                                                                                                                                                            | potential for exotic species invasion within this habitat due to the regulatory affect of frequent inundation and salinity.                                                                                                                                                                                                                                                                                     |                           |
| <b>Traditional Ecological Knowledge</b> | 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.<br><br>Documentation of traditional habitat utilisation is a fundamental information requirement.                                                                                                                                                                                      | Moderate                  |
| <b>Fire Management</b>                  | This habitat will not generally carry fire except on the margins where melaleuca may be a prominent species.                                                                                                                                                                                                                                                                               | No action required.                                                                                                                                                                                                                                                                                                                                                                                             | Non-priority              |
| <b>Threatened Species Management</b>    | Documentation on the extent and density of the population of the 'Near-Threatened' species <i>Dolichandrone spathacea</i> .                                                                                                                                                                                                                                                                | <u>Flora</u> : No management actions required. Carry out ongoing surveys as identified in flora and actions above.<br><br><u>Fauna</u> : Further baseline information is required (see fauna surveys) before discrete management actions can be defined.                                                                                                                                                        | Moderate<br><br>High      |
| <b>Invasive Species Management</b>      | <u>Flora</u> : There are no existing weed issues identified within this habitat and weed incursions are likely to be regulated by saline incursion which limits the potential for aggressive weed invasion. The habitat is subject to potential future invasion by pond apple.<br><br><u>Fauna</u> : The habitat is likely to provide shelter and potential foraging ground for rusa deer. | <u>Flora</u> : No active weed control or management required at present. Monitoring for early introduction of pond apple should be undertaken in general ranger duties.<br><br><u>Fauna</u> : Documentation of the habitat utilisation by deer should be recorded. Monitoring and control requirements should be guided by the <i>Feral Deer Management Strategy 2010 – 2015</i> (Biosecurity Queensland 2010). | Moderate<br><br>Immediate |
| <b>Monitoring</b>                       | Changes to vegetation composition and structure may occur due to the effects of ongoing sea level rise and changing climatic regimes.                                                                                                                                                                                                                                                      | No formal monitoring of this habitat is suggested. Due to its transitional nature, it is expected that the broad distribution and floristic assemblage of this habitat will change over time.                                                                                                                                                                                                                   | Low                       |

## **8.10 Mangrove Forest, Woodland and Shrubland Complexes**

### **8.10.1. Status of Current Ecological Knowledge**

This is a highly complex and variable habitat type occupying intertidal areas. Although considerable structural variation is apparent, this habitat is mapped by Stanton *et al.* (2009) as a complex of tall closed to open forest, woodland and shrubland. This reflects limitations in sampling and general structural complexity. Surveys undertaken by Duke (2010) on Boigu Island recorded 30 mangrove species, one of the highest biodiversities of mangroves in world, although mangrove habitats on Saibai have not undergone similar floristic scrutiny. As per findings of Duke (2010) for nearby Boigu Island, at least three structural zones are present, ranging from sea and channel edge forests comprising *Rhizophora* species (including *R. stylosa*, *R. apiculata*, *R. mucronata*) to inner mangrove wetland assemblages comprising *Avicennia marina*, *Bruguiera exaristata*, and *Ceriops australis*.

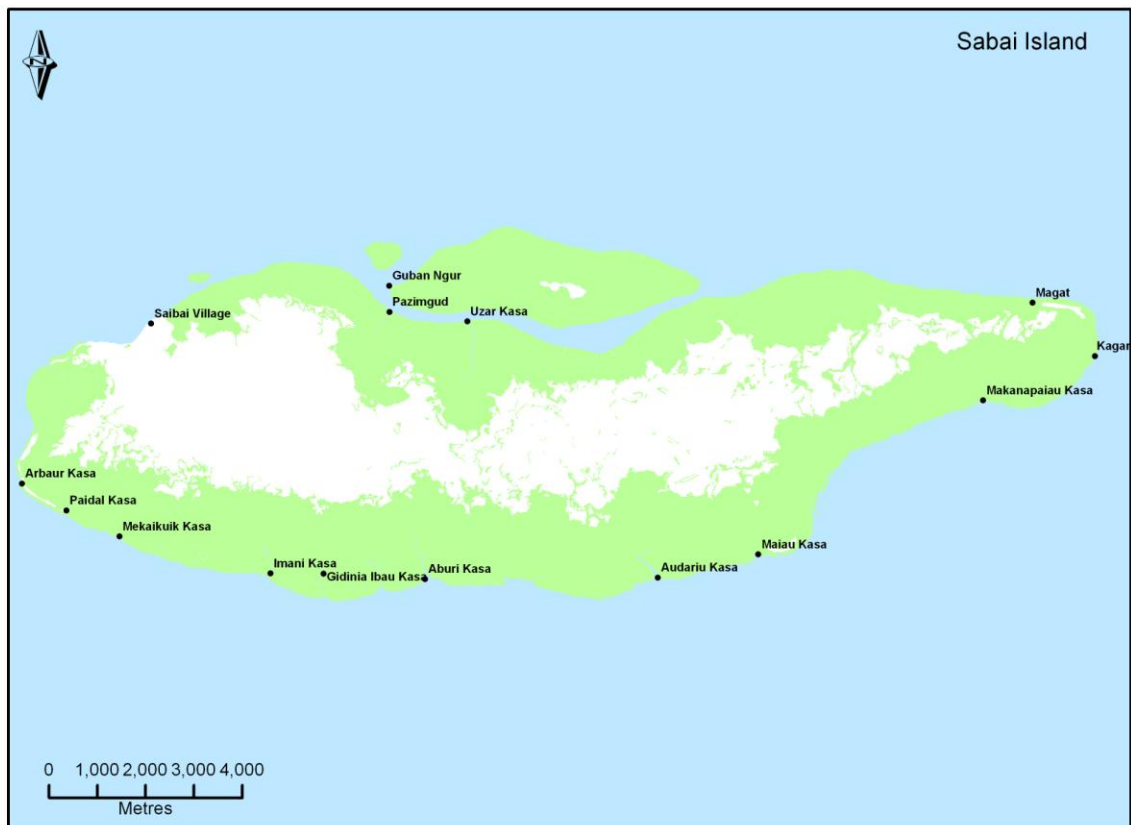
### **8.10.2 Ecological / Cultural Considerations**

**Habitat Condition:** The habitat exhibits high integrity although there may be minor impacts associated with local timber usage.

**Fauna:** Mangrove forest and woodland areas provide habitat for estuarine crocodile whilst the interface between mangrove forest and samphire grassland/ wetland areas provides potential habitat for the false water mouse (*Xeromys myoides*). The emerald monitor (*Varanus prasinus*) has been recorded within this habitat on Boigu Island (Burrows *et al.* 2010) although to date, the species has not been formally recorded on Saibai Island.



**Photograph 16.** Mangrove open forest forming a dense barrier on the south coast of Saibai Island.



**Figure 13.** Distribution of mangrove dominant habitats on Saibai Island (place names after Lawrie, 1970).

**Flora:** The high species diversity of the mangroves on Boigu Island is previously documented by Burrows *et al.* (2010) who describe the Island mangrove flora as one of the highest biodiversity of mangroves in Australia and the world. Comparative studies are required to document mangrove ecology and diversity on Saibai Island. The observation record of the endangered antelope orchid (*Dendrobium antennatum*) is from mangrove forest.

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

### **8.10.3 Management Implications**

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

### **8.10.4 Summary of Recommended Management Actions**

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

**Table 22.** Summary of recommended management actions for samphire herblands and shrublands

| Management Category                     | Context/Issue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Priority                    |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Fauna Surveys</b>                    | The fauna composition and utilisation within this habitat is poorly documented.                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>Ongoing collection and documentation of observed wildlife is critical to providing greater insight into the habitats fauna assemblage and utilisation.</p> <p>Targeted survey for false water mouse should be considered a priority action. This can be completed using Elliot Traps (A or B) baited with sardines placed on the interface between mangrove areas and other habitats (estuarine wetlands, samphire grasslands etc).</p> <p>Focus on ethnotaxonomy should be maintained throughout the process to feed into TEK.</p>                           | High                        |
| <b>Plant Surveys</b>                    | Floristic composition requires comprehensively survey.                                                                                                                                                                                                                                                                                                                                                                                                                                              | Floristic survey should focus on the collection and identification of important cultural resource species and traditional nomenclature. There is limited potential for exotic species invasion within this habitat due to the regulatory affect of frequent inundation and salinity.                                                                                                                                                                                                                                                                             | High                        |
| <b>Traditional Ecological Knowledge</b> | 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.                                                                                                                                                                                                                                                                                                                           | <p>Collect and collate TEK knowledge within this habitat gained through fauna and flora survey actions on an ongoing basis.</p> <p>Documentation of traditional habitat utilisation is a fundamental information requirement.</p>                                                                                                                                                                                                                                                                                                                                | Moderate                    |
| <b>Fire Management</b>                  | This habitat will not generally carry fire and there is no requirement for active fire management or monitoring.                                                                                                                                                                                                                                                                                                                                                                                    | No action required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Non-priority                |
| <b>Threatened Species Management</b>    | <p><u>Flora:</u> Documentation on the extent and density of the population of the endangered orchid <i>Dendrobium antennatum</i> and the possible occurrence of the 'Near-Threatened' species <i>Dolichandrone spathacea</i>.</p> <p><u>Fauna:</u> Mangroves provide habitat for threatened species including black-necked stork, emerald monitor, estuarine crocodile and false water mouse</p> <p>Targeted fauna survey should be considered priority and inform species specific management.</p> | <p><u>Flora:</u> Further baseline information is required before discrete management actions can be defined. Carry out targeted surveys as identified in flora and actions above.</p> <p><u>Fauna:</u> Further baseline information is required (see fauna surveys) before discrete management actions can be defined.</p> <p>Particular attention should be paid to recording site locations of threatened species including black-necked stork, emerald monitor and estuarine crocodile.</p> <p>Targeted survey for false water mouse should be considered</p> | <p>Moderate</p> <p>High</p> |

| Management Category                | Context/Issue                                                                                                                                                                                       | Actions                                                                                                                                                                                          | Priority  |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|                                    |                                                                                                                                                                                                     | priority and inform management requirements.                                                                                                                                                     |           |
| <b>Invasive Species Management</b> | Flora: There are no existing weed issues identified within this habitat and weed incursions are likely to be regulated by saline incursion which limits the potential for aggressive weed invasion. | Flora: No active weed control or management required at present.                                                                                                                                 | Moderate  |
|                                    | Fauna: Mangrove habitats are known to host populations of climbing perch on Boigu Island.                                                                                                           | Fauna: Vigilance in respect to monitoring climbing perch ( <i>Anabas testudineus</i> ) populations which may occur within water bodies throughout this habitat (see Burrows <i>et al.</i> 2010). | Immediate |
| <b>Monitoring</b>                  | Changes to mangrove condition and structure may occur due to the effects of ongoing sea level rise.                                                                                                 | Extensive recommendations for management and monitoring of mangrove ecosystems within the Mangrove Watch program are identified by Duke (2010).                                                  | Moderate  |

## 8.11 Cleared Areas and Regrowth

### 8.11.1 Status of Ecological Knowledge

Cleared areas refer to areas of anthropogenic disturbance, generally relating to development of the township and associated infrastructure. Management of these areas is under control of the local island council.

Areas utilised for habitation and infrastructure purposes host 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. *Leucaena* is considered to be a major weed threat with potential to spread away from the area around the township into natural communities. Whilst detailed weed management strategies are beyond the scope of this exercise, absolute priority should be given to the management of *leucaena* which is considerable to have potential to spread to undisturbed alluvial habitats throughout the islands interior. Further survey of exotic species in the vicinity of the Saibai Island township is required to fully document risks to biodiversity. A comprehensive program of weed control and eradication around the township is also required to minimise the risk of spread of these species into natural habitats. Dispersal mechanisms into island habitats will include natural means such as water, wind and animal dispersal as well as by human means on vehicles and machinery. Declared weeds such as lantana (*Lantana camara*) and bellyache bush (*Jatropha gossypifolia*) are also considered a major threat to biodiversity on the island and vigilance is required to monitor for their potential introduction and spread.

### 8.11.2 Summary of Recommended Management Actions

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

**Table 23.** Summary of recommended management actions for disturbed areas.

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

## 9.0 References

- Allison, A. (2006). *Reptiles and amphibians of the Trans-Fly Region, New Guinea*. Pacific Biological Survey, Bishop Museum, Hawaii.
- Australian Tropical Herbarium (2012). *Specimen data retrieval for Torres Strait*.
- 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.
- Barham, A.J. (1999). *The local environmental impact of prehistoric populations on Saibai Island, northern Torres Strait, Australia: enigmatic evidence from Holocene swamp lithostratigraphic records*. Quaternary International 59 (1999) 71-105. Elsevier Science Ltd.
- Barham, A.J., Harris, D.R. (1985). Relict field systems in the Torres Strait region. In: Farrington, I.S. (Ed.), *Prehistoric Intensive Agriculture in the Tropics, British Archaeological Reports, International Series 232* (vol. I). BAR, Oxford, pp. 247-283.
- 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.
- Bartolo, R.E., Bowe, M., Stronach, N. & Hill, G.J.E. (2002). *Landscape change and the threat to wetland biodiversity in the Wasur National Park, West Papua* (Irian Jaya). Pp. 232-241 in Ali, A., Rawi, C.S. Md., Mansor, M., Nakamura, M., Nakamura, R., Ramakrishna, S. and Mundkur, T. (eds), *The Asian wetlands: Bringing partnerships into good wetland practices*. Proceedings of the Asian Wetlands Symposium, 2001. Penang: Penerbit Universiti Sains Malaysia.
- Baxter, R. (2010). *Trip report Torres Strait (Boigu-Saibai-Dauan) 16th-23rd Oct 2008*. <http://www.birdingtours.com.au/ts.html>
- Biosecurity Queensland (2007). Fact Sheet PP85, *Invasive Plants and Animals, Leucaena leucocephala*. The State of Queensland (Department of Primary Industries and Fisheries), Brisbane, 2007.
- Biosecurity Queensland (2010). *Feral Deer Management Strategy 2010 – 2015*. Queensland Department of Employment, Economic Development and Innovation, Brisbane.
- Biosecurity Queensland (2011). *Fact Sheet Sisal Agave sisalana*. Weeds of Australia, Queensland Government, Biosecurity Queensland Edition, Brisbane. Online at [http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Agave\\_sisalana.htm](http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Agave_sisalana.htm). Accessed 24 September 2012.
- BirdLife International (2008). *Aquila gurneyi*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.4. [www.iucnredlist.org](http://www.iucnredlist.org). Downloaded on 23 February 2011.
- 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.
- Bleaker, P. (1983). *Soils of the Morehead-Kiunga Area, In Land Resources of the Morehead-Kiunga Area*, Papua New Guinea. Land Research Series No. 29, CSIRO 1971.
- 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.
- Bonaccorso, F. (1999). *Bats of Papua New Guinea*. Conservation International, Washington.
- 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.) (2007). *Census of the Queensland Flora 2007*. Queensland Herbarium, Environment protection Agency, Brisbane.
- Bostock, P.D. and Holland, A.E. (eds.) (2010). *Census of the Queensland Flora 2010*. Queensland Herbarium, Brisbane.
- 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 027018 – Saibai Island*. Available at [www.bom.gov.au/climate/averages](http://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](http://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](http://www.bom.gov.au/climate/averages).
- Burrows, D.W. (2010). *Wetland Assessment of Boigu Island, Torres Strait*. ACTFR Report No. 10/06. Australian Centre for Tropical Freshwater Research, James Cook University, Townsville.
- Burrows, D. & Schaffer, J. (2010). *Wetland assessment of Boigu Island, Torres Strait. Part A - Freshwater habitats and fish*. Report No. 10/06. Australian Centre for Tropical Freshwater Research, James Cook University, Townsville.
- 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* (2<sup>nd</sup> Edition) Jacana Books, Crows Nest.
- Clarke, R.H. (2004). *The avifauna of northern Torres Strait: Notes on a wet-season visit. Australian Field Ornithology* 21: 49-66.
- 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 Ehippiorhynchus 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.
- Clayton, W.D., Vorontsova, M.S., Harman, K.T. and Williamson, H. (2011). *GrassBase - The Online World Grass Flora*. <http://www.kew.org/data/grasses-db.html>. [accessed 24 May 2012].
- 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). *Saibai Island Environmental Report: Torres Strait Sustainable Land Use Plan Habitat and Fauna Assessment*. 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, Moa 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). *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.A. & Couper, P.J. (1994). *Type specimens of frog and reptile species, Queensland Museum: Recent additions and new information*. *Memoirs of the Queensland Museum*, **37**: 53-65.
- Covacevich, J., Ingram, G.J. and Czechura, G.V. (1982). *Rare frogs and reptiles of Cape York Peninsula, Australia*. *Biological Conservation*, **22**: 283-294.
- Crushes, S. (2008). *Pest plant Risk Assessment, Kudzu* (*Pueraria montana* var. *lobata*), Biosecurity Queensland, Brisbane. Online at [http://www.daff.qld.gov.au/documents/Biosecurity\\_EnvironmentalPests/IPA-Kudzu-Risk-Assessment.pdf](http://www.daff.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Kudzu-Risk-Assessment.pdf). Accessed June 2012.
- Debus, S. (1998). *The birds of prey of Australia: A field guide to Australian raptors*. Oxford University Press, Melbourne.
- Department of Agriculture, Fisheries and Forestry (2012). *Weed survey data for selected Torres Strait islands*. Unpublished.
- Department of Environment and Resource Management (2009a). *Back on Track Species prioritisation for Torres Strait Islands*. Department of Environment and Resource Management, Brisbane.
- Department of Environment and Resource Management (2009b). *National recovery plan for the water mouse (false water rat) Xeromys myoides*. Report to Department of the Environment, Water, Heritage and the Arts, Canberra. Brisbane: Department of the Environment and Resource Management.
- 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.
- Department of Environment and Resource Management (2010a). *Wildlife Online Extract. Latitude: 9.2622 Longitude: 142.2095 Distance: 6 km*. Department of Environment and Resource Management. Extracted 15 October 2010.
- Department of Environment and Resource Management (2010b). *Wildlife Online Extract. Latitude: 9.5874 Longitude: 143.7703 Distance: 9 km*. Department of Environment and Resource Management. Extracted 18 October 2010.
- Department of Environment and Resource Management (2010c). *Wildlife Online Extract. Latitude: 9.8999 Longitude: 142.7747 Distance: 12 km*. Department of Environment and Resource Management. Extracted 15 October 2010.

- Department of Environment and Resource Management (2010d). *Wildlife Online Extract*. Latitude: 9.9149 Longitude: 144.052 Distance: 25 km. Department of Environment and Resource Management. Extracted 15 October 2010.
- Department of Environment and Resource Management (2010e). *Wildlife Online Extract*. Latitude: 9.9534 Longitude: 142.1817 Distance: 10 km. Department of Environment and Resource Management. Extracted 18 October 2010.
- Department of Environment and Resource Management (2010f). *Wildlife Online Extract*. Latitude: 10.1846 Longitude: 142.266 Distance: 9 km. Department of Environment and Resource Management. Extracted 15 October 2010.
- Department of Environment and Resource Management (2010g). *Wildlife Online Extract*. Latitude: 10.1149 Longitude: 142.156 Distance: 7 km. Department of Environment and Resource Management. Extracted 15 October 2010.
- Department of Environment and Resource Management (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](http://www.derm.qld.gov.au/wildlife-ecosystems/wildlife/back_on_track_species_prioritisation_framework/index.html).
- Department of Environment and Resource Management (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](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 Environment and Resource Management (2011c). *HerbreCs Data Extract for Torres Strait Region*. Sourced March 2011. Department of Environment and Resource Management, Brisbane.
- 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](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>.

- Dorfman, E.J., Lamont, A. & Dickman, C.R. (2001). *Foraging behaviour and success of black-necked storks (Ephippiorhynchus asiaticus) in Australia: Implications for management*. Emu, **101**: 145-149.
- Duke, N.C. (2006). Australia's Mangroves. *The authoritative guide to Australia's mangrove plants*. University of Queensland and Norman C Duke, Brisbane, 200 pages.
- Duke, N.C. (2010). *Wetland Assessment of Boigu Island, Torres Strait*, Part C, Mangroves. In Burrows, D.W. (2010). *Wetland Assessment of Boigu Island, Torres Strait*. ACTFR Report No. 10/06. Australian Centre for Tropical Freshwater Research, James Cook University, Townsville.
- 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.
- Environmental Protection Agency (2007). *Nature conservation (Estuarine Crocodile) plan 2007 and management program 2007-2017*. Environmental Protection Agency, Queensland.
- 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.
- Flannery, T. F. (1995). *Mammals of New Guinea*. Reed Publishing, Chatswood.
- 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.
- 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.
- Greene, H.W. (1986). *Diet and arboreality in the emerald monitor, Varanus prasinus, with comments on the study of adaptation*. FIELDIANA Zoology NEW SERIES, No. **31**. Publication 1370.
- 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., Sollas, L.L.D. and Cole, G.A.J. (1892). *On the Geology of Torres Straits*. The Transactions of the Royal Irish Academy, Vol. 30 (1892/1896), pp. 419-476.
- Haddon, A.C. (ed.) (1901-1935). *Reports of the Cambridge Anthropological Expedition to Torres Straits*. 6 Volumes. Cambridge University Press, Cambridge.
- 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. and Rivers, W.H.R. (1904). *Totemism*. Pp. 153-193. In Haddon, A.C. (ed.) Reports of the Cambridge Anthropological Expedition to Torres straits: sociology, magic and religion of the western Islanders. Vol. 5. (Cambridge University Press: Cambridge, UK).
- 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.

- Harris, D.R., 1977. *Subsistence strategies across Torres Strait*. In: Allen, J., Golson, J., Jones, R. (Eds), *Sunda and Sahul, Prehistoric Studies in Southeast Asia, Melanesia and Australia*. Academic Press, London, pp. 421-463.
- Harris, D.R., Laba, B., 1982. *The mystery of the Papuan mound-builders*. *Geographical Magazine* 54, 386-391.
- 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.
- Helgen, K.M. (2004). *On the identity of flying-foxes, genus Pteropus* (Mammalia: Chiroptera), from islands in the Torres Strait, Australia. *Zootaxa* 780: 1-14.
- Henderson, R.J.F. (2002) (Ed.). *Names and Distribution of Queensland Plants, Algae and Lichens*. Queensland Herbarium Environmental Protection Agency, Brisbane.
- 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.
- Hitchcock, G. (1998). *First record of the false water-rat, Xeromys myoides (Rodentia: Muridae), in New Guinea*. *Science in New Guinea*, **23**: 141-144.
- 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 Mua*. In B. David, L. Manas and M. Quinnell (eds), *Gelam's Homeland: Cultural and Natural History on the Island of Mua, Torres Strait*, pp. 619-628. *Memoirs of the Queensland Museum (Cultural Heritage Series)* 4(2).
- Ingram, G.J. (2008). *The terrestrial vertebrates of Moa, western Torres Strait*. *Memoirs of the Queensland Museum, Cultural Heritage Series*, **4**: 619-628.
- Jones, D.L., Hopley, T., Duffy, S.M., Richards, K.J., Clements, M.A., Zhanget, X. (2012). *Australian Orchid Genera - an information and identification system*. Centre for Plant Biodiversity Research Australian National Herbarium CSIRO Plant Industry, Canberra. Online at <http://www.anbg.gov.au/cpbr/cd-keys/orchidkey/html/aboutkey.html>. Accessed 1 October 2012.
- Kushlan, J.A. & Hancock, J. (2005). *Heron*. Oxford University Press, Oxford.
- International Union for the Conservation of Nature (2002). *Global Invasive species database*. Online at <http://www.issg.org/database/welcome/>. Accessed 10 October 2012.
- 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.
- Lawrie, M. (1970). *Myths and Legends of the Torres Strait*. University of Queensland Press, St Lucia Brisbane.

- Loffler, E. (1977). *Geomorphology of Papua New Guinea*. Australian National University Press, Canberra.
- Maddock, M. (2000). 'Heron Conservation', 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). *Hérons, 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.
- Miller, C., Brady, M. & Grice, T. (2009). *A preliminary ecological assessment of Boigu Island wetlands and opportunities for livelihoods based on natural resource management*. CSIRO Sustainable Ecosystems, St. Lucia.
- National Heritage Trust (2003). *Alert list for Environmental Weeds. Weed Management Guide, Barleria or porcupine flower, Barleria prionitis*. Accessed 17 Jan 2011. Online at <http://www.weeds.gov.au/publications/guidelines/alert/pubs/b-prionitis.pdf>.
- 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. (1998). *Vegetation communities of the Torres Strait islands*. Queensland Herbarium, Department of Environment, Brisbane.
- Neldner, V. J., Fensham, R. J., Clarkson, J. R. and Stanton, J. P. (1997). *The natural grasslands of Cape Yorke 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.
- Olsen, P. (1998). *Australia's raptors: diurnal birds of prey and owls*. Supplement to *Wingspan*, 8: I-XVI.
- Othman, B. (1997). *Sonneratia ovata* Backer. In Faridah Hanum, I. & van der Maesen, L.J.G. (Eds.): *Plant Resources of South-East Asia No. 11. Auxiliary Plants*. Prosea Foundation, Bogor, Indonesia. pp. 242-244.
- OZCAM (2011). *BioMaps*. Online Zoological Collections of Australian Museums. <http://www.biomaps.net.au/biomaps2/>. Searched 11-18/2/2011.
- Parr, J.F. & Carter, M. (2003). *Phytolith and starch analysis of sediment samples from two archaeological sites on Dauar Island, Torres Strait, northeastern Australia*. *Vegetation history and Archeobotany*, Vol. 12, Issue 2, pp. 131-141. Springer-Verlag 2003.
- Pavey, C.R. & Burwell, C.J. (2008). 'Fawn Leaf-nosed Bat *Hipposideros cervinus*', in *The mammals of Australia*, Third Edition. eds. S. Van Dyck & R. Strahan, Reed New Holland, Sydney.

- 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.
- Rowe, C. (2006). *Landscapes in Western Torres Strait History* [online]. In: David, Bruno (Editor); Barker, Bryce (Editor); McNiven, Ian J (Editor). *Social Archaeology of Australian Indigenous Societies*. The. Canberra: Aboriginal Studies Press, 2006: 270-286. Availability: <http://search.informit.com.au/documentSummary;dn=030272299317606;res=IELIND> ISBN: 0855754990. [cited 17 Oct 12].
- 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, J. P., and 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.
- Shine, R. (2010). *The ecological impact of invasive cane toads (Bufo marinus) in Australia*. *Quarterly Review of Biology*, **85**: 253-291.
- Smith, N.M. ( 2003). *Weeds of the Wet/Dry tropics of Australia*. Environment Centre of the Northern Territory, Darwin.
- Snow, N. (2000). *A new Leptochloa (Poaceae: Chloridoideae) from Papua New Guinea and the Torres Strait islands of Australia*. *Novon* 10: 238–241.
- Space, J. C. & Flynn, T. (2002). *Report to the Government of Samoa 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.

- Taylor, I.R. & Bester, A. (1999). *The response of foraging waders to human recreation disturbance at Rhyll, Phillip Island, Victoria*. *Stilt*, **35**: 67.
- Terborgh, J. & Faaborg, J. (1973). Turnover and ecological release in the avifauna of Mona Island, Puerto Rico. *Auk*, **90**: 759-779.
- 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.
- van Steenis, C.G.G.J. (1977). *Bignoniaceae. Flora of Malesiana*. Ser. 1 vol. 8 (2): 114-186.
- Walton, C. S. (2003). *Leucaena* (*Leucaena leucocephala*) in Queensland PEST STATUS REVIEW SERIES – LAND PROTECTION. Department of Natural Resources and Mines, Qld.
- Watson, J.J. (2009). *Terrestrial vertebrate fauna of the Pulu Indigenous Protected Area, Torres Strait*. Report to Arafura Consulting.
- Watson, J.J. & Hitchcock, G. (in press) *The terrestrial vertebrate fauna of Mabuiag*. 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 Moa 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.
- Woinarski, J. (2007). 'False water-rat *Xeromys myoides*,' in *Lost from our landscape: threatened species of the Northern Territory*, eds. J. Woinarski, C. Pavey, R. Kerrigan, I. Cowie & S. Ward, Northern Territory Department of Natural Resources, Environment and The Arts, Palmerston.

## 10.0 Glossary

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

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

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

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

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

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

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

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

**Metastable:** Stable or in apparent equilibrium under specific conditions although state of equilibrium changes when conditions change.

**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.

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

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

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

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

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

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

**Vine Forest:** A vegetation community commonly referred to as rainforest, that is formed by predominantly soft leaf (rainforest) trees and shrubs. Dense cover of lianes (vines) and epiphytes are

common at all structural levels. Vine forest is differentiated from vine thicket by height, with predominant vine forest canopy being > 9m.

## **11.0      *Appendices***

## Appendix A. Queensland Govt. Vegetation Structural Classification

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

| Projective Foliage Cover  | 70-100%                                            | 30-70%                  | 10-30%                       | <10%                            |
|---------------------------|----------------------------------------------------|-------------------------|------------------------------|---------------------------------|
| Approximate Crown Cover % | 80 - 100%                                          | 50 - 80%                | 20 - 50%                     | < 20%                           |
| Crown separation          | closed or dense                                    | mid-dense               | sparse                       | very sparse                     |
| Growth Form <sup>8</sup>  | 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)        | -                               |

<sup>8</sup> Growth form of the predominant layer (the ecologically dominant layer).

## **Appendix B. Preliminary Flora Species List – Saibai Island, Torres Strait, Queensland.**

### **D.G. Fell**

- Nomenclature follows Bostock & Holland (2010) 'Census of the Queensland Flora'.
- Habitats refer to broad vegetation groups of Stanton *et al.* (2009).
- \*Denotes naturalised or doubtfully naturalised taxa according to Bostock & Holland (2010).
- ^ denotes local - cultural significance.
- # denotes regional significance.
- Unnamed species followed by a collection number (i.e. DGF10153) are pending formal identification at Qld Herbarium.
- Common names of rainforest taxa follow Hyland *et al.* (2010).
- Weed lists compiled by Department of Agriculture Fisheries and Forestry Northern Australia Quarantine Strategy plant health surveillance activities have been incorporated (DAFF 2012).
- Includes selected native non-indigenous plants and naturalised plants found in village areas.

### **SUMMARY**

- 344 taxa (10 ferns, 334 angiosperms);
- 280 native (81%);
- 64 naturalised (19%) 2 declared;
- 90 families (9 wholly naturalised);
- 250 genera (44 wholly naturalised);
- 5 threatened species (1 endangered, 4 Near-Threatened).

### **LIFE FORM**

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

| Family                                         | Botanical Name                                 | Life form | Status | Common name    | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|------------------------------------------------|------------------------------------------------|-----------|--------|----------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
| <b>Pteridophytes (Ferns &amp; Fern Allies)</b> |                                                |           |        |                |                       |           |           |          |           |                     |                 |            |                        |                   |                                    |           |
| Adiantaceae                                    | <i>Cheilanthes tenuifolia</i>                  | F         |        |                | X                     |           |           |          |           |                     | X               | X          |                        |                   | X                                  |           |
| Blechnaceae                                    | <i>Blechnum pyramidatum</i>                    | F         |        |                | X                     |           |           |          |           |                     |                 | X          |                        |                   |                                    |           |
| Parkeraceae                                    | <i>Ceratopteris thalictroides</i>              | F         |        |                |                       |           |           |          |           |                     | X               | X          |                        |                   |                                    |           |
| Polypodiaceae                                  | <i>Drynaria sparsisora</i>                     | F         |        |                | X                     |           |           |          |           |                     | X               | X          |                        |                   | X                                  |           |
|                                                | <i>Microsorium grossum</i>                     | F         |        |                | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|                                                | <i>Microsorium membranifolium</i>              | F         |        |                | X                     |           |           |          |           |                     |                 | X          |                        |                   |                                    |           |
|                                                | <i>Pyrrosia lanceolata</i>                     | F         |        |                | X                     |           |           |          |           |                     |                 | X          |                        |                   |                                    |           |
| Pteridiaceae                                   | <i>Acrostichum aureum</i>                      | F         |        | mangrove fern  |                       |           |           | X        | X         |                     |                 |            |                        | X                 | X                                  |           |
|                                                | <i>Acrostichum speciosum</i>                   | F         |        | mangrove fern  |                       |           | X         | X        | X         | X                   | X               |            |                        |                   | X                                  | X         |
| Ophioglossaceae                                | <i>Ophioglossum</i> sp.                        | F         |        |                |                       |           |           | X        |           |                     |                 | X          | X                      |                   |                                    |           |
| <b>Angiosperms (Flowering Plants)</b>          |                                                |           |        |                |                       |           |           |          |           |                     |                 |            |                        |                   |                                    |           |
| Acanthaceae                                    | <i>Acanthus ilicifolius</i>                    | S         |        | holly mangrove |                       |           |           | X        |           |                     | X               | X          |                        | X                 | X                                  | X         |
|                                                | <i>Achyranthes aspera</i>                      | H         |        | chaff flower   | X                     |           | X         |          |           | X                   |                 |            |                        | X                 | X                                  |           |
|                                                | <i>Asystasia australasica</i>                  | H         |        |                | X                     |           |           |          |           |                     |                 | X          |                        |                   | X                                  |           |
|                                                | <i>Ruellia simplex</i>                         | H         | *      |                |                       |           |           |          |           |                     |                 | X          |                        |                   |                                    |           |
|                                                | <i>Ruellia tuberosa</i>                        | H         | *      |                |                       |           |           |          |           | X                   |                 | X          |                        |                   | X                                  |           |
|                                                | <i>Ruellia tweediana</i>                       | H         | *      | spearpod       |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
| Agavaceae                                      | <i>Agave sisalana</i>                          | S         | *^     | manilla rope   |                       |           |           |          |           | X                   |                 |            |                        | X                 | X                                  |           |
| Aizoaceae                                      | <i>Sesuvium portulacastrum</i>                 | H         | ^      | sea purslane   |                       | X         |           |          |           |                     | X               | X          |                        |                   |                                    |           |
| Amaranthaceae                                  | <i>Alternanthera bettzickiana</i>              | H         | *      |                |                       |           |           |          |           | X                   |                 |            |                        | X                 |                                    |           |
|                                                | <i>Alternanthera dentata</i> var. 'rubiginosa' | H         | *      |                |                       |           |           |          |           | X                   |                 |            |                        | X                 |                                    |           |
|                                                | <i>Alternanthera pungens</i>                   | H         | *      | khaki burr     |                       |           |           |          |           | X                   | X               |            |                        |                   |                                    |           |
|                                                | <i>Alternanthera</i> sp.                       | H         |        |                |                       |           |           |          |           | X                   |                 |            |                        |                   |                                    |           |
| Anacardiaceae                                  | <i>Anacardium occidentale</i>                  | S         | *^     | cashew         |                       |           |           |          |           | X                   |                 |            |                        |                   |                                    |           |
|                                                | <i>Mangifera indica</i>                        | T         | *^     | mango          |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |

| Family      | Botanical Name                                      | Life form | Status   | Common name     | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|-------------|-----------------------------------------------------|-----------|----------|-----------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
|             | <i>Pleiogynum timorense</i>                         | T         | Cult.    | Burdekin plum   |                       |           |           |          |           | X                   |                 |            |                        | X                 | X                                  |           |
| Annonaceae  | <i>Annona muricata</i>                              | S         | *        | custard apple   |                       |           |           |          |           | X                   |                 |            |                        | X                 |                                    |           |
| Apiaceae    | <i>Centella asiatica</i>                            | H         | *        | gota kolu       |                       |           |           |          |           | X                   | X               |            |                        |                   |                                    |           |
| Apocynaceae | <i>Alyxia spicata</i>                               | S         |          | chain fruit     | X                     |           | X         |          |           |                     |                 |            |                        |                   | X                                  |           |
|             | <i>Calotropis gigantea</i>                          | S         | *        | calotrope       |                       |           |           |          |           | X                   |                 |            |                        | X                 | X                                  |           |
|             | <i>Carissa laxiflora</i>                            | S         | ^        |                 | X                     |           |           |          |           |                     | X               | X          |                        |                   | X                                  |           |
|             | <i>Catharanthus roseus</i>                          | H         | **       | pink periwinkle |                       |           |           |          |           | X                   |                 |            |                        | X                 | X                                  |           |
|             | <i>Cynanchum carnosum</i>                           | V         |          |                 |                       |           | X         | X        |           |                     | X               | X          |                        |                   | X                                  |           |
|             | <i>Dischidia major</i>                              | E         |          |                 |                       |           |           |          |           |                     | X               |            |                        |                   |                                    |           |
|             | <i>Dischidia nummularia</i>                         | E         |          | button plant    |                       |           | X         |          |           |                     | X               |            |                        |                   | Xv                                 |           |
|             | <i>Dischidia ovata</i>                              | E         |          |                 | X                     |           | X         |          |           |                     | X               | X          |                        |                   | X                                  | X         |
|             | <i>Gymnanthera oblonga</i>                          | V         |          |                 | X                     |           | X         |          |           |                     |                 | X          |                        |                   | X                                  | X         |
|             | <i>Tylophora benthamii</i>                          | V         |          |                 | X                     |           | X         |          |           |                     | X               |            |                        |                   |                                    |           |
|             | <i>Tylophora flexuosa</i>                           | V         |          |                 | X                     |           |           |          |           |                     |                 | X          |                        |                   |                                    |           |
|             | <i>Kopsia arborea</i>                               | S         | #        |                 | X                     |           |           |          |           |                     |                 | X          |                        |                   |                                    |           |
| Arecaceae   | <i>Cocos nucifera</i>                               | P         | **Cult.  | coconut         | X                     |           |           |          |           | X                   |                 |            |                        |                   | X                                  | X         |
|             | <i>Hydriastele wendlandiana</i>                     | P         |          | cut leaf palm   | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|             | <i>Livistona benthamii</i>                          | P         |          |                 | X                     |           |           |          |           |                     |                 | X          |                        |                   | Xv                                 | X         |
|             | <i>Livistona muelleri</i>                           | P         | ^        | fan palm        |                       |           |           |          |           |                     | X               | X          |                        |                   | X                                  | X         |
|             | <i>Ptychosperma elegans</i>                         | P         |          | elegant palm    | X                     |           |           |          |           |                     | X               |            |                        |                   | Xv                                 |           |
| Asteraceae  | <i>Ageratum conyzoides</i> subsp. <i>conyzoides</i> | H         | *        | blue top        |                       |           |           |          |           | X                   | X               | X          |                        | X                 | X                                  |           |
|             | <i>Blumea saxatilis</i>                             | H         |          |                 |                       | X         |           |          |           | X                   | X               |            |                        |                   | X                                  |           |
|             | <i>Cyanthillium cinereum</i>                        | H         |          |                 |                       |           | X         |          |           | X                   | X               |            |                        | X                 | X                                  |           |
|             | <i>Eclipta prostrata</i>                            | H         |          |                 |                       | X         |           |          |           | X                   | X               | X          |                        | X                 | X                                  |           |
|             | <i>Epaltes australis</i>                            | H         |          |                 |                       | X         |           |          |           | X                   | X               |            |                        |                   |                                    |           |
|             | <i>Melanthera biflora</i>                           | H         |          |                 |                       |           |           |          |           | X                   | X               | X          |                        | X                 | X                                  |           |
|             | <i>Pluchea indica</i>                               | S         |          |                 |                       |           |           |          |           | X                   | X               |            |                        |                   | X                                  | X         |
|             | <i>Sphaeranthus africanus</i>                       | H         |          |                 |                       | X         |           |          |           |                     | X               | X          |                        |                   |                                    |           |
|             | <i>Sphagneticola trilobata</i>                      | H         | *Class 2 | Singapore daisy |                       |           |           |          |           | X                   |                 |            |                        | X                 | X                                  | X         |

| Family          | Botanical Name                                     | Life form | Status   | Common name                 | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|-----------------|----------------------------------------------------|-----------|----------|-----------------------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
|                 | <i>Synedrella nodiflora</i>                        | H         | *        | cinderella weed             |                       |           |           |          |           | X                   | X               |            |                        |                   | X                                  |           |
|                 | <i>Tridax procumbens</i>                           | H         | *^       | tridax daisy                |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|                 | <i>Zinnia</i> sp.                                  | H         | *        |                             |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
| Amaryllidaceae  | <i>Crinum</i> sp.                                  | Ge        |          |                             |                       | X         |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
| Avicenniaceae   | <i>Avicennia marina</i> var. <i>eucalyptifolia</i> | T         | ^        | grey mangrove               |                       |           |           | X        |           | X                   | X               |            |                        | X                 | X                                  | X         |
| Bataceae        | <i>Batis argillicola</i>                           | H         |          |                             |                       |           |           | X        | X         |                     | X               |            |                        |                   |                                    |           |
| Bignoniaceae    | <i>Tecoma stans</i> var. <i>stans</i>              | S         | *Class 3 | yellow bells                |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
| Bombacaceae     | <i>Bombax ceiba</i> var. <i>leiocarpa</i>          | T         | ^        | canoe tree                  | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|                 | <i>Camptostemon schultzei</i>                      | T         |          |                             |                       |           |           | X        |           |                     | X               | X          |                        |                   | X                                  |           |
| Boraginaceae    | <i>Cordia myxa</i>                                 | T         | *        |                             |                       |           |           |          |           | X                   |                 |            |                        |                   | Xv                                 | X         |
|                 | <i>Cordia subcordata</i>                           | T         | ^        | golden trumpet tree         | X                     |           |           |          |           | X                   | X               | X          |                        |                   | X                                  | X         |
| Caesalpiniaceae | <i>Caesalpinia bonduc</i>                          | S         | ^        | nicker nut                  | X                     |           |           |          |           |                     | X               | X          |                        |                   | X                                  |           |
|                 | <i>Caesalpinia pulcherrima</i>                     | V         | *        | red bird of paradise flower |                       |           |           |          |           | X                   |                 |            |                        |                   |                                    |           |
|                 | <i>Delonix regia</i>                               | T         | *^       | poinciana                   |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|                 | <i>Intsia bijuga</i>                               | T         | #        | kwila                       | X                     |           |           |          |           |                     | X               | X          |                        |                   | X                                  |           |
|                 | <i>Lysiphyllum binatum</i>                         | S         | #        |                             | X                     |           |           |          |           |                     | X               | X          |                        |                   | Xv                                 |           |
| Capparaceae     | <i>Capparis lucida</i>                             | S         |          |                             | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|                 | <i>Capparis quiniflora</i>                         | S         |          |                             | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|                 | <i>Capparis sepiaria</i>                           | S         |          |                             | X                     |           | X         |          |           |                     |                 |            |                        |                   | Xv                                 |           |
| Casuarinaceae   | <i>Casuarina equisetifolia</i> var. <i>incana</i>  | T         | ^        | horsetail oak               |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
| Caricaceae      | <i>Carica papaya</i>                               | S         | *^Cult.  | paw paw                     |                       |           |           |          |           | X                   |                 |            |                        | X                 | X                                  |           |
| Celastraceae    | <i>Elaeodendron melanocarpum</i>                   | S         |          | black olive plum            | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|                 | <i>Gymnosporia inermis</i>                         | V         |          |                             | X                     |           | X         | X        |           | X                   | X               | X          |                        |                   | Xv                                 | X         |
|                 | <i>Salacia chinensis</i>                           | S         | ^        |                             | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Chenopodiaceae  | <i>Salicornia</i> sp.                              | H         |          |                             |                       |           |           | X        | X         |                     |                 |            |                        |                   | X                                  |           |
|                 | <i>Tecticornia australasica</i>                    | H         |          |                             |                       |           |           | X        | X         |                     | X               |            |                        |                   | X                                  |           |
| Clusiaceae      | <i>Calophyllum inophyllum</i>                      | T         |          | beach touriga               |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
| Cochilaceae     | <i>Gloriosa suberosa</i>                           | H         | *        | glory lily                  |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  | X         |
| Combretaceae    | <i>Lumnitzera littorea</i>                         | T         |          |                             |                       |           |           | X        |           |                     |                 | X          |                        |                   |                                    |           |

| Family         | Botanical Name                                       | Life form | Status | Common name            | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|----------------|------------------------------------------------------|-----------|--------|------------------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
|                | <i>Lumnitzera racemosa</i>                           | T         |        |                        |                       |           |           | X        |           |                     |                 | X          |                        |                   | X                                  |           |
|                | <i>Terminalia arenicola</i>                          | T         | ^      | brown damson           | X                     |           |           |          |           |                     |                 |            |                        |                   |                                    |           |
|                | <i>Terminalia catappa</i>                            | T         | ^      | beach almond           |                       |           |           |          |           | X                   |                 | X          |                        |                   | X                                  | X         |
|                | <i>Terminalia muelleri</i>                           | T         | ^      | Australian almond      | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|                | <i>Terminalia sericocarpa</i>                        | T         | #      | damson plum            | X                     |           |           |          |           |                     | X               | X          |                        |                   | X                                  |           |
|                | <i>Terminalia subacroptera</i>                       | T         | ^      |                        | X                     |           | X         |          |           |                     | X               | X          |                        |                   | X                                  |           |
| Commeliniaceae | <i>Commelina ensifolia</i>                           | H         |        | scurvy weed            |                       |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Convolvulaceae | <i>Ipomoea macrantha</i>                             | V         |        |                        | X                     |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|                | <i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> | V         | ^      | goats foot convolvulus |                       |           |           |          |           | X                   |                 | X          |                        |                   | X                                  | X         |
|                | <i>Merremia hirta</i>                                | V         |        |                        | X                     |           | X         |          |           |                     | X               | X          |                        |                   |                                    |           |
|                | <i>Operculina turpethum</i>                          | V         |        |                        |                       |           | X         |          |           |                     | X               |            |                        |                   |                                    |           |
|                | <i>Polymeria subhirsuta</i>                          | H         |        |                        |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|                | <i>Xenostegia tridentata</i>                         | H         |        |                        |                       | X         |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Cucurbitaceae  | <i>Citrullus lanatus</i>                             | V         | *      |                        |                       |           |           |          |           | X                   |                 |            |                        | X                 | X                                  |           |
|                | <i>Cucumis melo</i>                                  | V         |        |                        | X                     |           |           |          |           |                     | X               |            |                        |                   |                                    |           |
| Cyperaceae     | <i>Abildgaardia ovata</i>                            | Gr        |        |                        |                       | X         | X         |          |           |                     |                 |            |                        |                   | X                                  |           |
|                | <i>Cyperus angustatus</i>                            | Gr        |        |                        |                       | X         |           |          |           |                     |                 |            |                        |                   |                                    |           |
|                | <i>Cyperus javanicus</i>                             | Gr        |        |                        |                       | X         |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|                | <i>Cyperus polystachyos</i> var. <i>polystachyos</i> | Gr        |        |                        |                       | X         |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|                | <i>Cyperus scariosus</i>                             | Gr        |        |                        |                       |           |           |          |           |                     | X               |            |                        |                   |                                    |           |
|                | <i>Cyperus</i> sp.                                   | Gr        |        |                        |                       |           |           |          |           |                     |                 |            |                        |                   |                                    |           |
|                | <i>Cyperus stoloniferus</i>                          | Gr        |        |                        |                       |           |           |          |           |                     | X               |            |                        |                   |                                    |           |
|                | <i>Eleocharis dulcis</i>                             | Gr        | ^      |                        |                       |           |           |          | X         | X                   | X               |            |                        |                   | X                                  | X         |
|                | <i>Eleocharis litoralis</i>                          | Gr        | ^      | water chestnut         |                       |           |           |          | X         |                     |                 | X          |                        |                   |                                    |           |
|                | <i>Eleocharis spiralis</i>                           | Gr        | ^      | water chestnut         |                       |           |           |          | X         |                     | X               |            |                        |                   | X                                  |           |
|                | <i>Fimbristylis dichotoma</i>                        | Gr        |        |                        |                       | X         | X         |          | X         | X                   | X               | X          |                        |                   | X                                  |           |
|                | <i>Fimbristylis ferruginea</i>                       | Gr        |        |                        |                       |           |           |          | X         | X                   | X               | X          |                        |                   | X                                  | X         |
|                | <i>Fimbristylis polytrichoides</i>                   | Gr        |        |                        |                       | X         |           |          | X         |                     | X               | X          |                        |                   |                                    |           |

| Family         | Botanical Name                                     | Life form | Status  | Common name          | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|----------------|----------------------------------------------------|-----------|---------|----------------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
|                | <i>Fimbristylis rara</i>                           | Gr        |         |                      |                       |           |           |          | X         |                     | X               |            |                        |                   |                                    |           |
|                | <i>Fuirena ciliaris</i>                            | Gr        |         |                      |                       | X         |           |          | X         | X                   |                 | X          |                        |                   | X                                  |           |
|                | <i>Schoenoplectus litoralis</i>                    | Gr        |         |                      |                       |           |           |          | X         | X                   | X               |            |                        |                   | X                                  |           |
|                | <i>Schoenoplectus validus</i>                      | Gr        |         |                      |                       |           |           |          | X         |                     | X               |            |                        |                   | X                                  |           |
|                | <i>Schoenus falcatus</i>                           | Gr        |         |                      |                       |           |           |          | X         |                     | X               |            |                        |                   |                                    |           |
|                | <i>Scirpus littoralis</i>                          | Gr        |         |                      |                       | X         |           |          | X         |                     |                 | X          |                        |                   | X                                  |           |
|                | <i>Scleria novae-hollandiae</i>                    | Gr        |         |                      |                       | X         | X         |          | X         |                     |                 | X          |                        |                   |                                    |           |
| Dilleniaceae   | <i>Dillenia alata</i>                              | T         | ^       | red beech            |                       | X         |           |          |           |                     | X               | X          |                        |                   | X                                  | X         |
| Dioscoreaceae  | <i>Dioscorea alata</i>                             | V         | *^      | yam                  |                       |           |           |          |           | X                   |                 |            |                        | X                 | X                                  |           |
|                | <i>Dioscorea esculenta</i>                         | V         | *^      | yam                  | X                     | X         |           |          |           | X                   |                 |            |                        |                   | X                                  | X         |
| Ebenaceae      | <i>Diospyros calycantha</i>                        | T         |         |                      | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|                | <i>Diospyros compacta</i>                          | T         |         |                      | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|                | <i>Diospyros cupulosa</i>                          | T         |         |                      | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|                | <i>Diospyros geminata</i>                          | T         |         |                      | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|                | <i>Diospyros hebecarpa</i>                         | T         |         |                      | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|                | <i>Diospyros littorea</i>                          | S         |         |                      | X                     |           |           | X        |           |                     |                 |            |                        |                   | X                                  |           |
|                | <i>Diospyros maritima</i>                          | T         | ^       |                      | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Elaeocarpaceae | <i>Elaeocarpus arnhemicus</i>                      | T         |         | arnhem land quandong | X                     |           | X         |          |           |                     | X               |            |                        |                   | Xv                                 | X         |
| Euphorbiaceae  | <i>Acalypha wilkesiana</i>                         | S         | *^Cult. |                      |                       |           |           |          |           | X                   |                 |            |                        | X                 |                                    |           |
|                | <i>Euphorbia bifida</i>                            | H         |         |                      |                       | X         |           |          |           |                     | X               |            |                        |                   | Xv                                 |           |
|                | <i>Euphorbia heterophylla</i>                      | H         | *       |                      |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|                | <i>Euphorbia hirta</i>                             | H         | *       |                      |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|                | <i>Euphorbia macgillivrayi</i>                     | H         |         |                      |                       | X         |           |          |           |                     |                 |            |                        |                   |                                    |           |
|                | <i>Euphorbia prostrata</i>                         | H         | *       |                      |                       | X         |           |          |           | X                   | X               | X          |                        |                   |                                    |           |
|                | <i>Euphorbia vachellii</i>                         | H         |         |                      |                       | X         |           |          |           |                     |                 | X          |                        |                   | X                                  |           |
|                | <i>Excoecaria agallocha</i>                        | S/T       | ^       | milky mangrove       |                       |           |           | X        |           | X                   | X               | X          |                        |                   | X                                  |           |
|                | <i>Manihot esculenta</i>                           | S         | *^Cult. | cassava              |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  | X         |
| Fabaceae       | <i>Abrus precatorius</i> subsp. <i>precatorius</i> | V         | ^       | gidee gidee          | X                     |           |           |          |           |                     |                 | X          |                        | X                 | X                                  | X         |
|                | <i>Aeschynomene indica</i>                         | H         |         |                      |                       |           |           |          |           | X                   |                 |            |                        |                   | Xv                                 | X         |
|                | <i>Alysicarpus vaginalis</i>                       | H         | *       |                      |                       |           |           |          |           | X                   |                 |            |                        | X                 |                                    |           |

| Family          | Botanical Name                                          | Life form | Status | Common name        | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|-----------------|---------------------------------------------------------|-----------|--------|--------------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
|                 | <i>Canavalia cathartica</i>                             | V         |        |                    |                       | X         |           |          |           |                     |                 | X          |                        |                   | X                                  |           |
|                 | <i>Canavalia rosea</i>                                  | V         |        |                    |                       | X         |           |          |           | X                   | X               |            |                        |                   | X                                  | X         |
|                 | <i>Crotalaria calycina</i>                              | H         |        |                    |                       | X         |           |          |           | X                   |                 | X          |                        |                   | X                                  | X         |
|                 | <i>Crotalaria sessiliflora</i> var. <i>anthylloides</i> | H         |        |                    |                       | X         |           |          |           | X                   |                 |            |                        |                   |                                    |           |
|                 | <i>Crotalaria medicarginea</i>                          | H         |        |                    |                       | X         |           |          |           | X                   |                 |            |                        | X                 | X                                  |           |
|                 | <i>Crotalaria pallida</i> var. <i>obovata</i>           | H         | *      | streaked rattlepod |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  | X         |
|                 | <i>Cullen badocanum</i>                                 | S         |        |                    |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|                 | <i>Dalbergia densa</i> var. <i>australis</i>            | S         |        |                    | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|                 | <i>Dendrolobium arbruscula</i>                          | S         |        |                    | X                     |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|                 | <i>Dendrolobium umbellatum</i> var. <i>umbellatum</i>   | S         |        |                    | X                     |           |           |          |           |                     | X               | X          |                        |                   | Xv                                 | X         |
|                 | <i>Derris trifoliata</i>                                | V         |        |                    | X                     |           | X         | X        |           | X                   |                 | X          |                        |                   | X                                  | X         |
|                 | <i>Desmodium</i> sp.                                    | H         |        |                    |                       |           |           |          |           |                     |                 | X          |                        |                   |                                    |           |
|                 | <i>Desmodium tortuosum</i> *                            | H         | *      | beggar weed        |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|                 | <i>Erythrina insularis</i>                              | T         | ^      | coral tree         | X                     |           |           |          |           |                     |                 |            |                        |                   | Xv                                 | X         |
|                 | <i>Erythrina variegata</i>                              | T         | ^      | coral tree         | X                     |           |           |          |           |                     | X               | X          |                        |                   | Xv                                 |           |
|                 | <i>Galactica tenuiflora</i>                             | H         |        |                    |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|                 | <i>Indigofera tinctoria</i>                             | S         | *      |                    |                       |           |           |          |           | X                   | X               |            |                        |                   | X                                  |           |
|                 | <i>Macroptileum atropurpureum</i>                       | V         | *      | siratro            |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  | X         |
|                 | <i>Milletia pinnata</i>                                 | T         | ^      | Indian beech       | X                     |           |           |          |           | X                   |                 | X          |                        |                   | X                                  | X         |
|                 | <i>Mucuna gigantea</i>                                  | V         |        |                    | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|                 | <i>Ormocarpum orientale</i>                             | S         | ^      |                    | X                     |           |           |          |           | X                   | X               |            |                        |                   | X                                  |           |
|                 | <i>Pueraria phaseoloides</i> var. <i>phaseoloides</i>   | V         | *^     | tropical kudzu     |                       | X         |           |          |           | X                   | X               |            |                        |                   |                                    |           |
|                 | <i>Sesbania cannabina</i> var. <i>cannabina</i>         | S         |        |                    |                       | X         |           |          |           | X                   | X               | X          |                        |                   | Xv                                 | X         |
|                 | <i>Uraria picta</i>                                     | H         |        |                    |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|                 | <i>Vandasina retusa</i>                                 | V         |        |                    |                       | X         |           |          |           |                     | X               | X          |                        |                   | X                                  | X         |
|                 | <i>Vigna marina</i>                                     | V         |        |                    |                       | X         |           |          |           |                     |                 | X          |                        |                   | X                                  |           |
| Flagellariaceae | <i>Flagellaria indica</i>                               | V         | ^      | whip vine          | X                     |           | X         |          |           |                     | X               | X          |                        |                   | Xv                                 | X         |

| Family            | Botanical Name                                             | Life form | Status | Common name                   | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|-------------------|------------------------------------------------------------|-----------|--------|-------------------------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
| Goodeniaceae      | <i>Goodenia pilosa</i>                                     | H         |        |                               |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
| Haemorrallidaceae | <i>Dianella</i> sp. (DGF June 12)                          | Gr        |        | flax lily                     |                       | X         | X         |          |           |                     |                 |            |                        |                   | Xv                                 | X         |
| Helicteraceae     | <i>Helicteres semiglabrata</i>                             | S         | #      |                               |                       | X         |           |          |           |                     | X               |            |                        |                   | Xv                                 |           |
| Lamiaceae         | <i>Clerodendrum inerme</i>                                 | S         |        |                               |                       |           |           | X        |           |                     | X               | X          |                        |                   | X                                  | X         |
|                   | <i>Gmelina dalrympleana</i>                                | T         | ^      |                               | X                     | X         |           |          |           |                     | X               | X          |                        |                   | X                                  | X         |
|                   | <i>Ocimum basilicum</i>                                    | H         | *      | basil                         |                       |           |           |          |           | X                   | X               |            |                        |                   |                                    |           |
|                   | <i>Ocimum tenuiflorum</i>                                  | H         |        | wild basil                    |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|                   | <i>Premna serratifolia</i>                                 | S         | ^      |                               | X                     | X         |           |          |           |                     | X               | X          |                        |                   | X                                  | X         |
|                   | <i>Vitex trifolia</i> var. <i>trifolia</i>                 | S         |        |                               | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
| Lauraceae         | <i>Cassytha filiformis</i>                                 | V         | ^      | dodder laurel                 | X                     | X         | X         |          |           |                     | X               | X          |                        |                   | X                                  |           |
|                   | <i>Litsea glutinosa</i>                                    | S         |        |                               | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Leeaceae          | <i>Leea indica</i>                                         | S         |        | bandicoot berry               | X                     | X         |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Loranthaceae      | <i>Amyema mackayensis</i>                                  | E         |        |                               |                       |           |           |          |           |                     | X               | X          |                        |                   |                                    |           |
| Lythraceae        | <i>Pemphis acidula</i>                                     | S         | ^      | digging stick tree            |                       |           |           | X        |           | X                   |                 |            |                        |                   | X                                  |           |
|                   | <i>Sonneratia alba</i>                                     | T         |        | white flowered apple mangrove |                       |           |           | X        |           | X                   | X               | X          |                        |                   | X                                  |           |
| Malvaceae         | <i>Abelmoschus manihot</i>                                 | S         | *^     | aibika                        |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  | X         |
|                   | <i>Abutilon albescens</i>                                  | S         |        |                               | X                     |           |           |          |           |                     |                 |            |                        |                   |                                    |           |
|                   | <i>Abutilon indicum</i>                                    | S         |        |                               | X                     |           |           |          |           |                     |                 |            |                        | X                 |                                    |           |
|                   | <i>Hibiscus tiliaceus</i>                                  | T         | ^      | beach cotton wood             | X                     |           |           | X        |           | X                   | X               | X          |                        |                   | X                                  | X         |
|                   | <i>Sida</i> sp.                                            | H         | *      |                               |                       |           |           |          |           | X                   |                 |            |                        |                   |                                    |           |
|                   | <i>Thespesia populnea</i>                                  | T         |        |                               | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  | X         |
|                   | <i>Thespesia populneoides</i>                              | T         | ^      |                               | X                     |           |           |          |           |                     | X               | X          |                        |                   | Xv                                 |           |
| Melastomataceae   | <i>Melastoma malabathricum</i> subsp. <i>malabathricum</i> | S         | ^      | native lasiandra              |                       | X         |           |          |           |                     | X               | X          |                        |                   | X                                  | X         |
|                   | <i>Memecylon pauciflorum</i> var. <i>pauciflorum</i>       | S         |        |                               | X                     |           | X         |          |           |                     | X               |            |                        |                   | X                                  |           |
|                   | <i>Osbeckia chinensis</i> var. <i>chinensis</i>            | S         |        |                               |                       | X         |           |          |           |                     | X               | X          |                        |                   | X                                  |           |
| Meliaceae         | <i>Aglaiella eleagnoidea</i>                               | T         |        | coastal boodyara              | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|                   | <i>Vavaea amicornum</i>                                    | T         |        |                               | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|                   | <i>Xylocarpus granatum</i>                                 | T         | ^      | cedar mangrove                |                       |           |           | X        |           |                     | X               |            |                        |                   | X                                  |           |

| Family        | Botanical Name                                          | Life form | Status  | Common name          | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|---------------|---------------------------------------------------------|-----------|---------|----------------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
|               | <i>Xylocarpus moluccensis</i>                           | T         | ^       |                      |                       |           |           | X        |           |                     | X               | X          |                        |                   | X                                  |           |
| Menyanthaceae | <i>Nymphaea nouchali</i>                                | H(a)      |         |                      |                       | X         |           |          | X         |                     |                 | X          |                        |                   | Xv                                 |           |
|               | <i>Nymphoides</i> sp.                                   | H(a)      |         |                      |                       |           |           |          | X         |                     |                 |            |                        |                   | Xv                                 |           |
| Mimosaceae    | <i>Acacia auriculiformis</i>                            | T         | ^       |                      | X                     |           |           |          |           | X                   | X               |            |                        |                   | X                                  |           |
|               | <i>Acacia leptocarpa</i>                                | S         |         |                      |                       | X         | X         |          |           | X                   | X               |            |                        |                   | X                                  | X         |
|               | <i>Acacia polystachya</i>                               | T         | ^       |                      | X                     |           |           |          |           | X                   | X               |            |                        |                   | X                                  | X         |
|               | <i>Cathormion umbellatum</i> subsp. <i>moniliforme</i>  | S/T       |         |                      | X                     |           |           |          |           | X                   | X               |            |                        |                   | Xv                                 | X         |
|               | <i>Leucaena leucocephala</i> subsp. <i>leucocephala</i> | S         | *       | leucaena             |                       |           |           |          |           | X                   | X               |            |                        |                   | X                                  | X         |
|               | <i>Mimosa pudica</i> *                                  | H         | *       | sensitive weed       |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
| Moraceae      | <i>Ficus cumingii</i> var. <i>androbrota</i>            | S         |         |                      | X                     |           |           |          |           |                     |                 | X          |                        |                   | X                                  | X         |
|               | <i>Ficus drupacea</i> var. <i>drupacea</i>              | T         | ^Cult.  |                      |                       |           |           |          |           | X                   | X               |            |                        |                   | X                                  |           |
|               | <i>Ficus opposita</i>                                   | S         | ^       | sandpaper fig        | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|               | <i>Ficus virens</i> var. <i>sublanceolata</i>           | T         | ^Cult.  |                      |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|               | <i>Trophis scandens</i> subsp. <i>scandens</i>          | V         |         | burny vine           | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Musaceae      | <i>Musa</i> sp.                                         | S         | *^Cult. | banana               |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  | X         |
| Myrsinaceae   | <i>Aegiceras corniculatum</i>                           | S         |         | river mangrove       |                       |           |           | X        |           |                     | X               |            |                        |                   | X                                  | X         |
| Myrtaceae     | <i>Lophostemon suaveolens</i>                           | T         | #       | red paperbark        |                       |           |           |          |           |                     | X               | X          |                        |                   | Xv                                 | X         |
|               | <i>Melaleuca cajuputi</i> subsp. <i>platyphylla</i>     | S         | ^       |                      |                       | X         | X         |          |           |                     | X               | X          |                        |                   | Xv                                 | X         |
|               | <i>Melaleuca dealbata</i>                               | T         | ^       |                      |                       |           |           |          |           |                     |                 | X          |                        |                   | X                                  |           |
|               | <i>Melaleuca leucadendra</i>                            | T         | ^       | weeping paperbark    |                       |           |           |          |           | X                   | X               |            |                        |                   | X                                  |           |
|               | <i>Melaleuca viridiflora</i> var. <i>viridiflora</i>    | S         | ^       | broad leaf paperbark |                       |           | X         |          |           |                     | X               | X          |                        |                   | X                                  |           |
|               | <i>Osbornia octodonta</i>                               | S         |         |                      |                       |           |           | X        |           |                     | X               | X          |                        |                   | X                                  | X         |
|               | <i>Syzygium aqum</i>                                    | T         | ^Cult.  | bell fruit           |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|               | <i>Syzygium branderhorstii</i>                          | T         | ^Cult.  | Lockerbie satinash   |                       |           |           |          |           | X                   |                 | X          |                        |                   | X                                  |           |
| Nyctaginaceae | <i>Boerhavia</i> sp.                                    | H         |         | tar vine             |                       | X         |           |          |           | X                   |                 |            |                        | X                 |                                    |           |
| Olacaceae     | <i>Ximenia americana</i>                                | S         | ^       | yellow plum          | X                     |           |           |          |           | X                   |                 |            |                        | X                 | X                                  | X         |
| Oleaceae      | <i>Chionanthus ramiflora</i>                            | T         |         | native olive         | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|               | <i>Jasminum elongatum</i>                               | V         |         | native jasmine       | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Opiliaceae    | <i>Cansjera leptostachya</i>                            | V         |         |                      | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |

| Family         | Botanical Name                                             | Life form | Status  | Common name             | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|----------------|------------------------------------------------------------|-----------|---------|-------------------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
|                | <i>Opilia armentacea</i>                                   | V         |         |                         | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Orchidaceae    | <i>Dendrobium antennatum</i>                               | O         | E       | antelope orchid         |                       |           |           | X        |           |                     |                 |            | X                      |                   |                                    |           |
|                | <i>Didymoplexis pallens</i>                                | O         | NT      | crystal bells           |                       | X         |           |          |           |                     |                 | X          |                        |                   |                                    |           |
|                | <i>Empusa habenaria</i>                                    | O         |         |                         |                       |           |           |          |           |                     |                 |            | X                      |                   |                                    |           |
|                | <i>Grastidium insigne</i> (syn. <i>Dichopus insignis</i> ) | O         |         | mangrove tartan orchid  |                       |           |           | X        |           |                     |                 | X          | X                      |                   |                                    |           |
|                | <i>Habenaria propinqua</i>                                 | O         |         |                         |                       |           |           |          |           |                     |                 |            | X                      |                   |                                    |           |
|                | <i>Habenaria rumphii</i>                                   | O         | NT      |                         |                       | X         |           |          |           |                     |                 | X          | X                      |                   |                                    |           |
|                | <i>Nervilia crociformis</i>                                | O         | NT      | round shield orchid     |                       |           |           |          |           |                     |                 |            | X                      |                   |                                    |           |
| Pandanaceae    | <i>Pandanus</i> sp. (DGF9601+)                             | P         | ^       | pandanus                |                       | X         |           |          |           |                     |                 |            |                        |                   | Xv                                 | X         |
| Passifloraceae | <i>Passiflora foetida</i>                                  | V         | *^      | stinking passion flower |                       |           | X         |          |           | X                   |                 |            |                        |                   | X                                  | X         |
| Phyllanthaceae | <i>Antidesma ghaesembilla</i>                              | S         | ^       | black current bush      |                       | X         | X         |          |           |                     | X               | X          |                        |                   | X                                  | X         |
|                | <i>Antidesma parvifolium</i>                               | S         | ^       |                         |                       | X         | X         |          |           |                     | X               |            |                        |                   | X                                  |           |
|                | <i>Antidesma</i> sp. (DGF8654+)                            | T         |         |                         |                       |           | X         |          |           |                     |                 |            |                        |                   | Xv                                 |           |
|                | <i>Breynia oblongifolia</i>                                | S         |         | coffee bush             | X                     | X         | X         |          |           | X                   | X               |            |                        |                   | X                                  |           |
|                | <i>Phyllanthus amarus</i>                                  | H         | *       |                         |                       |           |           |          |           | X                   | X               | X          |                        |                   | X                                  |           |
|                | <i>Phyllanthus novae-hollandiae</i>                        | S         |         | phyllanthus             | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
| Plumbaginaceae | <i>Aegialitis annulata</i>                                 | S         |         |                         |                       |           |           | X        |           |                     | X               | X          |                        |                   | X                                  |           |
| Poaceae        | <i>Alloteropsis semialata</i>                              | Gr        |         | cockatoo grass          |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|                | <i>Apluda mutica</i>                                       | Gr        | NT      |                         |                       | X         |           |          |           |                     | X               | X          |                        |                   |                                    |           |
|                | <i>Axonopus compressus</i>                                 | Gr        | *       | broad leaf carpet grass |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|                | <i>Bambusa</i> sp.*                                        | Gr        | *^Cult. | bamboo                  |                       |           |           | X        |           | X                   |                 |            |                        | X                 | X                                  | X         |
|                | <i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>          | Gr        |         | forest blue grass       |                       | X         |           |          |           | X                   | X               |            |                        |                   | X                                  | X         |
|                | <i>Bothriochloa pertusa</i>                                | Gr        | *       | Indian couch            |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|                | <i>Cenchrus brownii</i>                                    | Gr        | *       |                         |                       | X         |           |          |           | X                   | X               |            |                        |                   |                                    |           |
|                | <i>Cenchrus echinatus</i>                                  | Gr        | *       | Mossman River grass     |                       |           |           |          |           | X                   | X               | X          |                        |                   | X                                  |           |
|                | <i>Chloris inflata</i> *                                   | Gr        | *       | purple top Rhodes grass |                       |           |           |          |           | X                   | X               |            |                        |                   | X                                  | X         |
|                | <i>Chrysopogon acicularis</i>                              | Gr        | *       |                         |                       | X         |           |          |           | X                   |                 |            |                        |                   |                                    |           |

| Family | Botanical Name                                       | Life form | Status | Common name       | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|--------|------------------------------------------------------|-----------|--------|-------------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
|        | <i>Dactyloctenium aegyptium</i>                      | Gr        | *      | button grass      |                       |           |           |          |           | X                   | X               |            |                        |                   | X                                  | X         |
|        | <i>Digitaria setigera</i>                            | Gr        |        |                   |                       | X         |           |          |           | X                   | X               | X          |                        |                   | X                                  |           |
|        | <i>Echinochloa colona</i>                            | Gr        | *      |                   |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|        | <i>Eleusine indica</i>                               | Gr        | *      | crows foot grass  |                       |           |           |          |           | X                   | X               |            |                        |                   | X                                  |           |
|        | <i>Eragrostis amabilis</i>                           | Gr        | *      | love grass        |                       |           |           |          |           | X                   |                 |            |                        |                   |                                    |           |
|        | <i>Eragrostis cumingii</i>                           | Gr        |        |                   |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|        | <i>Eragrostis tenella</i>                            | Gr        | *      | a love grass      |                       |           |           |          |           |                     | X               |            |                        |                   |                                    |           |
|        | <i>Eriochloa procera</i>                             | Gr        |        |                   |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|        | <i>Eulalia</i> sp. (Saibai Island J.R.Clarkson 7801) | Gr        | #      |                   |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|        | <i>Heteropogon contortus</i>                         | Gr        |        | black spear grass |                       | X         |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|        | <i>Imperata cylindrica</i>                           | Gr        | ^      | blady grass       |                       | X         |           |          |           | X                   | X               |            |                        |                   | X                                  | X         |
|        | <i>Ischaemum australe</i> var. <i>australe</i>       | Gr        | ^      | swamp grass       |                       | X         |           |          |           | X                   | X               | X          |                        |                   | X                                  | X         |
|        | <i>Ischaemum australe</i> var. <i>villosum</i>       | Gr        | ^      | swamp grass       |                       | X         |           |          |           |                     | X               | X          |                        |                   | X                                  |           |
|        | <i>Ischaemum muticum</i>                             | Gr        | ^      |                   |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|        | <i>Leptochloa fusca</i> subsp. <i>fusca</i>          | Gr        |        |                   |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|        | <i>Leptochloa simoniana</i>                          | Gr        |        |                   |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|        | <i>Mnesithea rottboellioides</i>                     | Gr        | ^      |                   |                       | X         |           |          |           |                     | X               |            |                        |                   | X                                  | X         |
|        | <i>Ophiuros exaltatus</i>                            | Gr        | ^      |                   |                       | X         |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|        | <i>Ophiuros megaphyllus</i>                          | Gr        |        |                   |                       | X         |           |          |           |                     |                 | X          |                        |                   | X                                  |           |
|        | <i>Panicum laevinode</i>                             | Gr        |        |                   |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|        | <i>Panicum mindanaense</i>                           | Gr        |        |                   |                       | X         |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|        | <i>Panicum trichoides</i>                            | Gr        |        |                   |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|        | <i>Paspalum vaginatum</i>                            | Gr        |        |                   |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|        | <i>Setaria surgens</i>                               | Gr        |        |                   |                       | X         |           |          |           | X                   |                 |            |                        | X                 | X                                  |           |
|        | <i>Sorghum nitidum</i> forma <i>nitidum</i>          | Gr        |        |                   |                       | X         |           |          |           |                     | X               | X          |                        |                   | X                                  |           |
|        | <i>Sorghum nitidum</i> forma <i>aristatum</i>        | Gr        |        |                   |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|        | <i>Sporobolus virginicus</i> var. <i>minor</i>       | Gr        |        |                   |                       |           |           | X        | X         | X                   | X               | X          |                        |                   | X                                  |           |
|        | <i>Themeda quadrivalvis</i>                          | Gr        | *      | grader grass      |                       |           |           |          |           | X                   | X               |            |                        |                   |                                    |           |

| Family         | Botanical Name                                         | Life form | Status | Common name                  | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|----------------|--------------------------------------------------------|-----------|--------|------------------------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
|                | <i>Themeda triandra</i>                                | Gr        |        | kangaroo grass               |                       | X         |           |          |           |                     | X               | X          |                        |                   | X                                  | X         |
| Portulacaceae  | <i>Calandrinia</i> sp.                                 | H         |        |                              |                       | X         |           |          |           |                     |                 | X          |                        |                   |                                    |           |
| Putranjivaceae | <i>Drypetes deplanchei</i>                             | S/T       | ^      | yellow boxwood               | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
| Rhamnaceae     | <i>Colubrina asiatica</i>                              | S         |        |                              | X                     |           |           |          |           |                     | X               | X          |                        |                   | X                                  | X         |
| Rhizophoraceae | <i>Bruguiera cylindrica</i>                            | T         |        | reflexed orange mangrove     |                       |           |           | X        |           |                     | X               | X          |                        |                   |                                    |           |
|                | <i>Bruguiera exaristata</i>                            | T         |        | rib fruited orange mangrove  |                       |           |           | X        |           |                     | X               |            |                        |                   |                                    |           |
|                | <i>Bruguiera gymnorhiza</i>                            | T         |        | large leaved orange mangrove |                       |           |           | X        |           |                     | X               | X          |                        |                   |                                    |           |
|                | <i>Bruguiera parviflora</i>                            | T         |        | small leaved orange mangrove |                       |           |           | X        |           |                     | X               |            |                        |                   | X                                  |           |
|                | <i>Bruguiera sexangula</i>                             | T         |        | upriver orange mangrove      |                       |           |           | X        |           |                     |                 | X          |                        |                   |                                    |           |
|                | <i>Ceriops decandra</i>                                | T         | ^      | broad leaved yellow mangrove |                       |           |           | X        |           |                     |                 | X          |                        |                   |                                    |           |
|                | <i>Ceriops tagal</i>                                   | T         | ^      | yellow mangrove              |                       |           |           | X        |           |                     | X               |            |                        |                   | Xv                                 | X         |
|                | <i>Rhizophora apiculata</i>                            | T         | ^      | tall stilt rooted mangrove   |                       |           |           | X        |           |                     | X               | X          |                        |                   | Xv                                 | X         |
|                | <i>Rhizophora stylosa</i>                              | T         | ^      | red mangrove                 |                       |           |           | X        |           |                     | X               | X          |                        |                   | X                                  |           |
| Rubiaceae      | <i>Cyclophyllum brevipes</i>                           | S         |        |                              | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|                | <i>Cyclophyllum maritimum</i>                          | S         |        |                              | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|                | <i>Dentella repens</i>                                 | H         |        |                              |                       | X         |           |          |           | X                   | X               | X          |                        |                   |                                    |           |
|                | <i>Guettardia speciosa</i>                             | T         | ^      | beach gardenia               | X                     |           |           |          |           |                     | X               |            |                        |                   | Xv                                 |           |
|                | <i>Hedyotis</i> sp.                                    | H         |        |                              |                       | X         |           |          |           |                     |                 | X          |                        |                   |                                    |           |
|                | <i>Hydnophytum formicarum</i>                          | E         |        |                              |                       |           |           | X        |           |                     |                 | X          |                        |                   |                                    |           |
|                | <i>Hydnophytum moseleyanum</i> var. <i>moseleyanum</i> | E         |        |                              |                       |           |           | X        |           |                     | X               |            |                        |                   | X                                  | X         |
|                | <i>Ixora timorensis</i>                                | S         |        | native ixora                 | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|                | <i>Morinda citrifolia</i>                              | S         | ^      | noni plum                    | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
|                | <i>Myrmecodia platytyrea</i> subsp. <i>antoinii</i>    | E         |        | ant plant                    |                       |           |           |          |           |                     | X               | X          |                        |                   | X                                  | X         |
|                | <i>Oldenlandia biflora</i>                             | H         |        |                              |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|                | <i>Oldenlandia galioides</i>                           | H         |        |                              |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
|                | <i>Pavetta brownii</i> var. <i>glabrata</i>            | S         |        |                              | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |

| Family           | Botanical Name                                  | Life form | Status  | Common name            | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|------------------|-------------------------------------------------|-----------|---------|------------------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
|                  | <i>Psychotria</i> sp.                           | S         |         |                        | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  | X         |
|                  | <i>Richardia scabra</i>                         | H         | *       |                        |                       |           |           |          |           | X                   | X               |            |                        |                   |                                    |           |
|                  | <i>Scyphiphora hydrophylacea</i>                | S         |         | yam stick mangrove     |                       |           |           | X        |           |                     |                 |            |                        |                   | X                                  |           |
|                  | <i>Spermacoce brachystema</i>                   | H         |         |                        |                       | X         |           |          |           | X                   |                 | X          |                        |                   | X                                  |           |
|                  | <i>Timonius timon</i> var. <i>timon</i>         | T         |         |                        |                       | X         | X         |          |           |                     | X               | X          |                        |                   | X                                  |           |
|                  | <i>Triflorensia australis</i>                   | S         | #       |                        | X                     |           |           |          |           |                     | X               |            |                        |                   | Xv                                 |           |
| Ruppiaceae       | <i>Ruppia</i> sp.                               | H         |         |                        |                       |           |           |          |           |                     |                 |            |                        |                   |                                    |           |
| Rutaceae         | <i>Glycosmis trifoliata</i>                     | S         |         |                        | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  |           |
|                  | <i>Micromelum minutum</i>                       | S         |         | lime berry             | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Santalaceae      | <i>Exocarpos latifolius</i>                     | S         | ^       | broad leaved ballart   | X                     |           | X         |          |           |                     | X               |            |                        |                   | X                                  |           |
| Sapindaceae      | <i>Allophylus cobbe</i>                         | S         |         |                        | X                     |           |           |          |           |                     | X               | X          |                        |                   |                                    |           |
|                  | <i>Cupaniopsis anacardioides</i>                | T         |         | tuckeroo               | X                     |           | X         |          |           |                     | X               | X          |                        |                   | X                                  |           |
|                  | <i>Elatostachys microcarpa</i>                  | S         | #       |                        |                       |           |           |          |           |                     |                 |            |                        |                   | Xv                                 |           |
|                  | <i>Jagera pseudorhus</i> var. <i>pseudorhus</i> | T         |         | foambark               | X                     |           | X         |          |           |                     | X               |            |                        |                   | Xv                                 | X         |
| Sapotaceae       | <i>Manilkara kauki</i>                          | T         | ^       | wongai plum            | X                     |           |           |          |           | X                   | X               |            |                        |                   | X                                  |           |
|                  | <i>Mimusops elengi</i>                          | T         |         |                        | X                     |           |           |          |           |                     | X               |            |                        |                   | X                                  | X         |
|                  | <i>Planchonella mysinodendron</i>               | T         |         |                        |                       |           |           |          |           |                     | X               |            |                        |                   |                                    |           |
|                  | <i>Planchonella obovata</i>                     | T         |         | northern boxwood       | X                     |           |           |          |           |                     |                 | X          |                        |                   | X                                  | X         |
| Scrophulariaceae | <i>Angelonia salicariifolia</i>                 | H         | *       |                        |                       |           |           |          |           | X                   | X               |            |                        | X                 |                                    |           |
|                  | <i>Scoparia dulcis</i>                          | H         | *       | sweet broom            |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
| Smilacaceae      | <i>Smilax australis</i>                         | V         |         | barb wire vine         | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Solanaceae       | <i>Capsicum annum</i> var. <i>glabriusculum</i> | H         | *^Cult. | birds eye chilli       |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  |           |
|                  | <i>Physalis angulata</i>                        | H         | *^      | cape gooseberry        |                       |           |           |          |           | X                   |                 |            |                        |                   | X                                  | X         |
|                  | <i>Solanum viridifolium</i>                     | H         |         |                        | X                     |           |           |          |           |                     | X               | X          |                        |                   | Xv                                 |           |
| Sparrmanniaceae  | <i>Grewia oxyphylla</i>                         | S         |         |                        | X                     |           |           |          |           |                     | X               |            |                        |                   | Xv                                 |           |
|                  | <i>Corchorus aestuans</i>                       | H         |         |                        |                       | X         |           |          |           | X                   | X               |            |                        |                   | X                                  | X         |
| Stackhousiaceae  | <i>Stackhousia</i> sp.                          | H         |         |                        |                       | X         |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Sterculiaceae    | <i>Heritiera littoralis</i>                     | T         |         | looking glass mangrove |                       |           |           | X        |           |                     | X               | X          |                        |                   | X                                  |           |

| Family       | Botanical Name                | Life form | Status | Common name      | Vine forest & thicket | Grassland | Shrubland | Mangrove | Sedgeland | Cleared - Disturbed | Qld Herb (2011) | ATH (2012) | Laverack et al. (1989) | Waterhouse (2003) | 3D Oct.2007, June 2012 (v-voucher) | DGF Photo |
|--------------|-------------------------------|-----------|--------|------------------|-----------------------|-----------|-----------|----------|-----------|---------------------|-----------------|------------|------------------------|-------------------|------------------------------------|-----------|
|              | <i>Sterculia quadrifida</i>   | T         | ^      | peanut tree      | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  | X         |
| Taccaceae    | <i>Tacca leontopetaloides</i> | Ge        | ^      | native arrowroot | X                     |           |           |          |           |                     |                 | X          |                        |                   | X                                  | X         |
| Thymeliaceae | <i>Thecanthes cornucopiae</i> | H         |        |                  |                       | X         |           |          |           |                     | X               |            |                        |                   |                                    |           |
| Ulmaceae     | <i>Celtis philippinensis</i>  | T         |        |                  | X                     |           |           |          |           |                     |                 |            |                        |                   | X                                  |           |
| Urticaceae   | <i>Pouzolzia zeylanica</i>    | H         |        |                  |                       | X         |           |          |           |                     | X               | X          |                        |                   |                                    |           |
| Vitaceae     | <i>Ampelocissus acetosa</i>   | V         | ^      |                  | X                     | X         |           |          |           |                     | X               |            |                        |                   | X                                  | X         |
|              | <i>Cayratia clematidea</i>    | V         |        |                  |                       | X         | X         |          |           | X                   |                 | X          |                        |                   | X                                  |           |
|              | <i>Cayratia maritima</i>      | V         |        |                  | X                     |           |           |          |           | X                   | X               | X          |                        |                   | X                                  | X         |
|              | <i>Cayratia saponaria</i>     | V         |        |                  |                       |           |           |          |           |                     | X               |            |                        |                   |                                    |           |
|              | <i>Cayratia trifolia</i>      | V         |        |                  | X                     | X         | X         |          |           | X                   |                 |            |                        | X                 | X                                  |           |

## Appendix C. Preliminary List of Useful Plants for Saibai Island

| Scientific Name                                   | Language Name<br><i>Kalaw Kawaw Ya</i> | common name           | Life Form  | Broad Use | Part Used                                                                                                                           | Broad Habitat                                                                  | Source                              |
|---------------------------------------------------|----------------------------------------|-----------------------|------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------|
| <i>Acacia auriculiformis</i>                      | Garagarrh or Goeragarr                 | earlobe wattle        | Tree       | Material  | Timber used for the making of dugong spears (whaps), building timber and firewood. The spear made from it is called <i>Thulup</i> . | Vine forests on dunes and shrublands on alluvium.                              | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Aegiceras corniculatum</i>                     | goowagoowa                             | river mangrove        | Shrub      | TBD       | TBD                                                                                                                                 | Mangroves                                                                      | Duke (2010) through N.Gibuma        |
| <i>Aegilitis annulata</i>                         | Yham, yaam                             | club mangrove         | Shrub      | Indicator | Barramundi hide under shade at high tides.                                                                                          | Mangroves                                                                      | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Aglaia eleagnoidea</i>                         | TBD                                    | coastal boodyara      | Tree       | Material  | Timber for building purposes.                                                                                                       | Vine forests and thickets.                                                     | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Antiaris toxicarya</i> var. <i>macrophylla</i> | kabi?                                  | antiaris              | Tree       | Material  | Timber for house construction.                                                                                                      | Vine forests and thickets.                                                     | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Antidesma parviflora</i>                       | mergey                                 | black currant bush    | Shrub      | Food      | Small purplish-black fruit eaten (staining hands and mouth)                                                                         | Vine forest & thickets, <i>Welchiodendron</i> forests, woodlands & shrublands. | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Avicennia marina</i>                           | zangau                                 | grey mangrove         | Tree       | Material  | Timber                                                                                                                              | Mangroves                                                                      | Duke (2010) through N.Gibuma        |
| <i>Avicennia marina</i> var. <i>australasica</i>  | zanghow                                | grey mangrove         | Shrub/Tree | Material  | Timber                                                                                                                              | Mangroves                                                                      | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Bambusa</i> sp.                                | sarrwah                                | bamboo                | Grass      | Material  | Stems                                                                                                                               | Groves within disturbed vine forests on dunes.                                 | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Bruguiera exaristata</i>                       | abi                                    | rib-fruited mangrove  | Tree       | Material  | Timber.                                                                                                                             | Mangroves                                                                      | Duke (2010) through N.Gibuma        |
| <i>Bruguiera gymnorhiza</i>                       | biw                                    | large-leafed mangrove | Tree       | Material  | Timber.                                                                                                                             | Mangroves                                                                      | Duke (2010) through N.Gibuma        |
| <i>Bruguiera parviflora</i>                       | gueedh                                 | small-leafed mangrove | Tree       | Material  | Timber.                                                                                                                             | Mangroves                                                                      | Duke (2010) through N.Gibuma        |
| <i>Caesalpinia bonduc</i>                         | TBD                                    | nicker nut            | Shrub/Vine | Material  | Seeds for playing marbles.                                                                                                          | Margins of vine forests near coast.                                            | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Camptostemon schultzei</i>                     | thapi or kapi                          | kapok mangrove        | Tree       | Material  | Timber for housing construction.                                                                                                    | Mangroves                                                                      | Duke (2010) through N.Gibuma        |
| <i>Capparis lucida</i>                            | kadal darng                            | coast caper           | Vine       | Food      | Fruit ripening blackish.                                                                                                            | Vine forests and thickets.                                                     | Nelson Gibuma pers. com. Nov.       |

| Scientific Name                                      | Language Name<br>Kalaw Kawaw Ya | common name                                                    | Life Form       | Broad Use        | Part Used                                                                     | Broad Habitat                       | Source                              |
|------------------------------------------------------|---------------------------------|----------------------------------------------------------------|-----------------|------------------|-------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|
|                                                      |                                 |                                                                |                 |                  |                                                                               |                                     | 2010.                               |
| <i>Carissa laxiflora</i>                             | patali or puttarli              | carissa                                                        | Sprawling shrub | Food             | Fruit                                                                         | Vine forests and thickets.          | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Ceriops australis</i>                             | amu                             | smooth-fruited yellow mangrove (locally called white mangrove) | Tree            | Material         | Timber.                                                                       | Mangroves                           | Duke (2010) through N.Gibuma        |
| <i>Ceriops decandra</i>                              | caradh                          | clumped yellow mangrove                                        | Tree            | Material         | Timber.                                                                       | Mangroves                           | Duke (2010) through N.Gibuma        |
| <i>Ceriops tagal</i>                                 | amu                             | rib-fruited yellow mangrove                                    | Tree            | Material         | Timber for fencing and construction.                                          | Mangroves                           | Duke (2010) through N.Gibuma        |
| <i>Chamaesyce mitchelliana</i> (or <i>C. atoto</i> ) | TBD                             | a coastal spurge                                               | Herb            | Material         | Sap.                                                                          | Open sandy areas in vine forests.   | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Cocos nucifera</i>                                | urub                            | coconut                                                        | Palm            | Food<br>Material | Kernel                                                                        | Planted locations.                  | Duke (2010) through N.Gibuma        |
| <i>Cocos nucifera</i>                                | Samoan urub                     | small yellow coconut                                           | Palm            | Food<br>Material | Kernel                                                                        | Planted locations.                  | Duke (2010) through N.Gibuma        |
| <i>Colubrina asiatica</i>                            | TBD                             | colubrina or beach berry bush                                  | Shrub           | Material         | Leaves in water to wash hands.                                                | Margins of vine forests near coast. | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Cordia subcordata</i>                             | wharrup                         | golden trumpet tree                                            | Tree            | Material         | Timber for drums.                                                             | Vine forests and thickets.          | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Cucumis melo</i>                                  | kipap                           | bitter melon                                                   | Vine            | Food             | Small round fruit about gooseberry size turns yellow when ripe and is edible. | Disturbed sites.                    | M. Lawrie (Herbrecs specimen data)  |
| <i>Dendrolobium arbuscula</i>                        | waubook                         | horse bush                                                     | Sprawling shrub | Material         | Firewood.                                                                     | Vine forests and thickets.          | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Derris trifoliata</i>                             | oomi                            | derris                                                         | Vine            | Material         | Stems used for rope. Fish poison?                                             | Mangrove margins and shrublands.    | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Diospyros littorea</i>                            | usar coon                       | ebony mangrove                                                 | Shrub           | Not known        | Not known                                                                     | Mangroves                           | Duke (2010) through N.Gibuma        |
| <i>Eleocharis dulcis</i>                             | mardhar                         | bulkuru, water chestnut                                        | Sedge           | Food             | Tuberous nuts eaten.                                                          | Brackish Wetlands                   | Duke (2010) through N.Gibuma        |
| <i>Erythrina insularis</i>                           | arbi                            | coral tree                                                     | Tree            | Material         | Glossy red seeds used for decorative purposes i.e. necklaces and bracelets.   | Vine forests and thickets.          | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Erythrina variegata</i>                           | arbi                            | coral tree                                                     | Tree            | Material         | Glossy red seeds used for decorative purposes i.e. necklaces and bracelets.   | Vine forests and thickets.          | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Excoecaria agallocha</i>                          | kem                             | milky mangrove                                                 | Shrub/Tree      | Medicinal        | Sap is remedy for sting from fish                                             | Mangroves and mangrove              | Nelson Gibuma                       |

| Scientific Name                                   | Language Name<br>Kalaw Kawaw Ya | common name                   | Life Form       | Broad Use        | Part Used                                                                        | Broad Habitat                          | Source                              |
|---------------------------------------------------|---------------------------------|-------------------------------|-----------------|------------------|----------------------------------------------------------------------------------|----------------------------------------|-------------------------------------|
|                                                   |                                 |                               |                 |                  | spines.                                                                          | margins of wetlands.                   | pers. com. Nov. 2010.               |
| <i>Ficus drupacea</i> var. <i>drupacea</i>        | Kabai                           | fig                           | Tree            | Food             | Orange fruit eaten.                                                              | Town areas, vine forests.              | M. Lawrie (HerbreCs specimen data)  |
| <i>Flagellaria indica</i>                         | booz                            | whip vine                     | Vine            | Material         | Stems for tying and binding.                                                     | Vine forests and thickets, shrublands. | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Guettarda speciosa</i>                         | borrdow                         | beach gardenia                | Tree            | Material         | Leaves for Kup Muri                                                              | Vine forests and thickets.             | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Heriteria littoralis</i>                       | kong                            | keeled-pod mangrove           | Tree            | Not known        | Not known                                                                        | Mangroves                              | Duke (2010) through N.Gibuma        |
| <i>Hibiscus tiliaceus</i>                         | themi woerakarr                 | cottonwood hibiscus           | Tree            | Material         | Light wood for making small racing canoes. Fibrous bark possibly used for fibre. | Coastal grasslands & mangrove edges.   | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Ipomoea pes capre</i> var. <i>brasiliensis</i> | pul                             | goats foot convolvulus        | Herb/Vine       | Material         | Stems                                                                            | Coastal sites.                         | Duke (2010) through N.Gibuma        |
| <i>Lumnitzera littorea</i>                        | kalkar gamorl pisurr            | red-flowered black mangrove   | Tree            | Not known        | Not known                                                                        | Mangroves                              | Duke (2010) through N.Gibuma        |
| <i>Lumnitzera racemosa</i>                        | pisurr                          | white-flowered black mangrove | Tree            | Not known        | Not known                                                                        | Mangroves                              | Duke (2010) through N.Gibuma        |
| <i>Lysiphyllum binnatum</i>                       | gurragoohl                      | no common name                | Sprawling shrub | Not known        | Not known                                                                        | Vine forests and thickets.             | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Manilkara kauki</i>                            | ubar                            | wongai                        | Tree            | Food<br>Material | Fruit are eaten. Strong timber favoured for dugong spears and carving.           | Vine forests & thickets.               | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Melaleuca cajuputi</i>                         | ubu                             | paperbark                     | Shrub           | Not known        | Leaves?                                                                          | Pandanus grasslands and shrublands     | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Micromelum minutum</i>                         | bom                             | lime berry                    | Shrub           | Not known        | Not known                                                                        | Vine forests and thickets.             | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Milletia pinnata</i>                           | arbi                            | pongamia                      | Tree            | Material         | Seed pods for children toy things. Leaves for Kup Muri.                          | Vine forests and thickets              | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Mimusops elengii</i>                           | usarkuhn                        | mimusops                      | Tree            | Material         | Timber for light dugong spear.                                                   | Vine forests and thickets              | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Nypa fruticans</i>                             | kudhu                           | mangrove palm                 | Palm            | Not known        | Not known                                                                        | Mangroves                              | Duke (2010) through N.Gibuma        |
| <i>Ormocarpum orientale</i>                       | waubuk                          | ormocarpum                    | Shrub           | Material<br>Food | Timber for firewood. Cultivated for young leaves used as a vegetable.            | Vine forest & thickets, town area.     | Nelson Gibuma pers. com. Nov. 2010. |

| Scientific Name                | Language Name<br>Kalaw Kawaw Ya | common name                      | Life Form              | Broad Use        | Part Used                                                                                                                        | Broad Habitat                            | Source                                    |
|--------------------------------|---------------------------------|----------------------------------|------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------|
| <i>Osbornia octodonta</i>      | surrh                           | myrtle mangrove                  | Shrub                  | Not known        | Not known                                                                                                                        | Mangroves                                | Duke (2010)<br>through N.Gibuma           |
| <i>Pandanus spirilis</i>       | habal or arbaal                 | pandanus                         | Pandanus<br>Palm       | Food<br>Material | Kernel of individual fruit segments<br>hammered out when dry and<br>eaten.<br>Leaves used for fibre making<br>baskets etc.       | Pandanus grasslands.                     | Nelson Gibuma<br>pers. com. Nov.<br>2010. |
| <i>Pandanus tectorius</i>      | kusargh or kassadh              | screw palm                       | Pandanus<br>Palm       | Food<br>Material | Base of ripe fruit eaten fresh in<br>small amounts.<br>Fruits treated in water to make<br>paste?<br>Leaves sued for making mats. | Vine forests on dunes.                   | Nelson Gibuma<br>pers. com. Nov.<br>2010. |
| <i>Pemphis acidula</i>         | sowrrl?                         | pemphis                          | Shrub                  | Material         | Timber used for firewood.                                                                                                        | Mangrove margins.                        | Nelson Gibuma<br>pers. com. Nov.<br>2010. |
| <i>Physalis angulata*</i>      | TDB                             | wild gooseberry                  | Herb                   | Food             | Fruit                                                                                                                            | Disturbed sites.                         | M. Lawrie<br>Herbrecks Data.              |
| <i>Rhizophora apiculata</i>    | goob                            | corky stilt mangrove             | Tree                   | Not known        | Not known                                                                                                                        | Mangroves                                | Duke (2010)<br>through N.Gibuma           |
| <i>Rhizophora mucronata</i>    | thag                            | upriver stilt mangrove           | Tree                   | Not known        | Not known                                                                                                                        | Mangroves                                | Duke (2010)<br>through N.Gibuma           |
| <i>Rhizophora stylosa</i>      | thag                            | long-style stilt<br>mangrove     | Tree                   | Material         | Gum scraped from underbark for<br>glueing drum skins.                                                                            | Mangroves                                | Duke (2010)<br>through N.Gibuma           |
| <i>Rhizophora x lamarckii</i>  | goob pui                        | hybrid stilt mangrove            | Tree                   | Not known        | Not known                                                                                                                        | Mangroves                                | Duke (2010)<br>through N.Gibuma           |
| <i>Sesuvium sp.</i>            | garuwadh                        | sea purslane                     | Herb                   | Not known        | Not known                                                                                                                        | Coastal sites.                           | Duke (2010)<br>through N.Gibuma           |
| <i>Sonneratia alba</i>         | kuzub                           | white-flowered apple<br>mangrove | Tree                   | Not known        | Not known                                                                                                                        | Mangroves                                | Duke (2010)<br>through N.Gibuma           |
| <i>Sonneratia ovata</i>        | wana                            | sonneratia                       | Tree                   | Not known        | Not known                                                                                                                        | Mangroves                                | Nelson Gibuma<br>pers. com. Nov.<br>2010. |
| <i>Syzygium aqum</i>           | TBD                             | bell fruit                       | Tree                   | Food             | Fruit eaten.                                                                                                                     | Town gardens.                            | Nelson Gibuma<br>pers. com. Nov.<br>2010. |
| <i>Syzygium branderhorstii</i> | uzu                             | lockerbie satin ash              | Shrub/Tree             | Food             | Fruit eaten. This plant grows in<br>the wild on Moa, Erub, Dauan<br>however is planted in domestic<br>gardens.                   | Town gardens.                            | Nelson Gibuma<br>pers. com. Nov.<br>2010. |
| <i>Terminalia catappa</i>      | merkai                          | sea almond                       | Tree                   | Food             | Outer skin of fruit eaten when ripe.<br>Inner nut eaten when dry.                                                                | Community areas.                         | Nelson Gibuma<br>pers. com. Nov.<br>2010. |
| <i>Terminalia subacroptera</i> | gughabargh or mipa              | no common name                   | Shrub or<br>small tree | Food             | Fleshy skin of small purplish-black<br>fruit eaten when ripe.                                                                    | Vine forest & thickets, &<br>shrublands. | Nelson Gibuma<br>pers. com. Nov.<br>2010. |
| <i>Thespesia populnea</i>      | warakarr                        | pacific rosewood                 | Shrub/Tree             | Material         | Round fruit used for toys.                                                                                                       | Mangrove margins.                        | Duke (2010)                               |

| Scientific Name               | Language Name<br>Kalaw Kawaw Ya | common name         | Life Form  | Broad Use | Part Used                                      | Broad Habitat                             | Source                              |
|-------------------------------|---------------------------------|---------------------|------------|-----------|------------------------------------------------|-------------------------------------------|-------------------------------------|
|                               |                                 |                     |            |           |                                                |                                           | through N.Gibuma                    |
| <i>Thespesia populneoides</i> | wanu?                           | pacific rosewood    | Shrub/Tree | Material  | Round fruit used for toys.                     | Mangrove margins.                         | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Vitex trifolia</i>         | del                             | vitex               | Shrub      | Not known | Not known                                      | Disturbed sites in vine forests on dunes. | Duke (2010) through N.Gibuma        |
| <i>Ximenia americana</i>      | putit                           | yellow plum         | Shrub      | Food      | Fruit with yellowish flesh is eaten.           | Edge of Mangroves                         | Nelson Gibuma pers. com. Nov. 2010. |
| <i>Xylocarpus granatum</i>    | budha                           | cannonball mangrove | Tree       | Material  | Fruit parts for play, timber for construction. | Mangroves                                 | Duke (2010) through N.Gibuma        |
| <i>Xylocarpus mollucensis</i> | budha                           | cedar mangrove      | Tree       | Material  | Fruit parts for play, timber for construction. | Mangroves                                 | Duke (2010) through N.Gibuma        |

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

| Scientific Name                | Language Name<br>Kalaw Kawaw Ya | Common Name                | Life Form                               | Broad Use | Part Used                                                                            | Broad Habitat                             | Source                    |
|--------------------------------|---------------------------------|----------------------------|-----------------------------------------|-----------|--------------------------------------------------------------------------------------|-------------------------------------------|---------------------------|
| <i>Abrus precatorius</i>       | TBD                             | Gidee Gidee                | Vine                                    | Material  | Black and red seeds used for decorative purposes i.e. necklaces and bracelets.       | Vine forest & thickets, & shrublands.     | TBD                       |
| <i>Anacardium occidentale*</i> | TBD                             | Cashew                     | Shrub                                   | Food      | Fruit eaten.                                                                         | Disturbed areas.                          | TBD                       |
| <i>Buchanania arborescens</i>  | TBD                             | Little Gooseberry Tree     | Tree                                    | Food      | Small black fruits eaten as a snack when ripe.                                       | Vine forests & thickets.                  | TBD                       |
| <i>Cassytha filiformis</i>     | TBD                             | Dodder Laurel Devils twine | Vine                                    | Food      | Small fruit eaten as a snack when ripe.                                              | Vine forest & thickets, & shrublands.     | TBD                       |
| <i>Coix lacryma-jobi*</i>      | TBD                             | Jobs Tears                 | Tall growing cane like perennial grass. | Material  | Hard grey seed used for beads.                                                       |                                           | M. Lawrie Herbrecks Data. |
| <i>Crinum uniflorum</i>        | TBD                             | Ground Lily                | Tuber                                   | Food      | On Mabuiag the tuber is dug and is scraped tin preparation of a paste                | Grasslands and dunes.                     | TBD                       |
| <i>Entada rheedii</i>          | TBD                             | Matchbox Bean              | Vine                                    | Material  | Large flat glossy brown seeds used for dancing decorations and instruments in music. | Vine forests & thickets, mangroves edges. | TBD                       |
| <i>Exocarpos latifolius</i>    | TBD                             | Broad leaved Ballart       | Shrub                                   | Food      | Small fruit eaten when ripe.                                                         | Vine forest & thickets, & shrublands.     | TBD                       |
| <i>Mangifera indica*</i>       | TBD                             | Mango                      | Tree                                    | Food      | Fruit eaten.                                                                         | Disturbed areas.                          | TBD                       |
| <i>Manihot esculenta*</i>      | TBD                             | Cassava                    | Shrub                                   | Food      | Tuber used for food.                                                                 | Disturbed areas.                          | TBD                       |

| Scientific Name             | Language Name<br><i>Kalaw Kawaw Ya</i> | Common Name               | Life Form   | Broad Use | Part Used                                              | Broad Habitat                                          | Source |
|-----------------------------|----------------------------------------|---------------------------|-------------|-----------|--------------------------------------------------------|--------------------------------------------------------|--------|
| <i>Passiflora foetida</i> * | TBD                                    | Wild Passionfruit         | Vine        | Food      | Small fruit eaten as a snack when ripe.                | Vine forest & thickets, & shrublands, disturbed areas. | TBD    |
| <i>Senna alata</i> *        | TBD                                    | Ringworm shrub, 6 o'clock | Shrub       | Medicinal | Decoction from leaves used for treatment of ringworms. | Disturbed areas.                                       | TBD    |
| <i>Tridax procumbens</i> *  | TBD                                    | Tridax                    | Annual herb | Medicinal | Decoction of leaves used for treating cuts and sores.  | Disturbed areas.                                       | TBD    |

**Appendix D. Terrestrial Vertebrates Known<sup>1</sup> or Predicted<sup>2</sup> to Occur on the Islands of Torres Strait and their Occurrence on Saibai Island.**

| Family         | Scientific Name <sup>3</sup>         | Common name              | Status <sup>4</sup> |        |     | Saibai Island                  |
|----------------|--------------------------------------|--------------------------|---------------------|--------|-----|--------------------------------|
|                |                                      |                          | EPBC Act            | NC Act | BoT |                                |
| AMPHIBIANS     |                                      |                          |                     |        |     |                                |
| Myobatrachidae | <i>Limnodynastes ornatus</i>         | ornate burrowing frog    |                     | LC     |     |                                |
| Myobatrachidae | <i>Uperoleia lithomoda</i>           | stonemason toadlet       |                     | LC     |     |                                |
| Myobatrachidae | <i>Uperoleia mimula</i>              | mimic toadlet            |                     | LC     |     |                                |
| Hylidae        | <i>Litoria bicolor</i>               | northern dwarf tree frog |                     | LC     |     |                                |
| Hylidae        | <i>Litoria caerulea</i>              | green tree frog          |                     | LC     |     | Unpublished record.            |
| Hylidae        | <i>Litoria gracilentia</i>           | dainty green tree frog   |                     | LC     |     |                                |
| Hylidae        | <i>Litoria infrafrenata</i>          | white-lipped tree frog   |                     | LC     |     |                                |
| Hylidae        | <i>Litoria nasuta</i>                | rocket frog              |                     | LC     |     |                                |
| Hylidae        | <i>Litoria nigrofrenata</i>          | bridle frog              |                     | LC     |     |                                |
| Hylidae        | <i>Litoria rubella</i>               | red tree frog            |                     | LC     |     |                                |
| Microhylidae   | <i>Austrochaperina gracilipes</i>    | slender frog             |                     | LC     |     |                                |
| Microhylidae   | <i>Cophixalus</i> sp.                | no common name           |                     |        |     |                                |
| Ranidae        | <i>Rana daemeli</i>                  | wood frog                |                     | LC     |     |                                |
| Bufonidae      | <i>Rhinella marina</i>               | cane toad                |                     | I      |     |                                |
| REPTILES       |                                      |                          |                     |        |     |                                |
| Crocodylidae   | <i>Crocodylus porosus</i>            | salt-water crocodile     | M                   | V      |     | Unpublished record.            |
| Gekkonidae     | <i>Cyrtodactylus lousiadensis</i>    | ring-tailed gecko        |                     | LC     |     |                                |
| Gekkonidae     | <i>Gehyra baliola</i>                | short-tailed dtella      |                     | LC     |     |                                |
| Gekkonidae     | <i>Gehyra dubia</i>                  | dubious dtella           |                     | LC     |     | Published record (Conics 2008) |
| Gekkonidae     | <i>Gehyra variegata</i>              | tree dtella              |                     | LC     |     |                                |
| Gekkonidae     | <i>Hemidactylus frenatus</i>         | house gecko              |                     | I      |     | Unpublished record.            |
| Gekkonidae     | <i>Heteronotia binoei</i>            | Bynoe's gecko            |                     | LC     |     |                                |
| Gekkonidae     | <i>Lepidodactylus lugubris</i>       | mourning gecko           |                     | LC     |     |                                |
| Gekkonidae     | <i>Lepidodactylus pumilus</i>        | slender chained gecko    |                     | NT     |     |                                |
| Gekkonidae     | <i>Nactus eboracensis</i>            | no common name           |                     | LC     |     |                                |
| Gekkonidae     | <i>Nactus 'pelagicus'</i>            | pelagic gecko            |                     | LC     |     |                                |
| Gekkonidae     | <i>Oedura rhombifer</i>              | zigzag velvet gecko      |                     | LC     |     |                                |
| Gekkonidae     | <i>Pseudothecadactylus australis</i> | giant tree gecko         |                     | LC     |     |                                |

| Family      | Scientific Name <sup>3</sup>               | Common name                    | Status <sup>4</sup> |        |     | Saibai Island                                  |
|-------------|--------------------------------------------|--------------------------------|---------------------|--------|-----|------------------------------------------------|
|             |                                            |                                | EPBC Act            | NC Act | BoT |                                                |
| Pygopodidae | <i>Lialis burtonis</i>                     | Burton's snake-lizard          |                     | LC     |     |                                                |
| Scincidae   | <i>Bellatorias frerei</i>                  | major skink                    |                     | LC     |     |                                                |
| Scincidae   | <i>Carlia coensis</i>                      | Coen rainbow-skink             |                     | LC     |     |                                                |
| Scincidae   | <i>Carlia longipes</i>                     | closed-litter rainbow-skink    |                     | LC     |     | Published record                               |
| Scincidae   | <i>Carlia Macfarlani</i>                   | closed-litter rainbow-skink    |                     | LC     |     | Published record                               |
| Scincidae   | <i>Carlia quinquecarinata</i>              | no common name                 |                     | LC     |     |                                                |
| Scincidae   | <i>Carlia sexdentata</i>                   | no common name                 |                     | LC     |     |                                                |
| Scincidae   | <i>Carlia storri</i>                       | brown bicarinate rainbow-skink |                     | LC     |     |                                                |
| Scincidae   | <i>Cryptoblepharus litoralis litoralis</i> | supralittoral shinning-skink   |                     | LC     |     |                                                |
| Scincidae   | <i>Cryptoblepharus virgatus</i>            | cream-striped shinning-skink   |                     | LC     |     |                                                |
| 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     |     |                                                |
| Scincidae   | <i>Eremiascincus pardalis</i>              | lowlands bar-lipped skink      |                     | LC     |     |                                                |
| Scincidae   | <i>Eugongylus rufescens</i>                | bar-lipped sheen-skink         |                     | LC     |     | Published records                              |
| Scincidae   | <i>Glaphyromorphus crassicaudus</i>        | Cape york mulch-skink          |                     | LC     |     |                                                |
| Scincidae   | <i>Glaphyromorphus nigricaudis</i>         | black-tailed bar-lipped skink  |                     | LC     |     |                                                |
| Scincidae   | <i>Glaphyromorphus pumilus</i>             | dwarf mulch-skink              |                     | LC     |     |                                                |
| Scincidae   | <i>Lygisaurus macfarlani</i>               | translucent litter-skink       |                     | LC     |     |                                                |
| Agamidae    | <i>Chlamydosaurus kingii</i>               | frilled lizard                 |                     | LC     |     |                                                |
| Agamidae    | <i>Diporiphora bilineata</i>               | two-lined dragon               |                     | LC     |     |                                                |
| Agamidae    | <i>Lophognathus temporalis</i>             | swamplands lashtail            |                     | LC     |     |                                                |
| Varanidae   | <i>Varanus gouldii</i>                     | Gould's goanna                 |                     | LC     |     |                                                |
| Varanidae   | <i>Varanus indicus</i>                     | mangrove monitor               |                     | LC     |     | Unpublished record. Karum.                     |
| Varanidae   | <i>Varanus mertensi</i>                    | Mertens' water monitor         |                     | LC     |     |                                                |
| Varanidae   | <i>Varanus panoptes</i>                    | yellow-spotted monitor         |                     | LC     |     |                                                |
| Varanidae   | <i>Varanus prasinus</i>                    | emerald monitor                |                     | NT     |     | Published & unpublished records. Borsboom 2007 |
| Varanidae   | <i>Varanus scalaris</i>                    | spotted tree monitor           |                     | LC     |     |                                                |
| 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     |     |                                                |

| Family        | Scientific Name <sup>3</sup>         | Common name              | Status <sup>4</sup> |        |     | Saibai Island                             |
|---------------|--------------------------------------|--------------------------|---------------------|--------|-----|-------------------------------------------|
|               |                                      |                          | EPBC Act            | NC Act | BoT |                                           |
| Boidae        | <i>Antaresia maculosa</i>            | spotted python           |                     | LC     |     |                                           |
| Boidae        | <i>Liasis fuscus</i>                 | water python             |                     | LC     |     | Published record                          |
| Boidae        | <i>Morelia amethystina</i>           | amethyst python          |                     | LC     |     |                                           |
| Boidae        | <i>Morelia kinghorni</i>             | scrub python             |                     | LC     |     |                                           |
| Colubridae    | <i>Boiga irregularis</i>             | brown tree snake         |                     | LC     |     |                                           |
| Colubridae    | <i>Cerberus australis</i>            | bockadam                 |                     | LC     |     |                                           |
| 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     |     |                                           |
| Elapidae      | <i>Acanthophis praelongus</i>        | northern death adder     |                     | LC     |     |                                           |
| Elapidae      | <i>Demansia papuensis</i>            | papuan whipsnake         |                     | LC     |     |                                           |
| Elapidae      | <i>Demansia vestigiata</i>           | black whipsnake          |                     | LC     |     |                                           |
| Elapidae      | <i>Furina tristis</i>                | brown-headed snake       |                     | LC     |     |                                           |
| Elapidae      | <i>Pseudechis papuanus</i>           | Papuan black snake       |                     | LC     |     | Published record.                         |
| Elapidae      | <i>Oxyuranus scutellatus</i>         | Papuan taipan            |                     | LC     |     | Published record.                         |
| <b>BIRDS</b>  |                                      |                          |                     |        |     |                                           |
| Megapodiidae  | <i>Alectura lathamii</i>             | Australian brush-turkey  |                     | LC     |     |                                           |
| Megapodiidae  | <i>Megapodius reinwardt duperryi</i> | orange-footed scrubfowl  |                     | LC     |     | WildNet, published & unpublished records. |
| Phasianidae   | <i>Coturnix ypsilophora</i>          | brown quail              |                     | LC     |     |                                           |
| Anseranatidae | <i>Anseranas semipalmata</i>         | magpie goose             |                     | LC     |     | Published record.                         |
| 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     |     | Published records.                        |
| Anatidae      | <i>Tadorna radjah</i>                | radjah shelduck          |                     | NT     |     | WildNet & published records.              |
| 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     |     | WildNet & published records               |
| Podicipedidae | <i>Tachybaptus novaehollandiae</i>   | Australasian grebe       |                     | LC     |     | WildNet & published records               |
| 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     |     | WildNet & published records.              |
| Columbidae    | <i>Geopelia humeralis</i>            | bar-shouldered dove      |                     | LC     |     | WildNet & published records.              |
| Columbidae    | <i>Ptilinopus magnificus</i>         | wompoo fruit-dove        |                     | LC     |     |                                           |

| Family            | Scientific Name <sup>3</sup>              | Common name               | Status <sup>4</sup> |        |     | Saibai Island                           |
|-------------------|-------------------------------------------|---------------------------|---------------------|--------|-----|-----------------------------------------|
|                   |                                           |                           | EPBC Act            | NC Act | BoT |                                         |
| Columbidae        | <i>Ptilinopus superbus</i>                | superb fruit-dove         |                     | LC     |     | WildNet record.                         |
| Columbidae        | <i>Ptilinopus regina</i>                  | rose-crowned fruit-dove   |                     | LC     |     | WildNet & published records.            |
| Columbidae        | <i>Ptilinopus iozonus</i>                 | orange-bellied fruit-dove |                     | LC     |     |                                         |
| Columbidae        | <i>Ducula mullerii</i>                    | collared imperial-pigeon  |                     | LC     |     | WildNet & published records.            |
| Columbidae        | <i>Ducula bicolor</i>                     | pied imperial-pigeon      |                     | LC     |     | WildNet & published records.            |
| Columbidae        | <i>Lopholaimus antarcticus</i>            | topknot pigeon            |                     | LC     |     |                                         |
| Podargidae        | <i>Podargus strigoides</i>                | tawny frogmouth           |                     | LC     |     |                                         |
| Podargidae        | <i>Podargus papuensis</i>                 | Papuan frogmouth          |                     | LC     |     |                                         |
| 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     |     | Published record                        |
| 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> <sup>5</sup> | white-throated needletail | M                   | LC     |     | Published record                        |
| Apodidae          | <i>Mearnsia novaeguineae</i>              | Papuan spine-tailed swift |                     | LC     |     |                                         |
| Apodidae          | <i>Apus pacificus</i>                     | fork-tailed swift         | M                   | LC     |     | Predicted EPBC Protected Matters Search |
| Apodidae          | <i>Apus affinis</i>                       | house swift               |                     | LC     |     |                                         |
| Anhingidae        | <i>Anhinga novaehollandiae</i>            | Australasian darter       |                     | LC     |     | WildNet & published records.            |
| Phalacrocoracidae | <i>Microcarbo melanoleucos</i>            | little pied cormorant     |                     | LC     |     | WildNet & published records.            |
| Phalacrocoracidae | <i>Phalacrocorax carbo</i>                | great cormorant           |                     | LC     |     | WildNet & published records.            |
| Phalacrocoracidae | <i>Phalacrocorax sulcirostris</i>         | little black cormorant    |                     | LC     |     | WildNet & published records.            |
| Phalacrocoracidae | <i>Phalacrocorax varius</i>               | pied cormorant            |                     | LC     |     |                                         |
| Pelecanidae       | <i>Pelecanus conspicillatus</i>           | Australian pelican        |                     | LC     |     | WildNet & published records.            |
| Ciconiidae        | <i>Ephippiorhynchus asiaticus</i>         | black-necked stork        |                     | NT     |     | WildNet & published records.            |
| Ardeidae          | <i>Ixobrychus dubius</i>                  | Australian little bittern |                     | LC     |     |                                         |
| Ardeidae          | <i>Ixobrychus flavicollis</i>             | black bittern             |                     | LC     |     | Published record                        |
| Ardeidae          | <i>Ardea pacifica</i>                     | white-necked heron        |                     | LC     |     | WildNet & published records.            |
| Ardeidae          | <i>Ardea modesta</i> <sup>6</sup>         | eastern great egret       | M                   | LC     |     | WildNet & published records.            |
| Ardeidae          | <i>Ardea intermedia</i>                   | intermediate egret        |                     | LC     |     | WildNet & published records.            |
| Ardeidae          | <i>Ardea sumatrana</i>                    | great-billed heron        |                     | LC     |     |                                         |
| Ardeidae          | <i>Ardea ibis</i> <sup>7</sup>            | cattle egret              | M                   | LC     |     | WildNet & published records.            |
| Ardeidae          | <i>Butorides striata</i>                  | striated heron            |                     | LC     |     | WildNet & published records.            |
| Ardeidae          | <i>Egretta picata</i>                     | pied heron                |                     | LC     |     | WildNet & published records.            |
| Ardeidae          | <i>Egretta novaehollandiae</i>            | white-faced heron         |                     | LC     |     | WildNet & published records.            |

| Family            | Scientific Name <sup>3</sup>          | Common name              | Status <sup>4</sup> |        |      | Saibai Island                |
|-------------------|---------------------------------------|--------------------------|---------------------|--------|------|------------------------------|
|                   |                                       |                          | EPBC Act            | NC Act | BoT  |                              |
| Ardeidae          | <i>Egretta garzetta</i>               | little egret             |                     | LC     |      | WildNet & published records. |
| Ardeidae          | <i>Egretta sacra</i>                  | eastern reef egret       | M                   | LC     |      | WildNet & published records. |
| Ardeidae          | <i>Nycticorax caledonicus</i>         | nankeen night-heron      |                     | LC     |      | WildNet & published records. |
| Threskiornithidae | <i>Plegadis falcinellus</i>           | glossy ibis              | M                   | LC     |      | Published record             |
| Threskiornithidae | <i>Threskiornis molucca</i>           | Australian white ibis    |                     | LC     |      | WildNet & published records. |
| Threskiornithidae | <i>Threskiornis spinicollis</i>       | straw-necked ibis        |                     | LC     |      | WildNet & published records. |
| Threskiornithidae | <i>Platalea regia</i>                 | royal spoonbill          |                     | LC     |      |                              |
| Accipitridae      | <i>Pandion cristatus</i> <sup>8</sup> | eastern osprey           | M                   | LC     |      | WildNet & published records. |
| Accipitridae      | <i>Elanus axillaris</i>               | black-shouldered kite    |                     | LC     |      |                              |
| Accipitridae      | <i>Hamirostra melanosternon</i>       | black-breasted buzzard   |                     | LC     |      |                              |
| Accipitridae      | <i>Aviceda subcristata</i>            | pacific baza             |                     | LC     |      |                              |
| Accipitridae      | <i>Haliaeetus leucogaster</i>         | white-bellied sea-eagle  | M                   | LC     |      | Published record             |
| Accipitridae      | <i>Haliastur sphenurus</i>            | whistling kite           |                     | LC     |      | Published record             |
| Accipitridae      | <i>Haliastur indus</i>                | brahminy kite            |                     | LC     |      | WildNet & published records. |
| Accipitridae      | <i>Milvus migrans</i>                 | black kite               |                     | LC     |      |                              |
| Accipitridae      | <i>Accipiter fasciatus</i>            | brown goshawk            |                     | LC     |      | WildNet & published records. |
| 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     |      | WildNet & published records. |
| Accipitridae      | <i>Erythrorhynchus radiatus</i>       | red goshawk              | V                   | E      | high |                              |
| Accipitridae      | <i>Aquila gurneyi</i>                 | gurney's eagle           |                     | LC     |      | .                            |
| Falconidae        | <i>Falco cenchroides</i>              | nankeen kestrel          |                     | LC     |      | WildNet & published records. |
| Falconidae        | <i>Falco berigora</i>                 | brown falcon             |                     | LC     |      |                              |
| Falconidae        | <i>Falco longipennis</i>              | Australian hobby         |                     | LC     |      | WildNet & published records. |
| Falconidae        | <i>Falco peregrinus</i>               | peregrine falcon         |                     | LC     |      |                              |
| Gruidae           | <i>Grus rubicunda</i>                 | bolga                    |                     | LC     |      | WildNet & published records. |
| Rallidae          | <i>Porphyrio porphyrio</i>            | purple swamphen          |                     | LC     |      | Published record             |
| Rallidae          | <i>Eulabeornis castaneiventris</i>    | chestnut rail            |                     | LC     |      |                              |
| Rallidae          | <i>Rallina tricolor</i>               | red-necked crane         |                     | LC     |      |                              |
| Rallidae          | <i>Gallirallus philippensis</i>       | buff-banded rail         |                     | LC     |      | Published record.            |
| Rallidae          | <i>Porzana pusilla</i>                | Baillon's crane          |                     | LC     |      |                              |
| Rallidae          | <i>Porzana fluminea</i>               | Australian spotted crane |                     | LC     |      |                              |
| Rallidae          | <i>Porzana tabuensis</i>              | spotless crane           |                     | LC     |      |                              |
| Rallidae          | <i>Amaurornis cinerea</i>             | white-browed crane       |                     | LC     |      |                              |

| Family           | Scientific Name <sup>3</sup>           | Common name                   | Status <sup>4</sup> |        |      | Saibai Island                |
|------------------|----------------------------------------|-------------------------------|---------------------|--------|------|------------------------------|
|                  |                                        |                               | EPBC Act            | NC Act | BoT  |                              |
| Rallidae         | <i>Amaurornis moluccana</i>            | pale-vented bush-hen          |                     | LC     |      |                              |
| Otididae         | <i>Ardeotis australis</i>              | Australian bustard            |                     | LC     |      |                              |
| Burhinidae       | <i>Burhinus grallarius</i>             | bush stone-curlew             |                     | LC     |      |                              |
| Burhinidae       | <i>Esacus magnirostris</i>             | beach stone-curlew            |                     | V      | high |                              |
| Haematopodidae   | <i>Haematopus longirostris</i>         | Australian pied oystercatcher |                     | LC     |      |                              |
| Haematopodidae   | <i>Haematopus fuliginosus</i>          | sooty oystercatcher           |                     | NT     |      |                              |
| Recurvirostridae | <i>Himantopus himantopus</i>           | black-winged stilt            |                     | LC     |      | WildNet & published records. |
| Charadriidae     | <i>Pluvialis fulva</i>                 | pacific golden plover         | M                   | LC     |      | WildNet & published records. |
| Charadriidae     | <i>Pluvialis squatarola</i>            | grey plover                   | M                   | LC     |      | .                            |
| Charadriidae     | <i>Charadrius ruficapillus</i>         | red-capped plover             |                     | LC     |      |                              |
| Charadriidae     | <i>Charadrius bicinctus</i>            | double-banded plover          | M                   | LC     |      |                              |
| Charadriidae     | <i>Charadrius mongolus</i>             | lesser sand plover            | M                   | LC     |      | WildNet & published records. |
| Charadriidae     | <i>Charadrius leschenaultii</i>        | greater sand plover           | M                   | LC     |      | WildNet & published records. |
| Charadriidae     | <i>Erythronyx cinctus</i>              | red-kneed dotterel            |                     | LC     |      | Published record.            |
| Charadriidae     | <i>Vanellus miles</i>                  | masked lapwing                |                     | LC     |      | WildNet & published records. |
| Scolopacidae     | <i>Gallinago hardwickii</i>            | Latham's snipe                | M                   | LC     |      | Predicted EPBC MNES search   |
| Scolopacidae     | <i>Gallinago megala</i>                | swinhoe's snipe               | M                   | LC     |      | Published record.            |
| Scolopacidae     | <i>Limosa limosa</i>                   | black-tailed godwit           | M                   | LC     |      | Published record.            |
| Scolopacidae     | <i>Limosa lapponica</i>                | bar-tailed godwit             | M                   | LC     |      |                              |
| Scolopacidae     | <i>Numenius minutus</i>                | little curlew                 | M                   | LC     |      | Published record.            |
| Scolopacidae     | <i>Numenius phaeopus</i>               | whimbrel                      | M                   | LC     |      | WildNet & published records. |
| Scolopacidae     | <i>Numenius madagascariensis</i>       | eastern curlew                | M                   | NT     |      |                              |
| Scolopacidae     | <i>Xenus cinereus</i>                  | terek sandpiper               | M                   | LC     |      | WildNet & published records. |
| Scolopacidae     | <i>Actitis hypoleucos</i> <sup>9</sup> | common sandpiper              | M                   | LC     |      | WildNet & published records. |
| Scolopacidae     | <i>Tringa brevipes</i> <sup>10</sup>   | grey-tailed tattler           | M                   | LC     |      | WildNet & published records. |
| Scolopacidae     | <i>Tringa incana</i> <sup>11</sup>     | wandering tattler             | M                   | LC     |      |                              |
| Scolopacidae     | <i>Tringa nebularia</i>                | common greenshank             | M                   | LC     |      | WildNet & published records. |
| Scolopacidae     | <i>Tringa stagnatilis</i>              | marsh sandpiper               | M                   | LC     |      |                              |
| Scolopacidae     | <i>Tringa glareola</i>                 | wood sandpiper                | M                   | LC     |      |                              |
| Scolopacidae     | <i>Arenaria interpres</i>              | ruddy turnstone               | M                   | LC     |      | Published record             |
| Scolopacidae     | <i>Calidris tenuirostris</i>           | great knot                    | M                   | LC     |      |                              |
| Scolopacidae     | <i>Calidris canutus</i>                | red knot                      | M                   | LC     |      |                              |
| Scolopacidae     | <i>Calidris alba</i> <sup>12</sup>     | sanderling                    | M                   | LC     |      |                              |
| Scolopacidae     | <i>Calidris ruficollis</i>             | red-necked stint              | M                   | LC     |      |                              |
| Scolopacidae     | <i>Calidris melanotos</i>              | pectoral sandpiper            | M                   | LC     |      |                              |

| Family       | Scientific Name <sup>3</sup>                 | Common name               | Status <sup>4</sup> |        |      | Saibai Island                                                                                            |
|--------------|----------------------------------------------|---------------------------|---------------------|--------|------|----------------------------------------------------------------------------------------------------------|
|              |                                              |                           | EPBC Act            | NC Act | BoT  |                                                                                                          |
| Scolopacidae | <i>Calidris acuminata</i>                    | sharp-tailed sandpiper    | M                   | LC     |      | WildNet & published records.                                                                             |
| Scolopacidae | <i>Calidris ferruginea</i>                   | curlew sandpiper          | M                   | LC     |      |                                                                                                          |
| Turnicidae   | <i>Turnix maculosus</i>                      | red-backed button-quail   |                     | LC     |      | Published record                                                                                         |
| Turnicidae   | <i>Turnix pyrrhothorax</i>                   | red-chested button-quail  |                     | LC     |      | Published record                                                                                         |
| Glareolidae  | <i>Glareola maldivarum</i>                   | oriental pratincole       | M                   | LC     |      |                                                                                                          |
| Glareolidae  | <i>Siltia isabella</i>                       | Australian pratincole     |                     | LC     |      | WildNet & published records.                                                                             |
| Laridae      | <i>Anous stolidus</i>                        | common noddy              | M                   | LC     |      |                                                                                                          |
| Laridae      | <i>Anous minutus</i>                         | black noddy               |                     | LC     |      |                                                                                                          |
| Laridae      | <i>Onychoprion anaethetus</i> <sup>13</sup>  | bridled tern              | M                   | LC     |      |                                                                                                          |
| Laridae      | <i>Onychoprion fuscata</i>                   | sooty tern                |                     | LC     |      |                                                                                                          |
| Laridae      | <i>Sternula albifrons</i> <sup>14</sup>      | little tern               | M                   | E      | high |                                                                                                          |
| Laridae      | <i>Gelochelidon nilotica</i>                 | gull-billed tern          |                     | LC     |      | WildNet & published records.                                                                             |
| Laridae      | <i>Hydroprogne caspia</i>                    | caspian tern              | M                   | LC     |      | WildNet & published records.                                                                             |
| Laridae      | <i>Chlidonias hybrida</i>                    | whiskered tern            |                     | LC     |      | WildNet & published records.                                                                             |
| 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     |      |                                                                                                          |
| Laridae      | <i>Sterna hirundo</i>                        | common tern               | M                   | LC     |      | Published record                                                                                         |
| Laridae      | <i>Thalasseus bengalensis</i> <sup>15</sup>  | lesser crested tern       | M                   | LC     |      |                                                                                                          |
| Laridae      | <i>Thalasseus bergii</i>                     | crested tern              |                     | LC     |      | WildNet & published records                                                                              |
| Laridae      | <i>Chroicocephalus novaehollandiae</i>       | silver gull               |                     | LC     |      | WildNet & published 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 caeruleiceps</i> | rainbow lorikeet          |                     | LC     |      | WildNet & published records.                                                                             |
| Psittacidae  | <i>Cyclopsitta species</i>                   | fig-parrot species        |                     |        |      |                                                                                                          |
| Psittacidae  | <i>Eclectus roratus polychloros</i>          | eclectus parrot           |                     | LC     |      | WildNet & published records (incorrectly identified as <i>Eclectus roratus macgillivrayi</i> in WildNet) |
| Psittacidae  | <i>Geoffroyus geoffroyi aruenensis</i>       | red-cheeked parrot        |                     | LC     |      | Published record                                                                                         |
| Cuculidae    | <i>Centropus phasianinus</i>                 | pheasant coucal           |                     | LC     |      | WildNet & published records.                                                                             |
| Cuculidae    | <i>Eudynamys orientalis</i>                  | eastern koel              |                     | LC     |      | WildNet & published records.                                                                             |
| Cuculidae    | <i>Urodynamys taitensis</i>                  | long-tailed cuckoo        |                     |        |      |                                                                                                          |
| Cuculidae    | <i>Scythrops novaehollandiae</i>             | channel-billed cuckoo     |                     | LC     |      | WildNet record.                                                                                          |
| Cuculidae    | <i>Chalcites basalis</i>                     | horsfield's bronze-cuckoo |                     | LC     |      | WildNet record.                                                                                          |

| Family            | Scientific Name <sup>3</sup>               | Common name                       | Status <sup>4</sup> |        |     | Saibai Island                |
|-------------------|--------------------------------------------|-----------------------------------|---------------------|--------|-----|------------------------------|
|                   |                                            |                                   | EPBC Act            | NC Act | BoT |                              |
| Cuculidae         | <i>Chalcites osculans</i>                  | black-eared cuckoo                |                     | LC     |     |                              |
| Cuculidae         | <i>Chalcites lucidus</i>                   | shining bronze-cuckoo             |                     | LC     |     | WildNet & published records. |
| Cuculidae         | <i>Chalcites minutillus</i>                | little bronze-cuckoo              |                     | LC     |     | WildNet & published records. |
| Cuculidae         | <i>Cacomantis pallidus</i>                 | pallid cuckoo                     |                     | LC     |     |                              |
| Cuculidae         | <i>Cacomantis castaneiventris</i>          | chestnut-breasted cuckoo          |                     | LC     |     |                              |
| Cuculidae         | <i>Cacomantis flabelliformis</i>           | fan-tailed cuckoo                 |                     | LC     |     |                              |
| Cuculidae         | <i>Cacomantis variolosus</i>               | brush cuckoo                      |                     | LC     |     | Published record.            |
| Cuculidae         | <i>Cuculus optatus</i> <sup>16</sup>       | oriental cuckoo                   | M                   | LC     |     |                              |
| Strigidae         | <i>Ninox connivens</i>                     | barking owl                       |                     | LC     |     | WildNet & published records. |
| 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 pusilla</i>                | little kingfisher                 |                     | LC     |     | WildNet & published records. |
| 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     |     | WildNet & published records. |
| Halcyonidae       | <i>Todiramphus sanctus</i>                 | sacred kingfisher                 |                     | LC     |     | WildNet & published records. |
| Halcyonidae       | <i>Todiramphus chloris</i>                 | collared kingfisher               |                     | LC     |     | Published record.            |
| Meropidae         | <i>Merops ornatus</i>                      | rainbow bee-eater                 | M                   | LC     |     | WildNet & published records. |
| Coraciidae        | <i>Eurystomus orientalis</i>               | dollarbird                        |                     | LC     |     |                              |
| Pittidae          | <i>Pitta erythrogaster</i>                 | red-bellied pitta                 |                     | LC     |     |                              |
| Pittidae          | <i>Pitta versicolor</i>                    | noisy pitta                       |                     | LC     |     |                              |
| Ptilonorhynchidae | <i>Ptilonorhynchus nuchalis</i>            | great bowerbird                   |                     | LC     |     |                              |
| Acanthizidae      | <i>Sericornis beccarii</i>                 | tropical scrubwren                |                     | LC     |     |                              |
| Acanthizidae      | <i>Gerygone levigaster</i>                 | mangrove gerygone                 |                     | LC     |     | WildNet & published records. |
| Acanthizidae      | <i>Gerygone magnirostris brunneipectus</i> | large-billed gerygone             |                     | LC     |     | WildNet & published records. |
| Acanthizidae      | <i>Gerygone palpebrosa</i>                 | fairy gerygone                    |                     | LC     |     |                              |
| Meliphagidae      | <i>Meliphaga notata</i>                    | yellow-spotted honeyeater         |                     | LC     |     |                              |
| Meliphagidae      | <i>Meliphaga gracilis</i>                  | graceful honeyeater               |                     | LC     |     |                              |
| Meliphagidae      | <i>Lichenostomus versicolor</i>            | varied honeyeater                 |                     | LC     |     | WildNet & published records. |
| Meliphagidae      | <i>Manorina melanocephala</i>              | noisy miner                       |                     | LC     |     |                              |

| Family          | Scientific Name <sup>3</sup>              | Common name                 | Status <sup>4</sup> |        |     | Saibai Island                |
|-----------------|-------------------------------------------|-----------------------------|---------------------|--------|-----|------------------------------|
|                 |                                           |                             | EPBC Act            | NC Act | BoT |                              |
| Meliphagidae    | <i>Ramsayornis modestus</i>               | brown-backed honeyeater     |                     | LC     |     | WildNet & published records. |
| Meliphagidae    | <i>Conopophila albogularis</i>            | rufous-banded honeyeater    |                     | LC     |     | WildNet & published records. |
| Meliphagidae    | <i>Myzomela obscura fumata</i>            | dusky honeyeater            |                     | LC     |     | WildNet & published records. |
| Meliphagidae    | <i>Myzomela erythrocephala infuscata</i>  | red-headed honeyeater       |                     | LC     |     | WildNet & published records. |
| Meliphagidae    | <i>Cissomela pectoralis</i>               | banded honeyeater           |                     | LC     |     |                              |
| Meliphagidae    | <i>Lichmera indistincta</i>               | brown honeyeater            |                     | LC     |     | WildNet & published records. |
| 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 saturator</i>    | tawny-breasted honeyeater   |                     | LC     |     | WildNet & published records. |
| Pomatostomidae  | <i>Pomatostomus temporalis</i>            | grey-crowned babbler        |                     | LC     |     |                              |
| Campephagidae   | <i>Coracina novaehollandiae</i>           | black-faced cuckoo-shrike   |                     | LC     |     | WildNet & published records. |
| Campephagidae   | <i>Coracina papuensis</i>                 | white-bellied cuckoo-shrike |                     | LC     |     | WildNet & published records. |
| Campephagidae   | <i>Coracina lineata</i>                   | barred cuckoo-shrike        |                     | LC     |     |                              |
| Campephagidae   | <i>Coracina tenuirostris melvillensis</i> | (Melville) cicadabird       | M                   | LC     |     | WildNet & published records. |
| Campephagidae   | <i>Lalage tricolor</i>                    | white-winged triller        |                     | LC     |     |                              |
| Campephagidae   | <i>Lalage leucomela</i>                   | varied triller              |                     | LC     |     | WildNet & published records. |
| Pachycephalidae | <i>Pachycephala melanura</i>              | mangrove golden whistler    |                     | LC     |     | WildNet & published records. |
| Pachycephalidae | <i>Pachycephala rufiventris</i>           | rufous whistler             |                     | LC     |     |                              |
| Pachycephalidae | <i>Colluricincla megarhyncha</i>          | little shrike-thrush        |                     | LC     |     |                              |
| Oriolidae       | <i>Sphecothebes vieilloti</i>             | Australasian figbird        |                     | LC     |     |                              |
| Oriolidae       | <i>Oriolus flavocinctus</i>               | yellow oriole               |                     | LC     |     | Published record.            |
| Oriolidae       | <i>Oriolus sagittatus</i>                 | olive-backed oriole         |                     | LC     |     | WildNet record.              |
| Artamidae       | <i>Artamus leucorhynchus</i>              | white-breasted woodswallow  |                     | LC     |     | WildNet & published records. |
| Artamidae       | <i>Artamus cinereus</i>                   | black-faced woodswallow     |                     | LC     |     |                              |
| Artamidae       | <i>Artamus minor</i>                      | little woodswallow          |                     | LC     |     |                              |
| Artamidae       | <i>Cracticus quoyi alecto</i>             | black butcherbird           |                     | LC     |     | WildNet & published records. |
| Dicruridae      | <i>Dicrurus bracteatus carbonarius</i>    | spangled drongo             |                     | LC     |     | WildNet & published records. |
| Rhipiduridae    | <i>Rhipidura rufifrons</i>                | rufous fantail              | M                   | LC     |     | Published record             |
| Rhipiduridae    | <i>Rhipidura phasiana</i>                 | mangrove grey fantail       |                     | LC     |     | Published record             |
| Rhipiduridae    | <i>Rhipidura rufiventris gularis</i>      | northern fantail            |                     | LC     |     | WildNet & published records. |
| Rhipiduridae    | <i>Rhipidura leucophrys melaleuca</i>     | willie wagtail              |                     | LC     |     | WildNet & published records. |
| Corvidae        | <i>Corvus orru orru</i>                   | torresian crow              |                     | LC     |     | WildNet & published records. |

| Family         | Scientific Name <sup>3</sup>                   | Common name              | Status <sup>4</sup> |        |     | Saibai Island                                       |
|----------------|------------------------------------------------|--------------------------|---------------------|--------|-----|-----------------------------------------------------|
|                |                                                |                          | EPBC Act            | NC Act | BoT |                                                     |
| Monarchidae    | <i>Myiagra ruficollis</i>                      | broad-billed flycatcher  |                     | LC     |     | WildNet & published records.                        |
| Monarchidae    | <i>Myiagra rubecula</i>                        | leaden flycatcher        |                     | LC     |     |                                                     |
| Monarchidae    | <i>Myiagra cyanoleuca</i>                      | satin flycatcher         | M                   | LC     |     | Published record.                                   |
| Monarchidae    | <i>Myiagra alecto</i>                          | shining flycatcher       |                     | LC     |     |                                                     |
| Monarchidae    | <i>Myiagra inquieta</i>                        | restless flycatcher      |                     | LC     |     | Published record                                    |
| Monarchidae    | <i>Monarcha melanopsis</i>                     | black-faced monarch      | M                   | LC     |     | WildNet & published records.                        |
| Monarchidae    | <i>Monarcha frater</i>                         | black-winged monarch     | M                   | LC     |     | Predicted by the EPBC Protected Matters Search Tool |
| Monarchidae    | <i>Symposiachrus trivirgatus</i> <sup>17</sup> | spectacled monarch       | M                   | LC     |     | WildNet record.                                     |
| Monarchidae    | <i>Grallina cyanoleuca</i>                     | magpie-lark              |                     | LC     |     |                                                     |
| Monarchidae    | <i>Arses telescopthalmus</i>                   | frilled monarch          |                     | LC     |     |                                                     |
| Paradisaeidae  | <i>Phonygammus keraudrenii</i>                 | trumpet manucode         |                     | LC     |     | Published record.                                   |
| Paradisaeidae  | <i>Ptiloris magnificus</i>                     | magnificent riflebird    |                     | LC     |     |                                                     |
| Petroicidae    | <i>Microeca flavigaster</i>                    | lemon-bellied flycatcher |                     | LC     |     |                                                     |
| Petroicidae    | <i>Peneoenanthe pulverulenta</i>               | mangrove robin           |                     | LC     |     | Published record.                                   |
| Petroicidae    | <i>Drymodes supercilialis</i>                  | northern scrub-robin     |                     | LC     |     |                                                     |
| Cisticolidae   | <i>Cisticola exilis</i>                        | golden-headed cisticola  |                     | LC     |     | WildNet & published records.                        |
| Acrocephalidae | <i>Acrocephalus australis</i> <sup>18</sup>    | 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     |     |                                                     |
| Timaliidae     | <i>Zosterops lateralis</i>                     | silveryeye               |                     | LC     |     |                                                     |
| Hirundinidae   | <i>Hirundo rustica</i>                         | barn swallow             | M                   | LC     |     |                                                     |
| Hirundinidae   | <i>Hirundo neoxena</i>                         | welcome swallow          |                     | LC     |     | Published record                                    |
| Hirundinidae   | <i>Petrochelidon ariel</i>                     | fairy martin             |                     | LC     |     | WildNet record.                                     |
| Hirundinidae   | <i>Petrochelidon nigricans</i>                 | tree martin              |                     | LC     |     | WildNet & published records.                        |
| Hirundinidae   | <i>Cecropis daurica</i> <sup>19</sup>          | red-rumped swallow       | M                   | LC     |     |                                                     |
| Turdidae       | <i>Zoothera</i> sp.                            | thrush species           |                     | LC     |     |                                                     |
| Sturnidae      | <i>Aplornis cantoroides</i>                    | singing starling         |                     | LC     |     | WildNet & published records.                        |
| Sturnidae      | <i>Aplornis metallica</i>                      | metallic starling        |                     | LC     |     | WildNet & published records.                        |
| Sturnidae      | <i>Sturnus tristis</i>                         | common myna              |                     | I      |     |                                                     |
| Nectariniidae  | <i>Dicaeum geelvinkianum</i>                   | red-capped flowerpecker  |                     | LC     |     | Published record                                    |
| Nectariniidae  | <i>Dicaeum hirundinaceum</i>                   | mistletoebird            |                     | LC     |     |                                                     |
| Nectariniidae  | <i>Nectarinia jugularis</i>                    | olive-backed sunbird     |                     | LC     |     | WildNet & published records.                        |
| Estrildidae    | <i>Poephila personata</i>                      | masked finch             |                     | LC     |     |                                                     |
| Estrildidae    | <i>Lonchura punctulata</i>                     | nutmeg mannikin          |                     | I      |     |                                                     |

| Family           | Scientific Name <sup>3</sup>                   | Common name                       | Status <sup>4</sup> |        |      | Saibai Island                                        |
|------------------|------------------------------------------------|-----------------------------------|---------------------|--------|------|------------------------------------------------------|
|                  |                                                |                                   | EPBC Act            | NC Act | BoT  |                                                      |
| Estrildidae      | <i>Lonchura castaneothorax</i>                 | chestnut-breasted mannikin        |                     | LC     |      | WildNet & published records.                         |
| Passeridae       | <i>Passer domesticus</i>                       | house sparrow                     |                     | I      |      | WildNet & published records.                         |
| Motacillidae     | <i>Motacilla</i> sp.                           | yellow wagtail species            | M                   | LC     |      |                                                      |
| <b>MAMMALS</b>   |                                                |                                   |                     |        |      |                                                      |
| 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  |
| Pteropodidae     | <i>Pteropus macrotis</i>                       | large-eared flying-fox            |                     | LC     |      | Published record (Clarke 2007).                      |
| 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 bat    |                     | LC     |      |                                                      |
| Hipposideridae   | <i>Hipposideros cervinus</i>                   | fawn leaf-nosed bat               |                     | V      | high |                                                      |
| Hipposideridae   | <i>Hipposideros diadema</i>                    | diadem leaf-nosed bat             |                     | LC     |      |                                                      |
| Emballonuridae   | <i>Saccolaimus saccolaimus nudicluniatus</i>   | bare-rumped sheath-tail-bat       | CE                  | E      | high |                                                      |
| Emballonuridae   | <i>Taphozous australis</i>                     | coastal sheath-tail bat           |                     | V      | high |                                                      |
| 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     |      | Published record                                     |
| 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     |      | Published record (Clarke 2007) with some uncertainty |

| Family   | Scientific Name <sup>3</sup> | Common name         | Status <sup>4</sup> |        |      | Saibai Island                    |
|----------|------------------------------|---------------------|---------------------|--------|------|----------------------------------|
|          |                              |                     | EPBC Act            | NC Act | BoT  |                                  |
| Muridae  | <i>Melomys capensis</i>      | cape york melomys   |                     | LC     |      |                                  |
| Muridae  | <i>Melomys rubicola</i>      | bramble cay melomys | E                   | E      | high |                                  |
| Muridae  | <i>Mus musculus</i>          | house mouse         |                     | I      |      |                                  |
| Muridae  | <i>Pseudomys delicatulus</i> | delicate mouse      |                     | LC     |      |                                  |
| Muridae  | <i>Rattus exulans</i>        | pacific rat         |                     | I      |      |                                  |
| Muridae  | <i>Rattus norvegicus</i>     | brown rat           |                     | I      |      |                                  |
| Muridae  | <i>Rattus rattus</i>         | black rat           |                     | I      |      |                                  |
| Muridae  | <i>Xeromys myoides</i>       | water mouse         | V                   | V      | high |                                  |
| Canidae  | <i>Canis lupus</i>           | dingo, domestic dog |                     | I      |      | Stanton D (personal observation) |
| Felidae  | <i>Felis catus</i>           | cat                 |                     | I      |      | Unpublished record.              |
| Equidae  | <i>Equus caballus</i>        | horse, brumby       |                     | I      |      |                                  |
| Suidae   | <i>Sus scrofa</i>            | pig                 |                     | I      |      | Unpublished record.              |
| Bovidae  | <i>Capra hircus</i>          | goat                |                     | I      |      |                                  |
| Cervidae | <i>Cervus timorensis</i>     | rusa deer           |                     | I      |      | Unpublished record.              |

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

26. Listed under the EPBC Act as *Hirundo daurica* (ROKAMBA).

## ***Appendix E. Species Profiles for Endangered, Vulnerable and Near-Threatened animals predicted to occur on Saibai Island***

### **Fawn Leaf-nosed Bat (*Hipposideros cervinus*)**

**NC Act:** Vulnerable

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

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

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

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

### **Water mouse (*Xeromys myoides*)**

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

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

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

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

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

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

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

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

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

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

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

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

#### **Torresian Tube-nosed Bat (*Nyctimene cephalotes*)**

**NC Act:** Near-Threatened

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

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

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

### **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 Papua 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, and observations and Anabat recordings from Pulu (Watson 2009). There are possible Anabat recordings for Mabuiag (Conics 2009b) but Pulu is in such close proximity to Mabuiag that individuals would move between islands readily. In March 2011 at least 20 individuals were present in the church at St Pauls on Mua Island (Terry Reis *pers. obs.*).

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 Saibai 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.

### **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. Conics (2010a) however reports healthy populations of the species on Ugar. *Emoia* species are efficient rafters and colonise islands on floating debris (Wilson 2005) and it is likely to occur on Torres Strait Islands in addition to Boigu.

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

### **Emerald Monitor (*Varanus prasinus*)**

**NC Act:** Near-Threatened

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

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

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

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

## ***Appendix F. Profiles of Migratory Fauna Species Potentially occurring on Saibai Island and Surrounding Islets***

### **Waders**

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

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

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

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

### **Terns**

**Life history:** Six Migratory tern species have been recorded from Saibai 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 Saibai Island. Threats appear to be minimal.

### **Herons and egrets**

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

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

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

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

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

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

### **Swifts**

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

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

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

### **Raptors**

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

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

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

### **Glossy ibis (*Plegadis falcinellus*)**

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

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

### **Oriental Cuckoo (*Cuculus optatus*)**

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

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

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

#### **Rainbow Bee-eater (*Merops ornatus*)**

The Rainbow bee-eater occurs in almost any habitat. The species eats insects, preferring bees and wasps, which are mostly caught in the air, and will also take food from the ground or vegetation and occasionally water. It is widespread in Australia, 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 have been found to prey on the eggs and nestlings (Boland 2004b). Draffan *et al.* (1983) describe rainbow bee-eater as an abundant passage migrant in Torres Strait and the species could occur in, or over, all habitats on Saibai 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 Saibai Island and would use any wooded areas, including mangroves. Breeding by any species would be limited, if any breeding occurs, and black rat has not been reported. Threats would appear to be limited to habitat loss.

#### **Open habitat species**

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

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

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

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

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

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

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

