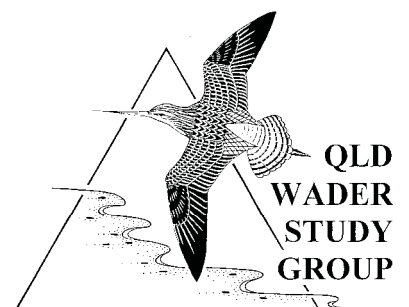




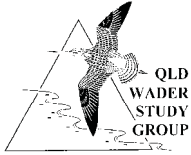
# Moreton Bay Regional Council Shorebird Habitat Mapping Project

David Milton and Jill Denning  
Report 640/1-20-5/P  
30 June 2009

For Planning and Environment, Moreton Bay Regional Council  
Ms E Porter & Mr M Messer







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# CONTENTS

1.	<b>SUMMARY</b> .....	3
2.	<b>INTRODUCTION</b> .....	3
2.1	<b>Background</b> .....	3
2.2	<b>Introduction</b> .....	5
2.3	<b>Project aims and objectives</b> .....	6
2.4	<b>Project scope and methodology</b> .....	6
2.5	<b>Key milestones and deliverables</b> .....	6
2.6	<b>Project Team</b> .....	7
3.	<b>SHOREBIRD ROOST HABITAT MAPPING</b> .....	9
3.1	<b>Roost habitat classification</b> .....	9
3.1.1	<b>Roost habitat types within Moreton Bay Regional Council jurisdiction</b> .....	9
	<i>Roost habitat TECM</i> .....	10
	<i>Roost habitat TECSMR</i> .....	10
	<i>Roost habitat TECSM</i> .....	10
	<i>Roost habitat TECS</i> .....	10
	<i>Roost habitat LFSM</i> .....	10
	<i>Roost habitat TECMR</i> .....	11
3.2	<b>MBRC shorebird high tide roosts</b> .....	15
3.2.1	<b>Roost site mapping methods</b> .....	15
3.2.2	<b>Summary of shorebird roost data</b> .....	15
3.2.3	<b>Roost mapping survey limitations</b> .....	55
3.2.4	<b>Putting MBRC shorebird roosts in a regional context</b> .....	55
4.	<b>REFERENCES</b> .....	57
	<b>APPENDIX A – GLOSSARY OF TECHNICAL TERMS</b> .....	58
	<b>APPENDIX B – SHOREBIRD SPECIES LIST FOR MORETON BAY</b> .....	59
	<b>APPENDIX C - INTERNATIONAL AND COMMONWEALTH MECHANISMS FOR SHOREBIRD PROTECTION</b> .....	61

<b>APPENDIX D – PUMICESTONE SHOREBIRD MANAGEMENT GROUP (PSMG).....</b>	<b>62</b>
<b>APPENDIX E – SHOREBIRD FACTSHEET AND PLANNING GUIDELINES.</b>	<b>63</b>

## LIST OF FIGURES

Figure 3-1 Donnybrook claypan roost (Type 1) on a spring high tide showing a large flock of shorebirds at a typical TECM roost type.	11
Figure 3-2 Roost habitat TECSMR at Sandstone Pt (Type 1) looking across to Bribie Is on an incoming tide.	12
Figure 3-3 Toorbul north roost (Type 1) (habitat TECSM) on a king high tide showing the mixed sandy mud habitat typical of this roost habitat classification.	12
Figure 3-4 Roost habitat TECS on the Buckley's Hole sandspit (Type 1) at southern end of Bribie Is. This site is a <b>critical</b> king tide roost that is subject to extensive regular disturbance from people.	13
Figure 3-5 Typical roost habitat LFSM at Buckley's Hole lagoon (Type 1) on Bribie Is	13
Figure 3-6 The Deception Bay central roost (Type 2: staging roost) (habitat TECMR) on a rising tide showing the mud and rock substrate and two dogs that had chased shorebirds prior to the photograph being taken.	14
Figure 3-7 An example of a Type 3 tree roost in Hays Inlet (not mapped) used occasionally by Terek Sandpipers on the high tide. Predation can often be low at these tree roosts as they are usually separated from the adjacent mangroves and the birds have good visibility.	14
Figure 3-8 Index map of the Moreton Bay Regional Council jurisdiction showing the locations of all 28 shorebird high tide roosts and the eight more detailed inset maps.	17
Figure 3-9 Map 1 showing the shorebird high tide roosts in the northern part of Moreton Bay Regional Council jurisdiction in Pumicestone Passage. See Table 3.3 below for shorebird species composition at each roost, their roost characteristics and threats.	18
Figure 3-10 Map 2 showing the shorebird high tide roosts on the mainland side of central Pumicestone Passage. See Table 3.3 below for shorebird species composition at each roost, their roost characteristics and threats.	18
Figure 3-11 Map 3 showing shorebird high tide roosts in the southern part of Pumicestone Passage. See Table 3.3 below for shorebird species composition at each roost, their roost characteristics and threats.	19
Figure 3-12 Map 4 showing shorebird high tide roosts on southern Bribie Is and adjacent mainland parts of northern Deception Bay. See Table 3.3 below for shorebird species composition at each roost, their roost characteristics and threats.	19
Figure 3-13 Map 5 showing the shorebird high tide roosts in Deception Bay. See Table 3.3 below for shorebird species composition at each roost, their roost characteristics and threats.	20
Figure 3-14 Map 6 showing Deception Bay South (DBMN), the large roost in southern Deception Bay (QWSG code: RANS) and the nearby freshwater wetland (NARD). See Table 3.3 below for shorebird species composition, roost characteristics and threats.	20
Figure 3-15. Map 7 showing the known high tide roost in Hays Inlet, west of Redcliffe. Also shaded is the extent of potential roosting habitat in the area that remain unsurveyed due to inaccessibility during the project period. See Table 3.3 below for shorebird species composition, roost characteristics and threats	21
Figure 3-16. Map 8 showing the high tide roosts in the mouth of the North Pine River and the southern extent of the potential shorebird roosting habitat on Map 7 (Fig. 3.15). See Table 3.3 below for shorebird species composition, roost characteristics and threats.	21

## LIST OF TABLES

Table 3-1 The roost habitat codes used to define all shorebird high tide roosts mapped by QWSG members. Each roost was defined by a combination of up to six of the habitat codes depending on its characteristics. For example, a roost on an open sandy beach would have a habitat code of TOCS, whereas a roost on a muddy spit in a brackish mangrove creek could have a code of TEBM.....	9
Table 3-2 The list of the high tide roosts in within the Moreton Bay Regional Council boundary, the roost type and its habitat classification. The characteristics of each of these roosts are described in detail in Table 3.3.....	16
Table 3-3 The shorebird roost sites within Moreton Bay Regional Council (MRC) jurisdiction identified by J. Denning and QWSG in February 2008 and April 2009. Roost names and codes correspond with that used in the QWSG count database provided to MBRC. Roost characteristics are taken from the habitat codes in Table 3.1 above. The number of counts (made before April 2009) gives an indication of data precision and accuracy. Name in bold are migratory species listed under the federal EPBC Act 1999. .....	22



## 1. SUMMARY

Moreton Bay provides critical non-breeding habitat for up to 42 species of migratory and resident shorebird. It was designated a RAMSAR site of international importance in 1996 as it meets two of the criteria. It holds > 20,000 migratory shorebirds and supporting >1% of the world population of eight species. Migratory shorebirds are also EPBC-listed species and the subject of several international agreements. These birds feed in intertidal areas at low tide and roost in adjacent supratidal areas at high tide. Thus, undisturbed high tide roosting habitats are important to maintain their populations and enable them to undertake the annual 20,000 km round trip to their arctic breeding grounds. There are large populations of shorebirds within Moreton Bay Regional Council (MBRC) boundaries. The MBRC region supports over 50% of the shorebirds in Moreton Bay due to large areas of intertidal feeding habitat and suitable adjacent roosting habitat. The aim of this project was to map the shorebird roosts within MBRC jurisdiction, summarise the numbers of shorebirds using each roost, categorise the important habitats of each roost and document known threats. The geographical locations and extents of each shorebird high tide roost have been mapped and incorporated into the MBRC GIS system. A total of 28 high tide roosts have been identified, mapped and their use by shorebirds and waterbirds summarised. A summary table provides a list of the species found at each roost and the mean and maximum count. These indices of relative abundance can be used to assess the relative importance of each roost for shorebirds. The northern parts of the MBRC in Pumicestone Passage support the greatest number of shorebirds. Up to 55 species of shorebird and waterbird have been documented from some large roosts in the southern Pumicestone Passage and North Pine River. It is most critical for the MBRC to protect and maintain the viability of these roosts as they support a large number of shorebirds. A number of threats to the viability of roosts were identified, including natural and introduced predators and disturbance by people and their pets. The most significant threat to shorebird roost use in MBRC is from disturbance by people and their dogs. Buckley's Hole Sandbar on the southern end of Bribie Is is the most consistently disturbed roost within MBRC and Moreton Bay. All the large roosts in the southern Pumicestone Passage also receive regular disturbance. The low level of coastal development within the northern MBRC where the shorebird numbers are greatest means that the MBRC have an important role in the protection of the shorebird populations in the region. To help facilitate this, simple planning guidelines have been developed to be used in conjunction with this report to advise MBRC planners in their assessment of development applications.

## 2. INTRODUCTION

### 2.1 Background

Shorebirds, also known around the world as 'waders'; comprise 10% of Australia's bird species. Most shorebirds that visit Moreton Bay during summer (September – April) are migratory. They breed in Siberia and Alaska and travel the East Asian-Australasian Flyway twice a year on migration. About 2 million shorebirds migrate to Australia every year, travelling up to 25,000 km. From September to April, a large number of shorebird species (up to 40,000 birds) are found in Moreton Bay. Some shorebirds reside in one location for their entire lives, and are

known as 'resident' shorebirds (see Appendix A for definitions). Many shorebirds roost (or rest) above the high tide mark and feed at low tide in mud flats. The species of shorebirds that use Moreton Bay (including Pumicestone Passage) are listed in Appendix B.

Moreton Bay Marine Park, including Pumicestone Passage, was declared a Ramsar wetland of international significance partly because of the area's significance as an East Asian-Australasian Flyway shorebird feeding and roosting habitat. Although there are 112 identified shorebird roost sites in Moreton Bay, only 15 of these are available to shorebirds during the particularly high king tides that occur on a few days of each year. At these times, all of Moreton Bay's shorebirds are crowded into the limited roost areas, and disturbance during this time is more critical than usual. A significant number of these roosts are considered threatened by development as they lie outside the boundary of the Marine Park at the Highest Astronomical Tide (HAT) line.

Shorebirds are vulnerable to a number of threats throughout their range including habitat loss and degradation, pollution, hunting, and disturbance from people, dogs, competition, vehicles, vessels and exotic pests. The major threat in Queensland is the inadequate protection of shorebird roosting and feeding sites, and threats from pollution. Appendix C outlines the international and commonwealth mechanisms for protection of shorebirds and/or their habitat.

The Queensland Wader Study Group (QWSG) is one of many across Australia that are working towards the protection of shorebirds by providing scientific information, and advocating both for the preservation and wise management of their habitat. The QWSG is a special interest group within Birds Queensland.

To date the QWSG has completed the Great Sandy Strait Shorebird Roost Mapping Project Final report (QWSG, 2005) for the Great Sandy Strait. The QWSG also recently mapped shorebird habitat along the Burnett Mary Coast north of the Sandy Straits between Hervey Bay and Gladstone. The Australasian Wader Study Group has also completed a project to map Great Knot roosts in the Mackay region.

The QWSG recently mapped shorebird habitat and made a concurrent shorebird count across the entire Moreton Bay Ramsar Wetland. The habitat mapping to be undertaken for the Moreton Bay Regional Council (MBRC) project, that is the subject of this report, will inform and complement the broader Moreton Bay Mapping Study being undertaken for the Queensland Department of Environment and Resource Management in 2009.

Sunshine Coast Regional Council recently completed mapping of high and low tide roosts in and adjacent to Caloundra to inform their submission to the State Government on the Moreton Bay Marine Park Zoning Plan.

The Pumicestone Shorebird Management Group (PSMG) is a partnership between a developer, consultants, governments, the community and experts, to guide the management of shorebirds and their habitat in the Pumicestone Passage region. The PSMG formed in 2000 to facilitate the implementation of an environmental management plan – the Management Plan for Wader High-tide Roosts in Central-Southern Pumicestone Passage. The plan was developed to address a lack of shorebird roost management in the Pumicestone Passage, and the imminent removal of an artificially created roost on a construction site located on Bribie Island adjoining Pumicestone Passage. A list of PSMG members is provided in Appendix D.

In January 2007, the PSMG held a workshop focusing on the management of the recently enhanced southern Toorbul shorebird roost and other priority shorebird management actions in the southern Pumicestone Passage region. Specifically the workshop aims were to:

- Foster stewardship of the shorebird staging roost at southern Toorbul;
- Develop an agreed plan for the on-going management of the southern Toorbul roost in order to establish, maintain and demonstrate best practice standards for site maintenance as part of overall habitat management in the region; and
- Identify other priority shorebird management actions for the southern Pumicestone Passage region, and funding necessary to deliver them.

One of the actions that came out of the workshop was to “...acquire current mapping of shorebird feeding and roosting sites (and associated data) in the southern Pumicestone Passage and incorporate the relevant area into the Moreton Bay Regional Council Plan (during next appropriate planning scheme update) for consideration in the development assessment process”. This project aims to deliver on this action.

The project outputs will form part of Council’s Local Nature Conservation Strategy currently in development, which is a requirement under the SEQ Regional Plan and the Regional Nature Conservation Strategy. Ultimately they will inform future amendments to Council’s planning scheme.

## 2.2 Introduction

Pumicestone Passage is recognised as a wetland of international significance partly because of its importance to migratory shorebirds. Many shorebird species that visit the parts of Moreton Bay within Moreton Bay Regional Council jurisdiction in the summer months are also listed under international migratory bird treaties and so are protected under Commonwealth legislation as matters of national environmental significance. It is imperative that Council has a thorough understanding of the habitats and roosting requirements of these birds to better inform planning decisions.

The Moreton Bay Regional Council Shorebird Habitat Mapping Project ultimately aims to provide improved habitat protection and planning outcomes for shorebirds in MBRC jurisdiction. The project outputs will form part of Council’s Local Nature Conservation Strategy, currently in development. Ultimately they will inform future amendments to Council’s planning scheme. This will enable Council and other land managers to better conserve and appropriately manage important shorebird sites in the region.

Better planning by local governments is needed to help reduce the impacts of people on shorebirds. Councils need to be aware of the locations of shorebird high tide roosts when assessing new coastal development applications. They also need to be aware of the impact of disturbance on shorebird energy budgets and take steps to minimise disturbance to roosting shorebirds. The first step in improving planning assessments is to identify and map existing shorebird roosting habitats within each council’s jurisdiction. The Queensland Wader Study Group has been mapping shorebird high tide roosting habitats along the Queensland coast since 2003. High tide roosts in the Great Sandy Strait (Harding et al. 2005) north to Tannum Sands, near Gladstone (Milton and Harding 2007) have now been mapped and these data available for use in planning development assessment.

## 2.3 Project aims and objectives

- Liaise with council planning officers (and EPA officers) to determine roost attributes to be collected and information required for planning guidelines (provide Great Sandy Straits example);
- Extract the location details (latitude and longitude) of all shorebird high tide roosts in MBRC recorded in the Queensland Wader Study Group (QWSG) database;
- Plot the boundaries of these and other known shorebird roosts using GPS unit/s;
- Liaise with Council's GIS officers to generate a map of shorebird high tide roosts (using the GPS data) to inform the relevant local government planning scheme;
- Develop a simple set of guidelines to support the map of shorebird high tide roosts, also to inform the relevant local government planning scheme, including general shorebird information, threats and management considerations;
- Seek QWSG and EPA endorsement of the habitat mapping data and planning guidelines; and
- Identify and formalise procedures for ongoing sharing of QWSG shorebird count data with local government to guide decision-making.

## 2.4 Project scope and methodology

The project scope extends to the mapping of shorebird high tide roosts that require protection within MBRC boundaries, the development of planning guidelines to guide decision-making in the development assessment process and formalising procedures for data sharing arrangements.

The preferred methodology to be adopted for the mapping of the high tide roosts is that adopted by the QWSG for the Great Sandy Strait Shorebird Roost Mapping Project (Harding et al., 2005).

## 2.5 Key milestones and deliverables

The project has five key milestones including:

- Planning Phase
- Field Work Phase
- Desktop Phase
- Reporting Phase
- Evaluation Phase

The two (2) key deliverables from this project include:

- Mapping of high tide roosts
- Planning Guidelines

## 2.6 Project Team

<b>Project Role</b>	<b>Position</b>	<b>Interest</b>
David Milton	QWSG committee member	Principal author of report, extensive experience with shorebird mapping along central and south-eastern Qld coast
Jill Denning	QWSG member and local shorebird expert	Extensive experience of shorebirds in Pumicestone Passage and adjacent Sunshine Coast. Responsible for mapping of roosts
Erin Porter	Coordinator Catchments & Coastal Management Planning (Policy), Moreton Bay Regional Council	Project Manager (internal)
Michael Messer	Senior Environmental Planner, Moreton Bay Regional Council	Project Manager (internal)/Review of planning guidelines and mapping outputs for incorporation into Planning Scheme as future amendment
Catherine Rollo	Strategic Planner, Moreton Bay Regional Council	Review of planning guidelines and mapping outputs for incorporation into Planning Scheme as future amendment
Siobhan Bland	Coordinator Biodiversity & Natural Environment (Policy)	Review of planning guidelines and mapping outputs for incorporation into Planning Scheme as future amendment
Steve Agioritis	Senior GIS Officer, Moreton Bay Regional Council	GIS advice, mapping of digital data and review
Nicola Udy	Manager, Moreton Bay Marine Park, Queensland Parks and Wildlife Service	Review of planning guidelines and mapping data



### 3. SHOREBIRD ROOST HABITAT MAPPING

#### 3.1 Roost habitat classification

The Queensland Wader Study Group (QWSG) has been undertaking counts of shorebirds at their high tide roosts in Moreton Bay since 1992. As part of these surveys, QWSG have developed a roost habitat classification system (Table 3.1). This classification system identified the major characteristics of the habitats used by shorebirds at high tide. This habitat classification system has been applied to high tide roosts throughout Queensland that have been surveyed by QWSG.

Table 3-1 The roost habitat codes used to define all shorebird high tide roosts mapped by QWSG members. Each roost was defined by a combination of up to six of the habitat codes depending on its characteristics. For example, a roost on an open sandy beach would have a habitat code of TOCS, whereas a roost on a muddy spit in a brackish mangrove creek could have a code of TEBM.

Site location	Code	Water definition	Code	Substrate	Code
Coastal tidal	T	Marine	C	Sand	S
Coastal non-tidal	N	Freshwater	F	Mud	M
Coastal open water	O	Brackish	B	Rock	R
Coastal bay, inlet or estuary	E	Dry	D	Other (specify)	X
Coastal lake, swamp or lagoon	L				
Inland (> 10 km from sea or estuary)	I				

##### 3.1.1 Roost habitat types within Moreton Bay Regional Council jurisdiction

Shorebirds are a group of mostly migratory birds that feed along the margins of wetlands, especially coastal intertidal flats. They breed at high latitudes in the northern hemisphere and spend their non-breeding season (September – April) along the coast of countries in the southern hemisphere. This life cycle is believed to have evolved as an adaptation to the limited feeding habitats in tropical regions due to the narrow tidal range.

Moreton Bay hosts up to 40,000 shorebirds of 42 species of shorebird during the summer (Appendix C). Shorebirds are governed by the daily tidal cycles and will feed both day and night during low tide. At high tide, they move above the high water line to suitable open areas near their feeding grounds to rest and digest their food. These high tide resting areas are known as “roosts” (Appendix A) and can be classified into a range of broad categories based on their physical locations and characteristics. Most species only roost on the ground in supratidal areas with a clear view of their surroundings. However, three species found in MBRC area (Grey-tailed Tattler, Terek Sandpiper and Whimbrel) will often also use exposed tree branches to roost.

High tide roosts are usually within 1-2 km of the feeding grounds of shorebirds. In Moreton Bay, QWSG has found individual shorebirds show a strong daily fidelity to their feeding and

roosting areas. Where possible, they use the same roost each high tide and move between the roost and their intertidal feeding areas twice a day. Roosts are chosen for their landscape features that allow clear view of predators (including people and their pets) and safety from regular disturbance. Shorebirds try to keep energy expenditure on unnecessary flight to a minimum in order to convert food to stored fat. This fat fuels their long (up to 10,000 km non-stop) flights to and from their northern hemisphere breeding grounds. Thus, access to productive feeding grounds and safe high tide roosts nearby that allow rest with minimal disturbance are both critical for successful annual migrations.

In many parts of Moreton Bay, the gradients are quite shallow along the margins of the bay. This means that open areas, such as beaches, that may be used as a roost during moderate (up to 2.2 m) high tides may be covered in water at some times of the month and year when tides are much higher. At these times, the shorebirds are forced to fly further at high tide and congregate in the few roosts that remain above high water. These roosts may not be used during other tides, but are critical for the shorebirds during these spring (2.2 – 2.4 m) and king (>2.4 m) tides each year. QWSG estimate that there are only about 15 king tide roosts available throughout Moreton Bay to hold 40,000 shorebirds. Moreton Bay Regional Council has five of these critical king tide roosts.

A total of 28 high tide roosts used by shorebirds on most high tides were identified within MBRC from the QWSG count database and site visits (see Section 3.2.1 below for details). Among the roosts, there were five different habitat classifications identified (Table 3.2). In order to better understand the types of habitats present in each roost habitat classification, photographs of an example of each habitat classification are provided.

#### *Roost habitat TECM*

These roosts are mostly large claypans and often used by large numbers of shorebirds, especially on spring and king high tides (Figure 3.1).

#### *Roost habitat TECSMR*

These roosts are a mixture of sand and mud beaches with rock ledges that are used as a roost by some species as the tide comes in (Figure 3.2)

#### *Roost habitat TECSM*

These roosts are mostly on beaches along the foreshore of Pumicestone Passage (Figure 3.3).

#### *Roost habitat TECS*

Typically, roosts classified as TECS are sandspit roosts like Buckley's Hole sandspit (Figure 3.4)

#### *Roost habitat LFSM*

An unusual roost habitat that occurs rarely in coastal areas. There are few freshwater lakes near the foreshore of Moreton Bay and close to coastal low-tide feeding habitats (Figure 3.5).



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*Roost habitat TECMR*

An uncommon roost habitat classification. Usually only found on promontories and other exposed sites (Figure 3.6).



Figure 3-1 Donnybrook claypan roost (Type 1) on a spring high tide showing a large flock of shorebirds at a typical TECM roost type.



Figure 3-2 Roost habitat TECSMR at Sandstone Pt (Type 1) looking across to Bribie Is on an incoming tide.



Figure 3-3 Toorbul north roost (Type 1) (habitat TECSM) on a king high tide showing the mixed sandy mud habitat typical of this roost habitat classification.



Figure 3-4 Roost habitat TECS on the Buckley's Hole sandspit (Type 1) at southern end of Bribie Is. This site is a **critical** king tide roost that is subject to extensive regular disturbance from people.



Figure 3-5 Typical roost habitat LFSM at Buckley's Hole lagoon (Type 1) on Bribie Is



Figure 3-6 The Deception Bay central roost (Type 2: staging roost) (habitat TECMR) on a rising tide showing the mud and rock substrate and two dogs that had chased shorebirds prior to the photograph being taken.



Figure 3-7 An example of a Type 3 tree roost in Hays Inlet (not mapped) used occasionally by Terek Sandpipers on the high tide. Predation can often be low at these tree roosts as they are usually separated from the adjacent mangroves and the birds have good visibility.

## **3.2 MBRC shorebird high tide roosts**

The locations of shorebird high tide roosts within MBRC had been identified by QWSG members over the last 15 yrs. Several aerial surveys of the less accessible parts of the shire, such as Pumicestone Passage, have been undertaken to locate roosts. These roosts have all been visited previously on several occasions by Ms J. Denning. Additionally, QWSG member, Ken Cowell also made an aerial reconnaissance of Pumicestone Passage in January 2008 to identify any potentially new roosts. No new roosts were identified during this survey. Surveys of the southern section of the MBRC jurisdiction from Redcliffe airport south to the North Pine River were undertaken in late March-early April 2009 in association with MBRC staff and Mr Cowell. The known roosts (Table 2.2) were then visited specifically to undertake the shorebird roost habitat mapping by Ms Denning.

### **3.2.1 Roost site mapping methods**

In order to accurately define each roost, a field visit was made to each site at a moderate to spring high tide during February 2008 (north and central MBRC) and April 2009 (south). Aerial photographs (<1:10,000) of each roost were obtained from MBRC prior to the visits. Ms Denning made fixes at each roost with a GPS set on datum WGS84. Once on site, a series of photographs of the roost were taken, the boundaries of the roost were walked and GPS fixes taken at several points around the boundaries. The location of each fix was noted on the aerial photograph and assigned a number. GPS fixes, roost habitat characteristics (Table 2.1) and known or potential threats were listed on a field sheet. These data were used to produce Table 2.3 and the annotated aerial photographs were returned to the MBRC GIS officer for digitising and production of the GIS polygon of each roost.

### **3.2.2 Summary of shorebird roost data**

To support the shorebird GIS layer in the MBRC Planning Department GIS system, available information on each shorebird roost has been summarised. For each roost, the average and maximum number of each shorebird species using the roost, the number of times each species was seen at each roost, the roost habitat characteristics and threats to its viability as a roost are described (Table 3.3). These data are to be used in conjunction with the GIS developed within MBRC and provide the facts to support their definition as a shorebird high tide roost.

A simple guideline for planners has also been developed as a separate stand alone document to support the GIS (Appendix E). These guidelines suggest recommendations for buffer distances between developments and roosts, screening between public walkways along foreshore parks and reserves and coastal lighting. The guideline also provides some general background about shorebirds and their habitat needs and is written in plain English.

Table 3-2 The list of the high tide roosts in within the Moreton Bay Regional Council boundary, the roost type and its habitat classification. The characteristics of each of these roosts are described in detail in Table 3.3.

No	QWSG site code	QWSG roost name	Roost type	Habitat classification
1	LIPK	Lime Pocket	1 and 3	TECSM
2	GMCK	Glass Mountain Creek claypan	1	TECM
3	GMTR	Glass Mountain Creek tree roost	3	TECM
4	MIPT	Mission Point	1	TECSM
5	PCMP	Poverty Creek behind Mission Point	1	TECM
6	POCK	Poverty Creek	1	TECS
7	DOJT	Donnybrook Jetty	1	TECSM
8	DONN	Donnybrook claypan	1	TECM
9	BULL	Bullock Ck mouth claypan	1	TECM
10	TRCC	Toorbul Crescent	1	TECM
11	TRSS	Toorbul sandspit	2	TECSM
12	TRNT	Toorbul north	1	TECSM
13	TRSF	Toorbul Sandfly Bay	1	TECSM
14	TOOR	Toorbul main roost	1	TECSM
15	KKBC	Kakadu Beach	1	TECS
16	DUCR	Dux Creek, Bribie Island	1	TECM
17	SAPT	Sandstone Point	1	TECSMR
18	BUCK	Buckley's Hole lagoon	1	LFSM
19	BHBI	Buckley's Hole sandspit, Bribie Island	1	TECS
20	GOBC	Godwin Beach	2	TECSM
21	CABO	Caboolture River mouth	1	TECM
22	DBBA	Deception Bay claypan	1	TECM
23	DBFR	Deception Bay central (DPI)	2 and 3	TECMR
24	DBMN	Deception Bay south	1	TECM
25	RANS	Redcliffe Airport North side	1	TECM
26	NARD	Nathan Rd Redcliffe wetland	1	LFM
27	CTFW	Clontarf west	1	TECM
28	PRNS	Pine Rivers north	1	TECM

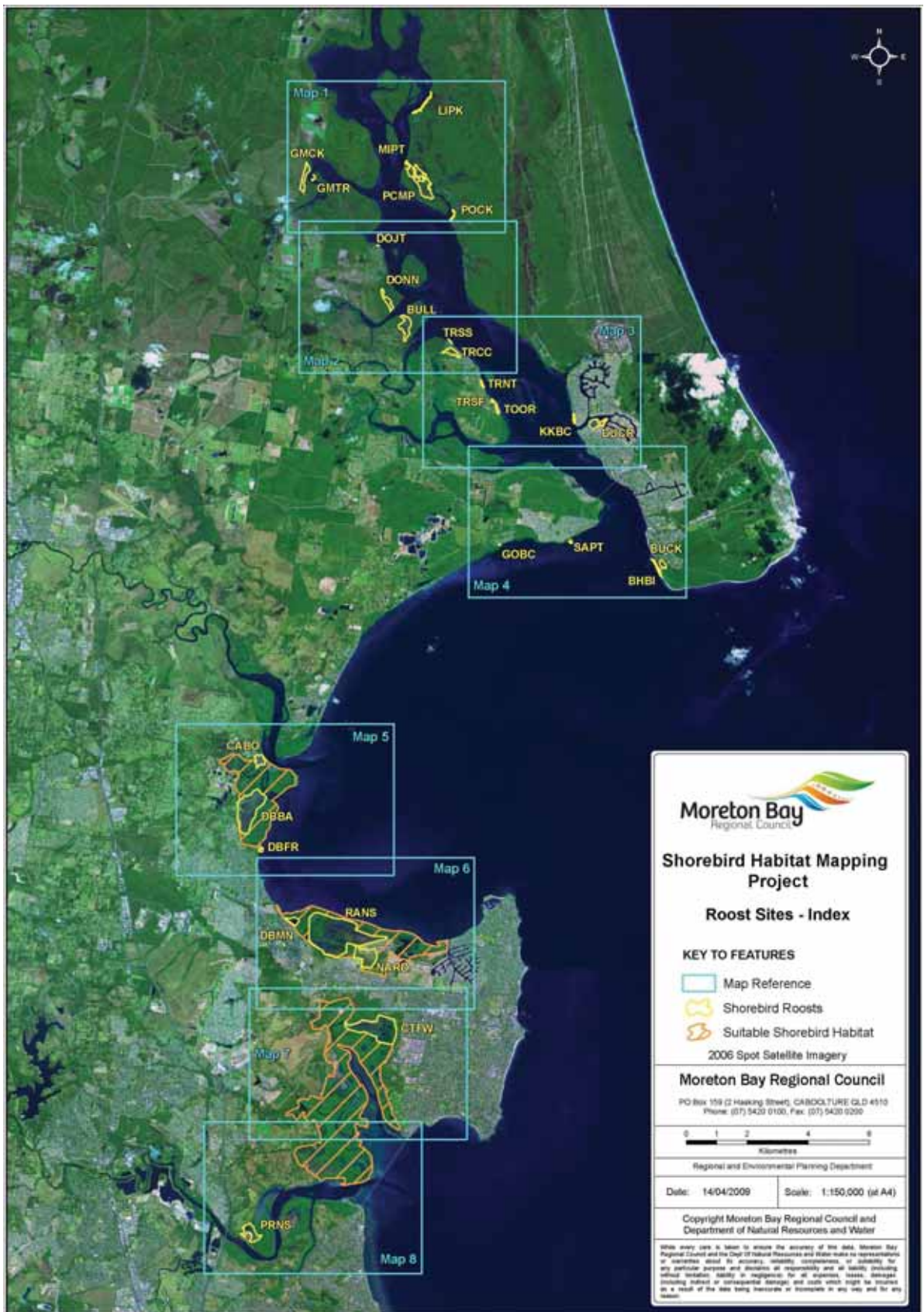


Figure 3-8 Index map of the Moreton Bay Regional Council jurisdiction showing the locations of all 28 shorebird high tide roosts and the eight more detailed inset maps.

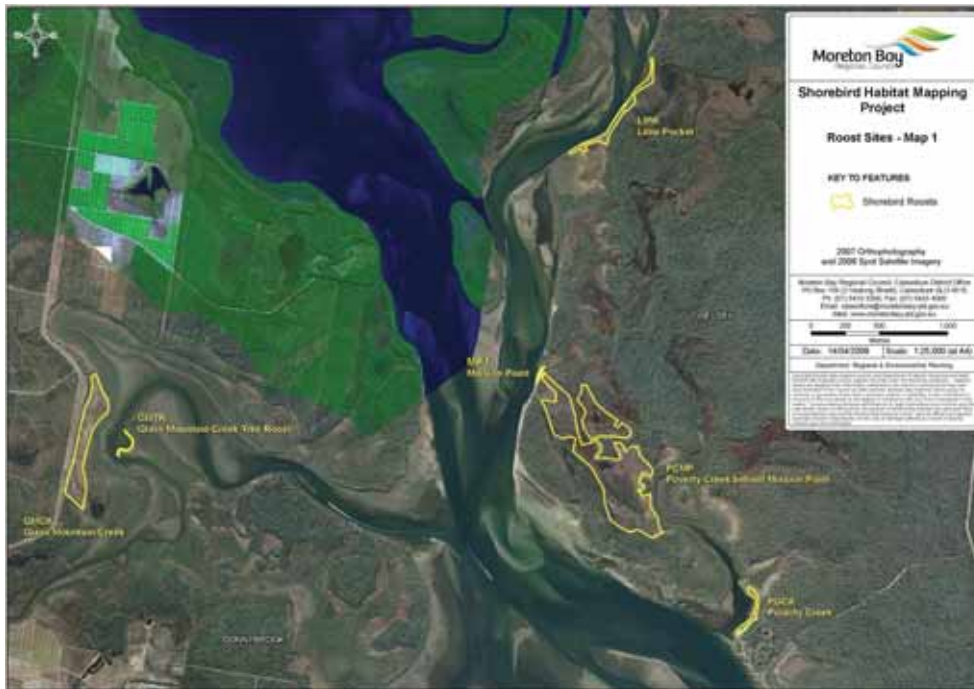


Figure 3-9 Map 1 showing the shorebird high tide roosts in the northern part of Moreton Bay Regional Council jurisdiction in Pumicestone Passage. See Table 3.3 below for shorebird species composition at each roost, their roost characteristics and threats.



Figure 3-10 Map 2 showing the shorebird high tide roosts on the mainland side of central Pumicestone Passage. See Table 3.3 below for shorebird species composition at each roost, their roost characteristics and threats.





Figure 3-11 Map 3 showing shorebird high tide roosts in the southern part of Pumicestone Passage. See Table 3.3 below for shorebird species composition at each roost, their roost characteristics and threats.



Figure 3-12 Map 4 showing shorebird high tide roosts on southern Bribie Is and adjacent mainland parts of northern Deception Bay. See Table 3.3 below for shorebird species composition at each roost, their roost characteristics and threats.



Figure 3-13 Map 5 showing the shorebird high tide roosts in Deception Bay. See Table 3.3 below for shorebird species composition at each roost, their roost characteristics and threats.



Figure 3-14 Map 6 showing Deception Bay South (DBMN), the large roost in southern Deception Bay (QWSG code: RANS) and the nearby freshwater wetland (NARD). See Table 3.3 below for shorebird species composition, roost characteristics and threats.



Figure 3-15. Map 7 showing the known high tide roost in Hays Inlet, west of Redcliffe. Also shaded is the extent of potential roosting habitat in the area that remain unsurveyed due to inaccessibility during the project period. See Table 3.3 below for shorebird species composition, roost characteristics and threats

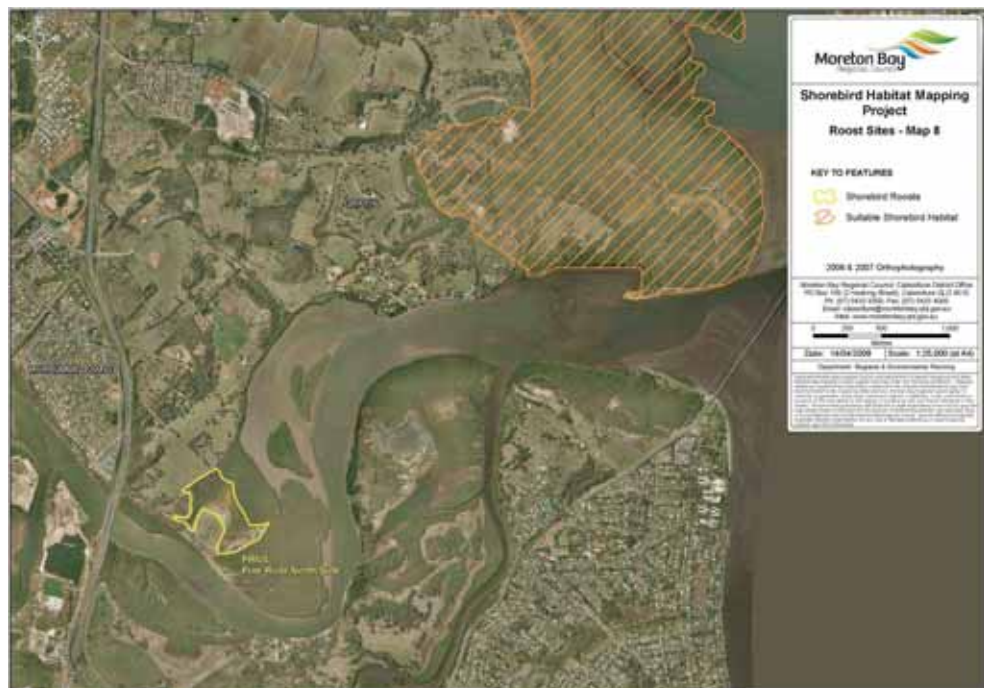


Figure 3-16. Map 8 showing the high tide roosts in the mouth of the North Pine River and the southern extent of the potential shorebird roosting habitat on Map 7 (Fig. 3.15). See Table 3.3 below for shorebird species composition, roost characteristics and threats.

Table 3-3 The shorebird roost sites within Moreton Bay Regional Council (MRC) jurisdiction identified by J. Dening and QWSG in February 2008 and April 2009. Roost names and codes correspond with that used in the QWSG count database provided to MBRC. Roost characteristics are taken from the habitat codes in Table 3.1 above. The number of counts (made before April 2009) gives an indication of data precision and accuracy. Name in bold are migratory species listed under the federal EPBC Act 1999.

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
1	Lime Pocket Pumicestone Passage	LIPK	Australian White Ibis	8	12	2	<b>Habitat code:</b> TECSM	Regularly disturbed by fishers and boat users that stop on the bank to recreate or camp.
			<b>Bar-tailed Godwit</b>	2	3	2	Type 1 and 3	
			Black-necked Stork	1.75	2	4	Site is a mixture of low-lying sedge swamp	
			<b>Black-winged Stilt</b>	82.5	402	12	fronted by a sandy beach	
			Brahminy Kite	1	1	1	and bank. Birds use the beach, swamp and also roost in a small patch of mangrove trees in the middle of the site.	
			<b>Curlew Sandpiper</b>	26.25	100	4		
			<b>Great Egret</b>	1	1	1		
			<b>Common Greenshank</b>	15.25	30	4		
			<b>Grey-tailed Tattler</b>	159.25	300	8		
			Masked Lapwing	1.5	2	2		
			Osprey	1.33	2	3		
			<b>Pied Oystercatcher</b>	2	2	4		
			Straw-necked Ibis	3	3	1		
			<b>Terek Sandpiper</b>	16.5	30	4		
			Whistling Kite	1.5	2	2		
White-faced Heron	1.33	2	3					
2	Glass Mountain Ck claypan	GMCK	<b>Bar-tailed Godwit</b>	8	11	2	<b>Habitat code:</b> TECM	Very low disturbance level because of difficulty of access for vehicles or people.
			<b>Black-winged Stilt</b>	16	17	2	Type 1	
			Chestnut Teal	6	6	1	A claypan behind fringing mangroves of Glass Mountain Ck backed by state forestry land.	
			<b>Common Greenshank</b>	8	11	2		
			Crested Tern	1	1	1		
			<b>Eastern Curlew</b>	15	15	1		
			<b>Great Egret</b>	1	1	1		
			<b>Grey-tailed Tattler</b>	100	100	1		
			Masked Lapwing	2	2	1		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
3	Glass mountain Ck tree roost	GMTR	<b>Whimbrel</b>	47.7	100	3		
			<b>Black-winged Stilt</b>	8.7	20	3	<b>Habitat code:</b> TECM	Very low threat, as only accessible by boat. Some fishers may disturb birds from time to time.
			Brahminy Kite	1	1	1	Type 3	
			<b>Common Greenshank</b>	8	8	1	Mangrove roost which provides roosting on all tides, with open access to view approaching predators.	
			<b>Sharp-tailed Sandpiper</b>	4	4	1		
			Straw-necked Ibis	7	7	1		
			<b>Terek Sandpiper</b>	250	500	4		
			<b>Whimbrel</b>	15	15	1		
			White-bellied Sea-Eagle	1	1	1		
			Australian Pelican	2	3	2	<b>Habitat code:</b> TECSM	Site is major campsite for boat users in Pumicestone Passage and is disturbed constantly during high use periods such as weekends.
			Australian White Ibis	7	7	1	Type 1	Shorebird sign on roost appears to be completely ineffective.
			<b>Bar-tailed Godwit</b>	86.2	258	9		
			4	Mission Point	MIPT	<b>Black-tailed Godwit</b>	2	2
<b>Black-winged Stilt</b>	138.4	404				12	Birds use the beach and grassy swamp behind the beach.	
Brahminy Kite	1	1				1		
Caspian Tern	5.5	9				2		
<b>Curlew Sandpiper</b>	1	1				1		
<b>Eastern Curlew</b>	50.3	88				3		
<b>Great Egret</b>	1	1				2		
<b>Great Knot</b>	50.25	181				4		
<b>Grey-tailed Tattler</b>	188.2	350				5		
Gull-billed Tern	29	113				6		
Masked Lapwing	1.5	2				2		
Pied Oystercatcher	2	2				7		
Royal Spoonbill	7	7				1		
<b>Sharp-tailed Sandpiper</b>	2	2	1					
<b>Terek Sandpiper</b>	310	600	2					
<b>Whimbrel</b>	75	75	1					
Whistling Kite	1.3	3	3					

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
5	Poverty Creek behind Mission Point	PCMP	White-bellied Sea-Eagle	1.5	2	2		
			Australian Darter	1	1	1		
			Australian White Ibis	12.6	35	16	<b>Habitat code:</b> TECM Type 1	Site fringed by a dense stand of mangroves and so
			<b>Bar-tailed Godwit</b>	33.6	80	5		human disturbance is minimal. Cattle, horses and dingoes will disturb birds occasionally.
			Black Swan	2	2	1		
			Black-necked Stork	1	1	1		
			<b>Black-winged Stilt</b>	18.6	50	8		The site comprises a series of interlinked claypans west and north-west of Poverty Ck and extending to Mission Point (MIPT). Claypans are separated by pockets of denser taller vegetation ( <i>Casuarina</i> ). Birds roost in different parts of site depending on tide height.
			Brahminy Kite	1	1	1		
			Chestnut Teal	11.2	20	5		
			<b>Curlew Sandpiper</b>	3.5	4	2		
			<b>Eastern Curlew</b>	199.1	600	15		
			<b>Great Egret</b>	12	2	5		
			<b>Great Knot</b>	8	8	1		
			<b>Common Greenshank</b>	39.3	100	12		
			Intermediate Egret	1	1	1		
			Little Black Cormorant	1	1	1		
			Little Egret	5	9	5		
<b>Marsh Sandpiper</b>	2.75	5	4					
Masked Lapwing	3.9	8	19					
Osprey	1.5	2	2					
<b>Pacific Golden Plover</b>	10.7	17	6					
Pied Cormorant	2	2	1					
Pied Oystercatcher	2	2	3					
<b>Red-capped Plover</b>	9.8	41	14					
Red-kneed Dotterel	2.5	4	2					
<b>Red-necked Stint</b>	5.5	7	2					
Royal Spoonbill	13	14	2					
<b>Sharp-tailed Sandpiper</b>	48.6	118	5					
Straw-necked Ibis	8.7	15	3					

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
6	Poverty Ck Bribe Is	POCK	Striated Heron	1	1	1		
			<b>Whimbrel</b>	30.7	110	10		
			Whistling Kite	1.4	2	5		
			White-bellied Sea-eagle	1	1	1		
			White-faced Heron	14.8	38	16		
			Australian Pelican	1.5	2	2	<b>Habitat code:</b> TECS	Disturbed by campers from the nearby campground at the entrance to Poverty Ck. Fishers and other boat users would also occasionally disturb the birds.
			Australian White Ibis	3.33	6	3	Type 1	
			<b>Bar-tailed Godwit</b>	226.3	550	10	An important roost on neap and intermediate tides. Comprises a sandy beach fronting a shallow sedge swamp that is preferred habitat for several species. Site is flooded on spring tides.	
			<b>Black-tailed Godwit</b>	208.1	350	8	Mangrove growth is diminishing the viability of the roosting area.	
			<b>Black-winged Stilt</b>	115.7	392	26		
			Brahminy Kite	2	2	2		
			Chestnut Teal	72	72	1		
			<b>Curlew Sandpiper</b>	10	20	7		
			<b>Eastern Curlew</b>	1.33	2	3		
			<b>Great Egret</b>	1.5	2	2		
			<b>Great Knot</b>	187.9	300	7		
			<b>Common Greenshank</b>	50.2	150	12		
<b>Grey-tailed Tattler</b>	128.4	520	17					
Little Egret	1	1	1					
Little Pied Cormorant	1.2	2	5					
<b>Marsh Sandpiper</b>	1.5	2	2					
Masked Lapwing	2.44	4	9					
Pied Cormorant	2	2	1					
Pied Oystercatcher	1.6	4	5					
<b>Red-capped Plover</b>	110	110	1					
Rufous Night-heron	12	12	1					
Royal Spoonbill	3	3	1					
<b>Ruddy Turnstone</b>	3	6	3					
<b>Sharp-tailed Sandpiper</b>	9.5	10	2					

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
7	Donnybrook Jetty	DOJT	Striated Heron	1	1	1		
			<b>Terek Sandpiper</b>	11.7	30	11		
			<b>Whimbrel</b>	4.9	17	8		
			Whistling Kite	1.8	4	10		
			White-bellied Sea-Eagle	1	1	5		
			Australian Pelican	6.4	11	5	<b>Habitat code:</b> TECSM	Heavily disturbed as it is adjacent to houses on the northern edge of Donnybrook town.
			<b>Bar-tailed Godwit</b>	3	3	1	Type 1	Users of the jetty and people recreating on the beach also disturb the birds.
			<b>Black-winged Stilt</b>	145	290	13	A small sandy beach on the mainland side of	
			Brahminy Kite	1	1	3	Pumicestone Passage near	
			<b>Common Greenshank</b>	7	13	2	the Donnybrook Jetty.	
			<b>Eastern Curlew</b>	1	1	1	Used intermittently by several species on neap and intermediate high tides.	
			<b>Grey-tailed Tattler</b>	105.7	263	3		
			Little Black Cormorant	1	1	1		
			Little Egret	1	1	1		
			Little Pied Cormorant	1	1	2		
Pied Oystercatcher	2	2	1					
Royal Spoonbill	1	1	1					
Silver Gull	1	1	2					
Straw-necked Ibis	1	1	1					
White-bellied Sea-Eagle	1	1	1					
8	Donnybrook claypan	DONN	Australian Darter	1	1	2	<b>Habitat code:</b> TECM	Minimally disturbed site, as the occasional users only go there at low tide. Occasional disturbance by foxes noted.
			Australian Pelican	2.1	6	18	Type 1	
			Australian White Ibis	5.1	26	68	A large claypan south of Donnybrook town behind the fringing mangroves on the northern side of the entrance to Bullock Ck.	
			<b>Bar-tailed Godwit</b>	460.7	2000	75		
			Black-fronted Dotterel	5.4	18	7		
			Black-necked Stork	11	11	1		
			<b>Black-tailed Godwit</b>	63.7	500	42		
			<b>Black-winged Stilt</b>	23.8	150	58	A <b>critical</b> spring high tide roost. One of the	
			Brahminy Kite	1.5	4	21		



Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Caspian Tern	1.4	3	17	supporting the most	
			Chestnut Teal	6.7	19	31	species in MBRC area (47 spp). It supports a large	
			<b>Crested Tern</b>	3.5	6	2	numbers of shorebirds	
			<b>Curlew Sandpiper</b>	34.1	300	57	and waterbirds on spring	
			<b>Eastern Curlew</b>	63.7	429	84	high tides.	
			<b>Great Egret</b>	1.3	4	29		
			<b>Great Knot</b>	140.1	600	48		
			<b>Greater Sand Plover</b>	11.7	32	3		
			<b>Common Greenshank</b>	36.6	200	89		
			<b>Grey Plover</b>	1	1	1		
			Grey Teal	4	4	1		
			<b>Grey-tailed Tattler</b>	19.5	77	12		
			Gull-billed Tern	32.5	121	19		
			Intermediate Egret	1.2	2	6		
			<b>Lesser Sand Plover</b>	2	2	1		
			Little Black Cormorant	1	1	1		
			Little Egret	2.5	10	37		
			Little Pied Cormorant	4.5	8	2		
			<b>Marsh Sandpiper</b>	15.4	54	49		
			Masked Lapwing	2.2	5	29		
			Osprey	1.1	2	15		
			Pacific Black Duck	1	1	1		
			Pied Oystercatcher	2.1	4	56		
			<b>Red Knot</b>	14	56	21		
			<b>Red-capped Plover</b>	5.3	18	26		
			Red-kneed Dotterel	2	3	2		
			<b>Red-necked Avocet</b>	9.4	20	7		
			<b>Red-necked Stint</b>	4	14	10		
			Royal Spoonbill	16	28	2		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats	
9			<b>Sharp-tailed Sandpiper</b>	21.1	141	27			
			Silver Gull	2	4	5			
			Straw-necked Ibis	2.5	4	2			
			<b>Whimbrel</b>	99.3	500	91			
			Whiskered Tern	9	9	1			
			Whistling Kite	1.6	5	62			
			White-bellied Sea-Eagle	1.3	3	25			
			White-faced Heron	3.9	18	76			
			Australian Darter	1	1	1			
		Bullock Ck mouth claypan	BULL	Australian White Ibis	1.3	10	4	<b>Habitat code:</b> TECM Type 1	Highly disturbed at times by trailbike riders and other recreational vehicles. Saltmarsh is considerably damaged by vehicles. Dogs and walkers are probably a disturbance because of nearby housing and easy access.
				<b>Bar-tailed Godwit</b>	1	1	1		
				Caspian Tern	3	3	1		
				<b>Eastern Curlew</b>	108.5	167	2		
				<b>Great Egret</b>	1	1	1		
				Gull-billed Tern	12	12	1		
				Little Egret	2	2	1		
				Masked Lapwing	1.5	2	2		
			Pied Cormorant	2	3	2			
			Pied Oystercatcher	2	2	1			
			<b>Red-capped Plover</b>	3	4	3			
			<b>Sharp-tailed Sandpiper</b>	1	1	1			
			<b>Whimbrel</b>	8	8	1			
			Whistling Kite	1	1	3			
			White-bellied Sea-Eagle	1	1	2			
			White-faced Heron	13	13	1			
			Australian Pelican	2	2	1			
			Australian White Ibis	5.8	16	12	<b>Habitat code:</b> TECM Type 1	Disturbance by people walking pets would occur regularly.	
	The Crescent Toorbul	TRCC	Black-tailed Native Hen	1	1	1			
			<b>Black-winged Stilt</b>	5.5	10	4			

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
11	Toorbul sandspit	TRSS	<b>Cattle Egret</b>	1	1	1	An ephemeral wetland	
			Chestnut Teal	8.8	30	6	with samphire flat at the northern end of the	
			<b>Eastern Curlew</b>	1	1	2	Toorbul Esplanade that is	
			<b>Great Egret</b>	1.2	2	5	mainly used by waterbirds, and a few shorebirds, especially during	
			Intermediate Egret	1.3	2	4	migration (Sept-Oct and Mar-April). A site used	
			Little Egret	1	1	1	by species not usually present on the larger coastal roosts.	
			Maned Duck	3	3	1		
			Masked Lapwing	2.9	6	16		
			Pacific Black Duck	4	6	2		
			<b>Pacific Golden Plover</b>	10.5	16	2		
			<b>Sharp-tailed Sandpiper</b>	71	71	1		
			Straw-necked Ibis	1	1	2		
			<b>Whimbrel</b>	12.5	19	2		
			Whistling Kite	1	1	2		
			White-faced Heron	3.6	21	17		
			Australian Darter	1.67	2	6	<b>Habitat code:</b> TECSM	Regularly disturbed by beach users along the Toorbul foreshore.
			Australian Pelican	1.7	4	37	Type 2	
			Australian White Ibis	3.5	32	28		
			<b>Bar-tailed Godwit</b>	91.8	350	89	A sandspit on the foreshore of the northern	
			Black Swan	49	180	17	part of Toorbul that is used on neap and intermediate high tides by a diversity of shorebirds and waterbirds.	
Black-fronted Dotterel	2	2	1					
<b>Black-tailed Godwit</b>	6	15	3					
<b>Black-winged Stilt</b>	36	170	96					
Brahminy Kite	1.25	2	8					
Caspian Tern	5.6	28	65					
<b>Crested Tern</b>	2.5	6	16					
<b>Curlew Sandpiper</b>	4	4	1					
<b>Eastern Curlew</b>	3.4	31	45					
<b>Great Egret</b>	1.25	3	16					

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			<b>Great Knot</b>	23.9	80	20		
			<b>Common Greenshank</b>	5	12	16		
			<b>Grey-tailed Tattler</b>	18.5	80	15		
			Gull-billed Tern	14.2	83	16		
			Little Black Cormorant	56.75	224	4		
			Little Egret	1	1	4		
			Little Pied Cormorant	2.5	7	32		
			<b>Little Tern</b>	2	3	3		
			<b>Marsh Sandpiper</b>	1	1	1		
			Masked Lapwing	1.8	3	33		
			Osprey	1	1	2		
			<b>Pacific Golden Plover</b>	9.5	26	10		
			Pied Cormorant	3.3	6	3		
			Pied Oystercatcher	1.8	2	45		
			Royal Spoonbill	4.6	14	8		
			<b>Ruddy Turnstone</b>	1	1	1		
			<b>Sharp-tailed Sandpiper</b>	27	27	1		
			Silver Gull	2.4	28	41		
			<b>Terek Sandpiper</b>	8.6	21	5		
			<b>Whimbrel</b>	4.7	24	23		
			Whistling Kite	1.4	3	5		
			White-bellied Sea-Eagle	2.7	6	3		
			White-faced Heron	2	10	19		
			Australian Pelican	8.4	82	260	<b>Habitat code: TECSM</b>	Nearby road and foreshore park
			Australian White Ibis	5.3	92	150	Type 1	enable people and pets to come close to the birds. Birds can become
			<b>Bar-tailed Godwit</b>	376.9	3100	279		
			Black Swan	48.6	231	14	An important high tide roost used by a large variety of shorebirds on	
			<b>Black-tailed Godwit</b>	18.7	250	60		
12	Toorbul north	TRNT		94.6	500	191		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Brahminy Kite	1	1	18	most tides. Site is a	accustomed to
			<b>Broad-billed Sandpiper</b>	1.5	2	2	raised samphire beach	disturbance and
			Brown Falcon	1	1	1	along the Toorbul	reduce their flight
			Caspian Tern	6	78	130	foreshore. Growth of	distance as there are
			<b>Cattle Egret</b>	2	2	1	mangroves may limit	few alternative roost
			Chestnut Teal	19.2	77	29	usage in the future.	sites nearby.
			<b>Common Tern</b>	1	1	1		
			<b>Crested Tern</b>	8.4	46	10		
			<b>Curlew Sandpiper</b>	12.54	135	105		
			<b>Eastern Curlew</b>	35.1	644	104		
			<b>Great Egret</b>	1.5	6	35		
			<b>Great Knot</b>	73.3	540	196		
			<b>Greater Sand Plover</b>	5.5	9	2		
			<b>Common Greenshank</b>	13.7	70	173		
			<b>Grey Plover</b>	4	7	2		
			<b>Grey-tailed Tattler</b>	43	300	123		
			Gull-billed Tern	9.7	77	102		
			Intermediate Egret	1.4	4	15		
			<b>Lesser Sand Plover</b>	24.7	53	6		
			Little Black Cormorant	2	2	2		
			Little Egret	1.8	10	55		
			Little Pied Cormorant	2.3	6	14		
			<b>Little Tern</b>	1.6	3	5		
			Maned Duck	5.8	20	39		
			<b>Marsh Sandpiper</b>	5.6	20	8		
			Masked Lapwing	2.5	8	138		
			Osprey	1.1	3	30		
			Pacific Black Duck	3.5	8	6		
			<b>Pacific Golden Plover</b>	2	2	1		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
13	Toorbul sandfly	TRSF	Pied Oystercatcher	2.2	8	265		
			<b>Red Knot</b>	9.6	100	60		
			<b>Red-necked Avocet</b>	2	2	1		
			<b>Red-necked Stint</b>	6	9	2		
			Royal Spoonbill	7	25	7		
			<b>Ruddy Turnstone</b>	10.9	54	103		
			<b>Sharp-tailed Sandpiper</b>	3.25	10	20		
			Silver Gull	42.7	528	91		
			Straw-necked Ibis	8.4	75	236		
			Striated Heron	1.6	5	11		
			<b>Terek Sandpiper</b>	1	1	2		
			<b>Whimbrel</b>	19.1	302	80		
			Whistling Kite	1.1	2	43		
			White-bellied Sea-Eagle	1.25	2	4		
			White-faced Heron	2.5	17	115		
			Australian Darter	1	1	2	<b>Habitat code:</b> TECSM	Nearby road and foreshore park
			Australian Pelican	5.9	37	25	Type 1	enable people and
Australian White Ibis	4.2	20	39		pets to come close			
<b>Bar-tailed Godwit</b>	214.3	2000	79	An important high tide roost used by a large	to the birds. Birds			
Black Swan	14.5	50	11	variety of shorebirds on	can become			
Black-necked Stork	1	1	1	most tides. Site is a	accustomed to			
<b>Black-tailed Godwit</b>	12.9	52	8	raised beach along the	disturbance and			
<b>Black-winged Stilt</b>	59.3	300	36	Toorbul foreshore. Forms	reduce their flight			
Brahminy Kite	1	1	6	the second of three	distance as there are			
Caspian Tern	3.6	17	30	interconnected roosts	few alternative roost			
<b>Cattle Egret</b>	5	5	1	along the Toorbul	sites nearby.			
Chestnut Teal	29	29	1	foreshore.				
<b>Common Tern</b>	2	2	1					
<b>Curlew Sandpiper</b>	11	43	34					

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			<b>Eastern Curlew</b>	113.5	496	85		
			<b>Great Egret</b>	1.4	5	13		
			<b>Great Knot</b>	71.5	500	50		
			<b>Greater Sand Plover</b>	4	7	2		
			<b>Common Greenshank</b>	10.5	37	27		
			<b>Grey Plover</b>	1.2	2	17		
			<b>Grey-tailed Tattler</b>	80	440	48		
			Gull-billed Tern	12.6	72	20		
			Intermediate Egret	1	1	3		
			<b>Lesser Sand Plover</b>	51.4	152	8		
			Little Black Cormorant	10	10	1		
			Little Egret	1.1	2	8		
			Little Pied Cormorant	3.5	8	21		
			<b>Little Tern</b>	3	3	1		
			Maned Duck	4	9	3		
			<b>Marsh Sandpiper</b>	2	2	1		
			Masked Lapwing	1.9	6	28		
			Osprey	1.1	2	7		
			<b>Pacific Golden Plover</b>	1	1	1		
			Pied Cormorant	6.2	16	6		
			Pied Oystercatcher	1.9	4	54		
			<b>Red Knot</b>	18.2	88	13		
			<b>Red-necked Stint</b>	12.7	37	11		
			Royal Spoonbill	14.75	34	4		
			<b>Ruddy Turnstone</b>	2	3	6		
			Ruff	1.2	2	5		
			<b>Sharp-tailed Sandpiper</b>	21.6	73	16		
			Silver Gull	3.8	21	17		
			<b>Sooty Oystercatcher</b>	1	1	1		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Straw-necked Ibis	1	1	1		
			<b>Terek Sandpiper</b>	4.4	12	8		
			<b>Whimbrel</b>	65.1	300	64		
			Whistling Kite	1.3	3	9		
			White-bellied Sea-Eagle	1	1	2		
			White-faced Heron	2.3	6	29		
14	Toorbul	TOOR	Australian Darter	1.3	2	3	<b>Habitat code:</b> TECSM	Nearby road and foreshore park
			Australian Pelican	4.5	31	89	Type 1	enable people and
			Australian White Ibis	6.5	36	101		pets to come close
			<b>Bar-tailed Godwit</b>	500.5	3750	262	An important high tide	to the birds. Birds
			Black Swan	35.5	218	139	roost used by a large	can become
			Black-fronted Dotterel	1	1	1	variety of shorebirds on	accustomed to
			Black-necked Stork	1	1	1	most tides. Site is an	disturbance and
			<b>Black-tailed Godwit</b>	22.9	70	54	artificially-raised mound	reduce their flight
			<b>Black-winged Stilt</b>	66.6	400	143	at the southern end of the	distance as there are
			Brahminy Kite	1.1	2	16	Toorbul Esplanade.	few alternative roost
			<b>Broad-billed Sandpiper</b>	1.4	3	5	Forms the third of three	sites nearby. This
			Caspian Tern	8.5	78	204	interconnected roosts	roost is less
			Chestnut Teal	5.6	17	12	along the Toorbul	disturbed than other
			<b>Common Tern</b>	1.5	2	2	foreshore and is the only	roosts on foreshore
			<b>Crested Tern</b>	3.7	12	20	roost on the mainland that	as it is at the end of
			<b>Curlew Sandpiper</b>	36.4	500	182	can support shorebirds on	the esplanade.
			<b>Double-banded Plover</b>	1.8	2	5	spring high tides.	
			Eastern Curlew	87	1000	201		
			Great Egret	1.6	5	44		
			<b>Great Knot</b>	104	557	204		
			<b>Greater Sand Plover</b>	22.4	200	31		
			<b>Common Greenshank</b>	17	112	107		
			<b>Grey Plover</b>	1.1	2	13		



Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Grey Teal	13.3	23	3		
			<b>Grey-tailed Tattler</b>	165.8	800	220		
			Gull-billed Tern	11.7	64	153		
			Intermediate Egret	1.8	7	22		
			<b>Lesser Sand Plover</b>	52.4	320	60		
			Little Black Cormorant	2.7	6	6		
			Little Egret	10.9	400	45		
			Little Pied Cormorant	3.8	12	74		
			<b>Little Tern</b>	25.5	200	65		
			Maned Duck	11	57	31		
			<b>Marsh Sandpiper</b>	45	216	5		
			Masked Lapwing	3.1	13	128		
			Nankeen Night Heron	9	9	1		
			Osprey	1.3	3	61		
			Pacific Black Duck	14.5	24	2		
			<b>Pacific Golden Plover</b>	1.6	2	5		
			Pied Cormorant	4.9	52	14		
			Pied Oystercatcher	2.3	9	176		
			<b>Red Knot</b>	16.8	160	69		
			<b>Red-capped Plover</b>	6.8	19	23		
			<b>Red-necked Avocet</b>	1	1	1		
			<b>Red-necked Stint</b>	39.6	344	100		
			Royal Spoonbill	18.5	68	89		
			<b>Ruddy Turnstone</b>	4.7	15	76		
			<b>Sharp-tailed Sandpiper</b>	42.6	390	80		
			Silver Gull	5.1	24	92		
			<b>Sooty Oystercatcher</b>	1.9	6	28		
			Straw-necked Ibis	4.1	10	8		
			Striated Heron	1	1	12		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
15	Kakadu Beach Bribie Is	KKBC	<b>Terek Sandpiper</b>	9.4	63	79		
			<b>Whimbrel</b>	150.3	800	259		
			Whistling Kite	1.4	3	94		
			White-bellied Sea-Eagle	1.3	3	23		
			White-faced Heron	2.3	20	63		
			<b>Wood Sandpiper</b>	6	6	1		
			Australian Darter	1.2	2	5	<b>Habitat code:</b> TECS	Access to roost from the foreshore is restricted by fences, so disturbance from the landward side is minimal. Signage on the beach has reduced disturbance from fishers and boat users landing on the beach.
			Australian Pelican	2.7	9	69	Type 1	
			Australian White Ibis	1.3	4	25		
			<b>Bar-tailed Godwit</b>	481.6	2388	94	An artificial sand mound on beach adjacent to Kakadu Beach residential development. Designed at a spring high tide roost.	
			<b>Beach Stone-curlew</b>	1.7	3	10	A <b>critical</b> roost used by large numbers of shorebirds on king tides.	
			<b>Black-tailed Godwit</b>	7.3	15	6	Needs regular maintenance to retain its viability as a shorebird roost. Beach Stone-curlew (listed as Rare under the Qld Nature Conservation Act) has nested at this site.	
			<b>Black-winged Stilt</b>	8.7	35	72		
			Brahminy Kite	1.2	2	5		
			<b>Broad-billed Sandpiper</b>	2.5	5	4		
			Caspian Tern	6.3	42	116		
			Chestnut Teal	2.3	3	3		
<b>Common Tern</b>	1.5	2	2					
<b>Crested Tern</b>	3.1	27	82					
<b>Curlew Sandpiper</b>	7.6	70	27					
<b>Double-banded Plover</b>	11.5	45	20					
<b>Eastern Curlew</b>	11.4	126	83					
Great Cormorant	1	1	2					
<b>Great Egret</b>	1.1	2	9					
<b>Great Knot</b>	179.3	1270	51					
<b>Greater Sand Plover</b>	29.7	200	21					
<b>Common Greenshank</b>	2	2	1					
<b>Grey Plover</b>	1.1	3	35					
<b>Grey-tailed Tattler</b>	27	53	2					

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Gull-billed Tern	18.8	114	83		
			Intermediate Egret	1	1	3		
			<b>Lesser Crested Tern</b>	1	1	2		
			<b>Lesser Sand Plover</b>	46.4	245	61		
			Little Black Cormorant	3.1	7	9		
			Little Egret	1	1	3		
			Little Pied Cormorant	1.2	3	18		
			<b>Little Tern</b>	18.5	85	20		
			Maned Duck	7.2	50	24		
			Masked Lapwing	2.4	11	98		
			Osprey	1.3	4	20		
			Pacific Black Duck	3.3	5	4		
			<b>Pacific Golden Plover</b>	11.5	97	16		
			Pied Cormorant	5.5	26	28		
			Pied Oystercatcher	6	30	130		
			<b>Red Knot</b>	8.7	44	7		
			<b>Red-capped Plover</b>	8.4	51	99		
			<b>Red-necked Avocet</b>	1	1	1		
			<b>Red-necked Stint</b>	50.6	360	61		
			Royal Spoonbill	2.5	4	2		
			<b>Ruddy Turnstone</b>	1.1	2	9		
			<b>Sharp-tailed Sandpiper</b>	7.2	66	16		
			Silver Gull	8.5	75	143		
			<b>Sooty Oystercatcher</b>	2.2	4	27		
			Straw-necked Ibis	3.8	19	13		
			Striated Heron	1	1	12		
			<b>Terek Sandpiper</b>	2.2	4	5		
			<b>Whimbrel</b>	2.9	50	29		
			Whistling Kite	1.2	4	49		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
16	Dux Ck Bribe Is	DUCR	White-bellied Sea-Eagle	1.1	2	13		
			White-faced Heron	1.2	3	24		
			White-winged Black Tern	7	7	1		
			Asiatic Dowitcher	3	3	1	<b>Habitat code: TECM</b>	Little disturbance except during machinery operation as the site is within the Kakadu Beach development.
			Australian Darter	1.2	3	91	Type 1	
			Australian Pelican	7.4	40	144		
			Australian White Ibis	5.7	102	144	An area of dredge spoil that has become an artificial roost. The site was lost in 2002 when the Kakadu Beach development completed	
			<b>Bar-tailed Godwit</b>	774.7	3800	143		
			<b>Beach Thick-knee</b>	1.2	2	15		
			Black Swan	2	2	4		However, disturbance will increase as the development nears completion in the near future.
			Black-fronted Dotterel	2.1	5	24	Kakadu Beach	
			Black-necked Stork	1	1	5		
			Black-shouldered Kite	1.3	4	11		
			<b>Black-tailed Godwit</b>	13.7	40	7		
			<b>Black-winged Stilt</b>	14.4	54	183	subsequent dredging has created new roosting habitat that the birds have started to use again. Site is important during spring high tides. As development continues it is to be expected that the site will become unattractive to shorebirds.	
			Brahminy Kite	1.3	3	43		
<b>Broad-billed Sandpiper</b>	1.9	5	33					
Caspian Tern	13.4	70	190					
Chestnut Teal	10.1	71	142					
<b>Common Sandpiper</b>	1.5	3	20					
<b>Common Tern</b>	3.0	5	2					
<b>Crested Tern</b>	4.8	50	51					
<b>Curlew Sandpiper</b>	35.7	260	150					
<b>Double-banded Plover</b>	16.8	32	52					
<b>Eastern Curlew</b>	291.1	980	211					
<b>Great Egret</b>	1.6	4	133					
<b>Great Knot</b>	127.1	550	56					
<b>Greater Sand Plover</b>	17.7	160	96					
<b>Common Greenshank</b>	12.9	70	82					

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			<b>Grey Plover</b>	1.0	1	14		
			<b>Grey-tailed Tattler</b>	17.4	100	17		
			Gull-billed Tern	30.0	200	189		
			Intermediate Egret	1.0	2	23		
			<b>Latham's Snipe</b>	1.0	1	1		
			<b>Lesser Sand Plover</b>	100.7	382	139		
			Little Black Cormorant	3.9	80	86		
			Little Egret	1.4	5	110		
			Little Pied Cormorant	1.7	10	119		
			<b>Little Tern</b>	30.1	160	52		
			Maned Duck	8.1	78	85		
			<b>Marsh Sandpiper</b>	1.9	10	16		
			Masked Lapwing	5.2	25	201		
			Osprey	1.3	7	86		
			Pacific Black Duck	7.3	38	151		
			<b>Pacific Golden Plover</b>	15.4	162	60		
			Pied Cormorant	1.6	5	37		
			Pied Oystercatcher	13.1	63	213		
			<b>Red Knot</b>	5.3	20	10		
			<b>Red-capped Plover</b>	21.1	134	184		
			Red-kneed Dotterel	2.1	6	34		
			<b>Red-necked Avocet</b>	9.4	34	23		
			<b>Red-necked Stint</b>	56.6	330	149		
			Royal Spoonbill	2.7	10	58		
			<b>Ruddy Turnstone</b>	3.2	12	17		
			<b>Sharp-tailed Sandpiper</b>	28.7	200	146		
			Silver Gull	23.3	360	155		
			<b>Sooty Oystercatcher</b>	2.6	8	75		
			Straw-necked Ibis	4.4	17	21		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
17	Sandstone Point	SAPT	Striated Heron	1.1	3	65		
			<b>Terek Sandpiper</b>	5.4	28	9		
			<b>Whimbrel</b>	13.8	120	149		
			Whistling Kite	2.3	8	154		
			White-bellied Sea-Eagle	1.25	3	12		
			White-faced Heron	2.2	13	126		
			Australian Pelican	10.9	80	20	<b>Habitat code:</b> TECSM	Disturbance by people and pets occurs regularly and may have contributed to the decline in shorebirds using the site.
			Australian White Ibis	9	15	11	Type 1	
			<b>Bar-tailed Godwit</b>	63.9	300	59		
			<b>Beach Thick-knee</b>	1.8	2	19	An open beach roost and rock platform but lacks adequate habitat for birds at higher tides. Use by large numbers of birds is intermittent. Last counted in October 2002 and locals have suggested that the numbers of birds using the site have declined dramatically in recent times.	
			Black Swan	3	3	1		
			<b>Black-tailed Godwit</b>	40	40	1		
			<b>Black-winged Stilt</b>	22.3	130	25		
			Brahminy Kite	1.3	2	10		
			Bush Thick-knee	2	2	1		
			Caspian Tern	4.7	13	36		
			Chestnut Teal	4	4	1		
<b>Crested Tern</b>	4.2	17	18					
<b>Curlew Sandpiper</b>	10.7	45	18					
<b>Double-banded Plover</b>	5.75	8	4					
<b>Eastern Curlew</b>	6.2	22	52					
<b>Great Egret</b>	1.5	2	8					
<b>Great Knot</b>	21.2	110	19					
<b>Greater Sand Plover</b>	19.7	56	6					
<b>Common Greenshank</b>	2.2	10	36					
<b>Grey-tailed Tattler</b>	69.9	367	72					
Gull-billed Tern	3.1	8	15					
<b>Lesser Sand Plover</b>	8.25	14	4					
Little Black Cormorant	14	40	4					

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Little Egret	2.25	7	8		
			Little Pied Cormorant	10.1	54	16		
			<b>Little Tern</b>	7	12	2		
			Masked Lapwing	3	10	16		
			Osprey	1	1	3		
			Pacific Black Duck	2	2	1		
			Pied Cormorant	16	20	5		
			Pied Oystercatcher	5	20	65		
			<b>Red Knot</b>	5.3	8	3		
			<b>Red-necked Stint</b>	70	138	2		
			Royal Spoonbill	10.75	30	4		
			<b>Ruddy Turnstone</b>	5	14	41		
			<b>Sharp-tailed Sandpiper</b>	5	8	2		
			Silver Gull	3.8	10	16		
			<b>Sooty Oystercatcher</b>	2.2	4	5		
			Straw-necked Ibis	1	1	1		
			<b>Terek Sandpiper</b>	2.25	3	4		
			<b>Whimbrel</b>	29.9	100	65		
			Whistling Kite	1.4	2	32		
			White-bellied Sea-Eagle	1.2	2	5		
			White-faced Heron	5.9	18	28		
18	Buckley's Hole, Bribie Is	BUCK	Australian Pelican	1	1	1	<b>Habitat code:</b> LFSM	Public access to the lagoon is limited by surrounding
			Australian White Ibis	4	10	4	Type 1	vegetation and so disturbance is negligible.
			<b>Bar-tailed Godwit</b>	313.5	600	2		
			Black Swan	2	2	2		A freshwater lagoon on the southeastern coast of
			Black-fronted Dotterel	3	3	1		disturbance is negligible.
			<b>Black-winged Stilt</b>	54.8	162	5		
			Brahminy Kite	2	2	1		Bribie Is that is intermittently used by a
			Caspian Tern	14.75	36	4		variety of migratory

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Chestnut Teal	19.5	38	2	shorebirds. The	
			<b>Common Tern</b>	2	2	1	attractiveness of the site	
			<b>Crested Tern</b>	48	88	2	varies with water level in	
			<b>Curlew Sandpiper</b>	21	40	2	the lagoon and the	
			<b>Eastern Curlew</b>	1	1	1	amount of disturbance on	
			<b>Great Egret</b>	1.5	2	2	the nearby Buckley's	
			<b>Great Knot</b>	88	100	2	Hole sandspit (BHBI).	
			<b>Greater Sand Plover</b>	37.5	60	2		
			<b>Grey-tailed Tattler</b>	2	2	1		
			Gull-billed Tern	1.7	2	3		
			Intermediate Egret	3	3	1		
			<b>Latham's Snipe</b>	6	6	1		
			<b>Lesser Sand Plover</b>	81	81	1		
			<b>Little Tern</b>	47	47	1		
			Maned Duck	8	8	1		
			<b>Marsh Sandpiper</b>	1	1	2		
			Masked Lapwing	5	5	1		
			Osprey	1	1	1		
			Pied Oystercatcher	1	1	1		
			<b>Red Knot</b>	5	5	1		
			<b>Red-necked Stint</b>	345	700	4		
			<b>Sharp-tailed Sandpiper</b>	47.7	82	3		
			Silver Gull	30.5	93	4		
			Swamp Harrier	1	1	1		
			Wandering Whistling Duck	6	6	1		
			Whistling Kite	1.25	2	4		
			White-bellied Sea-Eagle	1	1	1		
			White-faced Heron	2	2	1		
19	Buckley's Hole sandbar,	BHBI	Australian Darter	1	1	1	<b>Habitat code: TECS</b>	A heavily disturbed



Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
	Bribie Is		Australian Pelican	4.5	18	20	Type 1	site where beach users and fishers regularly ignore
			Australian White Ibis	2.7	6	14		EPA Marine Parks signs identifying the site as a shorebird roost. Birds continue to use site despite disturbance as there are no alternative roosts nearby.
			<b>Bar-tailed Godwit</b>	196.9	700	46	A beach sandspit on the southeastern corner of Bribie Is seaward of the Buckley's Hole lagoon.	
			<b>Beach Thick-knee</b>	2	2	1		
			Black-fronted Dotterel	1	1	1		
			<b>Black-tailed Godwit</b>	10.9	32	7		
			<b>Black-winged Stilt</b>	11.9	50	15	A <b>critical</b> king tide roost that is available on all tides.	
			Brahminy Kite	1	1	4		
			<b>Broad-billed Sandpiper</b>	2	2	1		
			Caspian Tern	4.5	18	20		
			<b>Common Tern</b>	2.7	6	14		
			<b>Crested Tern</b>	196.9	700	46		
			<b>Curlew Sandpiper</b>	62.2	252	27		
			<b>Eastern Curlew</b>	1.2	3	12		
			<b>Great Egret</b>	1.0	1	4		
			<b>Great Knot</b>	76.9	267	29		
			<b>Greater Sand Plover</b>	46.0	250	28		
			<b>Grey-tailed Tattler</b>	2	2	1		
			Gull-billed Tern	8.2	44	19		
			<b>Lesser Crested Tern</b>	4.2	8	6		
			<b>Lesser Sand Plover</b>	67.9	200	15		
			Little Black Cormorant	1.5	3	6		
			Little Egret	1.0	1	1		
			Little Pied Cormorant	3.1	16	18		
			<b>Little Tern</b>	91.2	408	26		
			Masked Lapwing	2.0	3	6		
			Osprey	1.3	3	10		
			Pied Cormorant	2.3	10	18		
			Pied Oystercatcher	14.7	56	20		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
20	Godwin Beach	GOBC	<b>Red Knot</b>	9.0	20	7		
			<b>Red-capped Plover</b>	4.1	12	18		
			<b>Red-necked Stint</b>	131.5	600	32		
			<b>Ruddy Turnstone</b>	2.7	6	3		
			<b>Sanderling</b>	1	1	2		
			<b>Sharp-tailed Sandpiper</b>	17	30	4		
			Silver Gull	25.3	86	46		
			Sooty Oystercatcher	1	1	1		
			Straw-necked Ibis	2	3	2		
			<b>Terek Sandpiper</b>	1	1	1		
			<b>Whimbrel</b>	1.5	2	8		
			Whistling Kite	1.2	2	25		
			White-bellied Sea-Eagle	1.3	2	3		
			White-faced Heron	1.4	4	14		
			White-fronted Tern	1.5	2	2		
			Australian Pelican	16	16	1	<b>Habitat code: TECSM</b>	Likely high disturbance from walkers, pets and possibly vehicles.
			<b>Bar-tailed Godwit</b>	88	214	3	Type 2	
			<b>Black-tailed Godwit</b>	4	4	1		
			<b>Black-winged Stilt</b>	20	20	1	Small sandspit roost	
			Caspian Tern	3	3	1	available to birds on neap	
<b>Crested Tern</b>	2	2	2	high tides and as a staging				
<b>Curlew Sandpiper</b>	50	50	1	roost. Adjoins grassed				
<b>Eastern Curlew</b>	5.5	10	2	esplanade of Godwin				
<b>Great Knot</b>	12	12	1	Beach, with housing				
<b>Common Greenshank</b>	9	15	2	opposite. Situated next to				
<b>Grey-tailed Tattler</b>	10	10	1	extensive feeding				
Little Pied Cormorant	4	4	1					
<b>Red Knot</b>	6	6	1					
<b>Sharp-tailed Sandpiper</b>	15	15	1					

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Silver Gull	1	1	1		
			<b>Terek Sandpiper</b>	10	10	1		
			Whistling Kite	1	1	1		
			White-faced Heron	2	2	1		
			Australian Darter	1.1	2	10	<b>Habitat code: TECM</b>	Severe damage to saltmarsh through regular vehicle usage by recreational fishers. Popular spot for fishers who walk through the claypan to the creek. Dogs, walkers and vehicles are a continual threat to birds. This site is in urgent need of government management as bird use has declined dramatically..
21	Caboolture River mouth	CABO	Australian Pelican	13.6	49	134	Type 1	
			Australian White Ibis	4.3	28	83		
			<b>Bar-tailed Godwit</b>	127.8	592	112	Medium-sized claypan	
			Black Swan	2	2	2	with fringing mangroves, road access and boat ramp. Bounded on north by Caboolture River and on the southern side by Burpengary Creek	
			Black-fronted Dotterel	3.5	12	11		
			<b>Black-tailed Godwit</b>	184	400	4		
			<b>Black-winged Stilt</b>	16.5	54	50		
			Brahminy Kite	1.3	3	86		
			<b>Broad-billed Sandpiper</b>	2.6	4	5		
			Caspian Tern	12.0	72	130		
			Chestnut Teal	2.8	12	20		
			<b>Common Sandpiper</b>	1.4	2	8		
			<b>Common Tern</b>	6.3	12	3		
			<b>Crested Tern</b>	5.3	42	85		
			<b>Curlew Sandpiper</b>	22.6	200	54		
			<b>Double-banded Plover</b>	15.4	105	27		
			<b>Eastern Curlew</b>	24.9	192	120		
			<b>Great Egret</b>	1.3	4	50		
			<b>Great Knot</b>	49.4	250	68		
			<b>Greater Sand Plover</b>	7.0	50	64		
			<b>Common Greenshank</b>	7.7	60	30		
			<b>Grey-tailed Tattler</b>	21.1	80	9		
			Gull-billed Tern	10.3	35	99		
			Intermediate Egret	1	1	4		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Lesser Crested Tern	1.5	2	2		
			<b>Lesser Sand Plover</b>	117.6	570	103		
			Little Black Cormorant	12.7	30	13		
			Little Egret	1.3	6	61		
			Little Pied Cormorant	1.3	2	6		
			<b>Little Tern</b>	22	22	1		
			Maned Duck	4	4	1		
			<b>Marsh Sandpiper</b>	22	22	1		
			Masked Lapwing	2	6	51		
			Osprey	1.2	5	36		
			Pacific Black Duck	1.8	2	5		
			<b>Pacific Golden Plover</b>	24.2	115	41		
			Pied Cormorant	1.6	3	12		
			Pied Oystercatcher	16.8	90	77		
			<b>Red Knot</b>	11.4	30	7		
			<b>Red-capped Plover</b>	12.8	70	123		
			<b>Red-necked Stint</b>	116.9	600	100		
			Royal Spoonbill	2	4	3		
			<b>Ruddy Turnstone</b>	1.5	3	6		
			<b>Sanderling</b>	6	6	1		
			<b>Sharp-tailed Sandpiper</b>	4.4	19	14		
			Silver Gull	34.2	300	130		
			Straw-necked Ibis	1.5	4	16		
			Striated Heron	1	1	6		
			<b>Terek Sandpiper</b>	6.6	35	9		
			<b>Whimbrel</b>	24.8	138	124		
			Whistling Kite	1.3	4	86		
			White-bellied Sea-Eagle	1.2	3	60		
			White-faced Heron	1.3	4	42		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
22	Deception Bay claypan	DBBA	White-winged Black Tern	75	75	1	<b>Habitat code:</b> TECM	Regular disturbance from people
			Australian Darter	1	1	1	Type 1	walking and riding motorbikes and bicycles across the site to Burpengary Ck.
			Australian Pelican	1.6	3	5		
			Australian White Ibis	11.3	67	107		
			<b>Bar-tailed Godwit</b>	92.5	438	51	A <b>critical</b> king high tide roost that provides a roost for shorebirds from adjacent roosts (CABO, DBMN and DBFR) on extreme high tides. Vast claypan and saltmarsh with interconnecting roosting areas. Fringed by mangroves on eastern side and housing on the west.	
			Black-fronted Dotterel	14	37	29		
			Black-necked Stork	1	1	1		
			<b>Black-tailed Godwit</b>	76	105	3		
			<b>Black-winged Stilt</b>	3.6	11	5		
			Brahminy Kite	4.5	47	15		
			<b>Broad-billed Sandpiper</b>	3.3	6	3		
			Caspian Tern	24.0	400	44		
			Chestnut Teal	3.7	32	22		
			<b>Curlew Sandpiper</b>	16.5	84	13		
			<b>Double-banded Plover</b>	6.7	33	6		
			<b>Eastern Curlew</b>	56.8	206	76		
			<b>Great Egret</b>	1.4	3	20		
			<b>Great Knot</b>	32.4	124	17		
			<b>Greater Sand Plover</b>	1.0	1	1		
			<b>Common Greenshank</b>	1.5	3	11		
			Gull-billed Tern	7.1	23	29		
			Intermediate Egret	1.3	3	9		
			<b>Latham's Snipe</b>	1.2	2	5		
			<b>Lesser Sand Plover</b>	89.4	358	21		
			Little Black Cormorant	1.0	1	1		
			Little Egret	1.4	6	27		
			Little Pied Cormorant	1	1	1		
			<b>Little Tern</b>	8	8	1		
			Maned Duck	4	7	2		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Masked Lapwing	2.9	7	40		
			Osprey	1.4	2	7		
			Pacific Black Duck	1.8	4	6		
			<b>Pacific Golden Plover</b>	34.6	94	47		
			Pied Oystercatcher	15.0	65	16		
			<b>Red Knot</b>	15.8	33	5		
			<b>Red-capped Plover</b>	15.9	116	83		
			Red-kneed Dotterel	1.3	2	3		
			<b>Red-necked Stint</b>	162.5	946	52		
			Royal Spoonbill	1.1	2	8		
			<b>Ruddy Turnstone</b>	1	1	1		
			<b>Sharp-tailed Sandpiper</b>	10.7	55	26		
			Straw-necked Ibis	2.8	15	47		
			Striated Heron	1	1	1		
			<b>Terek Sandpiper</b>	1.5	2	2		
			<b>Whimbrel</b>	32.4	114	69		
			Whistling Kite	1.7	10	33		
			White-bellied Sea-Eagle	1.2	2	10		
			White-faced Heron	2.6	11	102		
			White-necked Heron	5	5	1		
			White-winged Black Tern	7	7	1		
23	Deception Bay central (DPI)	DBFR	Australian Pelican	3.9	7	7	<b>Habitat code:</b> TECMR	All the threats of intense human habitation are present at this roost:
			Australian White Ibis	3.6	25	11	Type 2/3	habitation are
			<b>Bar-tailed Godwit</b>	17.7	59	12		present at this roost:
			<b>Black-tailed Godwit</b>	26	50	2		dogs, cats, people
			<b>Black-winged Stilt</b>	33.9	79	17		use the site almost
			Brahminy Kite	1.3	2	12		daily.
			Caspian Tern	1.1	2	8		
			<b>Curlew Sandpiper</b>	10	30	4		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			<b>Eastern Curlew</b>	20.9	50	10	tides.	
			<b>Great Egret</b>	1	1	4		
			<b>Great Knot</b>	45.8	100	5		
			<b>Common Greenshank</b>	1.8	4	5		
			<b>Grey-tailed Tattler</b>	60.6	285	34		
			Gull-billed Tern	2.7	3	3		
			Little Egret	1	1	3		
			Little Pied Cormorant	1	1	1		
			Masked Lapwing	1.8	3	5		
			Osprey	1	1	5		
			Pied Cormorant	3	3	1		
			Pied Oystercatcher	27	27	1		
			<b>Ruddy Turnstone</b>	2.3	3	3		
			<b>Sharp-tailed Sandpiper</b>	1.5	2	2		
			Silver Gull	10.8	24	4		
			Striated Heron	1	1	2		
			<b>Terek Sandpiper</b>	10.2	46	25		
			<b>Whimbrel</b>	17.6	100	17		
			Whistling Kite	1	1	3		
			White-bellied Sea-Eagle	1	1	1		
			White-faced Heron	1.3	3	13		
24	Deception Bay south	DBMN	Australian Darter	1	1	2	<b>Habitat code:</b> TECM	The staging roost is highly disturbed by people and dogs, but the lagoon is probably not greatly disturbed by humans or pets and has limited threats
			Australian Pelican	1.2	2	15	Type 1	
			Australian White Ibis	3.3	26	108		
			<b>Bar-tailed Godwit</b>	108.6	555	144	Vast mangrove-fringed wetland extending into Redcliffe Peninsula. A large tidally inundated lagoon that is fringed by	
			<b>Beach Thick-knee</b>	1	1	1		
			Black-fronted Dotterel	2	2	1		
			Black-necked Stork	2	2	1		
			<b>Black-tailed Godwit</b>	70.7	506	94		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			<b>Black-winged Stilt</b>	129.4	1132	154	mangroves and some	to shorebirds.
			Brahminy Kite	1.2	2	24	<i>Casuarina</i> on the	
			Caspian Tern	1.0	1	1	landward side. Site is	
			Chestnut Teal	21.5	240	134	part of a designated Fish	
			<b>Common Greenshank</b>	19.8	76	113	Habitat Reserve. Roost	
			<b>Crested Tern</b>	1.0	1	1	used by a large range of	
			<b>Curlew Sandpiper</b>	51.0	409	96	shorebirds and waterbirds	
			<b>Eastern Curlew</b>	3.3	32	39	on most neap and	
			<b>Great Egret</b>	2.5	16	45	moderate high tides (up to	
			<b>Great Knot</b>	24.1	142	76	2.3 m). The site also	
			Grey Teal	2	2	1	includes a small staging	
			<b>Grey-tailed Tattler</b>	35	212	63	roost on northern adjacent	
			Gull-billed Tern	3.7	9	3	beach that supports	
			Intermediate Egret	1.5	7	16	shorebirds on neap tides.	
			Little Black Cormorant	10.2	50	6	Mangrove forest adjoins	
			Little Egret	2.4	18	75	esplanade of suburban	
			Little Pied Cormorant	1.0	1	3	area.	
			<b>Marsh Sandpiper</b>	25.9	245	69		
			Masked Lapwing	3.7	25	47		
			Osprey	1.3	3	7		
			Pacific Black Duck	2.5	5	4		
			<b>Pacific Golden Plover</b>	2	2	1		
			Pied Cormorant	2	2	1		
			<b>Red Knot</b>	30.4	143	32		
			<b>Red-capped Plover</b>	12.0	12	1		
			Red-kneed Dotterel	2.7	6	3		
			<b>Red-necked Avocet</b>	112.0	646	92		
			<b>Red-necked Stint</b>	17.0	40	5		
			Royal Spoonbill	4.7	16	34		



Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
25	Redcliffe Airport Northside	RANS	<b>Sharp-tailed Sandpiper</b>	21.1	120	26		
			Silver Gull	13.2	42	12		
			Straw-necked Ibis	4.2	8	6		
			Striated Heron	1	1	5		
			<b>Terek Sandpiper</b>	1.5	4	8		
			<b>Whimbrel</b>	25.0	120	157		
			Whistling Kite	1.2	4	49		
			White-bellied Sea-Eagle	1.0	2	21		
			White-faced Heron	2.4	19	118		
			<b>Black-winged Stilt</b>	5	5	1	<b>Habitat code: TECM</b>	Tenure of site fairly secure while
			Brahminy Kite	1	1	1	Type 1	Redcliffe airport
			Caspian Tern	34	61	2		continues to operate.
			Chestnut Teal	10	10	1		Access to roost is only through airport
			<b>Eastern Curlew</b>	8	9	2		and thus is heavily restricted. This would be one of the least threatened sites in MBRC
			<b>Great Egret</b>	1	1	1		jurisdiction.
			Intermediate Egret	4	4	2		
			Masked Lapwing	2.5	3	2		
Osprey	2	2	2					
Pacific Black Duck	12	12	1					
Pied Oystercatcher	3	3	1					
<b>Red-capped Plover</b>	15.5	16	2					
<b>Red-necked Stint</b>	1199.5	1742	2					
<b>Sharp-tailed Sandpiper</b>	76.5	91	2					
Silver Gull	3.5	5	2					
<b>Black-winged Stilt</b>	50	50	1	<b>Habitat code: LFM Type</b>	Site threatened by potential housing development and reductions of local runoff from			
<b>Curlew Sandpiper</b>	3	3	1	1				
<b>Japanese Snipe</b>	30	30	1					
<b>Marsh Sandpiper</b>	10	10	1					
Red-kneed Dotterel	15	15	1					

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			<b>Sharp-tailed Sandpiper</b> <b>Wood Sandpiper</b>	50	50	1	However, in periods of above-average rainfall, provides suitable roosting and feeding habitat for migratory shorebirds that prefer freshwater wetlands.	conversion of the catchment to urban development. This has the effect of reducing the periods when the site is inundated and thus suitable for shorebirds.
27	Clontarf West	CTFW	Black-fronted Dotterel <b>Black-winged Stilt</b> Chestnut Teal <b>Eastern Curlew</b> Masked Lapwing <b>Red-capped Plover</b> <b>Red-necked Stint</b> White-faced Heron	1 10 1 25 13 5.5 4 5 1	1 10 1 25 13 9 4 5 1	1 1 1 1 2 1 1 1	<b>Habitat code:</b> TECM Type 1 A large claypan in the upper section of Hays Inlet. Site would have been important to shorebirds in the past when the water quality and habitats in Hays Inlet supported more shorebirds. Would provide king tide roost habitats for birds if needed.	Low shorebird usage of site unrelated to threats. Site potentially under threat of future urban expansion. Motorbike tracks widely dispersed across mudflats suggest regular activity that may disturb shorebirds.
28	Pine Rivers north	PRNS	Australasian Shoveller Australian Darter Australasian Pelican Australasian White Ibis <b>Bar-tailed Godwit</b> Black Swan	2 1 3 11.9 162.4 2	2 1 8 41 840 2	1 1 15 123 97 1	<b>Habitat code:</b> TECM Type 1 A large claypan east of the motorway on the	Few threats as public access is restricted by property owner of access track west of claypan.

Moreton Bay Regional Council shorebird roost habitat mapping project

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Black-fronted Dotterel	3.6	6	3	north side of the North Pine River. The <b>critical</b>	
			<b>Black-tailed Godwit</b>	121.3	404	114	roost in the region that is used by almost all the shorebirds feeding in Bramble Bay and Hays Inlet.	
			<b>Black-winged Stilt</b>	82.7	337	136		
			Brahminy Kite	1.1	2	23		
			Caspian Tern	4.1	20	18		
			Cattle Egret	2	2	1		
			Chestnut Teal	56.2	342	120		
			<b>Common Greenshank</b>	19	68	115		
			<b>Curlew Sandpiper</b>	64.2	325	70		
			<b>Eastern Curlew</b>	28.3	160	86		
			<b>Great Egret</b>	1.7	7	68		
			<b>Great Knot</b>	38.4	171	40		
			Grey Teal	16.8	154	16		
			<b>Grey-tailed Tattler</b>	6	6	1		
			Gull-billed Tern	8.4	35	53		
			Intermediate Egret	2	5	12		
			<b>Latham's Snipe</b>	1	1	1		
			Little Black Cormorant	15	64	5		
			Little Egret	2.3	7	32		
			Little Pied Cormorant	1.8	5	17		
			<b>Little Tern</b>	6	6	1		
			Maned Duck	11.9	52	30		
			<b>Marsh Sandpiper</b>	8.3	74	89		
			Masked Lapwing	6.9	34	137		
			Osprey	1.1	2	18		
			Pacific Black Duck	16.8	164	32		
			<b>Pacific Golden Plover</b>	26.2	97	24		
			Peregrine Falcon	1	1	2		
			Pied Cormorant	5	8	2		

Site No	QWSG Roost Name	QWSG Roost Code	English Name	Average number of birds	Max No. of birds	No. of counts	Roost Characteristics	Threats
			Pied Oystercatcher	1.7	2	3		
			<b>Red Knot</b>	17	71	25		
			<b>Red-capped Plover</b>	10.3	63	55		
			Red-kneed Dotterel	10.2	57	65		
			Red-necked Avocet	28.4	103	19		
			<b>Red-necked Stint</b>	10.9	53	15		
			Royal Spoonbill	2.7	8	34		
			<b>Sharp-tailed Sandpiper</b>	76.4	640	98		
			Silver Gull	7.9	53	24		
			Straw-necked Ibis	4.2	34	59		
			Striated Heron	1	1	1		
			<b>Terek Sandpiper</b>	4	4	1		
			<b>Whimbrel</b>	37.8	128	111		
			Whiskered Tern	1	1	1		
			Whistling Kite	1.5	21	53		
			White-bellied Sea-eagle	1.4	3	16		
			White-faced Heron	5.1	20	121		

### 3.2.3 Roost mapping survey limitations

This report is the result of two independent surveys of different parts of the coastal areas of the MBRC. These surveys were undertaken by the same people, but were made in separate years (January-February 2008 and April 2009). The interim report (Milton and Dening 2008) submitted to the then Caboolture Shire Council has been updated for this report to include roosts in the former North Pine Shire and Redcliffe City Council areas. These areas are in the southern part of the new MBRC jurisdiction. The timing of the surveys of the southern MBRC area in April 2009 was not ideal as most migratory shorebirds had left for their breeding grounds before the survey could be completed. Areas of potentially suitable habitat in the southern MBRC jurisdiction are difficult to access as the adjacent area is privately-owned freehold land. Additional surveys of these regions during the austral summer (2009/10) would be desirable to ensure all roosting habitats within the MBRC boundaries have been identified, mapped and incorporated into the MBRC GIS. The QWSG has a comprehensive knowledge of shorebird distribution in Moreton Bay. It is unlikely that additional surveys of these potential roost sites will identify new roosts used by many shorebirds (>50). However, the distribution of shorebirds is dynamic and roost use patterns change over time in response to changes in food and disturbance. Thus, completion of the surveys of these potential roosts is recommended to ensure the MBRC have the most comprehensive data available.

### 3.2.4 Putting MBRC shorebird roosts in a regional context

The MBRC has a large number of important shorebird roosts that support a large diversity of species of shorebird and other waterbirds (Table 3.3). Shorebird use of coastal areas in the rest of Moreton Bay is more constrained as much of the original sub-coastal habitats have been urbanised. The coastal areas to the north of the MBRC in the Sunshine Coast Regional Council jurisdiction have less suitable shorebird feeding habitat as the coast is more exposed to wave action and river estuaries are small and provide little feeding or roosting habitat. To the south, a single stormwater runoff event greatly reduced the densities of intertidal invertebrates on Nudgee Beach in 1997 (S. Quinnell, Griffith Univ. unpubl. data). The densities of shorebirds feeding in this area were high before this event (Thompson 1990) and have not subsequently recovered. Improvements in the quality of sewerage effluent from the Luggage Pt treatment plant have also reduced the densities of intertidal invertebrates around the mouth of the Brisbane River. At the same time, the Port of Brisbane Authority have undertaken a massive expansion and reclaimed several square kilometres of intertidal areas that were prime shorebird feeding habitat. This reclamation has provided artificial roosting and feeding habitats for the large number of shorebirds that occur in the area. QWSG surveys of the POB reclamation site have counted up to 13,000 shorebirds and waterbirds during summer. However, when the reclamation is complete, these habitats will be lost and these shorebirds will need to redistribute elsewhere in Moreton Bay or further afield. Elsewhere in the Brisbane City Council jurisdiction, only southern Moreton Is and the Manly-Lytton area hold substantial numbers of shorebirds similar to those in the MBRC. Thus, the MBRC region contains the least impacted parts of Moreton Bay with substantial quantities of shorebird feeding and roosting habitat. The area under MBRC jurisdiction supports over half the shorebirds in Moreton Bay and thus MBRC is in a unique position to play an important role in maintaining their habitats for the future.

Recent analysis of the QWSG count data has shown that seven species have declined dramatically in Moreton Bay since QWSG began in 1992 (Fuller et al. 2009). These species were all the larger shorebird species and most susceptible to changes in habitats in Moreton Bay and at staging sites between the breeding grounds and Australia. Most had declined by about 50% since 1992. Changes in the quality and quantity of shorebird habitats in Moreton Bay have contributed to these declines.

The study also looked at disturbance recorded by QWSG counters during monthly counts on the weekend spring high tides. It showed that two roosts in MBRC region had the highest level of disturbance of any roosts in Moreton Bay. These roosts (Buckley's Hole sandspit and Kakadu Beach) are both on Bribie Is, a popular tourist destination. MBRC needs to take appropriate steps to minimise human impacts on shorebirds. By inclusion of these shorebird high tide roosts within the MBRC planning provisions and following the guidelines outlined in the factsheet (Appendix E), Council will be making important steps towards reducing impacts and the decline in shorebirds in Moreton Bay.

#### 4. REFERENCES

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## APPENDIX A – GLOSSARY OF TECHNICAL TERMS

**Artificial roost** – Man-made roost developed to replace natural high tide roosts lost due to coastal development. **Not recommended** as a sustainable option for replacing lost natural roosts as they require on-going maintenance and management to ensure their viability. Moreton Bay Regional Council has two artificial roosts – Toorbul and Kakadu Beach and both require regular maintenance by Council to remove vegetation growth that covers each site if left alone.

**EPBC Act** – The federal Environmental Protection and Biodiversity Conservation Act 1999 – identifies matters of national environmental significance.

**High tide roost** – An open area usually above high water where shorebirds rest and digest their food while waiting for the tide to recede to allow them to return to feeding (see Appendix C for details). Some species roost in trees (roost Type 3) on some tides. These species rest on horizontal branches of mangrove trees where they have an unobstructed view of their surrounds.

**Shorebird** – A taxonomically related group of bird species that includes both resident and migratory species. Migratory species breed in the higher latitudes of the northern hemisphere from northern China north to the tundra in Russia and Alaska. Most migratory species feed in coastal intertidal areas on invertebrates. These species are listed under the federal EPBC Act (see Appendix C)

**Staging roost** – A roost usually on the upper intertidal flats adjacent to shorebird feeding areas. Staging roosts are used by shorebirds when the majority of the intertidal area is covered. As the tide rises further, birds are forced to leave for the main high tide roosts. If the tide does not rise further (such as during neap tidal cycles), birds will stay on these roosts as they are close to the feeding areas.





Family	Common name	Scientific name	Conservation status				
			V	R	M	V/c	M/r
Scolopacidae	Wandering tattler	<i>Heteroscelus incanus</i>			•		•
Scolopacidae	Broad-billed sandpiper	<i>Limicola falcinellus</i>			•		•
Scolopacidae	Asian dowitcher	<i>Limnodromus semipalmatus</i>			•		•
Scolopacidae	Bar-tailed godwit	<i>Limosa lapponica</i>			•		•
Scolopacidae	Black-tailed godwit	<i>Limosa limosa</i>			•		•
Scolopacidae	Eastern curlew	<i>Numenius madagascariensis</i>		•	•		•
Scolopacidae	Little curlew	<i>Numenius minutus</i>			•		•
Scolopacidae	Whimbrel	<i>Numenius phaeopus</i>			•		•
Scolopacidae	Common sandpiper	<i>Tringa hypoleucos</i>			•		•
Scolopacidae	Common greenshank	<i>Tringa nebularia</i>			•		•
Scolopacidae	Marsh sandpiper	<i>Tringa stagnatilis</i>			•		•
Scolopacidae	Terek sandpiper	<i>Xenus cinereus</i>			•		•

**Appendix 1 of EPA Moreton Bay Shorebird Management Strategy (2005)**

([//www.epa.qld.gov.au/publications/p01627aa.pdf/Shorebird\\_management\\_strategy\\_Moreton\\_Bay.pdf](http://www.epa.qld.gov.au/publications/p01627aa.pdf/Shorebird_management_strategy_Moreton_Bay.pdf))

## APPENDIX C - INTERNATIONAL AND COMMONWEALTH MECHANISMS FOR SHOREBIRD PROTECTION

<b>Mechanism</b>	<b>Level of Protection</b>	<b>Protection Provided</b>
<i>1971 Ramsar Convention</i>	International	Protects wetlands of international significance under the 'wise use' principle and obliges Australia to "...give particular priority to promoting sustainable restoration..." in respect to Wader habitat. Moreton Bay Ramsar Site 41 is one of 49 sites in Australia.
<i>1974 Japan Australia Migratory Bird Agreement and 1986 China Australia Migratory Bird Agreement</i>	International	Requires parties to protect migratory birds and their environments. Signatories are obliged to conserve and protect migratory birds, particularly endangered species; establish sanctuaries for migratory birds; and "take appropriate measures to preserve and enhance" their environment.
<i>Environmental Protection &amp; Biodiversity Conservation Act 1999</i>	Commonwealth	Sections 16 and 17 protect Ramsar wetlands of Moreton Bay as a matter of National Environmental Significance. The Commonwealth has the power to control or prohibit activities or development that might damage the well being of the birds' habitat.
National Plan for Shorebird Conservation	Commonwealth	Aims to protect shorebird roosting and feeding sites of national significance.

Other statutory and policy mechanisms in place at the State and local level to protect shorebirds and their habitats include:

- *Nature Conservation Act 1992*
- *Environmental Protection Act 1994*
- *Fisheries Act 1994*
- *Coastal Protection and Management Act 1995*
- *Marine Parks Act 1982*
- State Shorebird Management Strategy: Moreton Bay 2005
- Strategy for Conservation and Management of Queensland's Wetlands 1999
- Marine Parks (Moreton Bay) Zoning Plan 1997
- SEQ Regional Plan 2005 - 2026
- SEQ Regional Nature Conservation Strategy
- State and SEQ Coastal Policy
- SEQ NRM Plan
- Local Nature Conservation Strategy or LNCS (Moreton Bay Regional Council, in prep)
- Moreton Bay Regional Council Plan
- Management Plan for Wader High-Tide Roosts in the Central-Southern Pumicestone Passage (2000, Hegira)

## **APPENDIX D – PUMICESTONE SHOREBIRD MANAGEMENT GROUP (PSMG)**

The PSMG is represented by the following organisations:

- Queensland Wader Study Group (QWSG);
- Moreton Bay Regional Council (MBRC);
- Sunshine Coast Regional Council (SCRC);
- Queensland Parks and Wildlife Service (QPWS);
- Bribie Island Environmental Protection Association (BIEPA);
- Pumicestone Region Catchment Coordination Association Inc. (PRCCA);
- QM Properties Pty Ltd; and
- HLA-Envirosciences Ltd.

## **APPENDIX E – SHOREBIRD FACTSHEET AND PLANNING GUIDELINES**



