



2024/25

## Port of Brisbane shorebird monitoring



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Queensland Wader Study Group

## **Port of Brisbane shorebird monitoring annual report 2024/25**

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### **Cover image:**

Mixed flock of nine shorebird species feeding and roosting in Port of Brisbane reclamation area pond (Eva Plaganyi-Lloyd, QWSG).

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## EXECUTIVE SUMMARY

### BACKGROUND

For over 30 years, Port of Brisbane (Port) lands on Fisherman Islands have been used as high tide roosting habitat by large numbers of shorebirds, mostly migratory shorebirds but also resident shorebirds. Annual monitoring of shorebird roost sites was undertaken in an unstandardised way from 1991 to 2002. Since 2003, the QWSG has been commissioned by Port of Brisbane Pty Ltd to undertake standardised (typically monthly) counts shorebird use of all roost sites on Fisherman Islands. This is the thirteenth annual report since 2013 to present the results of the shorebird monitoring activities at the Port of Brisbane and covers the period September 2024 to August 2025.

### OBJECTIVES

The specific objectives of this report are to:

- Provide a summary of bird numbers by species and site (individually and overall) at the Port for 2024/25, presented as a table of raw numbers and associated graphs.
- Quantify the relative importance of the Port for supporting roosting shorebirds in Moreton Bay by comparing total Port counts with the total Moreton Bay count.
- Present annual changes in shorebird numbers by species for each roost site within the Port.
- Analyse longer-term trends of shorebird numbers at the Port by species.
- Provide a summary of shorebird banding activities at the Port.

### STUDY APPROACH

Ten counts were conducted over the period September 2024 to August 2025 at twelve roost sites on Fisherman Islands as well as the nearby Lytton Claypan No. 1 on the mainland. During each count, QWSG volunteers recorded the total number of individuals for each species observed at each site within a 2-hour period, approximately an hour either side of high tide. Birds were observed through high-powered spotting telescopes mounted on sturdy tripods. Any movement of birds between count sites during the count were noted and communicated between counting teams to avoid double-counting.

Temporal trends in the annual average austral summer count (over the period 1 October to 15 March inclusive, the period that migratory shorebird numbers on Fisherman Islands were consistently high and most stable) of individual species or shorebird groupings over the 23-year period of shorebird years 2002 to 2024 were tested using a general linear model (GLM). To assess the relative importance of the roosts on Fisherman Islands to individual migratory shorebird species in Moreton Bay, an index of relative importance was calculated for each species as the ratio of the average annual maximum count on Fisherman Islands over the period 2003 to 2024 to the maximum count for Moreton Bay since 2008 as reported in Fuller *et al.* (2021), expressed as a percentage. The significance of the roosts on Fisherman Islands collectively and individually was also assessed based on the percentage of the East Asian-Australasian Flyway (EAAF) population that the respective species counts represent, where counts representing greater than 1% of the EAAF population are internationally significant and counts representing greater than 0.1% of the EAAF population are nationally significant.

### KEY RESULTS

#### ***Monthly shorebird counts***

A total of 20 migratory shorebird species and seven resident shorebird species were recorded at the Port, similar to previous years. The total migratory shorebird count (including LYN1) ranged between 4,178 and 8,750 birds during the south migration period (September to mid-November), between 5026 and 10848 birds during the non-breeding period (mid-November to mid-March), between 1,418 and 5,542 during the north migration period (mid-March to May) and

between 402 and 1,678 during the northern hemisphere breeding period (June to August). The total resident shorebird count ranged between 185 and 768 birds.

Three of the Port roost sites supported 73% of the total migratory shorebirds overall: Lytton Claypan No. 1 (32%) and reclamation area ponds R3 (31%) and C3 (11%) and. Similarly, four of the Port sites supported 76% of the total resident shorebirds overall: Lytton Claypan No. 1 (27%), reclamation area pond R3 (26%), Fisherman Islands claypan (14%) and the artificial roost (9%). The artificial roost supported 0.4% of migratory shorebirds and 9.4% of resident shorebirds overall.

### **Seasonal variation in shorebird counts**

Total migratory shorebird numbers roosting on Fisherman Islands have shown the expected cyclical pattern of increasing during the south migration period (September to mid-November, generally reaching peak numbers through the non-breeding period (mid-November to mid-March), before decreasing again during the north migration period (mid-March to May) to relatively low numbers during the northern hemisphere breeding period. Total migratory shorebird numbers were consistently high and most stable over the period October to mid-March. Total resident shorebird numbers have overall shown an opposite seasonal pattern to migratory shorebirds, reaching lowest average numbers during the period of high migratory shorebird numbers, increasing from mid-April to late August when migratory shorebird numbers are low. Resident shorebirds were substantially less abundant than migratory shorebirds, making up only 9% of the overall total shorebird abundance from all counts since 2002.

### **Long-term trends in shorebird counts**

The average total migratory shorebird summer (1 October to 15 March) count on Fisherman Islands has shown a significant increasing then decreasing trend over the past 23 years 2002-2024 ( $X^2 = 10.88$ ,  $P = 0.004$ ) but there has been no significant trend in the average winter (1 May to 31 August) count ( $X^2 = 2.75$ ,  $P = 0.097$ ). The average summer count has ranged between 5,430 and 8,607 whereas the average winter count has ranged between 528 and 2,820 birds over the past 23 years. Among individual migratory shorebird species, there has been a significant decreasing trend (at least in recent years) in the average summer count for six species (Bar-tailed Godwit, Far Eastern Curlew, Great Knot, Greater Sand Plover, Grey Plover and Red-necked Stint) and a significant increasing trend for one species (Curlew Sandpiper) over the 23-year period 2002-2024. There has been no significant trend in the average annual count for the four commonly occurring resident shorebird species over the 23-year period 2002-2024.

### **Site importance**

The overall index of relative importance of the roosts on Fisherman Islands to different migratory shorebird species ranged between 83% for Curlew Sandpiper and <1% for Sanderling for the period 2002 to 2024. Thus, the average annual maximum count of Curlew Sandpiper on Fisherman Islands was 83% of the all-time maximum count of Curlew Sandpiper reported by Fuller *et al.* (2021) for the whole of Moreton Bay since 2008. In 2024, the index of relative importance was greater than 50% for four species and greater than 20% for 9 species, with the roosts on Fisherman Islands supporting nationally significant numbers (greater than 0.1% of the EAAF population) of 11 migratory shorebird species and internationally significant numbers (greater than 1% of the EAAF population) of two of these.

The reclamation area ponds (PBRA) have consistently supported 79-94% of the migratory shorebirds on Fisherman Islands over the past 23 years, with the artificial roost, Fisherman Islands claypan, visitor centre lake and rail loop sites supporting substantially lower numbers. Averaged across all years, the reclamation area ponds have supported 88%, the Fisherman Islands claypan 8%, the artificial roost 3%, and the visitor centre lake and rail loop less than 1% of the migratory shorebirds.

All four main roost sites at the Port, three on Fisherman Islands together with the Lytton Claypan No. 1 on the mainland, have supported nationally significant (greater than 0.1% of the EAAF population) and two roost sites, the reclamation area and Lytton Claypan No. 1 have supported internationally significant numbers (greater than 1% of the EAAF population) of migratory shorebird species within the most recent five years. The reclamation area was nationally significant for 13 species and internationally significant for five species, Lytton Claypan No. 1 was nationally significant for six species and internationally significant for two species, the Fisherman Islands claypan was nationally significant for five species and the artificial roost was nationally significant for one species.

### **Shorebird banding**

There were 43 shorebird flag re-sightings at the Port, all from birds roosting at Lytton Claypan No. 1 that were resighted by Arthur Keates. These re-sightings were of 40 different individuals, all but one originally banded in Moreton Bay, including birds banded in the Port reclamation area, at Manly Harbour, West Geoff Skinner Reserve, Wellington Point, King Street Mudflat, Thornlands, Oyster Point, Cleveland, and Toorbul. These re-sightings confirm that the birds using the Port roost sites also roost at many other sites up to 40 km away in Moreton Bay, particularly roost sites to the south of the Port. One bird had been banded at Chongming Dao, Shanghai, China.

### **RECOMMENDATIONS**

Port of Brisbane Pty Ltd is encouraged to continue to prioritise the management and monitoring of shorebirds at the Port. The monitoring reported here identifies the Fisherman Islands claypan and Lytton Claypan No. 1 roost sites as very significant, naturally occurring shorebird roost sites that are important to the network of roost sites in central Moreton Bay. Portions of these roost sites also provide foraging resources for migratory shorebirds when inundated. These two roost sites, together with the artificial roost, are likely to become increasingly relied upon by migratory shorebirds in future as the availability of roosting habitat in the current FPE reclamation area diminishes as it approaches the point when it is all expected to be resumed for port infrastructure. Consequently, retaining the Fisherman Islands claypan, Lytton Claypan No. 1 and artificial roost sites as part of the conservation buffer land use under the Brisbane Port Land Use Plan 2020 (LUP) can make an important contribution to the sympathetic management of migratory and other shorebirds in Moreton Bay. Recognising this importance, Port of Brisbane has already made an important contribution to protecting the Lytton Claypan No. 1 roost site from disturbance through fencing it off from unauthorised access. Migratory shorebird use of the Lytton Claypan No. 1 roost site may be increasing because of decreased disturbance resulting from this management action, providing an attractive alternative roost site to birds that might otherwise roost in the reclamation area.

Nevertheless, there remains a need to continue to explore opportunities to provision or improve roosting habitat for shorebirds within or adjacent to Port lands to compensate for the expected future loss of roosting habitat in the reclamation area. Planning to provide adequate shorebird habitat in Moreton Bay into the future is required to manage the increasing pressures on shorebirds from the continued growth and development of Brisbane and the anticipated future loss of roosting habitat in the Port reclamation area (Fuller *et al.* 2021). Although the artificial roost has supported only 3% of the migratory shorebirds using Fisherman Islands since 2002, it is occasionally used by large numbers of birds, indicating it has potential to support larger numbers of birds once currently preferred alternatives in the reclamation area are lost. The low, open islands in the artificial roost pond have gradually diminished in area over the years due to subsidence of the substrate. Consequently, an additional management intervention to improve the ability of the artificial roost site to accommodate larger numbers of birds could be to expand the area of bare substrate on the islands.

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- Appendix B: Monthly Port of Brisbane total count data for all shorebird species in 2024/25
- Appendix C: Monthly count data for the 12 most important migratory shorebird species by site in 2024/25
- Appendix D: Summary of 2024/25 monthly count data for Lytton Claypan No. 1

## ***Glossary of Terms and Acronyms***

EAAF	East Asian Australasian Flyway
FPE	Future Port Expansion
IRI	Index of relative importance
Port	Port of Brisbane
QWSG	Queensland Wader Study Group

## 1.0 INTRODUCTION

### 1.1 BACKGROUND

Located on the southern side of the mouth of the Brisbane River in Moreton Bay, the Port of Brisbane (the Port) beneficially uses the sediment dredged during shipping channel maintenance dredging to create port land. The dredge material is settled in a dredge reclamation area at the north-eastern end of the port. The reclamation area was expanded considerably during 2004 with the construction of the outer bund rock wall. Between 2004 and 2023, cells within this expansion area have been progressively bunded off and used to settle dredge material and manage tailwater turbidity, a process that has resulted in the progressive infilling of these cells and their eventual incorporation into the expanded Port development. The repeated process of pumping fresh dredge material into the relatively large (10 to 20 ha) cells and then allowing it to settle and dry out has created ideal roosting habitat conditions for shorebirds, particularly migratory shorebirds (see Box 1) in the area over decades. These ideal roosting habitat conditions include: (1) large areas of bare, open ground with little to no cover that provide a clear view of approaching predators; (2) being adjacent to the shoreline or incorporating areas of water and wet substrates that allow the birds to stay cool on hot days; (3) incorporating areas with uneven relief with small surface mounds and depressions that assists with camouflage and affords some protection from strong winds; and (4) being close to preferred tidal flat feeding areas that reduces their energy expenditure flying between roosting and feeding sites (Rogers *et al.* 2006, Ryeland *et al.* 2021); and (5) periodic refreshment with a nutrient rich slurry from the dredge material that promotes the development of invertebrate communities in the shallow waters, providing food for smaller shorebirds such as Red-necked Stint and sandpipers, allowing them to continue feeding through the high-tide phase of the tidal cycle (Fuller *et al.* 2021). Additionally, the Port has also voluntarily created two large bird habitats, a permanent artificial roost and a freshwater lake on what would otherwise be industrial land.

#### Box 1: Shorebird ecology in Moreton Bay

Shorebirds are bird species in the order Charadriiformes, which includes avocets, curlews, dotterels, godwits, lapwings, oystercatchers, plovers, sandpipers, stilts, stone-curlews, tattlers and whimbrels, but does not include groups such as gulls and terns (Colwell 2010). Coastal shorebirds have a daily activity pattern that follows the tides, feeding on tidal flats once they become exposed at low tide and moving to rest in flocks at roost sites above the high-water mark once the rising tide covers their feeding habitat. They feed on a wide variety of benthic invertebrates, including crustaceans, molluscs and polychaete worms that are taken either on the surface of tidal flats or extracted from soft, muddy or sandy sediments by probing with their bills, which are elongated in many species. Most shorebirds can feed at night as well as during the day.

Most shorebirds using Moreton Bay are migratory, spending their non-breeding season (the austral summer) in Australia and migrating up to 13,000 km north through south-east Asia along the East Asian–Australasian Flyway (the Flyway) to breeding grounds in northern Asia, eastern Siberia and western Alaska (Bamford *et al.* 2008) where they breed through the austral winter. An exception is the Double-banded Plover (*Charadrius bicinctus*), which breeds in New Zealand during the austral summer and a portion of the population migrates to Australia for its winter non-breeding season (Pierce 1999).

Moreton Bay is recognised as a Ramsar wetland of international significance and is the most important site for shorebirds in Queensland. Up to 37,900 shorebirds including up to 35,800 migratory shorebirds have been counted in Moreton Bay (Clemens *et al.* 2008), with a total estimate of up to 50,000 migratory shorebirds using Moreton Bay in the past (Thompson 1990). Moreton Bay regularly supports internationally significant numbers (greater than 1% of the Flyway population) of nine migratory shorebird species (Fuller *et al.* 2021).

The Queensland Wader Study Group (QWSG) has monitored shorebirds and other waterbirds at the Port from as early as August 1991, when three consecutive years of monitoring were

commissioned by the Port of Brisbane Corporation during the initial major development works that led to the creation of the current dredge reclamation area (Driscoll 1992, 1993, 1994). Between three and 16 counts were then conducted annually to 2002 in an unstandardised way. Since January 2003, the QWSG has been commissioned by Port of Brisbane Pty Ltd to undertake regular (typically monthly) standardised counts of birds on Port lands on Fisherman Islands (Figure 1.1): within the reclamation area; a purpose-built shorebird roost site (PBAR); a nearby claypan (FICP); a freshwater lake adjacent to the old visitor centre (FIVC); and an ephemeral freshwater pondage area within a rail loop (PBRL). During the 2024/25 season, a new pond (PBC5) was formed by excising the eastern portion of the PFPE pond. More recently a claypan roost site on Port lands on the mainland, Lytton Claypan No. 1 (LYN1) has been included in the monthly Port count to survey this site at the same time as the sites on Fisherman Islands. QWSG members have also regularly counted between 50 and 65 other high tide roosts in Moreton Bay, to monitor shorebird numbers throughout Moreton Bay more broadly (Fuller *et al.* 2021).



**Figure 1.3.** Locations of shorebird count sites on Fisherman Islands at Port of Brisbane in 2022/23, including seven sites within the current reclamation area, a purpose-built shorebird roost site (PBAR), a nearby claypan (FICP), a freshwater lake (FIVC) and an ephemeral freshwater pondage area within a rail loop (PBRL). Also showing the Lytton Claypan No. 1 (LYN1) and Luggage Point (LUPO) roost sites. Includes material © 2023 Google, © 2023 Airbus.

Starting in 2007, the QWSG has included the Port of Brisbane in a network of locations around Moreton Bay where shorebirds are irregularly captured to be fitted with numbered metal bands and engraved green leg flags. The leg flags are engraved with a unique combination of letters and numbers that can be read from a distance and allows each bird to be individually identified without the need to re-capture it. Furthermore, some birds have been fitted with small Platform Terminal Transmitter (PTT) satellite tracking devices to track their local and migratory movements. This contributes to a national and global programme that seeks to better understand the annual survival and movements of shorebirds both within Moreton Bay and on their migration through the Flyway to their breeding grounds in the northern hemisphere.

This is the thirteenth annual report since 2013 to present the results of the shorebird monitoring activities of the QWSG at the Port of Brisbane and covers the period September 2024 to August 2025.

## 1.2 OBJECTIVES

The specific objectives of this report are to:

- provide a summary of bird numbers by species and site (individually and overall) at the Port for 2024/25, presented as a table of raw numbers and suitable graph(s);
- quantify the relative importance of the Port for supporting roosting shorebirds in Moreton Bay by comparing total Port counts with the total Moreton Bay count;
- present annual changes in shorebird numbers by species for each roost site within the Port;
- analyse longer-term trends of shorebird numbers at the Port by species; and
- provide a summary of shorebird banding and leg flag re-sighting activities at the Port.

## 2.0 MONITORING APPROACH

The annual monitoring involved two main activities: monthly counts; and irregular shorebird banding and leg flag re-sighting.

### 2.1 MONTHLY SHOREBIRD COUNTS

Ten counts were conducted within the reporting period (**Table 2.1**). QWSG count volunteers generally met on site 1.5 hours before high tide to be briefed and assigned to one or more count sites in teams of at least two members. Each team then proceeded to record the total number of individuals for each species observed within their assigned sites within a 2-hour period, approximately an hour either side of high tide. Birds were observed through high-powered spotting telescopes mounted on sturdy tripods. Any movement of birds between count sites during the count were noted and communicated between teams to avoid double-counting.

Counts were allocated to one of four periods that characterise the annual cycle of a typical migratory shorebird as follows:

- Breeding (the northern hemisphere breeding season or austral winter months June to August);
- South migration (September to mid-November);
- Non-breeding (the austral summer months mid-November to mid-March); and
- North migration (mid-March to May).

**Table 2.1.** Count dates and high tide (HT) details during the September 2024 to August 2025 reporting period.

Shorebird activity period	Date	HT height (m)	HT time
South migration	22/09/2024	2.34	12:34
South migration	06/10/2024	2.18	11:22
South migration	10/11/2024	2.21	16:22
Non-breeding	08/12/2024	2.28	14:41
Non-breeding	19/01/2025	2.23	12:51
Non-breeding	16/02/2025	2.30	11:42
North migration	16/03/2025	2.26	10:39
North migration	11/05/2025	2.02	8:27
Breeding	13/07/2025	1.86	11:03
Breeding	17/08/2025	2.15	16:25

## 2.2 SHOREBIRD BANDING AND FLAG RE-SIGHTING

No shorebird banding took place at the Port during the reporting period due to other commitments the banding team had. During the monthly counts, the details of any birds carrying engraved leg flags were recorded opportunistically when the flag combinations were able to be read.

## 2.3 IMPORTANT MIGRATORY SHOREBIRD SPECIES AT THE PORT OF BRISBANE

Twelve migratory shorebird species are a particular focus of the monitoring at the Port (**Table 2.2**). The 12 species have all been recorded at some time or another on Fisherman Islands (i.e. excluding Lytton Claypan No. 1) in numbers exceeding 0.1 % of the total Flyway population size, including five species recorded in numbers exceeding 1% of the Flyway population (**Table 2.2**). Note that a site is considered internationally or nationally significant for a species if the population at the site exceeds >1% or > 0.1% of the total Flyway population size respectively (Bamford *et al.* 2008). The list of shorebird species recorded at the Port since 2002, and their conservation status is provided in **Appendix A**.

**Table 2.2.** Maximum counts of 12 important species on Fisherman Islands at the Port of Brisbane also expressed as the percentage of the total population size in the EAAF (van Swinderen *et al.* 2025) and year of maximum count between September 2003 and August 2024.

Species	Maximum count since 2003 (% flyway)	Year of maximum
Bar-tailed Godwit	1,572 (0.4)	2019
Curlew Sandpiper	3,408 (2.8)	2023
Far Eastern Curlew	670 (1.9)	2006
Great Knot	708 (0.2)	2013
Greater Sand Plover	441 (0.3)	2006
Grey Plover	145 (0.2)	2007
Grey-tailed Tattler	1,434 (1.8)	2019
Lesser Sand Plover	2,433 (0.9)	2003
Pacific Golden Plover	1,219 (0.8)	2019
Red-necked Stint	6,803 (1.1)	2003
Ruddy Turnstone	213 (0.7)	2016
Sharp-tailed Sandpiper	2,078 (1.6)	2005

## 2.4 ANALYSIS

Temporal trends in the annual average count of individual species or shorebird groupings over the 23-year period of shorebird years 2002 to 2024 were tested using a general linear model (GLM). The average annual count over the summer period (1 October to 15 March inclusive, the period that migratory shorebird numbers at the Port were consistently high) or winter period (1 May to 31 August) was the dependent variable, with year as the independent variable. Two alternative models of the temporal trend in the average annual count were compared based on Akaike's Information Criterion (AIC), one fitting a linear regression and the other fitting a polynomial regression; the model with the lowest AIC was selected as the most parsimonious model. Models were fitted in R (R Core Team 2025) following the methods of Crawley (2002).

To assess the relative importance of the roosts on Fisherman Islands to individual migratory shorebird species in Moreton Bay, an index of relative importance (IRI) was calculated for each species as the ratio of the average annual (or annual) maximum count at the Port over the period 2003 to 2023 to the maximum count for Moreton Bay since 2008 as reported in Fuller *et al.* (2021), expressed as a percentage:

$$IRI = \frac{\text{Average annual maximum count}}{\text{Maximum count for Moreton Bay since 2008}} \times 100$$

The significance of the roosts on Fisherman Islands collectively and individually was also assessed on the basis of the percentage of the East Asian-Australasian Flyway (EAAF) population that the respective species counts represent, where counts representing greater than 1% of the EAAF population are internationally significant (Ramsar 1971, Clemens *et al.* 2010) and counts representing greater than 0.1% of the EAAF population are nationally significant (Clemens *et al.* 2010).

## 2.5 PERMITS AND APPROVALS

All QWSG field activities were carried out in accordance with scientific purposes permits WISP16744415 and WA0032220, Moreton Bay Marine Park Permit QS2007/CVL1337A and Animal Ethics Approvals CA 2018-02-1159 and CA 2020-11-1435.

## 3.0 RESULTS AND DISCUSSION

### 3.1 MONTHLY SHOREBIRD COUNTS 2024/25

A total of 20 migratory shorebird species and seven resident shorebird species were recorded at the Port during the reporting period (**Appendix B**), similar to previous years. The total counts of both migratory and resident (non-migratory) shorebirds at each site each month between September 2024 and August 2025 are summarised in **Table 3.1**.

The total migratory shorebird count (including LYN1) ranged between 4,178 and 8,750 birds during the south migration period (September to mid-November), between 5026 and 10848 birds during the non-breeding period (mid-November to mid-March), between 1,418 and 5,542 during the north migration period (mid-March to May) and between 402 and 1,678 during the northern hemisphere breeding period (June to August). The total resident shorebird count ranged between 185 and 768 birds (**Table 3.1**).

Three of the Port roost sites supported 73% of the total migratory shorebirds overall (**Table 3.1**): Lytton Claypan No. 1 (32%) and reclamation area ponds R3 (31%) and C3 (11%) and. Similarly, four of the Port sites supported 76% of the total resident shorebirds overall: Lytton Claypan No. 1 (27%), reclamation area pond R3 (26%), Fisherman Islands claypan (14%) and the artificial roost (9%). The artificial roost supported 0.4% of migratory shorebirds and 9.4% of resident shorebirds overall.



**Photo 1.** *Mixed flock of Pacific Golden Plover, Lesser Sand Plover and Red-necked Stint roosting on a dry dredge reclamation pond on Fisherman Islands (Robert Bush, QWSG).*

**Table 3.1.** Total counts of both migratory and resident shorebirds at each site each month between September 2024 and August 2025. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% of total
<b>Migratory</b>													
Lytton Claypan No.1	LYN1	1927	797	2431	3085	2376	3422	1971	248	286	302	16845	31.7
Pond R3	PBR3	1707	1531	4957	1619	866	3500	395	438	115	1158	16286	30.6
Pond C3	PBC3	632	1388	166	3126	61	354	12	2	0	0	5741	10.8
Pond BS3	PBS3	150	0	404	1990	416	277	1665	72	0	26	5000	9.4
Pond FPE	PFPE	387	3	445	606	849	2249	243	0	0	0	4782	9.0
FI Claypan	FICP	28	367	258	8	431	1033	527	266	0	190	3108	5.8
Pond C5	PBC5							711	157	0	0	868	1.6
Pond BS4	PBS4	0	14	3	0	0	0	1	235	0	2	255	0.5
Artificial roost	PBAR	9	76	86	21	27	13	0	0	1	0	233	0.4
Pond C4	PBC4	0	2	0	5	0	0	17	0	0	0	24	0.0
Visitor Centre	FIVC	0	0	0	0	0	0	0	0	0	0	0	0.0
Rail Loop	PBRL	0	0	0	0	0	0	0	0	0	0	0	0.0
	Total	4840	4178	8750	10460	5026	10848	5542	1418	402	1678	53142	100.0
<b>Resident</b>													
Lytton Claypan No.1	LYN1	56	87	16	129	95	51	132	262	253	267	1348	26.5
Pond R3	PBR3	52	52	36	55	196	186	233	186	65	242	1303	25.6
FI Claypan	FICP	59	12	5	44	52	80	123	176	79	97	727	14.3
Artificial roost	PBAR	76	66	84	20	10	7	20	2	119	75	479	9.4
Pond C3	PBC3	68	38	2	13	13	87	11	45	9	8	294	5.8
Pond FPE	PFPE	29	17	21	16	0	72	54	0	44	30	283	5.6
Pond BS4	PBS4	3	6	13	0	0	6	4	38	176	0	246	4.8
Pond BS3	PBS3	8	2	0	23	0	28	151	0	3	0	215	4.2
Pond C4	PBC4	1	2	7	76	0	3	16	7	0	3	115	2.3
Pond C5	PBC5							0	8	20	21	49	1.0
Visitor Centre	FIVC	0	8	1	0	0	21	2	0	0	0	32	0.6
Rail Loop	PBRL	0	1	0	0	0	0	1	0	0		2	0.0
	Total	352	291	185	376	366	541	747	724	768	743	5093	100.0

Counts for each of the 12 important species for each site and month during the past year are given in **Appendix C**. **Appendix B** outlines the monthly totals across all Port sites for all shorebird species, not just the twelve important species. **Appendix D** summarises the results of all counts at Lytton Claypan No. 1, including counts on dates outside the Port count schedule.

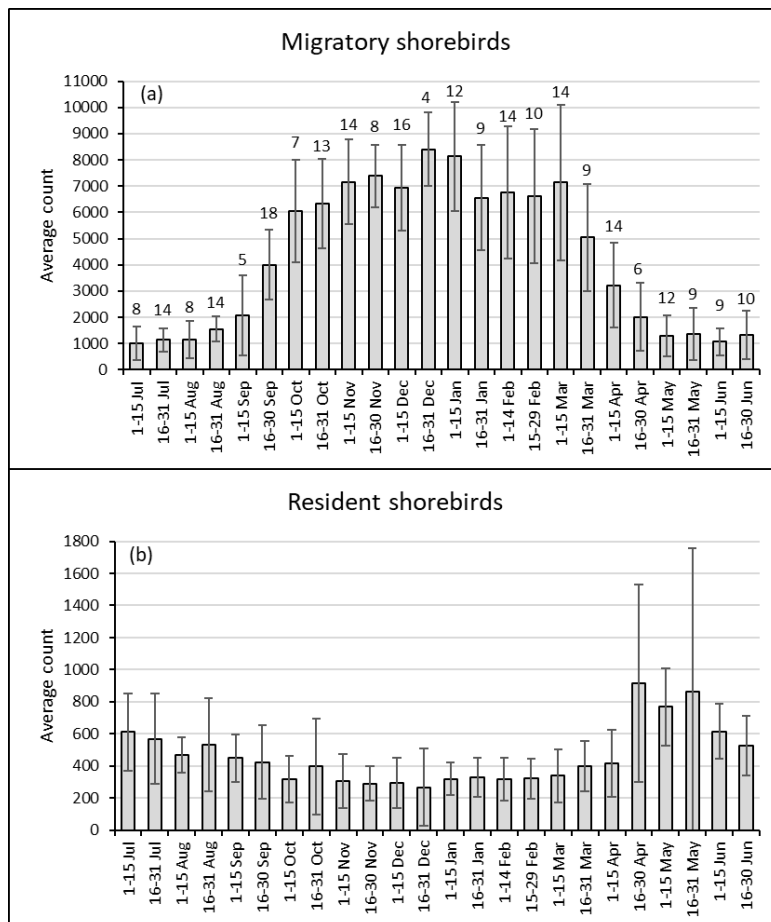
The maximum summer counts recorded on Fisherman Islands (i.e. excluding Lytton Claypan No. 1) during the 2024 shorebird year did not exceed the overall maximum count since 2003 for any of the 12 important species (**Table 3.2**).

**Table 3.2.** Maximum summer counts of 12 important species on Fisherman Islands at the Port of Brisbane also expressed as the percentage of the total population size in the EAAF (van Swinderen et al. 2025) and year of maximum count.

Species	Maximum count for 2024	Maximum count since 2003 (% flyway population)	Year of maximum
Bar-tailed Godwit	677	1,572 (0.4)	2019
Curlew Sandpiper	3,186	3,408 (2.8)	2023
Far Eastern Curlew	333	670 (1.9)	2006
Great Knot	430	708 (0.2)	2013
Greater Sand Plover	124	441 (0.3)	2006
Grey Plover	14	145 (0.2)	2007
Grey-tailed Tattler	1,214	1,434 (1.8)	2019
Lesser Sand Plover	1,307	2,433 (0.9)	2003
Pacific Golden Plover	813	1,219 (0.8)	2019
Red-necked Stint	2,247	6,803 (1.1)	2003
Ruddy Turnstone	69	213 (0.7)	2016
Sharp-tailed Sandpiper	463	2,078 (1.6)	2005

### 3.2 SEASONAL VARIATION IN SHOREBIRD COUNTS ON FISHERMAN ISLANDS

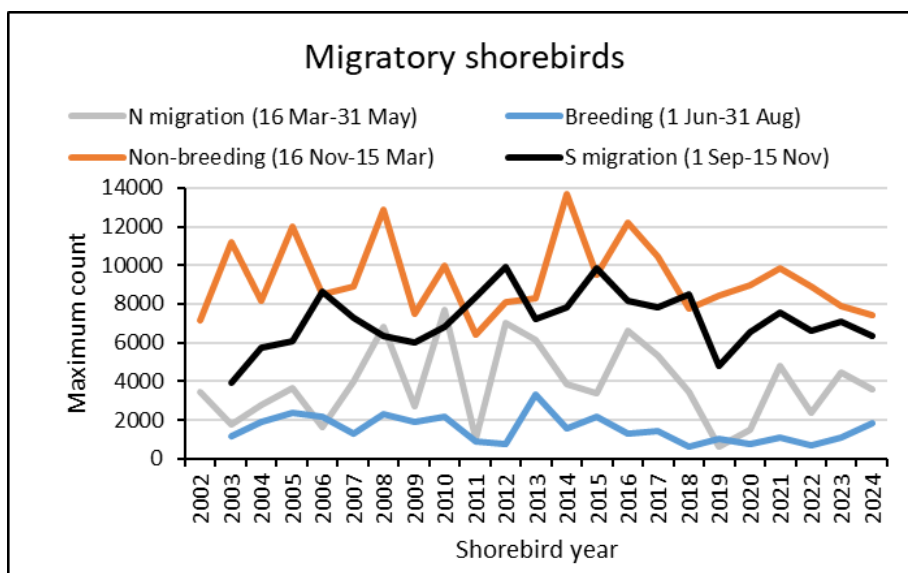
Total migratory shorebird numbers roosting on Fisherman Islands have shown the expected cyclical pattern of increasing during the south migration period that extends from September to mid-November, generally reaching peak numbers through the non-breeding period that extends from mid-November to mid-March, before decreasing again during the north migration period that extends from mid-March to May to relatively low numbers during the northern hemisphere breeding period that extends from June to August (**Figure 3.1a**).



**Figure 3.1.** Average ( $\pm 1$  SD) total migratory (a) and resident (b) shorebird counts on Fisherman Islands each fortnight through the year over the shorebird years 2002-2024. The total number of counts for each fortnight are shown above the respective column.

Total migratory shorebird numbers were consistently high and most stable over the period October to mid-March. Total resident shorebird numbers have overall shown an opposite seasonal pattern to migratory shorebirds (**Figure 3.1b**), reaching lowest average numbers during the period of high migratory shorebird numbers, increasing from mid-April to late August when migratory shorebird numbers are low. Resident shorebirds were substantially less abundant than migratory shorebirds, making up only 9% of the overall total shorebird abundance from all counts since 2002.

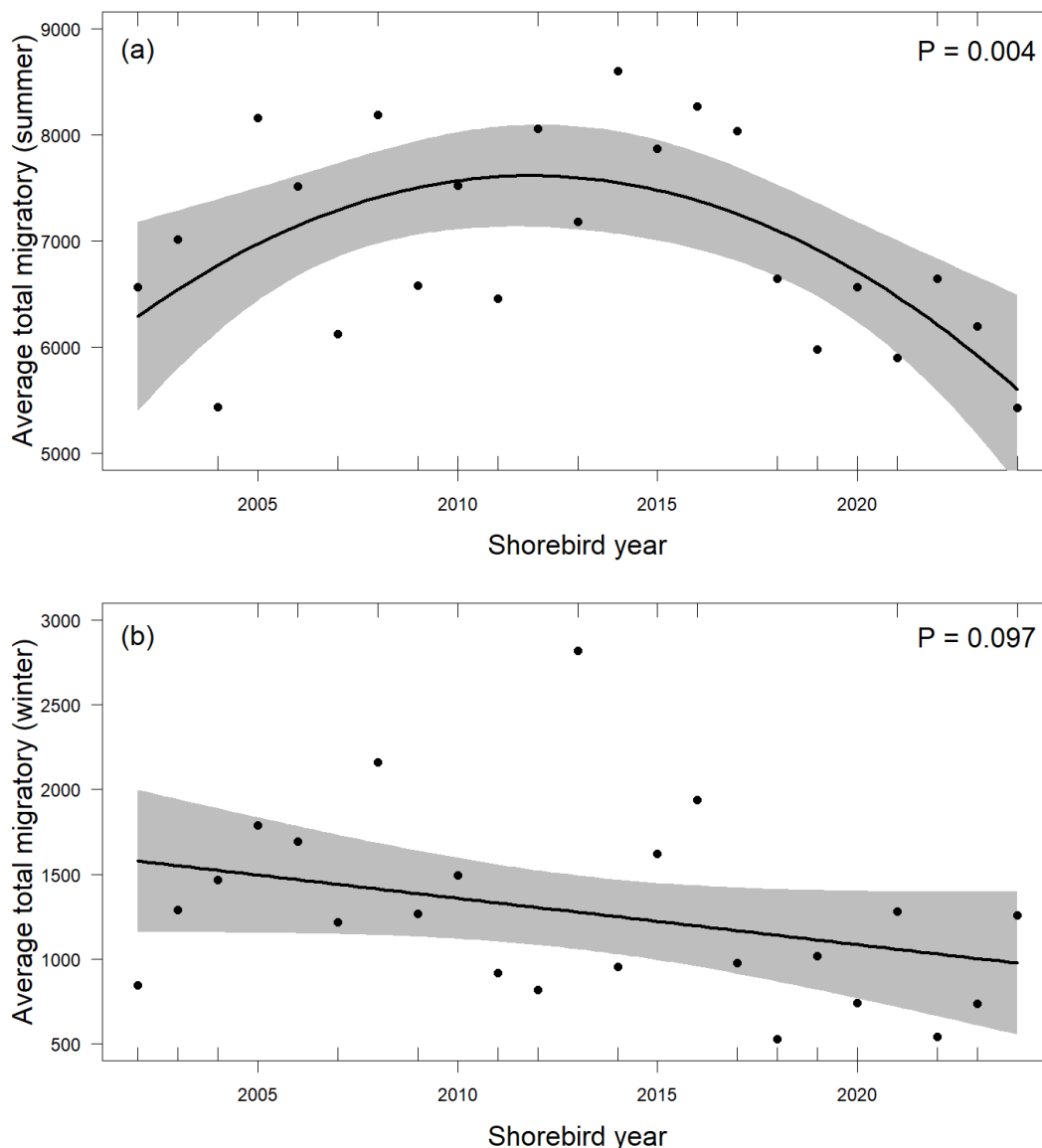
The maximum count of total migratory shorebirds roosting on Fisherman Islands each year has ranged between 7,159 and 13,703 (**Figure 3.2**). The highest counts were generally recorded during the non-breeding period through the austral summer, occasionally during the south migration, with typically lower maximum counts during the north migration and the lowest counts during the breeding period through the austral winter (**Figure 3.2**).



**Figure 3.2.** Maximum counts of migratory shorebirds on Fisherman Islands during the south migration, non-breeding, north migration and breeding periods over the shorebird years 2002-2024.

### 3.3 LONG TERM TRENDS IN SHOREBIRD COUNTS AT THE PORT OF BRISBANE

The average total migratory shorebird summer (1 October to 15 March) count on Fisherman Islands has shown a significant increasing then decreasing trend over the past 23 years 2002-2024 ( $X^2 = 10.88$ ,  $P = 0.004$ ) but there has been no significant trend in the average winter (1 May to 31 August) count ( $X^2 = 2.75$ ,  $P = 0.097$ ; **Figure 3.3**, **Table 3.3**). The average summer count has ranged between 5,430 and 8,607 whereas the average winter count has ranged between 528 and 2,820 birds over the past 23 years.



**Figure 3.3.** Average total counts for migratory shorebirds on Fisherman Islands during the (a) summer (1 October to 15 March) and (b) winter (1 May to 31 August) periods over the shorebird years 2002-2024. The lines of best fit and 95% confidence intervals were generated from the GLMs presented in Table 3.3.

**Table 3.3.** Summary of general linear models (GLMs) run separately for each species and shorebird grouping to examine temporal trends (2002 to 2024) in shorebird abundance on Fisherman Islands; significant trends in bold text are indicated as either positive (+) or negative (-).

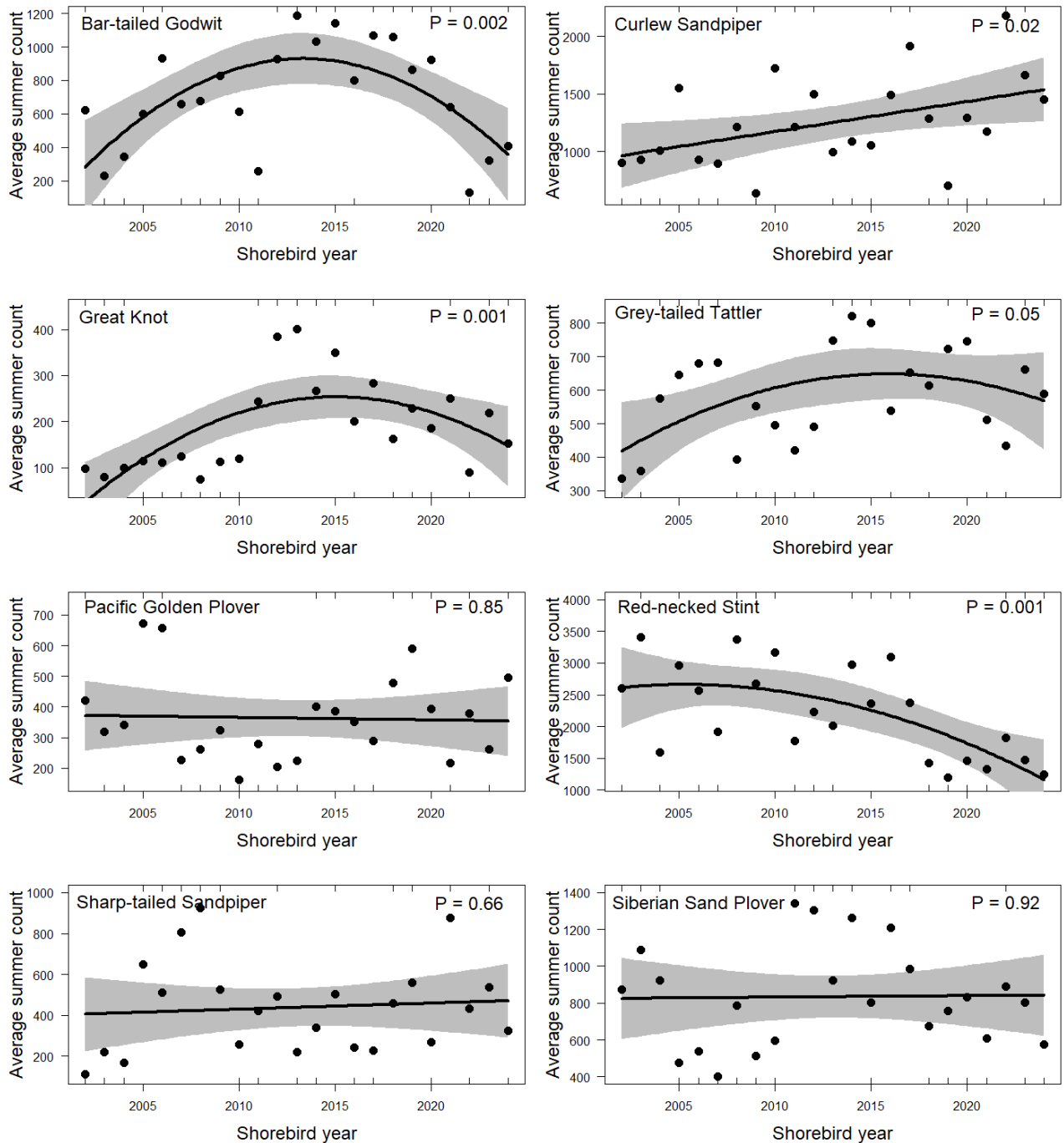
Species	$X^2$	P	Trend
<b>Migratory shorebirds (summer)</b>	<b>10.88</b>	<b>0.004</b>	<b>curvilinear</b>
Migratory shorebirds (winter)	2.75	0.097	
<b>Bar-tailed Godwit</b>	<b>12.77</b>	<b>0.002</b>	<b>curvilinear</b>
Broad-billed Sandpiper	3.05	0.08	
<b>Curlew Sandpiper</b>	<b>5.41</b>	<b>0.020</b>	<b>+</b>
Double-banded Plover	2.41	0.12	
Eurasian Whimbrel	0.92	0.34	
<b>Far Eastern Curlew</b>	<b>9.60</b>	<b>0.008</b>	<b>curvilinear</b>
<b>Great Knot</b>	<b>13.39</b>	<b>0.001</b>	<b>curvilinear</b>
<b>Greater Sand Plover</b>	<b>6.00</b>	<b>0.05</b>	<b>curvilinear</b>
<b>Grey Plover</b>	<b>13.34</b>	<b>&lt;0.001</b>	<b>-</b>
<b>Grey-tailed Tattler</b>	<b>5.89</b>	<b>0.05</b>	<b>curvilinear</b>

Species	$X^2$	<i>P</i>	Trend
Pacific Golden Plover	0.04	0.85	
<b>Red-necked Stint</b>	<b>13.33</b>	<b>0.001</b>	<b>curvilinear</b>
Ruddy Turnstone	10.05	0.007	<b>curvilinear</b>
Sharp-tailed Sandpiper	0.19	0.66	
Siberian Sand Plover	0.01	0.92	
Terek Sandpiper	2.30	0.13	
Pied Oystercatcher	2.28	0.13	
Pied Stilt	1.61	0.20	
Red-capped Plover	2.85	0.09	
Red-necked Avocet	3.09	0.21	

Among individual migratory shorebird species, there has been a significant decreasing trend (at least in recent years) in the average summer count for six species (Bar-tailed Godwit, Far Eastern Curlew, Great Knot, Greater Sand Plover, Grey Plover and Red-necked Stint) and a significant increasing trend for one species (Curlew Sandpiper) over the 23-year period 2002-2024 (**Figures 3.4 and 3.5**). The declines in Far Eastern Curlew and Grey Plover appear to have been gradual, possibly related to long-term population declines in these species (Wilson *et al.* 2011, Studds *et al.* 2017, Morrisk *et al.* 2022, Rogers *et al.* 2023), whereas the decline in Red-necked Stint has occurred since 2018. There is no published evidence that the population of Red-necked Stint using Moreton Bay has declined; while one study reported a significant decline in the population visiting Australia (Clemens *et al.* 2016), another found no significant decline (Studds *et al.* 2016), and a third found a significant increase in the population within Moreton Bay over the period 1996-2008 (Wilson *et al.* 2011). Red-necked Stint commonly uses high-tide roosting habitats as feeding areas at high tide; consequently, the decrease in numbers using the Port may reflect a reduction in the suitability of the reclamation area ponds for Red-necked Stint foraging in recent years, or their use of alternative nearby roost sites such as Luggage Point where they are also able to feed.

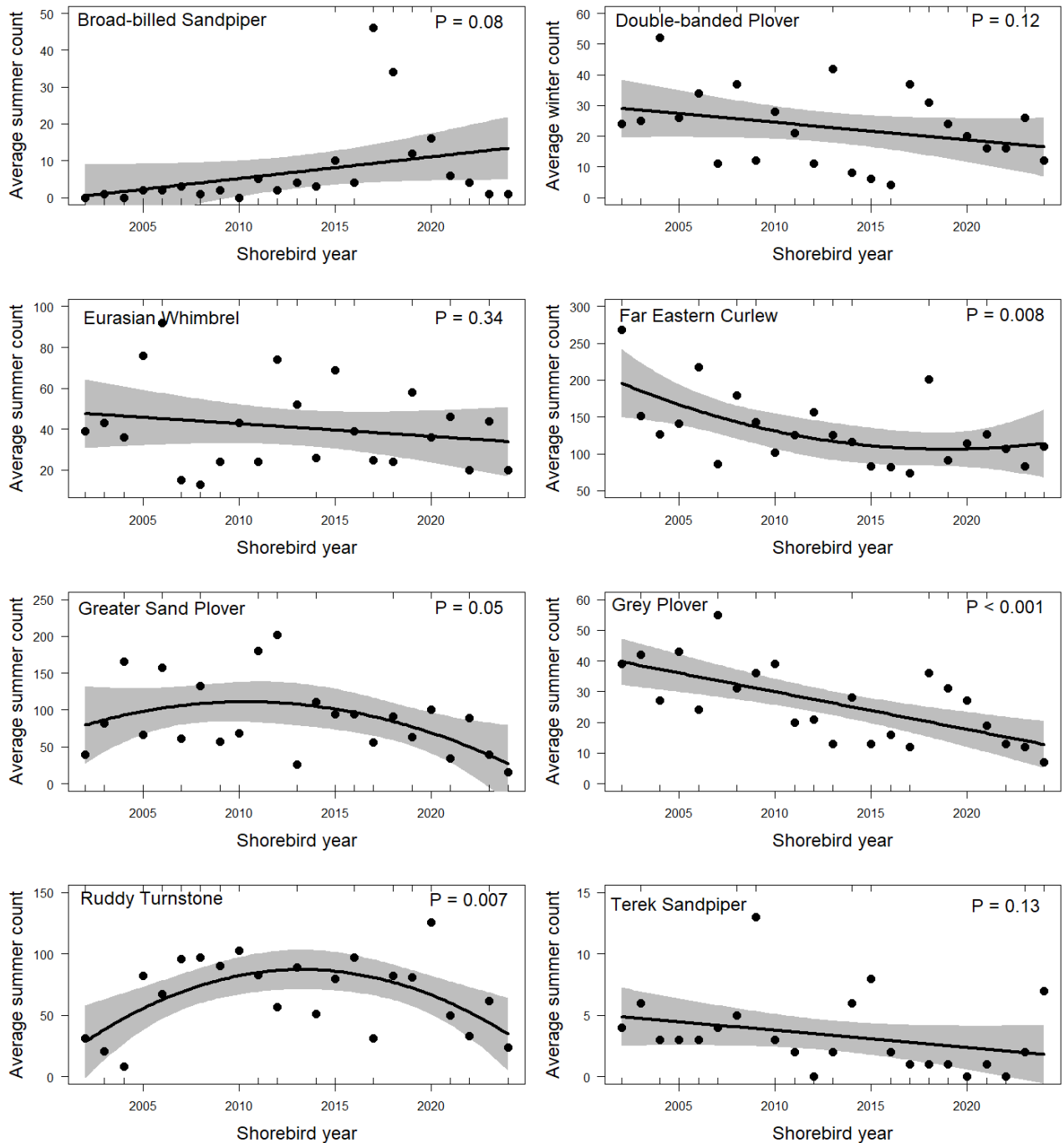
Despite Bar-tailed Godwit and Great Knot experiencing significant population declines within Moreton Bay over the period 1992 to 2008 (Wilson *et al.* 2011), both species increased between 2002 and around 2014, whereafter both have experienced a decline in the total summer count at the Port (**Figure 3.4**). A similar increase in Great Knot abundance after 2010 was observed at low tide foraging habitat adjacent to the Port (Lloyd *et al.* 2021). The recent decrease in counts of Bar-tailed Godwit over the most recent three years coincided with generally increased counts of up to 3,010 (in 2022) to 2,410 (in 2023) and 2,864 (in 2024) Bar-tailed Godwit roosting at the nearby Lytton Claypan No. 1 roost site (**Appendix D**). Similarly, large numbers of Great Knot have been recorded roosting at Lytton Claypan No. 1 (**Appendix D**). Consequently, the reduced counts on Fisherman Islands over the past several years may be due to increasing numbers switching to roosting at Lytton Claypan No. 1. This increased use of Lytton Claypan No. 1 is likely related to reduced human disturbance after Port of Brisbane fenced off the roost site from possible public access points as an active management measure.

Broad-billed Sandpiper was infrequently recorded in low numbers prior to 2014, whereafter numbers have increased, particularly during the northward migration in March-April. Variability in the counts of Broad-billed Sandpiper may also be related to difficulties in distinguishing this species from Curlew Sandpiper in some field situations when the birds are located far from observers.



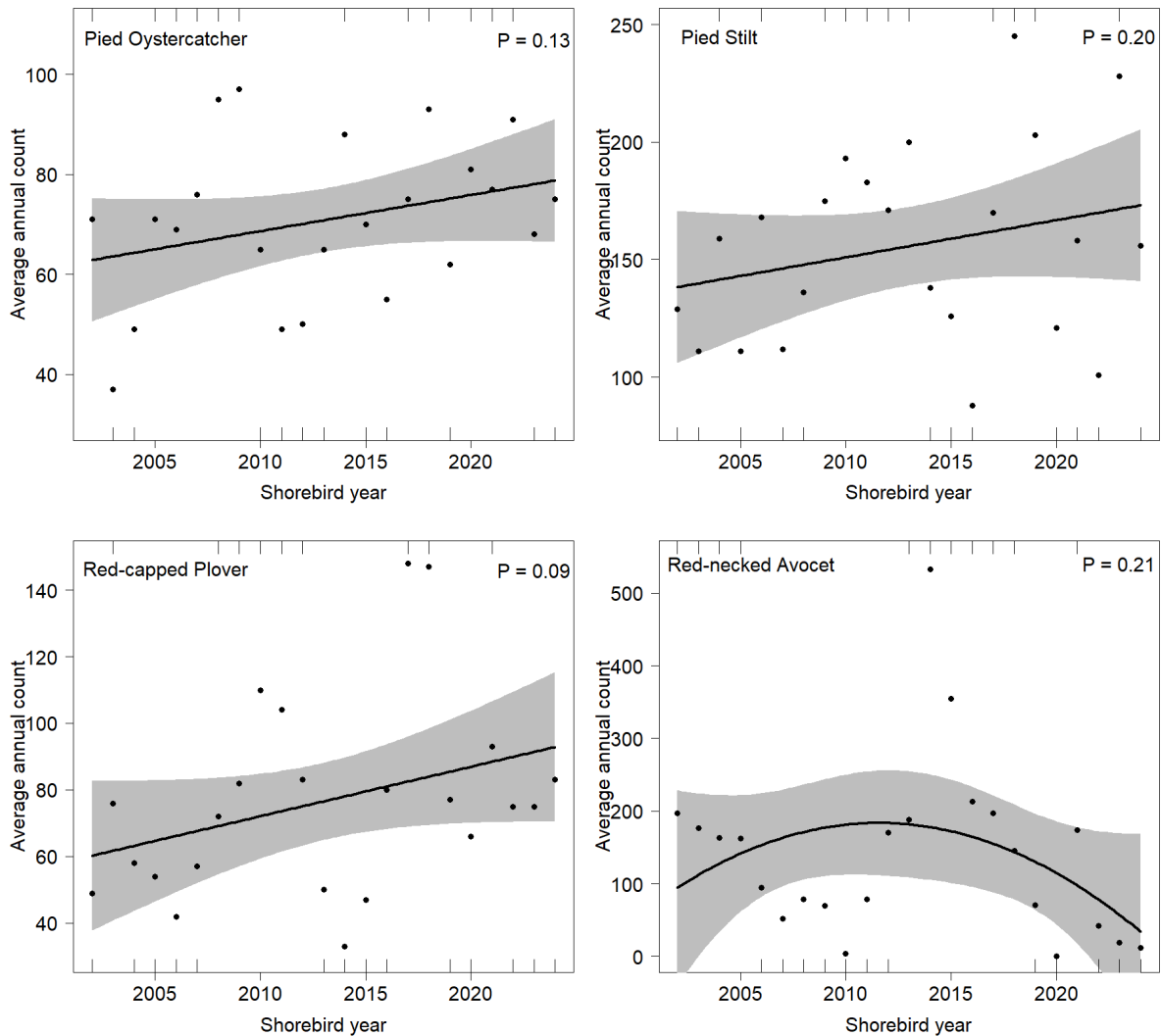
**Figure 3.4.** Average Port counts for eight migratory shorebird species during the summer period (1 October to 15 March: 14 species) or winter period (1 May to 31 August: Double-banded Plover). The lines of best fit and 95% confidence intervals were generated from the GLMs presented in Table 3.3.

The high variability of the summer season counts within each year indicates that many of the migratory shorebirds using roost sites on Fisherman Islands are likely to also be using alternative roost sites outside the Port on a regular basis. The other important shorebird roost sites nearby include Lytton Claypan No. 1, Luggage Point, Manly Harbour and Geoff Skinner Reserve. Satellite tracking and leg flag resighting has confirmed substantial movement of birds between the roosts on Fisherman Islands and other roost sites (Coleman and Milton 2012, Coleman and Bush 2020, Lilleyman *et al.* 2020).



**Figure 3.5.** Average Port counts for eight migratory shorebird species during the summer period (1 October to 15 March: 7 species) or winter period (1 May to 31 August: Double-banded Plover). The lines of best fit and 95% confidence intervals were generated from the GLMs presented in Table 3.3.

There has been no significant trend in the average annual count for the four commonly occurring resident shorebird species over the 23-year period 2002-2024 (**Figure 3.6**). The increased average and high variability in the counts of Red-necked Avocet in the 2014 shorebird year (i.e. 2014/15) were due to an influx of up to 2,810 birds to the reclamation area in April-May 2015.



**Figure 3.6.** Trends in the annual total Fisherman Islands counts of four resident shorebird species over the shorebird years 2002-2024. The lines of best fit and 95% confidence intervals were generated from the GLMs presented in Table 3.3.

### 3.4 SITE IMPORTANCE

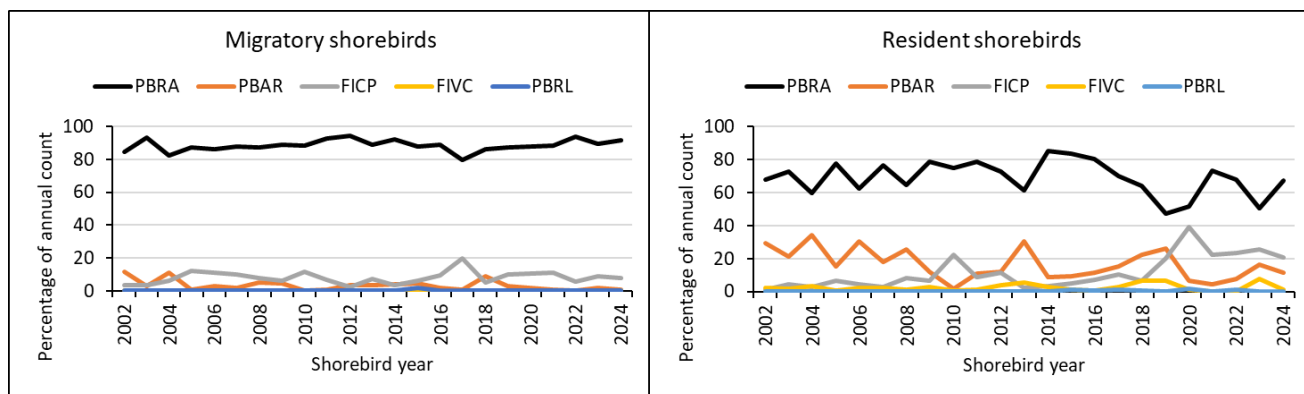
The overall index of relative importance of the roosts on Fisherman Islands to different migratory shorebird species ranged between 83% for Curlew Sandpiper and <1% for Sanderling for the period 2002 to 2024 (**Table 3.4**). Thus, the average annual maximum count of Curlew Sandpiper on Fisherman Islands was 83% of the all-time maximum count of Curlew Sandpiper reported by Fuller *et al.* (2021) for the whole of Moreton Bay since 2008.

The overall index of relative importance of Fisherman Islands was greater than 50% for seven species and greater than 20% for 12 species (**Table 3.4**). The roosts on Fisherman Islands have together supported nationally significant numbers (greater than 0.1% of the EAAF population) of 16 migratory shorebird species and internationally significant numbers (greater than 1% of the EAAF population) of four of these since 2002 (**Table 3.4**). In 2024, the index of relative importance was greater than 50% for four species and greater than 20% for 9 species, with the roosts on Fisherman Islands supporting nationally significant numbers (greater than 0.1% of the EAAF population) of 11 migratory shorebird species and internationally significant numbers (greater than 1% of the EAAF population) of two of these (**Table 3.4**).

**Table 3.4.** Summary of migratory and resident shorebird species recorded on Fisherman Islands at the Port of Brisbane over the shorebird years 2002 to 2022 versus 2023, their average ( $\pm 1SD$ ) summer (1 October to 15 March, migratory species) and winter (1 May to 31 August, migratory species) or annual (resident species) counts (with percentage of counts the species was present in parentheses), annual maximum counts (with overall maximum count in parentheses), and index of relative importance (IRI). Values that exceed 0.1% of the EAAF population of the species are highlighted in bold and values that exceed 1% of the EAAF population are underlined.

Common name	Average ( $\pm 1SD$ ) 2002-2024				2024	
	Summer (n = 111)	Winter (n = 83)	Annual maximum (max. count)	IRI	Max	IRI
Curlew Sandpiper	<b><u>1252</u></b> $\pm 386$	<b>126</b> $\pm 96$	<b><u>2080</u></b> $\pm 551$ ( <b><u>3408</u></b> )	83%	<b><u>3186</u></b>	130%
Pacific Golden Plover	<b>363</b> $\pm 140$	14 $\pm 11$	<b><u>582</u></b> $\pm 261$ ( <b><u>1219</u></b> )	69%	<b>813</b>	98%
Lesser Sand Plover	<b>834</b> $\pm 272$	56 $\pm 47$	<b><u>1408</u></b> $\pm 470$ ( <b><u>2433</u></b> )	73%	<b>1307</b>	68%
Grey-tailed Tattler	<b>586</b> $\pm 140$	<b>120</b> $\pm 127$	<b><u>1038</u></b> $\pm 260$ ( <b><u>1434</u></b> )	42%	<b><u>1214</u></b>	50%
Red-necked Stint	<b>2218</b> $\pm 722$	<b>629</b> $\pm 329$	<b>3707</b> $\pm 1396$ ( <b><u>6803</u></b> )	70%	<b>2247</b>	42%
Greater Sand Plover	88 $\pm 50$	7 $\pm 9$	<b>228</b> $\pm 121$ ( <b>441</b> )	69%	124	37%
Ruddy Turnstone	<b><u>353</u></b> $\pm 183$	<b>69</b> $\pm 82$	<b>128</b> $\pm 59$ ( <b>248</b> )	61%	<b>69</b>	32%
Great Knot	189 $\pm 98$	11 $\pm 17$	382 $\pm 181$ ( <b>708</b> )	27%	<b>430</b>	30%
Sharp-tailed Sandpiper	<b>438</b> $\pm 223$	28 $\pm 65$	<b><u>888</u></b> $\pm 523$ ( <b><u>2078</u></b> )	59%	<b>463</b>	30%
Double-banded Plover	0 $\pm 0$	23 $\pm 11$	<b>45</b> $\pm 35$ ( <b>172</b> )	18%	<b>29</b>	12%
Grey Plover	26 $\pm 13$	1 $\pm 2$	46 $\pm 24$ ( <b>145</b> )	40%	14	12%
Broad-billed Sandpiper	7 $\pm 11$	0 $\pm 0$	28 $\pm 37$ ( <b>131</b> )	22%	12	9%
Far Eastern Curlew	<b>131</b> $\pm 48$	<b>44</b> $\pm 40$	<b>248</b> $\pm 72$ ( <b>340</b> )	7%	<b>333</b>	9%
Bar-tailed Godwit	<b>707</b> $\pm 312$	206 $\pm 139$	<b>1048</b> $\pm 392$ ( <b>1633</b> )	9%	<b>677</b>	6%
Terek Sandpiper	3 $\pm 3$	1 $\pm 2$	12 $\pm 11$ (42)	2%	33	5%
Red Knot	35 $\pm 48$	2 $\pm 4$	<b>220</b> $\pm 218$ ( <b>760</b> )	23%	35	4%
Eurasian Whimbrel	41 $\pm 21$	10 $\pm 23$	<b>139</b> $\pm 95$ ( <b>405</b> )	11%	45	3%
Common Greenshank	4 $\pm 3$	1 $\pm 2$	10 $\pm 8$ (37)	6%	4	2%
Marsh Sandpiper	1 $\pm 1$	0 $\pm 0$	5 $\pm 5$ (18)	2%	6	2%
Black-tailed Godwit	1 $\pm 2$	0 $\pm 0$	6 $\pm 12$ (54)	1%	7	1%
Asian Dowitcher	0 $\pm 0$	0 $\pm 0$	0 $\pm 0$ (1)	6%	0	0%
Sanderling	1 $\pm 2$	0 $\pm 0$	0 $\pm 2$ (8)	0%	0	0%
Wandering Tattler	<1 $\pm$ <1	<1 $\pm$ <1	<1 $\pm$ <1 (3)			
Buff-breasted Sandpiper	<1 $\pm$ <1	0	<1 $\pm$ <1 (1)			
Common Sandpiper	<1 $\pm$ <1	0	<1 $\pm$ <1 (1)			
Latham's Snipe	<1 $\pm$ <1	0	<1 $\pm$ <1 (1)			
Ruff	0	0	<1 $\pm$ <1 (1)			
Total migratory	6997 $\pm 957$	1298 $\pm 448$	9530 $\pm 1811$ (13703)			
Black-fronted Dotterel		1 $\pm 1$	5 $\pm 3$ (13)		4	
Bush Stone-curlew		<1 $\pm$ <10				
Masked Lapwing		5 $\pm 2$	50 $\pm 20$ (102)		48	
Pied Oystercatcher		71 $\pm 16$	162 $\pm 45$ (240)		187	
Pied Stilt		156 $\pm 41$	384 $\pm 178$ (1070)		386	
Red-capped Plover		76 $\pm 29$	158 $\pm 58$ (279)		199	
Red-kneed Dotterel		1 $\pm 4$	6 $\pm 14$ (53)		0	
Red-necked Avocet		139 $\pm 122$	499 $\pm 586$ (2810)		23	
Sooty Oystercatcher		0 $\pm 0$	2 $\pm 2$ (6)		2	
Total resident		449 $\pm 121$	945 $\pm 553$ (3126)			

The reclamation area ponds (PBRA) have consistently supported 79-94% of the migratory shorebirds on Fisherman Islands over the past 23 years, with the artificial roost (PBAR), Fisherman Islands claypan (FICP), visitor centre lake (FIVC) and rail loop (PBRL) sites supporting substantially lower numbers (**Figure 3.7**).



**Figure 3.7.** Percentage of the total annual count of migratory and resident shorebirds on Fisherman Islands supported by each of the reclamation area (PBRA), artificial roost (PBAR), Fisherman Islands claypan (FICP), visitor centre (FIVC) and rail loop (PBRL) sites over the shorebird years 2002-2024.

Averaged across all years, the reclamation area ponds have supported 88%, the Fisherman Islands claypan 8%, the artificial roost 3%, and the visitor centre lake and rail loop less than 1% of the migratory shorebirds. Migratory shorebirds rarely visit the freshwater lake at the visitor centre; small numbers of Curlew Sandpiper, Sharp-tailed Sandpiper, Red-necked Stint and Marsh Sandpiper have been recorded only after the water levels at the lake have declined to very low levels during extended dry periods. The same species are similarly rarely recorded at the rail loop, but in this case only after heavy rainfall has flooded a basin inside the rail loop. The rail loop basin is an artefact of stormwater drainage management that currently allows the basin to flood after heavy rainfall. Similarly, the reclamation area ponds have consistently supported most of the resident shorebirds over the past 23 years (**Figure 3.7**). Averaged across all years, the reclamation area ponds have supported 69%, the artificial roost 17%, the Fisherman Islands claypan 12%, the visitor centre lake 3% and rail loop less than 1% of the resident shorebirds.

All four main roost sites at the Port, three on Fisherman Islands together with the Lytton Claypan No. 1 on the mainland, have supported nationally significant numbers (greater than 0.1% of the EAAF population) and two roost sites, the reclamation area and Lytton Claypan No. 1 have supported internationally significant numbers (greater than 1% of the EAAF population) of migratory shorebird species within the most recent five years (**Table 3.5**). The reclamation area was nationally significant for 13 species and internationally significant for five species, Lytton Claypan No. 1 was nationally significant for six species and internationally significant for two species, the Fisherman Islands claypan was nationally significant for five species and the artificial roost was nationally significant for one species.

**Table 3.5.** Summary of migratory and resident shorebird species recorded at the four main roost sites at the Port of Brisbane over the past five years since September 2020, their average ( $\pm 1SD$ ) summer (1 October to 15 March, migratory species except Double-banded Plover), winter (1 May to 31 August, Double-banded Plover) or annual (resident species) counts, with overall maximum count in parentheses. Values that exceed 0.1% of the EAAF population of the species are highlighted in bold and values that exceed 1% of the EAAF population are underlined.

Common name	Reclamation Area	Artificial Roost	Fisherman Isl. Claypan	Lytton Claypan No. 1
<b>Migratory shorebirds</b>				
Asian Dowitcher	0 $\pm$ 0.2 (1)	0	0	0.1 $\pm$ 0.3 (1)
Bar-tailed Godwit	<b>410.7<math>\pm</math>363.3 (1075)</b>	24.8 $\pm$ 86.5 (435)	39 $\pm$ 84.5 (251)	<b>1006.7<math>\pm</math>650.3 (3010)</b>
Black-tailed Godwit	0 $\pm$ 0.2 (1)	0.1 $\pm$ 0.3 (1)	0	12.5 $\pm$ 17.6 (71)
Broad-billed Sandpiper	5.5 $\pm$ 14.5 ( <b>76</b> )	0.5 $\pm$ 1.9 (8)	0	0
Common Greenshank	0.2 $\pm$ 0.7 (3)	0.6 $\pm$ 0.8 (2)	1.3 $\pm$ 6.6 (35)	0.9 $\pm$ 1.5 (8)
Common Sandpiper	0 $\pm$ 0.2 (1)	0	0	0
Curlew Sandpiper	<b><u>1528<math>\pm</math>922.8 (3408)</u></b>	11 $\pm$ 31.3 ( <b>158</b> )	45.7 $\pm$ 87.2 ( <b>289</b> )	<b>133.4<math>\pm</math>254.9 (1251)</b>
Double-banded Plover	0 $\pm$ 0.2 (1)	0	0	0
Eurasian Whimbrel	0.1 $\pm$ 0.6 (3)	5.8 $\pm$ 12.9 (45)	26.5 $\pm$ 37.7 ( <b>157</b> )	<b>114.8<math>\pm</math>65.5 (210)</b>
Far Eastern Curlew	<b>45.6<math>\pm</math>60.2 (244)</b>	2.1 $\pm$ 1.2 (4)	<b>60.5<math>\pm</math>95.2 (340)</b>	<b>220.7<math>\pm</math>98.6 (438)</b>
Great Knot	153.9 $\pm$ 163.9 ( <b>482</b> )	1.9 $\pm$ 9.1 (48)	17.3 $\pm$ 40.1 (180)	87.3 $\pm$ 129.8 ( <b>472</b> )
Greater Sand Plover	59.7 $\pm$ 71.5 ( <b>305</b> )	0	0	0
Grey Plover	15.9 $\pm$ 12.7 (49)	0	0	0
Grey-tailed Tattler	<b>583.1<math>\pm</math>410.4 (1275)</b>	0	0	0 $\pm$ 0.2 (1)
Lesser Sand Plover	<b>755.7<math>\pm</math>452.8 (2053)</b>	0	0	0
Marsh Sandpiper	0.9 $\pm$ 1.7 (6)	0	0.1 $\pm$ 0.4 (2)	2.4 $\pm$ 5.1 (22)
Pacific Golden Plover	<b>348.4<math>\pm</math>192.7 (812)</b>	1.8 $\pm$ 2.3 (8)	2.6 $\pm$ 6.3 (25)	0 $\pm$ 0.1 (1)
Red Knot	10 $\pm$ 30.1 ( <b>152</b> )	1.3 $\pm$ 4.5 (18)	1.1 $\pm$ 4 (20)	6.7 $\pm$ 17.5 (122)
Red-necked Stint	<b>1325.5<math>\pm</math>693.8 (2734)</b>	3.6 $\pm$ 8.7 (42)	160.5 $\pm$ 299 ( <b>1350</b> )	36.2 $\pm$ 68.4 (343)
Ruddy Turnstone	<b>59.4<math>\pm</math>65.6 (248)</b>	0	0	0
Sanderling	0 $\pm$ 0.2 (1)	0	0	0
Sharp-tailed Sandpiper	<b>380.3<math>\pm</math>334.6 (1640)</b>	23 $\pm$ 20.9 (87)	71.9 $\pm$ 163.7 ( <b>637</b> )	89.6 $\pm$ 130.7 ( <b>505</b> )
Terek Sandpiper	1.9 $\pm$ 6.5 (33)	0	0	0
<b>Resident shorebirds</b>				
Black-fronted Dotterel	0.2 $\pm$ 0.8 (4)	0.7 $\pm$ 1.3 (4)	0	0.2 $\pm$ 1.2 (9)
Masked Lapwing	0.2 $\pm$ 0.6 (2)	1.2 $\pm$ 1 (3)	3 $\pm$ 2 (7)	5.4 $\pm$ 5.8 (23)
Pied Oystercatcher	105 $\pm$ 73.5 (240)	1 $\pm$ 1.1 (3)	0.7 $\pm$ 2 (10)	10 $\pm$ 26.6 (189)
Pied Stilt	15.4 $\pm$ 26.4 (111)	28.5 $\pm$ 41.4 (146)	20.4 $\pm$ 41.1 (150)	46.5 $\pm$ 67.5 (309)
Red-capped Plover	58.3 $\pm$ 37.6 (152)	1 $\pm$ 1.3 (4)	3.1 $\pm$ 4.5 (16)	4.7 $\pm$ 6.1 (34)
Red-kneed Dotterel	0	0	0	0
Red-necked Avocet	35.8 $\pm$ 168.7 (896)	3.6 $\pm$ 10.6 (38)	0	2 $\pm$ 9.8 (56)
Sooty Oystercatcher	0.7 $\pm$ 1.4 (6)	0	0	0
<i>Total migratory</i>	5686.2 $\pm$ 2100.6 (9646)	76.5 $\pm$ 121.6 (544)	426.5 $\pm$ 465.5 (1522)	1454.4 $\pm$ 785.4 (3927)
<i>Total resident</i>	215.6 $\pm$ 184.9 (1032)	36 $\pm$ 49.5 (186)	27.1 $\pm$ 39.7 (152)	53.5 $\pm$ 66.8 (326)

### 3.5 SHOREBIRD BANDING AND FLAG RESIGHTING

There were 43 shorebird flag re-sightings at the Port, all from birds roosting at Lytton Claypan No. 1 that were resighted by Arthur Keates. These re-sightings were of 40 different individuals, all but one originally banded in Moreton Bay, including:

- 17 birds banded at Manly Harbour, 6 km south of the LYN1;
- 9 birds banded at West Geoff Skinner Reserve, Wellington Point, 11 km south of LYN1;
- 4 birds banded at King Street Mudflat, Thornlands, 21 km south of LYN1;
- 3 birds banded at Lytton Claypan No. 1;
- 3 birds banded at Oyster Point, Cleveland, 18 km south of LYN1;
- 1 bird banded at Toorbul, 40 km north of LYN1;
- 1 bird banded in the Port reclamation area; and
- 1 bird banded at Chongming Dao, Shanghai, China.

These re-sightings confirm that the birds using the Port roost sites also roost at many other sites up to 40 km away in Moreton Bay, particularly roost sites to the south of the Port.

### 4.0 MANAGEMENT ACTIONS

During the 2024/25 reporting period, actions undertaken by Port of Brisbane to manage and maintain the shorebird roosting values at the Port have included:

- Flooding the artificial roost (PBAR) with seawater on a spring tide for a month to assist with managing vegetation cover and manually removing any recruiting mangrove seedlings to maintain an extensive open area of sparsely vegetated substrate to accommodate larger numbers of migratory shorebirds.
- Maintaining fences, controlling weeds, foxes and fire ants, and conducting native plant rehabilitation at Whyte Island.

### 5.0 CONCLUSION

As reported here, the long-term monitoring supported by Port of Brisbane has shown that the combined roost sites at the Port of Brisbane, which are all located outside the boundary of the Moreton Bay Ramsar site, are the most roost area for migratory shorebirds in Moreton Bay, regularly used by around a third of migratory shorebirds that occupy the entire Moreton Bay Ramsar site through the austral summer months (Fuller *et al.* 2021, Lloyd *et al.* 2024b).

The disproportionate importance of the Port for many species may be related to several factors including suitability for roosting, availability of food, distance from preferred feeding habitat areas and protection from human disturbance. The high suitability of the reclamation area ponds as roosting habitat relates to them: (1) incorporating large areas of bare, open ground with little to no cover that provide a clear view of approaching predators; (2) being adjacent to the shoreline or incorporating areas of water and wet substrates that allow the birds to stay cool on hot days; (3) incorporating areas with uneven relief with small surface mounds and depressions that assists with camouflage and affords some protection from strong winds; and (4) being largely protected from tidal influence such that these preferred roosting characteristics are predictably available during all high tides. The nutrient rich slurry from the dredge material pumped into the ponds promotes the development of invertebrate communities in the shallow waters, which provides food for smaller shorebirds such as Red-necked Stint and sandpipers and allows them to continue feeding through the high-tide phase of the tidal cycle when their tidal flat foraging habitat is inundated and unavailable to them (Fuller *et al.* 2021).

Shorebirds prefer to roost close to their preferred tidal flat feeding areas since this reduces their energy expenditure flying between roosting and feeding sites (Rogers *et al.* 2006, Ryeland *et al.* 2021). The tidal flats within a 15 km radius of the Port support relatively high foraging densities at low tide of Curlew Sandpiper, Red-necked Stint, Pacific Golden Plover, Great Knot, Lesser Sand Plover and Sharp-tailed Sandpiper compared with other areas of Moreton Bay (Thompson 1990, Driscoll 1991, Lloyd *et al.* 2021, Fuller *et al.* 2021). The disproportionate importance of the Port for roosting by these species is therefore likely related to the proximity of the Port to preferred feeding areas.

Human disturbance is a key threat to migratory shorebird use of roost sites in Moreton Bay, one that is becoming more severe as the urban population of the greater Brisbane area grows, increasing the number of people engaging in water-based recreational activities (Milton *et al.* 2011, Fuller *et al.* 2021, Lloyd *et al.* 2024a). All the main shorebird roosts at the Port of Brisbane are fenced with no public access, and disturbance from operational activities occurs only occasionally, with birds able to move between the multiple suitable roost sites in proximity when they are disturbed. This has contributed to the Port providing a predictably safe roosting environment for shorebirds over a long period of time.

## 6.0 RECOMMENDATIONS

Port of Brisbane Pty Ltd is encouraged to continue to prioritise the management and monitoring of shorebirds at the Port. The monitoring reported here identifies the Fisherman Islands claypan and Lytton Claypan No. 1 roost sites as very significant, naturally occurring shorebird roost sites that are important to the network of roost sites in central Moreton Bay. Portions of these roost sites also provide foraging resources for migratory shorebirds when inundated. These two roost sites, together with the artificial roost, are likely to become increasingly relied upon by migratory shorebirds in future as the availability of roosting habitat in the current FPE reclamation area diminishes as it approaches the point when it is all expected to be resumed for port infrastructure. Consequently, retaining the Fisherman Islands claypan, Lytton Claypan No. 1 and artificial roost sites as part of the conservation buffer land use under the Brisbane Port Land Use Plan 2020 (LUP) can make an important contribution to the sympathetic management of migratory and other shorebirds in Moreton Bay. Recognising this importance, Port of Brisbane has already made an important contribution to protecting the Lytton Claypan No. 1 roost site from disturbance through fencing it off from possible unauthorised access. Migratory shorebird use of the Lytton Claypan No. 1 roost site may be increasing because of decreased disturbance resulting from this management action, providing an attractive alternative roost site to birds that might otherwise roost in the reclamation area.

Nevertheless, there remains a need to continue to explore opportunities to provision or improve roosting habitat for shorebirds within or adjacent to Port lands to compensate for the expected future loss of roosting habitat in the reclamation area. Planning to provide adequate shorebird habitat in Moreton Bay into the future is required to manage the increasing pressures on shorebirds from the continued growth and development of Brisbane and the anticipated future loss of roosting habitat in the Port reclamation area (Fuller *et al.* 2021). Although the artificial roost has supported only 3% of the migratory shorebirds using Fisherman Islands since 2002, it is occasionally used by large numbers of birds (see **Table 3.5**), indicating it has potential to support larger numbers of birds once currently preferred alternatives in the reclamation area are lost. The low, open islands in the artificial roost pond (PBAR) have gradually diminished in area over the years due to subsidence of the substrate. Consequently, an additional management intervention to improve the ability of the artificial roost site to accommodate larger numbers of birds could be to expand the area of bare substrate on the islands.

## 7.0 ACKNOWLEDGEMENTS

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**APPENDIX A: List of migratory and resident shorebirds recorded on Fisherman Islands since 2002 together with their conservation status under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Queensland *Nature Conservation Act 1992* (NC Act).**

Common name	Scientific name	EPBC Act*	NC Act*
<b>Migratory shorebirds</b>			
Asian Dowitcher	<i>Limnodromus semipalmatus</i>	M, V	V
Bar-tailed Godwit (Western Alaskan)	<i>Limosa lapponica baueri</i>	M, E	E
Black-tailed Godwit	<i>Limosa limosa</i>	M, E	E
Broad-billed Sandpiper	<i>Calidris falcinellus</i>	M	S
Buff-breasted Sandpiper	<i>Calidris subruficollis</i>	M	S
Common Greenshank	<i>Tringa nebularia</i>	M, E	E
Common Sandpiper	<i>Actitis hypoleucos</i>	M	S
Curlew Sandpiper	<i>Calidris ferruginea</i>	M, CE	CE
Double-banded Plover	<i>Charadrius bicinctus</i>	M	S
Eurasian Whimbrel	<i>Numenius phaeopus</i>	M	S
Far Eastern Curlew	<i>Numenius madagascariensis</i>	M, CE	CE
Great Knot	<i>Calidris tenuirostris</i>	M, V	V
Greater Sand Plover	<i>Charadrius leschenaultii</i>	M, V	V
Grey Plover	<i>Pluvialis squatarola</i>	M, V	V
Grey-tailed Tattler	<i>Tringa brevipes</i>	M	S
Latham's Snipe	<i>Gallinago hardwickii</i>	M, V	V
Lesser Sand Plover	<i>Charadrius mongolus</i>	M, E	E
Marsh Sandpiper	<i>Tringa stagnatilis</i>	M	S
Pacific Golden Plover	<i>Pluvialis fulva</i>	M	S
Red Knot	<i>Calidris canutus</i>	M, V	V
Red-necked Stint	<i>Calidris ruficollis</i>	M	S
Ruddy Turnstone	<i>Arenaria interpres</i>	M, V	V
Ruff	<i>Calidris pugnax</i>	M	S
Sanderling	<i>Calidris alba</i>	M	S
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	M, V	V
Terek Sandpiper	<i>Xenus cinereus</i>	M, V	V
Wandering Tattler	<i>Tringa incana</i>	M	S
<b>Resident shorebirds</b>			
Black-fronted Dotterel	<i>Euseyonis melanops</i>		LC
Bush Stone-curlew	<i>Burhinus grallarius</i>		LC
Hooded Dotterel	<i>Thinornis cucullatus</i>	V	LC
Masked Lapwing	<i>Vanellus miles</i>		LC
Pied Oystercatcher	<i>Haematopus longirostris</i>		LC
Pied Stilt	<i>Himantopus leucocephalus</i>		LC
Red-capped Plover	<i>Charadrius ruficapillus</i>		LC
Red-kneed Dotterel	<i>Erythronyx cinctus</i>		LC
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>		LC
Sooty Oystercatcher	<i>Haematopus fuliginosus</i>		LC

\* Conservation status: CE = critically endangered; E = endangered; M = migratory; V = vulnerable; LC = least concern; S = special least concern (migratory).

## APPENDIX B: Monthly Port of Brisbane total count data for all shorebird species in 2024/25, including all sites on Fisherman Islands and Lytton Claypan No. 1.

Date	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025
Migratory species	14	13	17	19	16	18	19	14	6	9
Resident species	6	6	5	5	5	5	5	5	6	5
Total migratory	4840	4178	8750	10460	5026	10848	5542	1418	402	1678
Total resident	352	291	185	376	366	541	746	724	768	743
<b>Migratory</b>										
Asian Dowitcher	0	0	0	0	0	0	0	0	0	0
Bar-tailed Godwit	1231	855	1456	2367	2328	2957	1315	552	355	468
Black-tailed Godwit	38	0	4	32	3	10	7	0	0	0
Broad-billed Sandpiper	0	0	0	7	0	0	12	0	0	0
Buff-breasted Sandpiper	0	0	0	0	0	0	0	0	0	0
Common Greenshank	0	1	2	1	6	3	5	1	1	0
Common Sandpiper	0	0	0	0	0	0	0	0	0	0
Curlew Sandpiper	1006	1011	3376	1896	162	1532	188	71	0	237
Double-banded Plover	0	0	0	0	0	0	0	3	0	23
Eurasian Whimbrel	104	49	197	141	142	94	172	19	1	3
Far Eastern Curlew	200	343	468	305	265	342	139	77	43	228
Great Knot	56	60	123	496	293	152	105	49	0	80
Greater Sand Plover	5	39	14	3	0	26	124	0	0	0
Grey Plover	0	0	1	14	8	12	9	0	0	0
Grey-tailed Tattler	365	0	281	603	847	1214	673	157	0	0
Latham's Snipe	0	0	0	0	0	0	0	0	0	0
Lesser Sand Plover	93	499	478	1186	77	628	1307	62	1	0
Marsh Sandpiper	0	0	3	9	2	6	1	0	0	0
Pacific Golden Plover	292	320	319	661	361	813	297	12	0	26
Red Knot	168	51	4	4	14	2	17	35	0	0
Red-necked Stint	707	471	1220	2032	355	2253	729	363	1	602
Ruddy Turnstone	27	3	31	5	14	69	66	12	0	0
Ruff	0	0	0	0	0	0	0	0	0	0
Sanderling	0	0	0	0	0	0	0	0	0	0
Sharp-tailed Sandpiper	548	305	773	694	149	702	363	5	0	11
Terek Sandpiper	0	0	0	3	0	33	13	0	0	0
Wandering Tattler	0	0	0	0	0	0	0	0	0	0
unidentified shorebird	0	171	0	1	0	0	0	0	0	0
<b>Resident</b>										
Black-fronted Dotterel	4	3	0	0	0	2	0	8	4	8
Masked Lapwing	9	6	5	3	7	11	14	11	3	6
Pied Oystercatcher	40	25	28	110	143	173	187	7	39	34
Pied Stilt	174	168	109	197	186	194	337	624	675	601
Red-capped Plover	108	66	24	52	13	161	206	74	43	94
Red-necked Avocet	17	23	19	14	17	0	0	0	4	0
Sooty Oystercatcher	0	0	0	0	0	0	2	0	0	0

## APPENDIX C: Monthly count data for the 12 most important migratory shorebird species by site in 2024/25.

**Table A1.** Monthly counts of Grey-tailed Tattler by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Pond FPE	PFPE	363		280	603	847	1214	1				3308	79.9
Pond C5	PBC5							671	157			828	20.0
Pond R3	PBR3	1		1				1				3	0.1
Pond C3	PBC3	1										1	0.0
	<b>Total</b>	<b>365</b>	<b>0</b>	<b>281</b>	<b>603</b>	<b>847</b>	<b>1214</b>	<b>673</b>	<b>157</b>	<b>0</b>	<b>0</b>	<b>4140</b>	<b>100.0</b>

**Table A2.** Monthly counts of Red-necked Stint by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Pond R3	PBR3	286		1198	270	84	1490	116	133		584	4161	47.6
Pond C3	PBC3	393	433		1550	31	350					2757	31.6
FI Claypan	FICP		13	4	1	214	405	120				757	8.7
Lytton Claypan No.1	LYN1	28	20	17	58	26	6	272	6	1	17	451	5.2
Pond BS3	PBS3				153		2	218				373	4.3
Pond BS4	PBS4		4	1					224		1	230	2.6
Pond FPE	PFPE							3				3	0.0
Pond C4	PBC4		1									1	0.0
Artificial roost	PBAR		14	9	5							28	0.2
	<b>Total</b>	<b>707</b>	<b>471</b>	<b>1220</b>	<b>2032</b>	<b>355</b>	<b>2253</b>	<b>729</b>	<b>363</b>	<b>1</b>	<b>602</b>	<b>8733</b>	<b>100.0</b>

**Table A3.** Monthly counts of Curlew Sandpiper by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Pond R3	PBR3	884	873	3141	150	4	1370	48	71		236	6777	71.5
Pond C3	PBC3	72	88		960	10						1130	11.9
Lytton Claypan No.1	LYN1	47	40	190	406	79	8	85				855	9.0
Pond BS3	PBS3				380							380	4.0
FI Claypan	FICP					69	113	55				237	2.5
Artificial roost	PBAR	3		43								46	0.5
Pond FPE	PFPE						41					41	0.4
Pond BS4	PBS4		9	2							1	12	0.1
Pond C4	PBC4		1									1	0.0
	<b>Total</b>	<b>1006</b>	<b>1011</b>	<b>3376</b>	<b>1896</b>	<b>162</b>	<b>1532</b>	<b>188</b>	<b>71</b>	<b>0</b>	<b>237</b>	<b>9479</b>	<b>100.0</b>

**Table A4.** Monthly counts of Sharp-tailed Sandpiper by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Pond R3	PBR3	441	200	431	205	6	249	97	3		11	1643	46.3
Lytton Claypan No.1	LYN1	89	65	310	239	82	296	108				1189	33.5
FI Claypan	FICP	15	6		6	28	131	151				337	9.5
Pond C3	PBC3		11	6	235	10	3		2			267	7.5
Artificial roost	PBAR	3	23	26	9	23	10					94	2.6
Pond FPE	PFPE						12					12	0.3
Pond C4	PBC4							4				4	0.1
Pond BS3	PBS3						1	3				4	0.1
<b>Total</b>		<b>548</b>	<b>305</b>	<b>773</b>	<b>694</b>	<b>149</b>	<b>702</b>	<b>363</b>	<b>5</b>	<b>0</b>	<b>11</b>	<b>3550</b>	<b>100.0</b>

**Table A5.** Monthly counts of Bar-tailed Godwit by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Lytton Claypan No.1	LYN1	430		952	892	1060	1246	2410	291	105	258	8062	74.2
Pond R3	PBR3	84	5		26	292	296	60	56		360	1324	12.2
FI Claypan	FICP	1		237	177		5	178	5	134		737	6.8
Pond C3	PBC3					280		137				417	3.8
Artificial roost	PBAR	27	155	3	1							186	1.7
Pond C4	PBC4	2	130	3								135	1.2
Pond BS4	PBS4				2							2	0.0
Pond FPE	PFPE			2								2	0.0
<b>Total</b>		<b>544</b>	<b>290</b>	<b>1197</b>	<b>1098</b>	<b>1632</b>	<b>1547</b>	<b>2785</b>	<b>352</b>	<b>239</b>	<b>618</b>	<b>10865</b>	<b>100.0</b>

**Table A6.** Monthly counts of Great Knot by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Pond R3	PBR3	68			23	225	102	122	3		53	644	44.7
Pond C4	PBC4		319	5	21							345	23.9
Pond C3	PBC3					180		48				228	15.8
FI Claypan	FICP			180	36			9				225	15.6
<b>Total</b>		<b>68</b>	<b>319</b>	<b>185</b>	<b>80</b>	<b>405</b>	<b>102</b>	<b>179</b>	<b>3</b>	<b>0</b>	<b>53</b>	<b>1442</b>	<b>100.0</b>

**Table A7.** Monthly counts of Far Eastern Curlew by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Lytton Claypan No.1	LYN1	359	338	238	221	192	155	118	22	50	144	1948	79.4
FI Claypan	FICP			35	71	2	148	13	15		35	319	13.0
Pond R3	PBR3	18	21			66						105	4.3
Pond C3	PBC3					26	18					44	1.8
Artificial roost	PBAR	6	3	3	3	3	1					21	0.9
Pond BS4	PBS4		1				14					15	0.6
Pond BS3	PBS3						1					1	0.0
	<b>Total</b>	<b>383</b>	<b>363</b>	<b>276</b>	<b>295</b>	<b>289</b>	<b>337</b>	<b>131</b>	<b>37</b>	<b>50</b>	<b>179</b>	<b>2453</b>	<b>100.0</b>

**Table A8.** Monthly counts of Ruddy Turnstone by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Pond R3	PBR3			1		67	52	14	12	5		152	40.1
Pond C3	PBC3			19	1	48	48	34				150	39.6
Pond BS4	PBS4				34	3	7					44	11.6
Pond FPE	PFPE		5	20				3				28	7.4
Pond BS3	PBS3						3					3	0.8
Pond C4	PBC4	1				1						2	0.5
	<b>Total</b>	<b>1</b>	<b>5</b>	<b>40</b>	<b>35</b>	<b>119</b>	<b>110</b>	<b>51</b>	<b>12</b>	<b>5</b>	<b>0</b>	<b>379</b>	<b>100.0</b>

**Table A9.** Monthly counts of Lesser Sand Plover by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Pond C3	PBC3	25	13	290	470	860	1304	480				3442	64.8
Pond R3	PBR3	22	652	355				36	48	250	93	1772	33.4
Pond FPE	PFPE		1	78								79	1.5
Pond C4	PBC4			2				13				15	0.3
	<b>Total</b>	<b>47</b>	<b>666</b>	<b>725</b>	<b>470</b>	<b>860</b>	<b>1304</b>	<b>529</b>	<b>48</b>	<b>250</b>	<b>93</b>	<b>5308</b>	<b>100.0</b>

**Table A10.** Monthly counts of Greater Sand Plover by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Pond C3	PBC3	8		22		50	41	30				151	49.2
Pond R3	PBR3		18	53							21	145	47.2
Pond C4	PBC4				11							11	3.6
	<b>Total</b>	<b>8</b>	<b>18</b>	<b>75</b>	<b>11</b>	<b>50</b>	<b>41</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>307</b>	<b>100.0</b>

**Table A11.** Monthly counts of Pacific Golden Plover by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Pond C3	PBC3	135	315	270	198	31	329	283				1561	87.8
Pond FPE	PFPE	3	1	135								139	7.8
Pond R3	PBR3	3						4	4		18	29	1.6
FI Claypan	FICP						20	8				28	1.6
Pond C4	PBC4		1	5		2						8	0.5
Pond BS4	PBS4	4	2		2							8	0.5
Artificial roost	PBAR		1		1			2				4	0.2
	<b>Total</b>	<b>145</b>	<b>320</b>	<b>410</b>	<b>201</b>	<b>33</b>	<b>351</b>	<b>295</b>	<b>4</b>	<b>0</b>	<b>18</b>	<b>1777</b>	<b>100.0</b>

**Table A12.** Monthly counts of Grey Plover by site. The percentage contributions to total numbers made by each site are shown in the final column.

Site	Date / Site code	22/09/2024	06/10/2024	10/11/2024	08/12/2024	19/01/2025	16/02/2025	16/03/2025	11/05/2025	13/07/2025	17/08/2025	Total	% total
Pond R3	PBR3	2			16	6	8					32	51.6
Pond C4	PBC4			22	4							26	41.9
Pond C3	PBC3					2	1					3	4.8
Pond FPE	PFPE			1								1	1.6
	<b>Total</b>	<b>2</b>	<b>0</b>	<b>23</b>	<b>20</b>	<b>8</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>62</b>	<b>100.0</b>

## APPENDIX D: Summary of 2024/25 count data for Lytton Claypan No. 1.

**Table D1.** Count results for each migratory and resident shorebird species at Lytton Claypan No. 1 (LYN1) roost site from September 2024 to August 2025.

Common name	22/09/2024	05/10/2024	06/10/2024	09/11/2024	10/11/2024	17/11/2024	07/12/2024	08/12/2024	22/12/2024	05/01/2025	14/01/2025	18/01/2025	19/01/2025	15/02/2025	16/02/2025	27/02/2025	16/03/2025	12/04/2025	10/05/2025	11/05/2025	18/06/2025	12/07/2025	13/07/2025	16/08/2025	17/08/2025
Tide height (m)	2.34	2.19	2.18	2.17	2.21	2.63	2.33	2.28	2.08	2.42	2.6	2.35	2.23	2.39	2.3	2.62	2.26	2.21	2.06	2.02	1.85	1.83	1.86	2.11	2.15
Asian Dowitcher	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bar-tailed Godwit	1211	1380	178	1591	1456	1566	1920	1830	1983	1678	1580	1710	1778	1363	2684	1562	1285	294	6	178	194	297	241	206	238
Black-tailed Godwit	38	8	0	9	4	35	24	32	46	21	28	9	3	0	10	0	0	31	0	0	0	0	0	0	0
Common Greenshank	0	0	0	0	1	1	2	1	4	2	3	1	2	4	3	3	3	4	0	1	0	0	0	0	0
Curlew Sandpiper	47	254	40	188	190	0	385	406	388	49	0	0	79	11	8	0	85	116	0	0	0	0	0	0	0
Eurasian Whimbrel	92	197	6	86	189	187	159	140	191	111	118	31	97	136	90	106	127	106	0	19	17	4	1	88	2
Far Eastern Curlew	198	302	285	304	135	228	312	302	263	177	282	227	161	226	289	328	3	17	7	44	0	1	43	201	41
Great Knot	56	47	8	8	122	126	59	66	74	52	53	106	133	55	36	41	81	3	0	0	0	0	0	3	4
Grey-tailed Tattler	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Marsh Sandpiper	0	0	0	0	3	12	5	9	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Red Knot	168	122	25	0	4	0	5	2	5	2	2	12	14	2	0	0	7	0	0	0	0	0	0	0	0
Red-necked Stint	28	35	20	0	17	0	44	58	343	85	0	2	26	148	6	4	272	330	1	6	0	27	1	1	17
Sharp-tailed Sandpiper	89	366	65	309	310	260	290	239	319	198	3	18	82	93	296	16	108	44	0	0	0	0	0	0	0
unidentified shorebird	0	0	170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total migratory</b>	<b>1927</b>	<b>2711</b>	<b>797</b>	<b>2495</b>	<b>2431</b>	<b>2415</b>	<b>3205</b>	<b>3085</b>	<b>3619</b>	<b>2377</b>	<b>2069</b>	<b>2117</b>	<b>2376</b>	<b>2038</b>	<b>3422</b>	<b>2060</b>	<b>1971</b>	<b>945</b>	<b>14</b>	<b>248</b>	<b>212</b>	<b>329</b>	<b>286</b>	<b>499</b>	<b>302</b>
Black-fronted Dotterel	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	10	0	4	0	8
Masked Lapwing	1	0	2	2	1	2	2	1	2	4	4	2	3	16	5	16	4	12	4	6	0	4	1	2	2
Pied Oystercatcher	4	3	2	0	0	8	23	7	5	0	0	0	0	12	2	0	0	0	0	0	0	0	0	0	0
Pied Stilt	47	17	73	16	1	110	182	107	38	94	184	94	84	157	38	236	121	234	113	238	282	202	236	174	243
Red-capped Plover	4	3	9	3	14	1	18	14	6	2	1	0	6	34	6	4	7	24	11	12	4	18	12	13	14
Red-necked Avocet	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total resident</b>	<b>56</b>	<b>23</b>	<b>87</b>	<b>21</b>	<b>16</b>	<b>121</b>	<b>225</b>	<b>129</b>	<b>51</b>	<b>100</b>	<b>189</b>	<b>97</b>	<b>95</b>	<b>219</b>	<b>51</b>	<b>256</b>	<b>132</b>	<b>274</b>	<b>128</b>	<b>262</b>	<b>296</b>	<b>224</b>	<b>253</b>	<b>189</b>	<b>267</b>

