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July 2022 – June 2023

Shorebird population monitoring within Gulf St Vincent .

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Front & rear cover photos: Bar-tailed Godwit and Sharp-tailed Sandpiper, taken by Daniel Lees

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Executive summary

Gulf St Vincent has long been recognised as a nationally and internationally significant area for shorebirds. With the cumulative effects of threats throughout the East Asia-Australian Flyway driving declines in migratory shorebirds in the region the conservation and appropriate management of key shorebird habitats in Gulf St Vincent will continue to be crucial to the flyway-wide conservation effort.

During 2022/23 count season the coordinated shorebird monitoring program for upper Gulf St Vincent undertook monthly simultaneous counts of shorebirds across an average of 14.5 sites (52% of total sites), which is extremely impressive for a monthly count program. Thirty-nine skilled volunteers and staff participated in counts across the season totalling 264 surveys and more than 497 hours of survey time (which does not include travel to and from sites). Forty-eight percent of surveys recorded throughout 2022/23 included a threat assessment; only slightly down from the previous 2021/22 seasons record high of 52%. Increasing the recording of threat data should remain a priority for the program.

2022/23's counts documents numerous sites within the Gulf St Vincent as well as the Gulf itself to hold national and internationally significant numbers of two migratory and four resident shorebird species: Banded Stilt, Pied Oystercatcher, Red-capped Plover, Red Knot, Red-necked Stint and Sooty Oystercatcher (Tables 3 & 4).

This report: (a) repeats an overview of shorebirds, habitats and counting methods (p5); (b) provides data from the 2022/23 simultaneous shorebird counts (p9); (c) reports on training and awareness events conducted during 2022/23 (p28) and (d) provides information and recommendations for the conservation management of shorebirds and the threats they face in Gulf St Vincent (p35).

Introduction

Shorebird populations throughout the world are declining (Morrison et al. 2001; Olsen et al. 2003), and a growing body of evidence describing population declines illustrates Australia as no exception (Clemens et al. 2016; Gosbell & Clemens 2006; Nebel et al. 2008). As populations continue to collapse and threats to shorebird populations are identified there has been an increased need for shorebird conservation in recent years. The former Adelaide and Mount Lofty Ranges Natural Resources Management Board, and now the Green Adelaide, provides funding and support to BirdLife Australia to coordinate a complete count of the shorebirds within Gulf St Vincent. Commencing in 2009, the project aimed to reinvigorate shorebird population monitoring and identify important shorebird habitats in the region. The resulting reports provide an inventory of shorebird habitats and highlight the distribution and abundance of shorebirds in Gulf St Vincent, as well as identifying current and potential threats to shorebirds in the region.

Gulf St Vincent has long been recognised as an internationally significant area for shorebirds (Bamford et al. 2008, Close 2008, Close & McCrie 1986, Lane 1987, Wilson 2000) and over the last 25 years, counts of migratory shorebirds throughout the wetlands of the region have been conducted by volunteer counters from organisations including the Australasian Wader Studies Group, Victorian Wader Studies Group and Birds SA. The gulf is known to be one of the most species diverse shorebird areas in Australia with 52 species of shorebird documented in the region. Currently the gulf regularly plays host an average of over 29,000 shorebirds each year including 14,000 migrants of 13 species (Purnell 2018). The significance of upper Gulf St Vincent for migratory shorebirds is recognised through the listing as a site within the National Directory of Important Migratory Shorebird Habitat (Weller et al. 2020).

The Gulf St Vincent shorebird population and monitoring project was instrumental in providing the information necessary for the nomination of the Gulf as an East Asian Australasian Flyway Partnership (EAAFP) Flyway site EAAF131, and in the creation of the Adelaide International Bird Sanctuary National Park – Winaityinaityi Pangkara in 2016. As well as the AIBS National Park area, the larger area of Gulf St Vincent, incorporating all the shorebird count areas of importance to migratory shorebirds, were incorporated into the East Asian Australasian Flyway site network, as site EAAF131 (EAAFP 2016).

The EAAFP is a voluntary, collaborative, non-binding programme involving 22 countries across the flyways, national governments, Inter-Governmental Organisations and international Non-Governmental Organisations. Flyway Site Network refers to the network of important sites – wetlands – used by migratory waterbirds throughout the Flyway. The Australian Government is the EAAF partner, but at flyway sites local site managers are expected to ensure that the waterbird and ecosystem functions of their site are maintained and enhanced where possible through adequate monitoring and management.

Local site mangers are also expected to promote local recognition of the importance of the flyway site and strengthen community support (EAAFP 2016).

As well as providing information on the numbers of shorebirds over time, the project has been invaluable in identifying shorebird habitats, threats and conservation priorities to better inform the management of the flyway site and National Park. The GSV population data is combined with that from shorebird counts carried out in Australia, New Zealand and other Flyway nations to help estimate migratory shorebird populations and trends across the East Asian-Australasian Flyway (see Hansen et al 2016). The contribution of local volunteers therefore contributes immensely to provide a global picture of shorebird populations.

Since proclamation of the AIBS National park, there is a commitment from the state government to establish a co-management agreement with the Kaurna Yerta Aboriginal Corporation (KYAC) through the National Parks and Wildlife Act 1972 for a number of parks, including the AIBS National Park-Winaityinaityi Pangkara. This will provide a formal platform for co-management through a Kaurna Parks Advisory Committee to provide management advice to the Minister and National Parks and Wildlife Service and development of a management plan (DEW 2022).

Shorebirds, habitats, threats and Gulf St Vincent

Shorebirds (or 'waders') are all members the order Charadriiformes, an arbitrary group, and not defined by any agreed taxonomic or morphological definition. They instead are usually characterised by their general dependence on wetland habitats. Shorebirds are a diverse group and include pratincoles, sandpipers, plovers, dotterels, stints, oystercatchers, godwits, curlews, knots and greenshanks (Purnell 2018). In Australia, shorebirds are categorised as either:

- Migrants - 37 species regularly spend their non-breeding season in Australia.
- Residents - 18 species breed in Australia, remaining here throughout the year.

Gulf St Vincent (GSV) is a highly productive and ecologically significant ecosystem. The mosaic of marine, coastal, inland and man-made habitats provide important feeding, roosting and (for resident species) breeding areas. These habitats include: expansive tidal flats, tidal creeks and estuaries, mangrove forests, seagrass meadows, tidal saltmarshes, tidal and supratidal claypans and sabkhas. These natural wetlands are supplemented by significant areas of artificial habitat including two large saltfield areas (Price and Dry Creek), artificial stormwater detention wetlands, effluent water treatment ponds and a man-made ephemeral, freshwater lake, Buckland Park Lake (Purnell 2018).

Global shorebird population trends

Shorebird population declines coincide with, among other threats, an accelerating loss and degradation of shorebird habitat (Rogers et al. 2009; Murray et al. 2013, Studds et al. 2016). In the East Asian–Australasian Flyway, a disproportionately high number of shorebird species have been classified as threatened, and many are under increasing threat from habitat destruction and over harvesting (Gallo-Cajiao et al. 2020, Murray et al. 2013, Studds et al. 2016). Climate change also poses a significant threat for migrating birds. Results from a recent study by Nagy et al. (2021) predict that Arctic breeding birds will have the greatest loss in habitat due to a changing climate with some species such as the Curlew Sandpiper predicted to experience a loss of over 70% breeding habitat by 2050.

The following shorebird species which regularly occur in upper Gulf St Vincent are listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act):

Critically endangered

- Northern Siberian Bar-tailed Godwit *Limosa lapponica menzbieri*
- Great Knot *Calidris tenuirostris*
- Curlew Sandpiper *Calidris ferruginea*
- Eastern Curlew *Numenius madagascariensis*

Endangered

- Red Knot *Calidris canutus rogersi* and *C. c. piersmai*
- Lesser Sand Plover *Charadrius mongolus*

Vulnerable

- Western Alaskan Bar-tailed Godwit *Limosa lapponica baueri*
- Greater Sand Plover *Charadrius leschenaultii*

The Hooded Plover *Thinornis cucullatus cucullatus*; a resident beach-nesting shorebird found on metropolitan Adelaide and Fleurieu beaches is also listed as Vulnerable and is the subject of a separate conservation project. Historically, it is irregularly sighted in upper Gulf St Vincent.

A full list of East Asian-Australasian Flyway migratory shorebird species that visit Gulf St Vincent is provided in the Appendix, Table 2.

Methods

Shorebird counts are conducted in line with the National Shorebird Monitoring Program (formally Shorebirds 2020). Survey participants are encouraged to contribute to simultaneous counts in which every count area within the shorebird area is covered within the smallest possible time window. Participants are then asked to submit their data in to Birdata https://birdata.birdlife.org.au/, BirdLife Australia's web- and app-enabled data portal. Coordinating surveys in Gulf St Vincent so that multiple areas can be surveyed simultaneously is fundamental to obtaining the most accurate counts possible as the simultaneous surveys minimise the likelihood of birds being missed or double-counted.

Counts are conducted during the peak of the non-breeding period (for northern hemisphere migrants; the Austral summer) and in the same month as previous counts. The National Shorebird Monitoring Program aims to collect count data for a minimum of one summer count. Ideally, all counts throughout the country would be done on the same day. Generally, this date is the 15th of January, however, surveys done as close to the national count date as possible are accepted and will contribute towards the national count data set. A second winter count is also encouraged, with the 1st of July being the preferred date. Along with the counting the numbers of each bird species at any given site, participants are also encouraged to complete the threat / disturbance data at each time they complete a survey. This includes collecting data including: number of people, dogs off/on lead, watercraft and vehicles. There is also opportunity to report 'other' potential threats and an area to leave comments. Such threat / disturbance data is crucial in areas that are heavily impacted by human disturbance and allows us to provide land managers evidence (especially when combined with photos) of the occurrences and impact of particular human threats.

Thanks to the dedication of the participants monthly counts across the Gulf St Vincent were able to be achieved with all but complete site coverage in July, January and February. Survey sites within Gulf St Vincent, their jurisdiction as well as their centroid location are described in Table 1. An exhaustive description of each site can also be found in Purnell (2018).

Table 1. List of the Gulf St Vincent count areas and associated management regions.

Count Area name	
Green Adelaide	**Northern & York**
Whicker Rd Wetlands*	Bald Hill
Magazine Rd Wetlands	Port Gawler
Bird Island (Section Banks)	Middle Beach
Torrens Island	Light Beach
Bolivar Waste Water Treatment Ponds (WWTP)	Port Prime
Saint Kilda	Thompson Beach South
Dry Creek Saltfields	Thompson Beach North
Mutton Cove	Webb Beach
Baker Inlet Wetlands (BIW)	Port Parham / Port Parham Claypans
	Clinton Conservation Park (Clinton CP)
	Macs Beach
	Port Arthur
	Port Clinton
	Price Saltfields
	Port Wakefield
	Tiddy Widdy
	Black Point
	Port Julia
	Port Wakefield Proof & Experimental Establishment (PWPEE)
***Note Whicker Road wetlands are also called Magazine Creek Wetlands**	

Results

Survey effort

During the 2022/23 survey season 39 participants comprised of trained Birds SA and Friends of the Adelaide International Bird Sanctuary volunteers, staff from DEW National Parks, Green Adelaide, Adelaide Plains Council and BirdLife Australia conducted a total of 264 surveys, totalling more than 497 hours of monitoring effort. An incredible effort, and one that should be commended especially when considering the above figures do not include the travel time to and from sites, many of which are remote, difficult to reach, or require special permissions. These figures are substantially above previous years as illustrated by Table 2 below which shows the number of participants, surveys conducted as well

as survey effort in hours. The 2022/23 surveys achieved impressive count coverage across the gulf with an average of 14.5 (range; 5 – 23) of the sites 28 total sites surveyed per month. Figure 1 below describes survey coverage across the 2022/23 count season by describing the number of shorebird sites surveyed by month while Table 3 illustrates simultaneous count totals for the 2021/22 shorebird count season. For detailed summaries of the counts of each site by month please see Appendix Tables 1a-i.

Table 2. The number of count participants, number of surveys conducted and survey effort conducted across the last six seasons.

Survey season	№ of participants	№ of surveys	Survey effort (hours)
2017/18	33	99	297
2018/19	33	115	345
2019/20	32	137	411
2020/21	33	144	432
2021/22	31	216	396
2022/23	39	264	497

Figure 1. The number of shorebird sites surveyed by month across the 2022/23 count season.

Table 3. Simultaneous count totals for the 2021/22 shorebird count season. *Values of international significance are emboldened.

Species	1% EAA*	0.1%EAA*	Jul-22	Aug-22	Sept-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23
Banded Lapwing**	270		0	0	0	0	0	1	45	180	0	0
Banded Stilt**	3700		500	0	2000	600	0	300	2003	2268	**7300**	3500
Bar-tailed Godwit	3250	325	14	6	22	176	100	254	377	448	403	11
Black-fronted Dotterel**	1600		12	1	4	4	0	11	10	20	3	11
Black-tailed Godwit	1390	139	0	1	2	0	0	0	2	20	48	0
Broad-billed Sandpiper	300	30	0	0	0	2	0	0	4	0	0	0
Common Greenshank	1100	110	16	15	42	215	34	178	193	413	243	110
Common Sandpiper	1900	190	0	0	2	32	1	2	9	8	5	0
Curlew Sandpiper	900	90	25	6	88	312	253	595	726	685	831	48
Double-banded Plover	190	19	12	7	1	0	0	0	1	0	4	4
Eastern Curlew	350	35	13	15	20	99	33	68	53	73	13	5
Great Knot	4250	425	20	0	18	63	0	65	61	51	93	6
Greater Sand Plover	2500	250	2	0	2	7	0	10	36	24	0	3
Grey Plover	800	80	2	0	42	225	18	371	179	246	224	21
Grey-tailed Tattler	700	70	0	0	2	3	2	3	6	7	4	3
Hooded Plover	45		0	0	0	2	0	2	0	0	0	0
Latham's Snipe	300	30	0	0	0	0	0	0	0	0	0	0
Lesser Sand Plover	2275	228	0	0	2	1	0	0	1	0	0	0
Little Curlew	1100	110	0	0	0	0	0	0	0	1	1	0
Little Stint	vagrant	vagrant	0	0	0	0	0	0	0	1	0	0
Long-toed Stint	2300	230	0	0	0	0	0	0	0	8	0	0
Marsh Sandpiper	1300	130	0	0	0	1	0	0	3	8	6	0
Masked Lapwing**	2870		37	90	18	29	24	112	183	234	125	113
Pacific Golden Plover	1200	120	0	0	0	3	6	8	4	21	4	1
Pectoral Sandpiper	15750	1575	0	0	0	0	0	0	2	2	0	0
Pied Oystercatcher**	110		107	7	80	67	39	93	102	**222**	92	46
Pied Stilt**	2660		238	0	15	2	0	63	153	564	246	193
Red Knot	1100	110	70	0	150	**1127**	400	**2232**	**2535**	**2515**	**1324**	210
Red-capped Plover**	950		176	170	135	124	17	230	355	**1105**	723	543
Red-kneed Dotterel**	260		0	0	0	0	0	0	2	0	8	132
Red-necked Avocet**	1070		170	100	180	200	0	58	75	209	180	440
Red-necked Stint	4750	475	640	570	3786	3966	1923	**8874**	**7066**	**12840**	**5479**	2127
Red-necked Phalarope	2500	250	0	0	0	0	0	0	0	0	0	0
Ruddy Turnstone	300	30	0	0	41	102	25	118	72	169	131	39
Ruff	625	63	0	0	0	0	0	0	0	0	1	0
Sanderling	300	30	0	0	0	0	0	0	0	0	1	60
Sharp-tailed Sandpiper	850	85	0	0	43	314	28	407	645	774	576	3
Sooty Oystercatcher**	40		**44**	14	30	31	37	25	**54**	**51**	**85**	**99**
Terek Sandpiper	500	50	5	0	5	12	0	7	11	9	0	12
Whimbrel	650	65	1	0	3	4	0	12	16	14	14	3
Wood Sandpiper	1300	130	0	0	1	0	0	0	1	4	0	0
TOTAL			2104	2004	6734	7723	2940	14099	14985	23194	18167	7743

Sightings of significance

During the 2022/23 survey season the Gulf St Vincent was documented to hold internationally significant numbers of two migratory and four resident shorebird species; Banded Stilt, Pied Oystercatcher, Red-capped Plover, Red Knot, Red-necked Stint and Sooty Oystercatcher (Table 3). Moreover, at the site level numerous sites were observed to support nationally (>0.1% EAA) and internationally (>1% EAA) significant number of shorebird species (Table 4), including:

- Internationally significant numbers of Red Knot observed at Price Saltfields and Port Prime, along with nationally significant numbers seen at Bald Hill and Clinton Conservation Park.
- Internationally significant numbers of Banded Stilt detected at Price Saltfields.
- Internationally significant numbers of Sooty Oystercatcher seen on Bird Island (Section Banks).
- Nationally significant numbers of Curlew Sandpiper at Price Saltfields, Thompson's Beach North, Thompson's Beach South, Bolivar WWTP.
- Nationally significant numbers of Grey Plover at Price Saltfields and the Clinton Conservation Park.
- Nationally significant numbers of Red-necked Stints at Clinton Conservation Park, Port Clinton, Port Prime, Port Parham, Price Saltfields, Bird Island (Section Banks), Dry Creek Saltfields, Thompson's Beach North, Thompson's Beach South and,
- Nationally significant numbers of Ruddy Turnstone were recorded at Bald Hill, Thompson's Beach North, Price Saltfields and Macs Beach.
- Nationally significant numbers of Sanderling sighted at Port Clinton.
- Nationally significant numbers of Sharp-tailed Sandpiper at Thompson's Beach North, Thompson's Beach South, Price Saltfields, Bolivar WWPT, Clinton Conservation Park and Dry Creek Saltfields.

Overall, Gulf St Vincent continues to hold nationally and internationally significant numbers of migratory and resident shorebird species, underpinning the regions value as a foraging, roosting and reproductive resource for this suite of diverse species. Of additional note, are species that were detected with close to the 1% EAAF significant numbers, thus warranting mention. Both Curlew Sandpiper and Sharp-tailed Sandpiper realized maximum count numbers of more than 90% of their 1% threshold and just shy of their international significance level (Table 3).

Interesting sightings

A single **Little Stint** *Calidris minuta*, a difficult to identify vagrant with an overwintering range between west Africa and southern Asia, was observed at Price Saltfields on the 10th of February by Teresa Jack.

Little Stint, photographed in 2021 by Colin Rodgers.

Up to eight **Long-toed Stint** *Calidris minuta*, regular but uncommon migrants were seen at Dry Creek Saltfields, Price Saltfields and the Bolivar WWTP during February by Bill Breed, Colin Roger, John Hatch and William Brooker.

Long-toed Stint sighted at Price Saltfields during the 2022/23 count season, photograph by Teresa Jack.

Like the above, numerous (up to three) **Broad-billed Sandpiper** *Limicola falcinellus*, a notoriously difficult to identify species was sighted at Clinton Conservation Park and Port Prime between October and February by Paul Taylor, Graham Moore and Graham Parkyn.

Broad-billed Sandpiper at Clinton Conservation Park during the 2022/23 count season, photograph by Paul Taylor.

Finally, a lone **Little Curlew** *Numenius minutus*, again a regular migrant, but rarely seen in the Gulf St Vincent was sighted at Macs Beach and Bald Hill during March by Paul Taylor, Graham Moore and Colin Rogers.

Little Curlew at Bald Hill Beach during the 2022/23 count season, photograph by Paul Taylor.

Table 4. 2022/23 Maximum counts recorded per species and the site / date of observation.

Species	22/23 Max	Count Area	Date
Banded Lapwing**	180	Clinton Conservation Park	23/03/2023
Banded Stilt**	5000	Price Saltfields	14/03/2023
Bar-tailed Godwit	224	Price Saltfields	9/01/2023 & 14/03/2023
Black-fronted Dotterel**	20	Bolivar WWTP	24/02/2023
Black-tailed Godwit	23	Bolivar WWTP	16/03/2023
Broad-billed Sandpiper	3	Clinton Conservation Park	13/01/2023
Common Greenshank	121	Thompson's Beach South	8/02/2023
Common Sandpiper	24	Port Clinton	27/10/2022
Curlew Sandpiper	500	Thompson's Beach South	22/11/2022 & 21/01/2023
Double-banded Plover	10	Bald Hill	22/07/2022
Eastern Curlew	30	Port Clinton	17/10/2022
Great Knot	60	Price Saltfields	17/10/2022
Greater Sand Plover	19	Price Saltfields	9/01/2023
Grey Plover	124	Price Saltfields	14/03/2023
Grey-tailed Tattler	4	Clinton Conservation Park	23/02/2023
Hooded Plover**	2	Section Banks	19/10/2023 & 2/12/2023
Lesser Sand Plover	2	Clinton Conservation Park	17/09/2022
Long-toed Stint	8	Dry Creek Saltfields	18/02/2023
Marsh Sandpiper	5	Bolivar WWTP	24/02/2023 & 16/03/2023
Masked Lapwing**	130	Bolivar WWTP	6/02/2023
Pacific Golden Plover	18	Macs Beach	3/02/2023
Pied Oystercatcher**	84	Light Beach	10/02/2023
Pied Stilt**	550	Bolivar WWTP	24/02/2023
Pectoral Sandpiper	1	Bolivar WWTP & Port Clinton	10/01, 21/01 & 6/02/2023
Red Knot	1200	Port Prime & Price Saltfields	9/01/2023 & 24/01/2023
Red-capped Plover**	340	Dry Creek Saltfields	27/02/2023
Red-Kneed Dotterel**	82	Bolivar WWTP	24/04/2023
Red-necked Avocet**	290	Dry Creek Saltfields	24/04/2023
Red-necked Phalarope	0	N/A	N/A
Red-necked Stint	4720	Port Prime	12/12/2022
Ruddy Turnstone	73	Price Saltfields	10/02/2023
Sanderling	60	Port Clinton	8/04/2023
Sharp-tailed Sandpiper	320	Dry Creek Saltfields	18/02/2023
Sooty Oystercatcher**	55	Section Banks	4/04/2023
Terek Sandpiper	12	Clinton Conservation Park	17/10/2022 & 3/04/2023
Whimbrel	12	Price Saltfields	12/12, 9/01 & 14/03/2023
Wood Sandpiper	4	Bolivar WWTP	6/02/2023

Key:

- **Internationally significant record >1% EAAF**
- **Nationally significant record >0.1% EAAF**

**** denotes resident species**

Long term trends

(i) Red Knot *Calidris canutus*

Northern hemisphere migrant

Two subspecies are of Red Knot are known to occur in the GSV, ssp. *piersmai* breeds in the New Siberian Islands, and ssp. *rogersi* that breeds on Chukotka Peninsula (north-eastern Siberia). The subspecies are notoriously difficult to identify in the field, particularly when in non-breeding plumage in GSV, thus we report on the species as a whole. The latest EAAF estimate for the Red Knot population is 110,000 individuals, making the 1% threshold of international significance to be 1,100 birds (Hansen et al. 2016). This significance threshold was exceeded in 12 of the last 15 count seasons (80%; Table 5). The Red Knot is listed by the EPBC status as Endangered, has an IUCN listing of Near Threatened and a population declining at approximately 4.4% annually (Studds et al. 2017). It is thus of considerable note that the Gulf St Vincent's population is on an upward trajectory and underscores the gulf's importance for this species (Figure 2).

Table 5. Maximum population counts for Red Knot from simultaneous surveys in Gulf St Vincent Shorebird Area (2008-2023).

Summer	Max count	Date
2008/09	**1,637**	02/2009
2009/10	**1,103**	01/2010
2010/11	**1,615**	03/2011
2011/12	1,095	02/2012
2012/13	**2,055**	12/2012
2013/14	836	03/2014
2014/15	**1,109**	02/2015
2015/16	**1,291**	02/2016
2016/17	824	02/2017
2017/18	**7,586**	03/2018
2018/19	**2,753**	01/2019
2019/20	**2,479**	11/2019
2020/21	**3,120**	02/2021
2021/22	**1,944**	03/2022
2022/23	**2,535**	01/2023

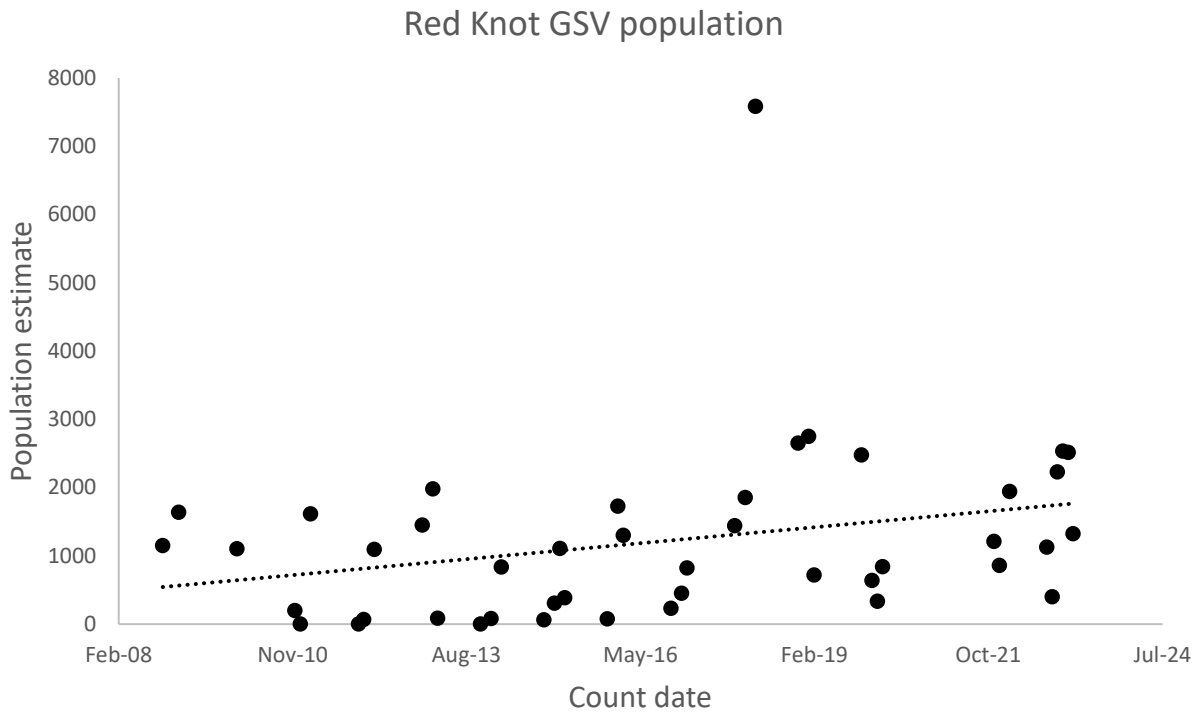


Figure 2. Population count data for Red Knot in Gulf St Vincent (2008-2023). Dotted line represents Red Knot population trend in GSV. Winter counts are excluded to remove the bias while adult birds are in the northern hemisphere.

(ii) Red-necked Stint *Calidris ruficollis*

Northern hemisphere migrant

The most recent population estimate for Red-necked Stint in the EAAF is 475,000 individuals with a 1% threshold for international significance 4,750 birds (Hansen et al. 2016). This threshold was exceeded in 9 of the last 15 years (Table 6). Variation across counts is substantial but despite this the population trend of Red-necked Stint in Gulf St Vincent appears stable. A maximum count this past season exceeding 10,000 birds, and two other count totals approaching that figure is reassuring and continues to illustrate the importance of the GSV for Red-necked Stint (Figure 3).

Table 6. Maximum population counts for Red Knot from simultaneous surveys in Gulf St Vincent Shorebird Area (2008-2023).

Summer	Max Count	Date
2008/09	**11,791**	02/2009
2009/10	**6,749**	01/2010
2010/11	2,927	03/2011
2011/12	3,123	11/2011

2012/13	4,070	12/2012
2013/14	3,865	03/2014
2014/15	6,162	02/2015
2015/16	7,834	02/2016
2016/17	10,318	02/2017
2017/18	7,114	03/2018
2018/19	3,338	11/2019
2019/20	4,295	02/2020
2020/21	7,321	03/2021
2021/22	9,103	12/2021
2022/23	12,840	02/2023

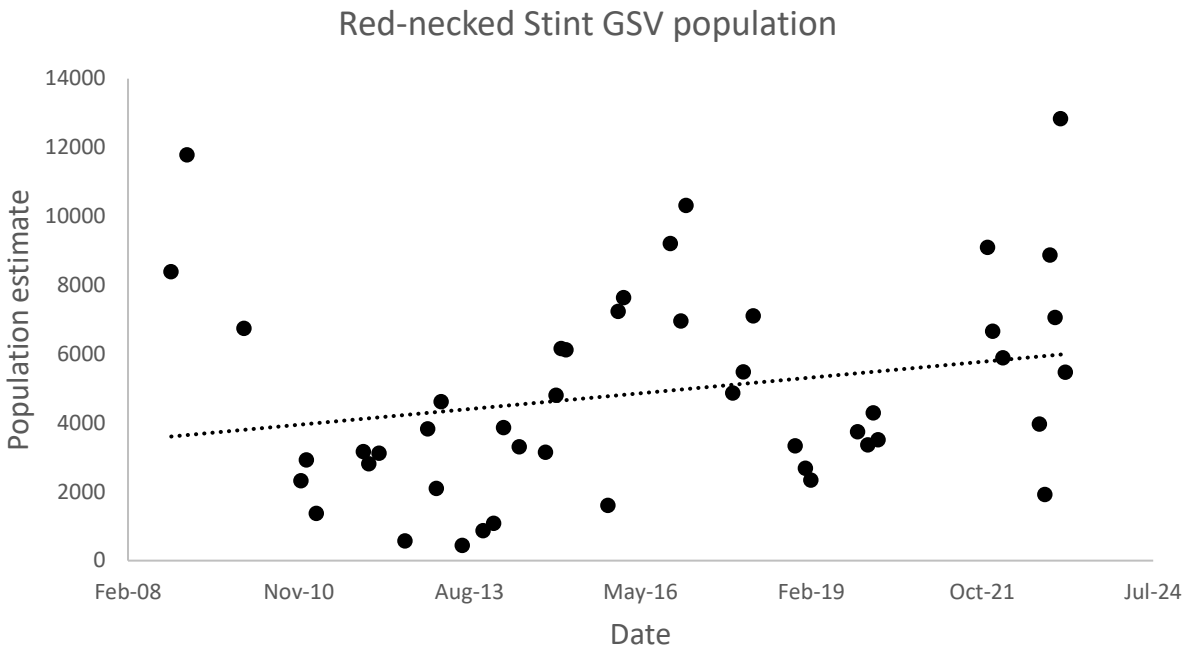


Figure 3. Population count data for Red-necked Stint in Gulf St Vincent (2008-2023). Dotted line represents population trend in GSV. Winter counts are excluded to remove the bias while adult birds are in the northern hemisphere.

(iii) Curlew Sandpiper *Calidris ferruginea*

Northern hemisphere migrant

Hansen et al. (2016) estimates the EAAF's population of Critically Endangered (EPBC) / Near Threatened (IUCN) Curlew Sandpiper to contain approximately 90,000 individuals; 1% of which makes a threshold for international significance to be 900 birds. This threshold has yet to be met within Gulf St Vincent, however, the 2022/23 count seasons maximum of 831 birds as well as a count in November 2016,

approach the 900-bird threshold (Table 7) and, along with the increasing Curlew Sandpiper GSV population demonstrates the gulf's habitat value for this Critically Endangered species (Figure 4).

Table 7. Maximum population counts for Curlew Sandpiper from simultaneous surveys in Gulf St Vincent Shorebird Area (2008-2023).

Summer	Max count	Date
2008/09	535	02/2009
2009/10	259	01/2010
2010/11	126	12/2010
2011/12	58	03/2011
2012/13	476	12/2012
2013/14	278	03/2013
2014/15	261	02/2015
2015/16	289	02/2016
2016/17	870	11/2016
2017/18	579	03/2018
2018/19	308	01/2019
2019/20	483	11/2019
2020/21	632	12/2020
2021/22	536	01/2022
2022/23	831	03/2023

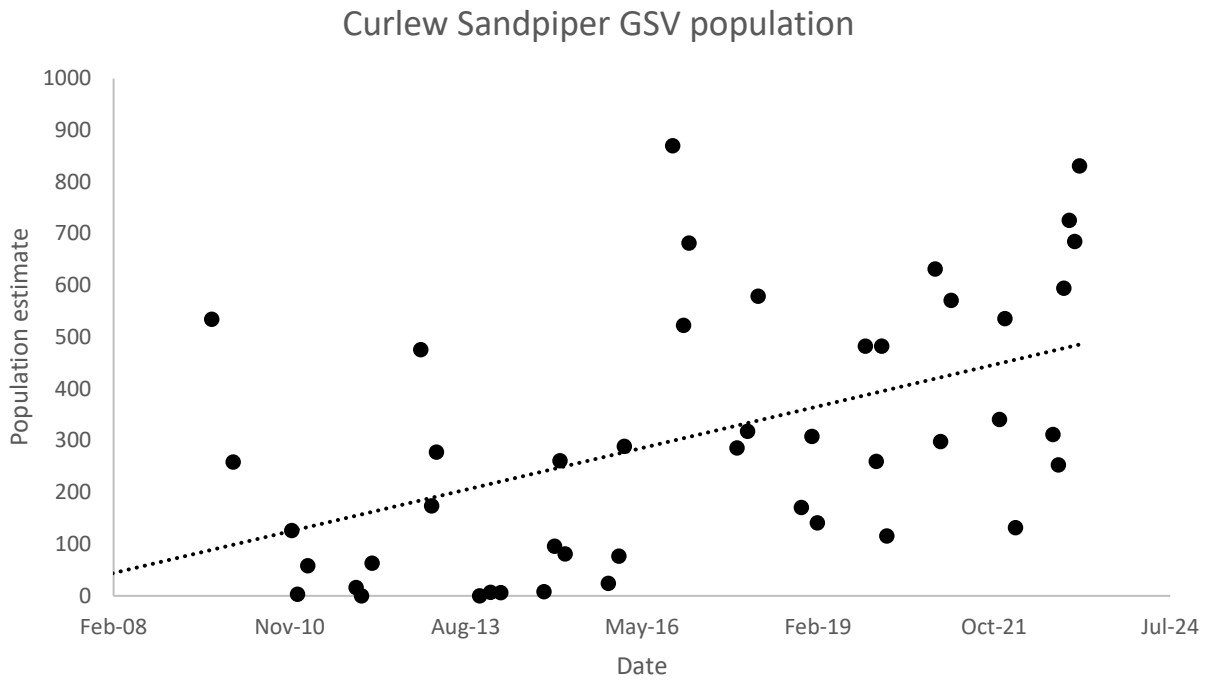


Figure 4. Population count data for Curlew Sandpiper in Gulf St Vincent (2008-2023). Dotted line represents population trend in GSV. Winter counts are excluded to remove the bias while adult birds are in the northern hemisphere.

(iv) Sharp-tailed Sandpipers *Calidris acuminata*

Northern hemisphere migrant

The latest EAAF population estimate for Sharp-tailed Sandpiper is 85,000 birds, with an associated 1% threshold of international significance of 850 (Hansen et al. 2016). The Gulf St Vincent shorebird has and remains a stronghold for Sharp-tailed Sandpipers. The 1% threshold having been exceeded in 10 of the last 15 years, however the 2022/23 maximum falls just short of the 1% threshold and is unfortunately a substantial decrease from the 1-2000 birds seen across seasons since 2015. Figure 5 below describes Sharp-tailed Sandpiper data across the last 15 count seasons; describing a complex trend that appears stable, yet, has notable absences of counts greater than 2500 individuals.

Table 8. Maximum population counts for Sharp-tailed Sandpiper from simultaneous surveys in Gulf St Vincent Shorebird Area (2008-2023).

Summer	Max count	Date
2008/09	3,224	02/2009
2009/10	3,120	01/2010
2010/11	74	12/2010
2011/12	752	12/2011
2012/13	1,103	12/2012
2013/14	757	03/2014
2014/15	545	02/2015
2015/16	1,530	02/2016
2016/17	1,062	02/2017
2017/18	1,144	01/2018
2018/19	1,240	01/2019
2019/20	1,970	11/2019
2020/21	2,010	01/2021
2021/22	2,239	01/2022
2022/23	774	02/2023

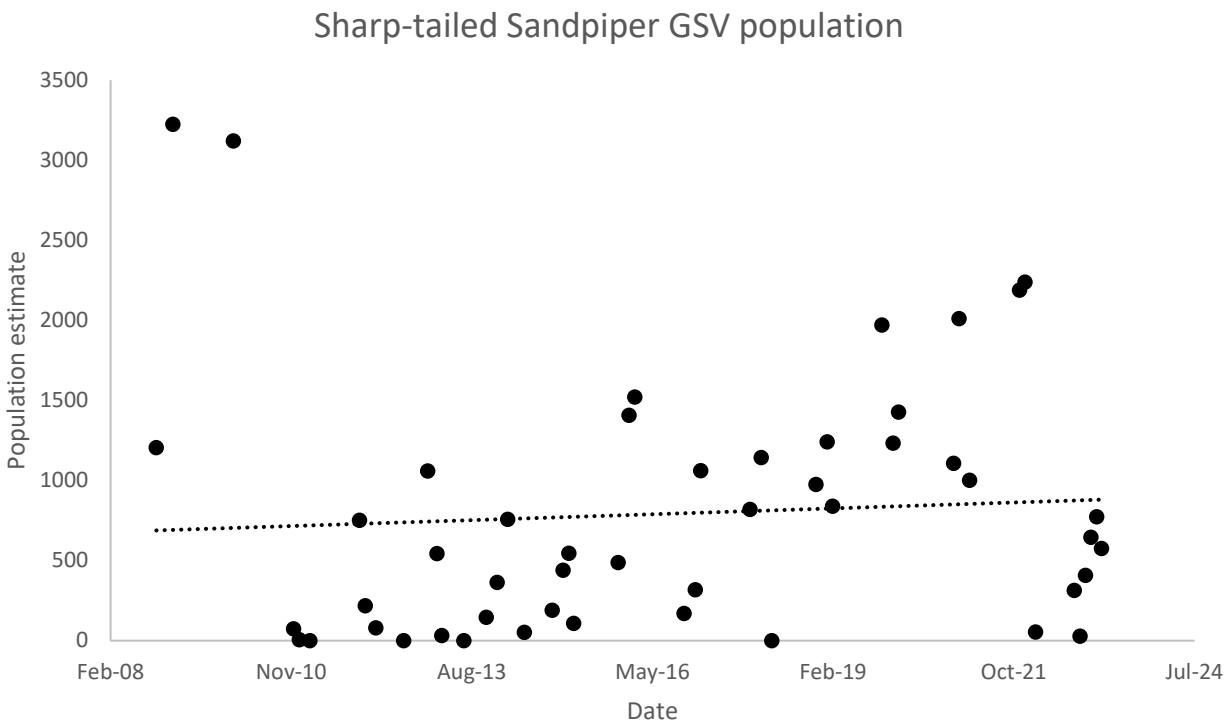
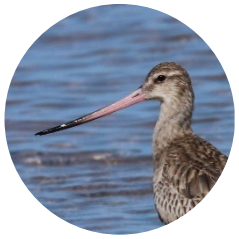


Figure 5. Population count data for Sharp-tailed Sandpiper in Gulf St Vincent (2008-2023). Dotted line represents population trend in GSV. Winter counts are excluded to remove the bias while adult birds are in the northern hemisphere.



(v) Bar-tailed Godwit *Limosa lapponica*

Northern hemisphere migrant

Two subspecies of Bar-tailed Godwit, (the western Alaskan breeding spp. *baueri* and northern Siberian breeding spp. *menzbieri*) are observed in Gulf St Vincent. Whist they can be distinguished in the field, doing so is difficult in count conditions and here, like the Red Knot above we combine population estimate for both subspecies. The subspecies have been given different EPBC spp. *menzbieri* listed as Critically Endangered, and the western Alaskan spp. *baueri* as Vulnerable.

The latest Bar-tailed Godwit population estimate from Hansen et al. (2016) is 325,000 with an associated 1% international significance threshold of 3,250 birds. Counts of Bar-tailed Godwit within the GSV have not achieved the threshold for international significance since monitoring began in 2008. However, the threshold for national significance (0.1% EAAF population) of 325 individuals designating national significance is routinely eclipsed (8 of the past 15 years), including this past 2022/23 count season (Table 9). Figure 6 below shows counts across the last 15 count seasons and although there is extensive variation surveys there the GSV population does appear stable.

Table 9. Maximum population counts for Bar-tailed Godwit from simultaneous surveys in Gulf St Vincent Shorebird Area (2008-2023).

Summer	Max count	Date
2008/09	575	02/2009
2009/10	337	01/2010
2010/11	324	03/2011
2011/12	53	03/2012
2012/13	824	02/2013
2013/14	104	01/2014
2014/15	407	02/2015
2015/16	110	01/2016
2016/17	236	02/2017
2017/18	363	01/2018
2018/19	179	11/2018
2019/20	430	11/2019
2020/21	269	01/2021
2021/22	335	01/2022
2022/23	448	02/2023

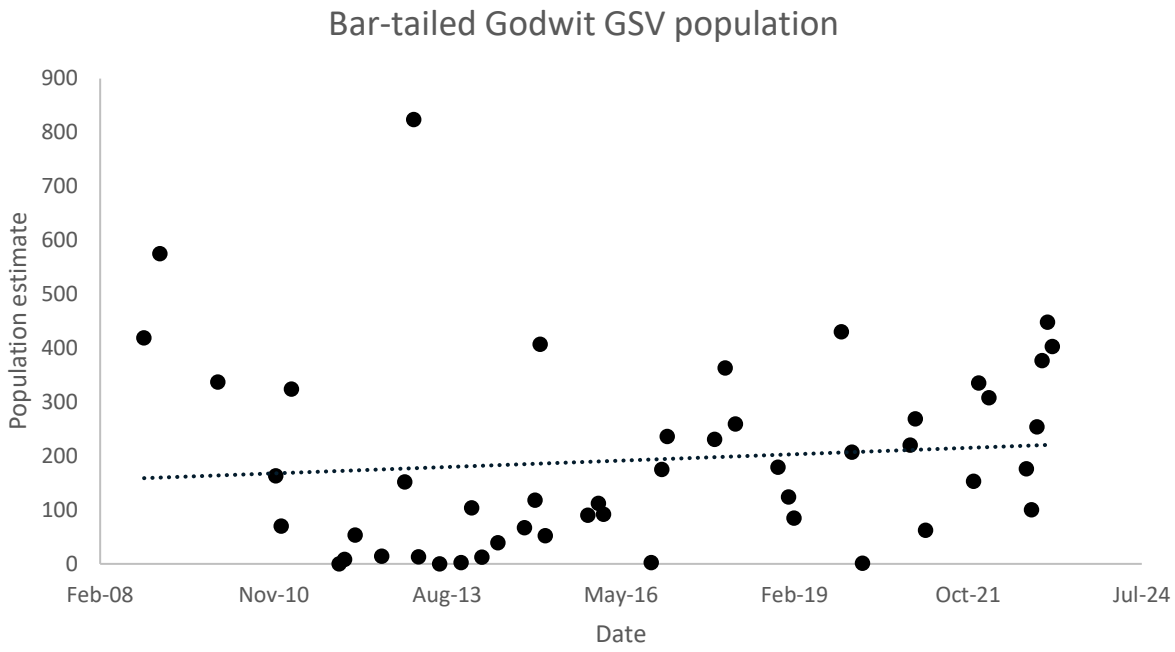


Figure 6. Population count data for Bar-tailed Godwit in Gulf St Vincent (2008-2023). Dotted line represents population trend in GSV. Winter counts are excluded to remove the bias while adult birds are in the northern hemisphere.

(vi) Banded Stilt *Cladorhynchus leucocephalus*

Endemic nomad

The Banded Stilt is an Australian shorebird which is highly nomadic within Australia. Wetlands International's most recent (2012) population estimate of the Banded Stilt to contain between 3-450,000 birds with an associated 1% threshold of 3,700 birds (Wetlands International 2023). This threshold has been eclipsed in all but two count seasons since 2008 (Table 10). As in previous reports, because of the nomadic/irruptive nature of Banded Stilt breeding (that occurs in response to inland weather events), here we only graph the GSV population count maximum to examine the population trend. Seasonal GSV count maximums in Figure 7 below depict a stable trend, however, a lack of maximum counts in the vicinity of those achieved between 2011/12 – 2015/16 warrants continued vigilance and even investigations further into population viability analysis and causes of breeding success/failure during inland breeding events.

Table 10. Maximum population counts for Banded Stilt from simultaneous surveys in Gulf St Vincent Shorebird Area (2008-2023).

Summer	Max count	Date
2008/09	12,062	11/2008
2009/10	2,228	01/2010
2010/11	110	12/2010
2011/12	19,843	12/2011
2012/13	24,647	12/2012
2013/14	8,278	03/2014
2014/15	15,901	11/2014
2015/16	21,352	02/2016
2016/17	9,342	11/2016
2017/18	11,608	01/2018
2018/19	11,520	02/2019
2019/20	8,000	11/2019
2020/21	7,000	12/2020
2021/22	10,000	12/2021
2022/23	7,300	03/2023

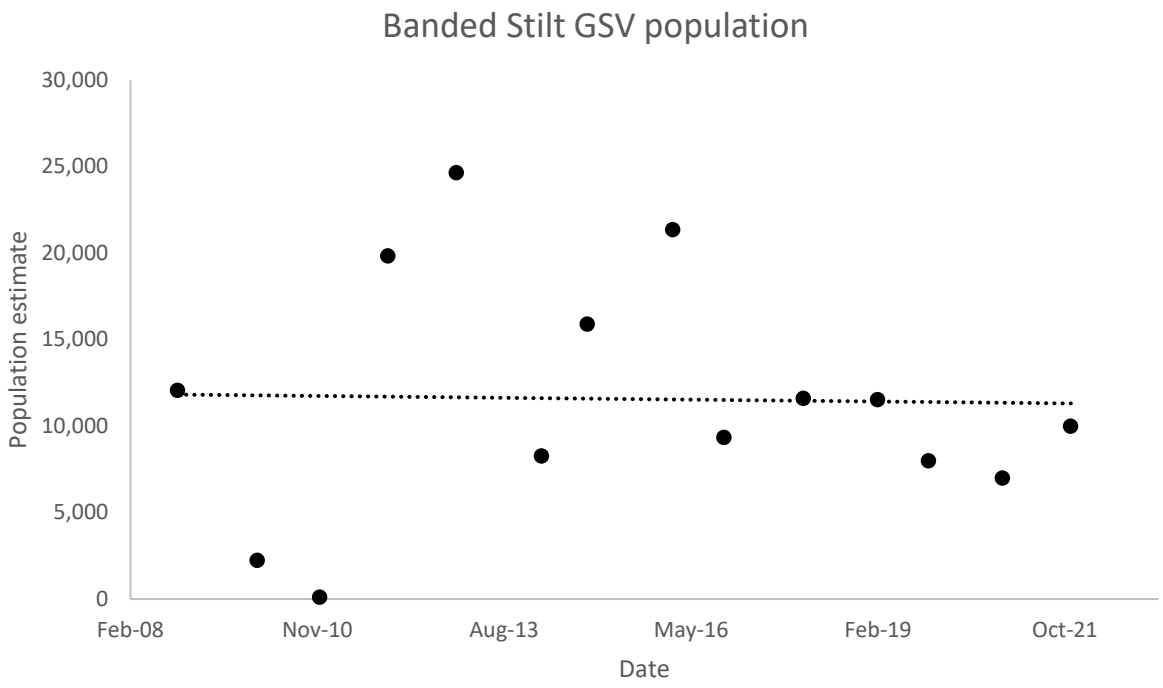


Figure 7. Banded Stilt seasonal population count maximums within Gulf St Vincent (2008-2023). Dotted line represents population trend in GSV.

(vii) Red-capped Plover *Charadrius ruficapillus*

Endemic resident

The Red-capped Plover is an Australian resident shorebird, which breeds locally and does not usually make large journeys. The most recent (1994) estimate published by Wetlands International assesses the Red-capped Plover population to contain approximately 95,000 (Wetlands International 2023). The 1% threshold of 950 birds was exceeded in 11 of the last 15 years (73%; Table 11), including eclipsing the threshold in the most recent 2022/23 count season. Unlike the migratory species, for which we exclude winter counts as adult birds are in the northern hemisphere, and the nomadic / irruptive Banded Stilt, where we only include count maximums, for the trend analysis of this locally breeding resident species all counts were included. The continuing decline in the Red-capped Plover population across the Gulf St Vincent shown by the decreasing population trend in Figure 8 and noted in previous reports is of growing concern. Like other relatively sedentary resident shorebirds such as the Hooded Plover, a high rate of localised breeding failure is likely to be the cause of this decline and we encourage increased investment in Red-capped Plover breeding monitoring as well as the implementation of threat mitigation measure in areas known to hold breeding populations.

Table 11. Population counts for Red-capped Plover from simultaneous surveys in Gulf St Vincent Shorebird Area (2008-2023).

Summer	Max count	Date
2008/09	4,963	02/2009
2009/10	2,026	01/2010
2010/11	119	01/2011
2011/12	1,084	12/2011
2012/13	2,194	03/2013
2013/14	1,206	06/2014
2014/15	527	01/2015
2015/16	2,301	02/2016
2016/17	1,225	02/2017
2017/18	1,441	03/2018
2018/19	746	11/2018
2019/20	804	01/2020
2020/21	1,106	01/2021
2021/22	1,663	12/2021
2022/23	1,005	02/2023

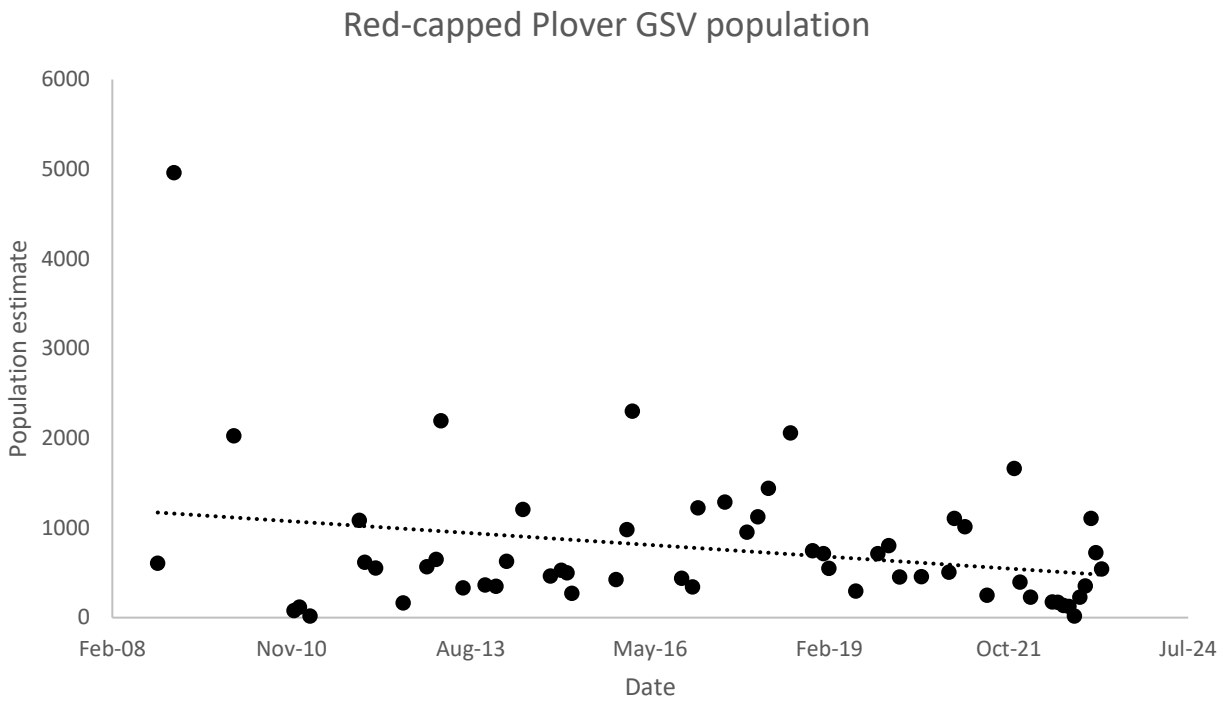


Figure 8. Red-capped Plover simultaneous count totals within Gulf St Vincent (2008-2023). Dotted line represents population trend in GSV.

Long term trends – a note of caution

The trends and population counts reported here should be interpreted with caution. Stable or increasing populations of some species are encouraging and represent GSV's value as shorebird habitat as well as highlighting the dedication of survey participants but should not be used as justification to become complacent in monitoring, enforcement, habitat restoration or site protection, particularly as the results herein are rely on maximum counts and have not been statistically analysed. Stable population trends in Gulf St Vincent, when viewed against background flyway-wide declines, are likely to be artefacts of increasing survey effort, better knowledge of species-specific habitat preferences, changes in site selection and are likely to mask overall population declines.

Threats and disturbance

Throughout the 2022/23 count season, 128 out of 264 shorebird surveys (48%) included threat / disturbance data. Although below what would be ideal (80%+) and even below last season's 52%, it remains a notable increase from the low of 36% during the 2020/21 count season and an additional reason to congratulate survey participants. Threat / disturbance data remains important aspect of shorebird surveys as it informs longer term disturbance trends at individual sites and as such can be used inform / petition land managers to intervene when and where threats emerge or dramatically increase i.e., off-road vehicles or off-leash dogs. Similar to previous reports, increasing the percentage of surveys with disturbance data should remain a priority moving into the 2023/24 count season.

Overall, across the 2022/23 count season the most commonly occurring threats in the vicinity of shorebirds and their habitat were (in descending order): people, watercraft, vehicles and dogs (Table 12). As evidenced by Table 12 below, in terms of both numbers of each threat category observed and the percent of surveys on which each threat type was detected, the sites of greatest number and diversity of threat / disturbance were (in descending order): Port Clinton, Thompson Beach North and South, Port Gawler and Pine Point. Off-leash dogs were particularly prevalent at Port Clinton and Thompson's Beach, as were off-road vehicles with the addition of Port Gawler and are as previously mentioned good candidates for education / enforcement activities.

Table 12. GSV shorebird sites with associated cumulative threat types and the percent of occasions where at least one of the threat types was observed; people, off- and on-leash dogs, total dogs, watercraft and vehicles. Note, sites not listed below did not have corresponding threat / disturbance data.

Site	People	Dogs off-leash	Dogs on-leash	Total dogs	Watercraft	Vehicles
Bald Hill	2 (13%)	0 (0%)	0 (0%)	0 (13%)	0 (0%)	3 (13%)
Black Point	0 (0%)	0 (0%)	0 (0%)	0 (33%)	0 (0%)	0 (0%)
Clinton CP	0 (0%)	0 (0%)	0 (0%)	0 (20%)	1 (10%)	2 (10%)
Dry Creek Saltfields	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Light Beach	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)
Macs Beach	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (33%)	1 (33%)

Magazine Road	4 (67%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Middle Beach	3 (29%)	0 (0%)	0 (0%)	0 (14%)	0 (14%)	6 (71%)
Mutton Cove	1 (33%)	2 (33%)	0 (0%)	2 (33%)	0 (0%)	0 (0%)
Pine Point	20 (67%)	1 (33%)	0 (0%)	1 (0%)	1 (33%)	2 (33%)
Port Arthur	2 (17%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	4 (33%)
Port Clinton	34 (87%)	11 (33%)	4 (20%)	15 (40%)	34 (53%)	12 (33%)
Port Gawler	6 (22%)	7 (33%)	2 (11%)	9 (33%)	0 (0%)	10 (78%)
Port Parham	0 (0%)	1 (25%)	1 (25%)	2 (50%)	0 (0%)	0 (0%)
Port Prime	5 (50%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (25%)
Price Saltfields	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Saint Kilda	1 (14%)	0 (0%)	0 (0%)	0 (0%)	1 (14%)	13 (29%)
Thompson's Beach N	23 (54%)	12 (31%)	0 (0%)	12 (31%)	3 (23%)	7 (38%)
Thompson's Beach S	46 (78%)	2 (11%)	5 (22%)	7 (44%)	8 (56%)	12 (55%)
Tiddy Widdy	1 (33%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (67%)
Section Banks	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Webb Beach	5 (57%)	2 (14%)	1 (14%)	3 (29%)	4 (29%)	2 (29%)
TOTAL	153 (33%)	38 (12%)	13 (6%)	51 (19%)	46 (17%)	78 (29%)

Community engagement

The Flock OZ at the Oz Asia Moon Lantern Trail

The Green Adelaide / BirdLife Australia Flock Oz once again flew in to be a part of the Oz Asia Festival's Moon Lantern Trail run by the Adelaide Festival Centre. The "Flock" of over 350 brightly painted shorebirds, created by local woodwork and men's sheds and community groups, celebrates the connection of our migratory shorebirds to the "OzAsia" migratory bird flyway. The Flock Oz was started by the previous NRM Board in 2014 when a Shorebird Lantern was commissioned to celebrate a Flyway Art exhibition and advocate for the Adelaide International Bird Sanctuary. The Flock was initiated in collaboration with the Flock NZ run by Pukorokoro Miranda Shorebird Centre. Unfortunately, the traditional paper lantern cannot be displayed outdoors, but the Flock Oz has made is annual appearance, set up prominently along the moon lantern trail. 25,000 visitors attended the four day OzAsia Festival Moon Lantern Trail at Tarntanya Wama/Pinky Flat. There are now Flock Oz's established across Australia, with one of the latest flocks on the Limestone Coast in the SE.

Section of the Flock Oz installation at this year's Oz Asia Moon Lantern trail, which will be illuminated as part of the trail, and signage that will accompany the installation. Photo Tony Flaherty.

Green Adelaide / BirdLIfe Australia's Flock Oz at the 2022 OzAsia Moon Lantern Festival. The trail attracted 25,0000 visitors over four days. Photos Tony Flaherty.

Introduction to Migratory Shorebirds workshop

An 'Introduction to Migratory Shorebirds' workshop was held on 12th November by BirdLife Australia and Green Adelaide. Friends of the Adelaide International Bird Sanctuary, Birds SA and volunteer NPWS Rangers also assisted with the session and on-beach viewing. Despite the weather, with cumulative thunderstorms, both the morning on beach viewing and presentations were well attended by some 25 participants. Species seen before the storms hit included migratory Ruddy Turnstone, Red Knot, Grey Plover, Golden Plover, Curlew Sandpiper, Common Greenshank, Sharp-tailed Sandpiper, Red-necked Stint, Bar-tailed Godwit and resident Red capped Plover, Sooty Oystercatcher. BirdLife Australia Sharing our Shores team, Deborah Furbank and Kerri Bartley, gave an introduction to local shorebirds and how to identify them, and Green Adelaide's Tony Flaherty provided an overview of tracking shorebird migration and what has been learnt from the Gulf St Vincent Shorebird conservation monitoring work over the last two decades. The object of these workshops is to raise community awareness of shorebirds and encourage them to become involved in shorebird monitoring.

Shorebird ID workshop participants viewing roosting shorebirds at high tide, Thompson Beach. Photo Kerri Bartley

Migratory Shorebirds Workshop presentation 12th November, 2022 inside 'The Shed' at Thompsons Beach. Photo Kerri Bartley

BirdLife Australia staff, NPWS Rangers, Birds SA and Friends of Adelaide International Bird Sanctuary volunteers and Green Adelade staff at the Migratory Shorebirds Workshop Nov 2022. Photo Birdlife Australia.

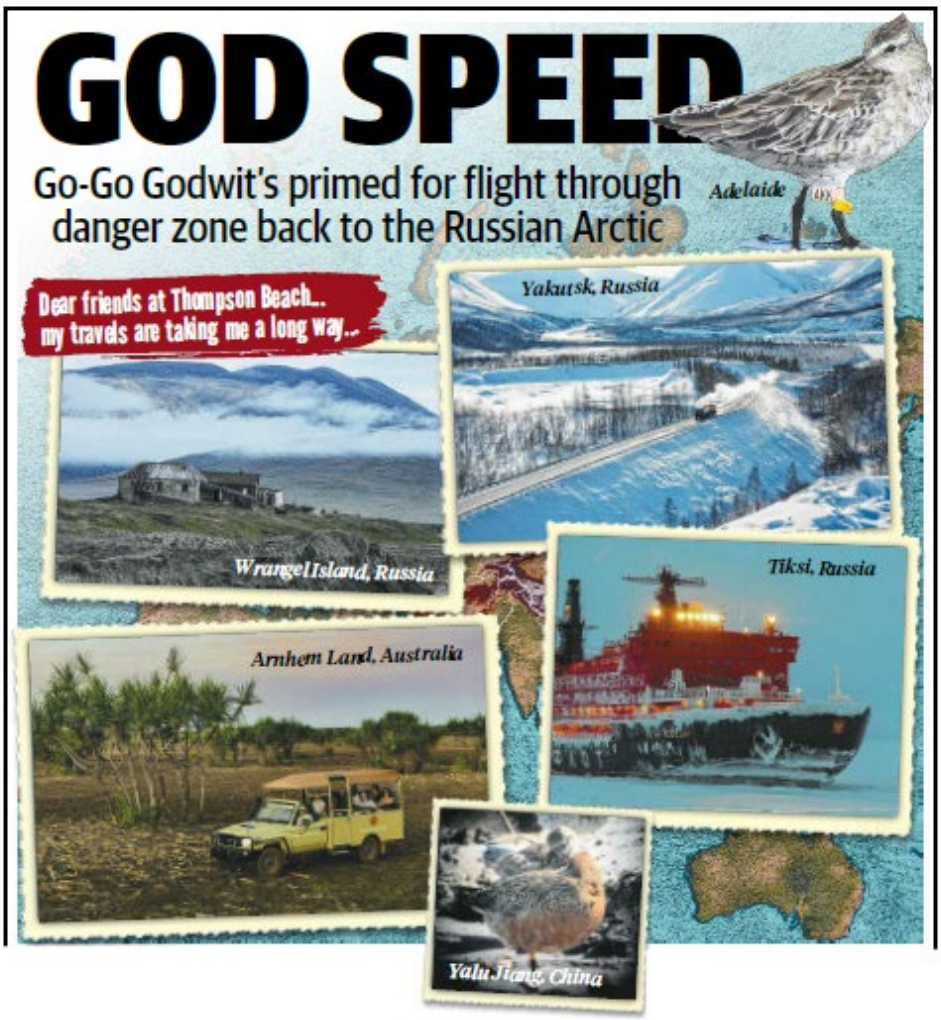
Go-Go Godwit returns

With the start of the 2022-23 shorebird season, Bar-tailed Godwit AKK, nicknamed Go-Go Godwit, returned along with our other migratory shorebirds. Shorebird count volunteer Paul Taylor sighted AKK at Bald Hill Beach in early November. AKK was banded at Thompsons Beach in November 2012 as part of our Shorebird Conservation work by the Victorian Wader Study Group and Friends of Shorebirds SE. Global Flyway Network shorebird counter, Adrian Boyle has re-sighted AKK in Bohai Bay in the Yellow Sea, each year since 2013 to April 2015, and re-sighted back in Bohai in April 2018. Advertiser journalist, Brad Crouch, has been following the bird since the first resighting in China in 2013, and ran a story in the Sunday Mail. Both Siberian and Alaskan breeding sub-species occur in our Gulf. Whilst the birds stop over on northward migration, AKK, as an Alaskan sub-species of godwit are more likely to fly direct back from Alaska to our Gulf on southward migration. AKK also featured in a two-page newspaper spread in March 2022 at the end of last season. Although, AKK is likely to be an Alaskan sub-species.

Bar-tailed Godwit AKK in November, showing some remaining breeding plumage. The photo was taken by Paul Taylor and featured in a story in The Advertiser.

GOD SPEED

Go-Go Godwit's primed for flight through danger zone back to the Russian Arctic



BRAD CROUCH

SOUTH Australia's premier frequent flyer is bulking up in preparation for his annual return journey to the Russian Arctic, via China.

Disregarding the risks of these politically turbulent times, the bird – dubbed Go-Go Godwit – will embark on the 26,000km flight for a little Arctic loving after feasting on worms and bugs in the area around Thompson Beach, about 55km north of Adelaide.

The plucky male bar-tailed godwit punches well above his featherweight status. He was banded with an identity tag at Thompson Beach in November 2012, when he would have been at least two years old.

Over the past decade, he has probably clocked up more than 300,000km – almost equal to a trip to the moon.

Keen wildlife photographers – including Paul Taylor, Adrian Boyle, Peter Corcoran and David Donovan – have captured him in places such as Nanpu, on Bohai Bay in China, sporting his telltale yellow AKK tag.

Godwits, weighing between 250-450g, undertake the longest non-stop flight of any bird.

One satellite-tracked bird from New Zealand made a non-stop flight of more than 11,000km in just nine days. Godwits can clock up 800,000km in their 30-year-plus lifespan.

The waders are believed to take the longest non-stop journey of any animal without pausing to feed.

As Taylor's latest photos show, Go-Go's grey-brown plumage blends in with the local mudflats north of Adelaide but will change to the breeding colours of red and russet tones for camouflage in the Arctic summer.

The East Asian-Australasian Flyway route used by Go-Go stretches across 22 countries from far-east Russia and Alaska to Australia and New Zealand. It is used by more than 50 million migratory shorebirds and waterbirds.

The Environment Department has used tiny solar-charged satellite trackers on grey plovers to map the route, giving an indication that after leaving South Australia, Go-Go visits Arnhem Land; Nanpu and Yalu Jiang, in China; Yakutsk, Tiksi and Wrangel Island, in Russia; possibly around Wainwright, in Alaska; and then heads back here. Exactly how he navigates is up for discussion, with the Earth's magnetic field a possibility.

Adelaide's northern coastline is a haven for migratory birds. The Adelaide International Bird Sanctuary, Winaityinaityi Pangkara, was established in 2016 to protect shorebirds and their habitat.

Each summer, thousands of migratory shorebirds, from tiny red-necked stints to giant eastern curlews, leave distant breeding grounds to join resident birds in the area to feast and roost.

Birdlife Australia and Green Adelaide are running an Introduction to Migratory Shorebirds workshop at Thompson Beach on March 20.

Article featured in The Advertiser on Wednesday 9th of March 2022.

Improved Magazine Road wetland security

In 2022, concerns over safety and anti-social behaviour and risks to volunteers at Magazine Road Wetlands were flagged with City of Salisbury. BirdLife Australia and Friends of Adelaide International Bird Sanctuary volunteers regularly undertake shorebird surveys as part of shorebird population monitoring at the site. A site meeting was held with council, Green Adelaide and NPWS staff last year. The area has historically been a key Birding Hotspot" close to Adelaide, and can support significant shorebird species if water levels are managed. Council have significantly increased security measures at the site with multiple surveillance cameras and on-going liaison with SAPOL. However summer water levels in key pond areas are still of concern with regards to maintaining habitat for migratory shorebirds.

One of a number of surveillance cameras installed at the Magazine Road Wetland car park to improve visitor safety.

BirdLife Australia monitoring recommendations

1) Further encouragement of participants to collect threat and disturbance data during each survey either via the Birdata App. or on the computer back at home, including the provision of Birdata user training to assist with the collection of threat/disturbance data.

2) Continue to foster good count and identification techniques among counters through upskilling workshops and mentoring.

3) Continue to conduct awareness raising events to bolster the profile of shorebird conservation and to recruit / train new volunteer counters and staff.

4) Where possible, shortfalls in volunteer survey coverage should be corrected through the allocation of trained staff enabling better estimates of shorebird populations in the Gulf St Vincent and EAAF overall.

5) With the decline in Red-capped Plover population and the documented local extinction from sites Adelaide Metro beaches, we highly recommended further investment in the Red-capped Plover monitoring program. Doing so will add to an existing body of work and gain volunteers, community and land managers support to document and mitigate threats, thus improving Red-capped Plover habitat values and breeding outcomes.

6) Continue to resource and implement actions within the Migratory Shorebirds National Conservation Action Plan (MC CAP) to assist with species recovery and conservation outcomes, including: habitat restoration work, feral animal control and compliance related to disturbance to shorebirds feeding and roosting sites.

7) Continue to support the work being undertaken through DEW National Parks within the AIBS including the AIBS Conservation Action Plan (CAP) process.

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Appendix table 1a. July 2022 Simultaneous count. *Shaded columns represent sites unable to be surveyed during the count period.

Common name	Bald Hill / PWPEE	Bolivar WWTP	Clinton CP	Section Banks	Dry Creek Saltfields	Light Beach	Macs Beach / Tiddy Widdy	Magizine Rd / BIW	Middle Beach	Mutton Cove	Port Arthur	Port Clinton	Port Gawler	Port Julia / Black Point	Port Parham	Port Prime	Price Saltfields	St Kilda Beach	Thompson's Beach N/S	Webb Beach
Banded Lapwing																				
Banded Stilt																	500			
Bar-tailed Godwit	13																	1		
Black-fronted Dotterel		8			1					3										
Black-tailed Godwit																				
Broad-billed Sandpiper																				
Common Greenshank			4														12			
Common Sandpiper																				
Curlew Sandpiper			15														10			
Double-banded Plover	10											2								
Eastern Curlew			9									3						1		
Great Knot			20																	
Greater Sand Plover			2																	
Grey Plover			2																	
Grey-tailed Tattler																				
Hooded Plover																				
Lesser Sand Plover																				
Little Curlew																				
Long-toed Stint																				
Marsh Sandpiper																				
Masked Lapwing		19			2				1	2	2		3	1			2	4	1	
Pacific Golden Plover																				
Pectoral Sandpiper																				
Pied Oystercatcher	7		2	55	4				2			3	2				18	4	8	2
Pied Stilt		8															20	210		
Red Knot			70																	
Red-capped Plover	23		30	6			10				2	24	26				33		22	
Red-kneed Dotterel																				
Red-necked Avocet																	170			
Red-necked Stint	35		4				120					36	300				55		90	
Ruddy Turnstone																				
Ruff																				
Sanderling																				
Sharp-tailed Sandpiper																				
Sooty Oystercatcher	2		2	16								10						4	10	
Terek Sandpiper			5																	
Whimbrel				1																
Wood Sandpiper																				
TOTAL	90	35	165	78	7		130		3	5	4	78	331	1	0		820	224	131	2

Appendix table 1b. August 2022 Simultaneous count. *Shaded columns represent sites unable to be surveyed during the count period.

Common name	Bald Hill / PWPEE	Bolivar WWTP	Clinton CP	Section Banks	Dry Creek Saltfields	Light Beach	Macs Beach / Tiddy Widdy	Magizine Rd / BIW	Middle Beach	Mutton Cove	Port Arthur	Port Clinton	Port Gawler	Port Julia / Black Point	Port Parham	Port Prime	Price Saltfields	St Kilda Beach	Thompson's Beach N/S	Webb Beach
Banded Lapwing					1															
Banded Stilt																				
Bar-tailed Godwit	6																			
Black-fronted Dotterel																				
Black-tailed Godwit	1																			
Broad-billed Sandpiper																				
Common Greenshank					15															
Common Sandpiper																				
Curlew Sandpiper					6															
Double-banded Plover					2														5	
Eastern Curlew	1											14								
Great Knot																				
Greater Sand Plover																				
Grey Plover																				
Grey-tailed Tattler																				
Hooded Plover																				
Lesser Sand Plover																				
Little Curlew																				
Long-toed Stint																				
Marsh Sandpiper																				
Masked Lapwing					90															
Pacific Golden Plover																				
Pectoral Sandpiper																				
Pied Oystercatcher					2														5	
Pied Stilt																				
Red Knot																				
Red-capped Plover					170															
Red-kneed Dotterel																				
Red-necked Avocet					100															
Red-necked Stint	140				400							30								
Ruddy Turnstone																				
Ruff																				
Sanderling																				
Sharp-tailed Sandpiper																				
Sooty Oystercatcher												3							11	
Terek Sandpiper																				
Whimbrel																				
Wood Sandpiper																				
TOTAL	148				786							47							21	

Appendix table 1c. September 2022 Simultaneous count. *Shaded columns represent sites unable to be surveyed during the count period.

Common name	Bald Hill / PWPEE	Bolivar WWTP	Clinton CP	Section Banks	Dry Creek Saltfields	Light Beach	Macs Beach / Tiddy Widdy	Magizine Rd / BIW	Middle Beach	Mutton Cove	Port Arthur	Port Clinton	Port Gawler	Port Julia / Black Point	Port Parham	Port Prime	Price Saltfields	St Kilda Beach	Thompson's Beach N/S	Webb Beach
Banded Lapwing																				
Banded Stilt																	2000			
Bar-tailed Godwit	4																18			
Black-fronted Dotterel		4																		
Black-tailed Godwit			2																	
Broad-billed Sandpiper																				
Common Greenshank		3				4						2					14		19	
Common Sandpiper		2																		
Curlew Sandpiper	3		20									2				3	60			
Double-banded Plover																	1			
Eastern Curlew												3					2		15	
Great Knot			12													6				
Greater Sand Plover			2																	
Grey Plover	3		19													7	12		1	
Grey-tailed Tattler												1					1			
Hooded Plover																				
Lesser Sand Plover			2																	
Little Curlew																				
Long-toed Stint																				
Marsh Sandpiper																				
Masked Lapwing	2	6								2		2				1	4		1	
Pacific Golden Plover																				
Pectoral Sandpiper																				
Pied Oystercatcher	31		2			31										1	8		7	
Pied Stilt		3															12			
Red Knot			86													60	4			
Red-capped Plover	5		80			7						13				19	10		1	
Red-kneed Dotterel																				
Red-necked Avocet																	180			
Red-necked Stint	440		1000			1						685				1200	200		260	
Ruddy Turnstone	2											1				11	18		9	
Ruff																				
Sanderling																				
Sharp-tailed Sandpiper	7															6	30			
Sooty Oystercatcher	6		3			3						13							5	
Terek Sandpiper			5																	
Whimbrel																	3			
Wood Sandpiper		1																		
TOTAL	503	19	1233			46				2		722				1314	2577		318	0

Table 4. October 2022 Simultaneous count. *Shaded columns represent sites unable to be surveyed during the count period.

Common name	Bald Hill / PWPEE	Bolivar WWTP	Clinton CP	Section Banks	Dry Creek Saltfields	Light Beach	Macs Beach / Tiddy Widdy	Magizine Rd / BIW	Middle Beach	Mutton Cove	Port Arthur	Port Clinton	Port Gawler	Port Julia / Black Point	Port Parham	Port Prime	Price Saltfields	St Kilda Beach	Thompson's Beach N/S	Webb Beach
Banded Lapwing																				
Banded Stilt																	600			
Bar-tailed Godwit	45		1														130			
Black-fronted Dotterel		4																		
Black-tailed Godwit																				
Broad-billed Sandpiper			2																	
Common Greenshank		10				19						11					32		139	4
Common Sandpiper	1	5								1		24					1			
Curlew Sandpiper	7	1	60									7				36	145		56	
Double-banded Plover																				
Eastern Curlew	10		29	9								30				15	1		5	
Great Knot	3																60			
Greater Sand Plover			7																	
Grey Plover	18		47													47	60	4	31	18
Grey-tailed Tattler			1									2								
Hooded Plover				2																
Lesser Sand Plover	1																			
Little Curlew																				
Long-toed Stint																				
Marsh Sandpiper		1																		
Masked Lapwing	2	10			4	1						3					4	2		3
Pacific Golden Plover	3																			
Pectoral Sandpiper																				
Pied Oystercatcher	4		2	8	1	30						2					18	2		
Pied Stilt		1													1					
Red Knot	300		7													140	680			
Red-capped Plover	5	2	65	4		7						6			2	17	10		6	
Red-kneed Dotterel																				
Red-necked Avocet																	200			
Red-necked Stint	260	50	610	49	59	61						505			483	1270	500	4	115	
Ruddy Turnstone	37											5				7	24		5	24
Ruff																				
Sanderling																				
Sharp-tailed Sandpiper	39	3	25		1							20				17	70		139	
Sooty Oystercatcher			4	12								3						6	6	
Terek Sandpiper			12																	
Whimbrel	1											1					2			
Wood Sandpiper																				
TOTAL	736	87	872	84	65	118				1		619			486	1549	2537	18	502	49

Appendix table 1d. November 2022 Simultaneous count. *Shaded columns represent sites unable to be surveyed during the count period.

Common name	Bald Hill / PWPEE	Bolivar WWTP	Clinton CP	Section Banks	Dry Creek Saltfields	Light Beach	Macs Beach / Tiddy Widdy	Magizine Rd / BIW	Middle Beach	Mutton Cove	Port Arthur	Port Clinton	Port Gawler	Port Julia / Black Point	Port Parham	Port Prime	Price Saltfields	St Kilda Beach	Thompson's Beach N/S	Webb Beach
Banded Lapwing																				
Banded Stilt																				
Bar-tailed Godwit	100																			
Black-fronted Dotterel																				
Black-tailed Godwit																				
Broad-billed Sandpiper																				
Common Greenshank												13			1				20	
Common Sandpiper										1										
Curlew Sandpiper												3							250	
Double-banded Plover																				
Eastern Curlew				1								27							5	
Great Knot																				
Greater Sand Plover																				
Grey Plover												1							9	8
Grey-tailed Tattler												2								
Hooded Plover																				
Lesser Sand Plover																				
Little Curlew																				
Long-toed Stint																				
Marsh Sandpiper																				
Masked Lapwing										8		3						8	5	
Pacific Golden Plover	3																		3	
Pectoral Sandpiper																				
Pied Oystercatcher				10								3						8	16	2
Pied Stilt																				
Red Knot	400																			
Red-capped Plover				1								9							7	
Red-kneed Dotterel																				
Red-necked Avocet																				
Red-necked Stint				1400								410			80					33
Ruddy Turnstone												3							20	2
Ruff																				
Sanderling																				
Sharp-tailed Sandpiper												28								
Sooty Oystercatcher				6								9						16	6	
Terek Sandpiper																				
Whimbrel																				
Wood Sandpiper																				
TOTAL	503			1418						9		511			81			32	341	45

Appendix table 1e. December 2022 Simultaneous count. *Shaded columns represent sites unable to be surveyed during the count period.

Common name	Bald Hill / PWPEE	Bolivar WWTP	Clinton CP	Section Banks	Dry Creek Saltfields	Light Beach	Macs Beach / Tiddy Widdy	Magizine Rd / BIW	Middle Beach	Mutton Cove	Port Arthur	Port Clinton	Port Gawler	Port Julia / Black Point	Port Parham	Port Prime	Price Saltfields	St Kilda Beach	Thompson's Beach N/S	Webb Beach
Banded Lapwing		1																		
Banded Stilt					200												100			
Bar-tailed Godwit			53	1													200			
Black-fronted Dotterel		9						2												
Black-tailed Godwit																				
Broad-billed Sandpiper																				
Common Greenshank		7	52		3					1		1					47		67	
Common Sandpiper		1															1			
Curlew Sandpiper	72		30		7											36	70		380	
Double-banded Plover																				
Eastern Curlew			28									28				11	1			
Great Knot	1		15													7	30		12	
Greater Sand Plover	3		6														1			
Grey Plover	62		31	13								30				44	94		74	23
Grey-tailed Tattler			1									2								
Hooded Plover				2																
Lesser Sand Plover																				
Little Curlew																				
Long-toed Stint																				
Marsh Sandpiper																				
Masked Lapwing	5	40			34			3		9							8		5	8
Pacific Golden Plover																1	1		6	
Pectoral Sandpiper																				
Pied Oystercatcher	31			25												6	15		16	
Pied Stilt		43						20												
Red Knot	72		60													1100	650		350	
Red-capped Plover	51	1			102							4				30	23		19	
Red-kneed Dotterel																				
Red-necked Avocet					50												8			
Red-necked Stint	890		79	50	850							455				4720	970		830	30
Ruddy Turnstone												6				3	50		55	4
Ruff																				
Sanderling																				
Sharp-tailed Sandpiper	21	5			38											33	100		210	
Sooty Oystercatcher	3			6								10							6	
Terek Sandpiper			7																	
Whimbrel																	12			
Wood Sandpiper																				
TOTAL	1211	107	362	97	1284			25		10		536				5991	2381		2030	65

Appendix table 1f. January 2023 Simultaneous count. *Shaded columns represent sites unable to be surveyed during the count period.

Common name	Bald Hill / PWPEE	Bolivar WWTP	Clinton CP	Section Banks	Dry Creek Saltfields	Light Beach	Macs Beach / Tiddy Widdy	Magizine Rd / BIW	Middle Beach	Mutton Cove	Port Arthur	Port Clinton	Port Gawler	Port Julia / Black Point	Port Parham	Port Prime	Price Saltfields	St Kilda Beach	Thompson's Beach N/S	Webb Beach
Banded Lapwing			45																	
Banded Stilt		1				2											2000			
Bar-tailed Godwit	130		22									1					224			
Black-fronted Dotterel		10																		
Black-tailed Godwit		2																		
Broad-billed Sandpiper			3													1				
Common Greenshank	1	10	22			10		1		1		16					42		50	40
Common Sandpiper	2	3								3		1								
Curlew Sandpiper	21		60													35	110		500	
Double-banded Plover			1																	
Eastern Curlew			29	8								1				13	2			
Great Knot	31		10														20			
Greater Sand Plover			17														19			
Grey Plover	2		36	10		6										58	43		11	13
Grey-tailed Tattler	2		2									2								
Hooded Plover																				
Lesser Sand Plover																			1	
Little Curlew																				
Long-toed Stint																				
Marsh Sandpiper		3																		
Masked Lapwing	12	100				3		2		4		5				3	15	10	17	12
Pacific Golden Plover																	2		2	
Pectoral Sandpiper		1										1								
Pied Oystercatcher	44			11		23											16	3	3	2
Pied Stilt		140						13												
Red Knot	80		55													1200	1200			
Red-capped Plover	61		80	20		21	9					17				50	36	6	10	45
Red-kneed Dotterel		2																		
Red-necked Avocet		50															25			
Red-necked Stint	1525		2200	40		491	400					130				1500	220		560	
Ruddy Turnstone	3						6					1					60		2	
Ruff																				
Sanderling																				
Sharp-tailed Sandpiper	140	120	100	20		16		54				17				34	130		14	
Sooty Oystercatcher	5		2	7		1	6			1		11						12	8	1
Terek Sandpiper			11																	
Whimbrel				4													12			
Wood Sandpiper		1																		
TOTAL	2059	443	2695	120		573	421	70		9	0	203				2894	4176	31	1178	113

Appendix table 1g. February 2023 Simultaneous count. *Shaded columns represent sites unable to be surveyed during the count period. ** Indicates the sighting of a Little Stint.

Common name	Bald Hill / PWPEE	Bolivar WWTP	Clinton CP	Section Banks	Dry Creek Saltfields	Light Beach	Macs Beach / Tiddy Widdy	Magizine Rd / BIW	Middle Beach	Mutton Cove	Port Arthur	Port Clinton	Port Gawler	Port Julia / Black Point	Port Parham	Port Prime	Price Saltfields	St Kilda Beach	Thompson's Beach N/S	Webb Beach
Banded Lapwing			180																	
Banded Stilt		155			1600												500	13		
Bar-tailed Godwit	160						92										195			1
Black-fronted Dotterel		20																		
Black-tailed Godwit		20																		
Broad-billed Sandpiper																				
Common Greenshank	11	33	15		72	45				1		22					30	8	106	70
Common Sandpiper	3	1			1					2		1								
Curlew Sandpiper		40	52	7	65		25									36	110		350	
Double-banded Plover																				
Eastern Curlew	30		20	1								10				8	4			
Great Knot	31						10										10			
Greater Sand Plover			15				4										2	3		
Grey Plover	20		80	17		1	12					2				39	45		19	11
Grey-tailed Tattler			4									3								
Hooded Plover																				
Lesser Sand Plover																				
Little Curlew							1													
Long-toed Stint		1			8												1**			
Marsh Sandpiper		5			2							1								
Masked Lapwing	3	130			42	2			2	6	2	3			4		11	8	13	8
Pacific Golden Plover	2						18												1	
Pectoral Sandpiper		1															1			
Pied Oystercatcher	112			8		84						2					8	4	2	2
Pied Stilt		550			10												4			
Red Knot	200						600									700	1000		15	
Red-capped Plover	44	8	85	85	520	13	85					25	15			52	40	25	25	83
Red-kneed Dotterel																				
Red-necked Avocet		150															59			
Red-necked Stint	883	5	925	1400	2785	357	2000					825	29	6		2000	245		1150	230
Ruddy Turnstone	14						56					3				2	73		7	14
Ruff																				
Sanderling																				
Sharp-tailed Sandpiper	12	100	100		320	27	2					5				36	110		60	2
Sooty Oystercatcher	10			11		3				1		15				8		2	1	
Terek Sandpiper			9																	
Whimbrel	2			2													10			
Wood Sandpiper		4																		
TOTAL	1537	1223	1485	1531	5425	532	2905		2	10	2	917	44	6	4	2881	2458	63	1749	421

Appendix table 1h. March 2023 Simultaneous count. *Shaded columns represent sites unable to be surveyed during the count period.

Common name	Bald Hill / PWPEE	Bolivar WWTP	Clinton CP	Section Banks	Dry Creek Saltfields	Light Beach	Macs Beach / Tiddy Widdy	Magizine Rd / BIW	Middle Beach	Mutton Cove	Port Arthur	Port Clinton	Port Gawler	Port Julia / Black Point	Port Parham	Port Prime	Price Saltfields	St Kilda Beach	Thompson's Beach N/S	Webb Beach
Banded Lapwing																				
Banded Stilt		300			2000												5000			
Bar-tailed Godwit	160						16					3					224			
Black-fronted Dotterel		3																		
Black-tailed Godwit		23			25															
Broad-billed Sandpiper																				
Common Greenshank	14	5			32							12					24		66	90
Common Sandpiper		1								2							2			
Curlew Sandpiper	60	150		32	4		183					69				53	160		70	50
Double-banded Plover														4						
Eastern Curlew	8			5																
Great Knot	13																30			50
Greater Sand Plover																				
Grey Plover	37			1								5				7	124		25	25
Grey-tailed Tattler												2					1			1
Hooded Plover																				
Lesser Sand Plover																				
Little Curlew	1																			
Long-toed Stint																				
Marsh Sandpiper		5															1			
Masked Lapwing	19	24			26		2		4	2		3				8	10		17	10
Pacific Golden Plover	2													1			1			
Pectoral Sandpiper																				
Pied Oystercatcher	47			33	5		1					3							2	1
Pied Stilt		200			27					5							14			
Red Knot	240			5			3									46	500		280	250
Red-capped Plover	196			48	148		50					30		18			174			59
Red-kneed Dotterel		2															6			
Red-necked Avocet		100															80			
Red-necked Stint	1408	300		550	601		300					500		350		500	700		140	130
Ruddy Turnstone	39						32					8		6			40		4	2
Ruff		1																		
Sanderling																	1			
Sharp-tailed Sandpiper	16	300			12		1					4				1	220		22	
Sooty Oystercatcher	15			40								18		4					8	
Terek Sandpiper																				
Whimbrel	1			1													12			
Wood Sandpiper																				
TOTAL	2276	1414		715	2880		588		4	9	0	657		383		615	7324		634	668

Appendix table 1i. April 2023 Simultaneous count. *Shaded columns represent sites unable to be surveyed during the count period.

Common name	Bald Hill / PWPEE	Bolivar WWTP	Clinton CP	Section Banks	Dry Creek Saltfields	Light Beach	Macs Beach / Tiddy Widdy	Magizine Rd / BIW	Middle Beach	Mutton Cove	Port Arthur	Port Clinton	Port Gawler	Port Julia / Black Point	Port Parham	Port Prime	Price Saltfields	St Kilda Beach	Thompson's Beach N/S	Webb Beach
Banded Lapwing																				
Banded Stilt					500												3000			
Bar-tailed Godwit	9		2																	
Black-fronted Dotterel		11																		
Black-tailed Godwit																				
Broad-billed Sandpiper																				
Common Greenshank		2	61		2							1					30	12		2
Common Sandpiper																				
Curlew Sandpiper	3		13														12		20	
Double-banded Plover	4																			
Eastern Curlew			3	1												1				
Great Knot			6																	
Greater Sand Plover			3																	
Grey Plover	1		15																	5
Grey-tailed Tattler	1		2																	
Hooded Plover																				
Lesser Sand Plover																				
Little Curlew																				
Long-toed Stint																				
Marsh Sandpiper																				
Masked Lapwing	2	35		4	32							8					6	4	14	8
Pacific Golden Plover																	1			
Pectoral Sandpiper																				
Pied Oystercatcher	3			18								6					11	2	6	
Pied Stilt		128			32												21	12		
Red Knot			110																100	
Red-capped Plover	42		65	6	230							7				119	64			10
Red-kneed Dotterel		82			46												4			
Red-necked Avocet					290												150			
Red-necked Stint	72	9	90	6	420											221	210		1004	95
Ruddy Turnstone	1																37			1
Ruff																				
Sanderling												60								
Sharp-tailed Sandpiper																	3			
Sooty Oystercatcher				55								20						22	2	
Terek Sandpiper			12																	
Whimbrel	1		1									1								
Wood Sandpiper																				
TOTAL	139	267	383	90	1552							103				341	3549	52	1146	121

Appendix table 2. *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) listing, population estimates derived from Hansen et. al. (2016) and associated 1% threshold for 25 migratory species known to occur in GSV.

Scientific name	Common name	Hansen et. al. 2016 estimates	1% EAAFP	Conservation status (EPBC)
Actitis hypoleucos	Common Sandpiper	190,000	1,900	
Arenaria interpres	Ruddy Turnstone	30,000	300	
Calidris acuminate	Sharp-tailed Sandpiper	80,000	800	
Calidris canutus	**Red Knot**	**110,000**	**1,100**	**E**
Calidris ferruginea	**Curlew Sandpiper**	**90,000**	**900**	**CE**
Calidris melanotos	Pectoral Sandpiper	1,220,000-1,930,000	12,200	
Calidris pugnax	Ruff	25,000-100,000	250	
Calidris ruficollis	Red-necked Stint	475,000	4,750	
Calidris subminuta	Long-toed Stint	230,000	2,300	
Calidris tenuirostris	**Great Knot**	**425,000**	**4,250**	**CE**
Charadrius bicinctus	Double-banded Plover	19,000	190	
Charadrius leschenaultia	**Greater Sand Plover**	**200,000-300,000**	**2,000**	**V**
Charadrius mongolus	**Lesser Sand Plover**	**180,000-275,000**	**1,800**	**E**
Gallinago hardwickii	Latham's Snipe	25,000-1,000,000	250	
Limosa lapponica	**Bar-tailed Godwit**	**325,000**	**3,250**	**CE / V**
Limosa limosa	Black-tailed Godwit	160,000	1,600	
Numenius madagascariensis	**(Far) Eastern Curlew**	**35,000**	**350**	**CE**
Numenius phaeopus	Whimbrel	65,000	650	
Pluvialis fulva	Pacific Golden Plover	120,000	1,200	
Pluvialis squatarola	Grey Plover	80,000	800	
Tringa brevipes	Grey-tailed Tattler	70,000	700	
Tringa glareola	Wood Sandpiper	130,000	1,300	
Tringa nebularia	Common Greenshank	110,000	1,100	
Tringa stagnatilis	Marsh Sandpiper	130,000	1,300	
Xenus cinereus	Terek Sandpiper	50,000	500	

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Thank you

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