Monitoring Hooded Plovers on the Fleurieu Peninsula: Distribution, breeding success and management in the 2012/2013 season

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birds are in our nature



Government of South Australia

Adelaide and Mount Lofty Ranges Natural Resources Management Board



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Introduction

The pressures placed on the Australian coast by over 80% of the population living within 50kms of the coast, a growing trend for a 'seachange' and coastal tourism representing a 20 million dollar recreation investment, are undoubtedly taking their toll on the resident shorebirds who breed on our ocean beaches during the spring and summer. In South Australia, there are four species of resident shorebirds, the Pied and Sooty Oystercatchers, Red-capped Plovers and Hooded Plovers, that nest on ocean beaches and offshore islands. Hooded Plovers are listed as Vulnerable and both Oystercatcher species as Rare in South Australia under the National Parks and Wildlife Act 1972. The Hooded Plovers are most threatened because they are limited to breeding exclusively on ocean beaches in South Australia, with the rare exception of some coastal saline lakes in parts of the South East coast and on the Eyre Peninsula. The oystercatchers have a broader nesting habitat range which includes rocky outcrops, islands and more heavily vegetated dune areas, and the redcapped plover can also breed around wetlands and low energy beaches. Colonial seabirds, such as Little Terns (Vulnerable, NPWS Act; rare west of Corner Inlet in Victoria and into South Australia) and Fairy Terns (Vulnerable, NPWS Act; breed in South Australia), are also beach-nesters, and suffer similar threats to the Hooded Plover.

Beach-nesters make simple nest-scrapes in the sand and their well-camouflaged eggs and chicks are extremely difficult to spot, and therefore at great risk of being trampled by visitors to the beach. People, unleashed dogs, horses and vehicles on beaches not only pose a direct threat, but they also disturb incubating adults, resulting in temporary nest abandonment which exposes the eggs to harsh temperatures, and predators such as ravens, gulls, foxes and cats. This is particularly true of disturbances caused by unleashed dogs, where adults spend long periods away from the nest. Furthermore, residential developments and littering attract increased numbers of predators to beaches. Chicks cannot fly for 5 weeks and need to forage on the beach in order to survive – this places them in harm's way, and they are easily crushed or disturbed by people, dogs and vehicles on the beach. If they spend too much time in hiding, they can starve to death or be exposed to harsh temperatures in the absence of brooding. The parent birds try to distract potential threats, leaving the chicks unattended and exposed to predators. In addition, vehicles on beaches compact the sand, killing the bulk of prey items that these shorebirds rely on.

Given the severe pressures placed on coastal breeding birds, in particular the threatened status of the Hooded Plover, BirdLife Australia embarked on a project to 'promote coexistence between recreationists and beach-nesting birds'. This project is funded by the Australian Government's Caring for our Country, the Victorian Government and Adelaide and Mount Lofty Ranges (AMLR) Natural Resources Management (NRM) Board. Beaches will always be popular places for recreation within Australian culture, and the best solution to a problem which is very much human generated, is to try and engage people to change their behaviours and help protect these birds so they have a future.

The main aim of the beach-nesting birds' (BNB) project is to involve coastal communities and land managers in best practice management of breeding sites to see an overall improvement in breeding success of beach-nesters. The project uses the Hooded Plover in Victoria and South Australia as a case study for developing and improving on-ground management strategies and community awareness methods. The results will be applicable in a broader sense to other beach-nesting birds around Australia. The outline of the project is as follows:

- Maintain a distribution map and database of location of breeding pairs of Hooded Plovers along the Victorian, South Australian and NSW Coast, updated every two years and comparable over time.
- 2. Estimate state and regional population numbers of Hooded Plovers in Victoria, South Australia and NSW every two years.
- 3. At the time of each biennial count, assess the threats to each pair and any management in place to alleviate these threats.
- 4. Assess gravity of threats at breeding sites from data collected during the biennial count and map sites according to threat status.
- 5. Choose sites in Victoria and South Australia for monitoring of breeding success during the breeding months (August-March). Seek to maintain monitoring of these sites over at least 5 years for a comparison of site-based threat profiles and to quantify improvements in breeding success related to management.
- 6. For monitoring sites selected, develop site profiles that assess threats in more detail and describe management of the site (e.g. identify land managers; identify full suite of management regulations for sites in relation to access, dog, horse and vehicle restrictions; assess weed infestations and availability of suitable nesting habitat).
- 7. Carry out on-ground management of vulnerable breeding sites following management directions outlined in 'A practical guide to managing beach-nesting birds in Australia.'
- 8. Compare threats and breeding success at managed and unmanaged sites.

- 9. Coordinate student research projects investigating the effectiveness of new management techniques and investigating attitudes and values held by people regarding beaches and conservation of beach-nesting birds.
- Use nest cameras to detect and identify nest predators and to determine nest fates. This is done to a limited degree to avoid any potential for training predators to associate cameras with nests.
- 11. Assess success of managements and make modifications for subsequent seasons. Managements need to adapt to local site and beach user specifications.
- 12. Band Hooded Plovers and maintain resighting database so as to track movements, dispersal and document survival rates and site fidelity. This will lead to better knowledge about exchange of birds between the Fleurieu Peninsula and other regions of South Australia, and possibly other states, enabling a better idea of what we consider a population. This is critical to effective population conservation and management.

The main roles of the different groups working on this project are as follows:

- BirdLife Australia Staff provide strategic direction for recovery of Hooded Plovers across the Eastern mainland, advice, workshops, training and technical support, as well as data analysis and maintenance of a national database.
- On the Fleurieu peninsula, Adelaide and Mount Lofty Ranges Natural Resources Management (AMLR NRM) Board officers support the project and volunteers, and local council and Department of Environment, Water and Natural Resources (DEWNR) staff assist with nest protection responses.
- The Normanville Natural Resources Centre facilitates school and public awareness of the project including chick shelter construction and dogs breakfast awareness events.

At a regional level, two Coastal Action Plans have been completed for the Adelaide and Mount Lofty Ranges Natural Resources Management Board region; the Southern Fleurieu Coastal Action Plan and for relevant coastal areas of the Metropolitan Adelaide and Northern Coastal Action Plan. These plans contain detailed coastal maps and plant and animal lists. The plans also outline key conservation priorities along our coast, provide suggested actions and identify key players to be involved. The Coastal Action Plans are used to assist in priority setting of coastal management actions for the AMLR NRM Board, councils and DEWNR. In implementing the Coastal Action Plans, the Adelaide and Mount Lofty Ranges NRM Board resources the local implementation of actions identified in the Coastal Action Plans including implementation of local initiatives to conserve Hooded Plovers.

Relevant actions and priorities of the (draft) South Australian Recovery Plan for the Hooded Plover (Baker-Gabb and Weston 2006) were incorporated into the Coastal Action Plan's detailed local actions to manage foreshore use to minimise impact on the species during the nesting and fledging season. Key players identified are the Department for Environment and Natural Resources, councils, community and the Natural Resources Management Board.

In view of the status of this species, the Hooded Plover has also been flagged as a focal species for the Southern Fleurieu Coastal Action Plan and for relevant coastal areas of the Metropolitan Adelaide and Northern Coastal Action Plan area.

A biennial count year

Every two years, all suitable ocean beach habitat across the Eastern mainland of Australia (SA, Vic and southern NSW) is surveyed across a weekend in mid November to census the Hooded Plover population. This is the second count where fixed survey routes of known length have been utilised, giving us the capacity to make direct comparisons of density between counts.

In November 2012, 2334 kilometres of coastline was identified as potential habitat in NSW, Victoria and South Australia, of which 80% was surveyed. A total of 1,248 Hooded Plovers (1,207 adults and 41 juveniles) were counted (Table 1). In Victoria, 84% of coast was surveyed and 568 Hooded Plovers sighted (565 adults and 3 juveniles); in South Australia, 77% of coast was surveyed and 621 Hooded Plovers sighted (591 adults and 30 juveniles), and in New South Wales, 89% of coast was surveyed and 59 Hooded Plovers sighted (51 adults and 8 juveniles).

Renee Mead was the national coordinator for the 2012 count, as well as the acting regional count coordinator on the Fleurieu Peninsula. Twenty nine volunteers participated in the count on the Fleurieu, compared to 19 in 2010, and walked 67.7 km, totalling 37.3 hours effort (not to mention travel times to and from sites).

In South Australia, 1018 km were covered during the count, representing 77% of potentially suitable habitat. Fleurieu coverage was higher, at 97% of suitable habitat (see Figure 1). A total of 34 adult Hooded Plovers were counted and there were no juveniles sighted on the Fleurieu. In South Australia, a total of 591 adult Hooded Plovers and 30 juveniles were observed, with most juvenile sightings coming from Kangaroo Island and Yorke Peninsula (Table 1). Of the birds sighted on the Fleurieu Peninsula, 7 pairs were on eggs, 1 pair was preparing a nest scrape, and another pair was suspected of having chicks.





The density of Hooded Plovers on the Fleurieu was 0.5 birds/km, compared to an average of 0.61 for South Australia, and 0.67 across the eastern mainland. The majority of beaches on the Fleurieu Peninsula are occupied by only one pair of Hooded Plovers, with the exceptions being the long continuous stretches of beach including Tunkalilla beach and Carrackalinga to

Lady Bay. In comparison to the 2010 count, there were 3 fewer adults sighted (Table 2). There were also differences in the distribution of where the birds were sighted (Figures 2a and b). This may suggest that while some breeding pairs are resident to one particular beach, others may move between sites that may vary temporally in their suitability. There are also likely to be 'floaters' present in the population, often younger birds, without a partner and territory.

		Hooded Plovers		Re	d-capp	ed		Sooty	•	Pied		• • • •
	Hood		vers		Plover	s 	Oys	ercato	ners	Oyst	ercato	ners
REGION	Adult	Juv.	Total	Adult	Juv.	Total	Adult	Juv.	Total	Adult	Juv.	Total
<u>Victoria</u> 1 East Ginnsland - NSW to Point												
Hicks	20	0	20	34	0	34	14	0	14	26	0	26
2. Mueller River to Lake Tyers	27	0	27	61	0	61	0	0	0	86	2	88
3. Lake Tyers to Seaspray	14	0	14	3	0	3	1	0	1	22	0	22
4. Seaspray to Corner Inlet	24	0	24	3	1	4	2	0	2	101	0	101
5. Wilsons Prom to Waratah Bay	44	0	44	0	0	0	18	0	18	2	0	2
6. Venus Bay	33	0	33	0	0	0	22	0	22	7	0	7
7. Inverloch to San Remo	47	0	47	1	0	1	9	0	9	0	0	0
8. Phillip Island	43	0	43	12	0	12	38	0	38	12	0	12
9. Mornington Peninsula	69	2	71	0	0	0	22	0	22	1	0	1
10. Queenscliff to Lorne	31	0	31	24	0	24	0	0	0	4	0	4
11. Lorne to Princetown	22	1	23	0	0	0	0	0	0	1	0	1
12. Princetown to Warrnambool	19	0	19	0	0	0	0	0	0	4	0	4
13. Warrnambool to Yambuk	98	0	98	64	0	64	13	0	13	60	1	61
14. Yambuk to Swan Lake	33	0	33	12	0	12	0	0	0	64	0	64
15. Discovery Bay (Swan Lake to	41	0	41	2	0	2	0	0	0	71	0	71
SA/VIC Dolder)	41 E6E	2	569	د ۲۱٦		<u> </u>	120	0	120	/1	2	164
VIC IOLAI	505	3	508	217		210	139	0	139	401	<u> </u>	404
16 South East SA	64	0	64	220	0	220	14	0	14	50	2	67
17. Coorong	21	0	21	111	0	111	14	0	14	151	0	1 5 1
17. Coolong	21	0	24	111	5	111	7	3	10	34	0	121
19 Kangaroo Island	175	10	185	67	5	72	59	0	59	210	8	218
20. Vorke Peninsula	212	15	227	921	g	930	61	0	61	63	1	64
21 Evre Peninsula	81	3	84	1319	0	1319	289	3	292	600	12	612
22. South West SA	4	2	6	517	106	623	205	0	20	4	0	3
SA Total	591	30	621	3166	125	3291	457	6	463	1121	24	1144
New South Wales			V-1	5100		3272	,					
23. NSW South	21	3	24	27	0	27	13	0	13	64	2	66
24. NSW North	30	5	35	26	2	28	53	1	54	27	1	28
NSW Total	51	8	59	53	2	55	66	1	67	91	3	94
Grand Total	1207	41	1248	3436	128	3564	662	7	669	1673	30	1702

Table 1. Results of the 2012 Biennial Hooded Plover Count (by state and region).

Table 2. The number of Hooded Plover adults on the Fleurieu Peninsula detected in the 2012 and 2010 biennial counts according to beach route.

Beach	2012 HP adults	2010 HP adults
Southport	2	
Moana		3
Maslin Beach	2	2
Port Willunga	2	
Silver Sands		2
Myponga Beach	2	2
Carrickalinga-Normanville	3	6
Normanville - Lady Bay	3	5
Tunkalilla	8	6
Callawonga and Ballaparudda	2	
Coolawang	2	
Parsons Beach	2	2
Waitpinga Beach	1	2
Victor Harbour Foreshore	2	2
Hindmarsh River		3
Boomer Beach (Watsons Gap)	2	
Bashams Beach	1	2

Figure 2. The distribution of beach-nesting shorebird sightings on the Fleurieu Peninsula during a) the 2012 biennial count and b) the 2010 biennial count.



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Threats are recorded when birds are sighted during the count in order to rapidly assess the range of threats the birds may be facing at each beach. A threat index is then formulated, where threats are weighted according to their relative impacts. Figure 3a and 3b below show the threat ratings from the 2012 and 2010 counts. Sites on the Fleurieu Peninsula vary in threat rating, with some sites being impacted by vehicles and off leash dogs, and others being more remote and less impacted by human threats. Normanville beach, Bungala River estuary nearest the jetty, had the highest threat rating of any site.

In terms of other beach-nesting shorebirds, the number of Sooty and Pied Oystercatchers and Red-capped Plovers on ocean beaches of South Australia are considerably higher relative to numbers on Victorian ocean beaches. This is particularly true for Red-capped Plovers, occurring in their thousands on ocean beaches across South Australia compared to being infrequent inhabitants of ocean beaches along the Victorian coastline. On the Fleurieu peninsula, ocean beaches appear to have sparser densities of beach-nesting shorebirds, with 16 Red-capped Plovers, 10 Sooty Oystercatchers and 34 Pied Oystercatchers recorded (see Table 1). The majority of oystercatcher sightings were from the Murray River mouth, Goolwa and Middleton beaches. While most Red-capped Plovers sightings were from Murray River mouth, Moana beach and Snapper Point.

Section Banks within Barker Inlet was also surveyed during the 2012 count to determine which species of beach-nesting birds occurred here. A total of 48 Red-capped Plovers, 23 Sooty Oystercatchers and 8 Pied Oystercatchers were sighted (Figure 4).



Sooty Oystercatcher chicks. Photo Glenn Ehmke.

Figure 3. The distribution of threats across the Fleurieu Peninsula at sites where beach-nesting shorebirds were located during a) the 2012 biennial count and b) the 2010 biennial count.



Figure 4. Distribution of Beach-nesting Shorebirds sighted during the 2012 biennial count on Section Banks, Barker Inlet.





Male Red-capped Plover doing distraction display. Photo courtesy Glenn Ehmke.

An overview of the 2012-2013 Breeding Season

Victoria

The BNB project has been running since 2006 in Victoria, with breeding success and threats at breeding sites monitored over 7 successive breeding seasons for up to 132 pairs (see summary in Table 3).

The season began poorly and by early December not a single chick had fledged in Victoria. In fact the first chick that would have fledged was mauled by an off leash Labrador only four days short of reaching flying age (this was at a beach that the birds have never bred at previously). The stable summer weather brought synchronous nesting across the coast, where most pairs re-nested in late December. There were an abundance of chicks during January and February and survival rates were high, resulting in one of the better seasons to date. Table 4 summarises fledgling production according to regions along the Victorian coast.

Table 3. Number of pairs monitored, nests found and their fate. Data for the 2012/13 is incomplete at this stage as it takes several weeks after the season ends to collate data. Estimates are included to provide an indication of the season. [Phillip Island data has not been included in this table as monitoring here is not coordinated by BirdLife Australia].

Season	Pairs monitored	Total nests	Nests fail egg	Nests Hatched	Nests fledged	<pre># confirmed fledglings</pre>	# eggs laid	# chicks hatched
2006/07	90	147	86	61	24	35	353	145
2007/08	86	157	100	57	24	32	372	140
2008/09	79	119	74	45	23	30	290	102
2009/10	103	167	96	70	43	69	386	139
2010/11	114	208	140	67	29	38	469	175
2011/12	120	224	165	51	19	24	474	94
2012/13	132					59		

Region	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
	106 pairs	100 pairs	96 pairs	119 pairs	123 pairs	137 pairs	141 pairs
Far West Vic	2	6	11	31	5	1	28
Shipwreck coast	7	3	0	4	0	1	-
Otway coast	0	1	3	0	1	0	2
Surf coast	2	4	2	2	2	2	0
Bellarine	3	3	4	4	3	2	2
Mornington Peninsula	10	6	6	7	10	3	9
Phillip Island	8	4	6	9	7	12	4
Bass Coast	4	2	4	20	17	6	10
Venus Bay (South Gippsland)	1	0	0	2	0	7	8
Lakes area, EG	2	0	0	0	-	-	-
Croajingalong (Marlo- Mallacoota)	4	7	0	1	0	-	-
Total fledglings	43	36	36	80	45	34	63
<i># fledglings per pair monitored</i>	0.41	0.36	0.38	0.67	0.37	0.25	0.45

Table 4. Number of confirmed fledglings produced by pairs in Victoria (based on data received; including additional pairs monitored by Phillip Island Nature Park) according to the different regions of the coast:

South Australia

Monitoring of breeding pairs was carried out on Yorke and Fleurieu Peninsulas in South Australia as part of the BNB project in the 2012/2013 breeding season. During the 2012/2013 season, 208 records on the Yorke Peninsula were received where 33 pairs on were surveyed on the Yorke Peninsula (15 were surveyed more than 3 times). On the Fleurieu Peninsula, 466 data records were completed for a total of 38 sites. A minimum of 169 hours of observation, data for survey times was available for 225 (48%) of the completed data sheets. Figure 5 reveals the sites that were monitored during 2012/13 on the Fleurieu Peninsula.

Table 5 shows the breakdown of visits and volunteers visiting sites on the Fleurieu Peninsula. Overall, twelve sites were well monitored, that is monitored across at least 5 months of the breeding season.

There were 6 beaches where Hooded Plovers were not sighted on any visit (Coolawang, Moana, Morgans, Middleton, O'Sullivans and Christies beaches). There were also sites where Hooded Plovers were seen during the breeding season, but no nesting attempts were detected (Aldinga, Bashams beach, Carrackalinga North, Lands End, Normanville North, Port

Stanvac, Sheepies, Tunkalilla shed caravan site). This may partly be because there was incomplete monitoring for the breeding season, with some of these sites visited across less than half the duration of the breeding season. It is possible that nests could have been missed due to the infrequency of visits at these sites. On some sites however, the birds appeared to be inconsistently present, for example on Sheepies they were seen on only 38% of visits and at Aldinga on only 30% of visits. As these birds are not banded, it is unknown whether these are the same individuals and whether they are attempting to breed at these sites or are instead using them for occasional foraging. Historically, there has been breeding at Sheepies. At Silver Sands and Coolawang, only one visit was made and the pair was detected but no breeding observed.

Table 5. Summary of visits to pairs on the Fleurieu Peninsula during the 2012/13 breeding season. Total visits and total visits (days) are presented separately as multiple visits were sometimes made on the same day by the same or different volunteers. Visits where adult birds were present are given as a percentage of total visits. Coverage refers to the proportion of the breeding season that pairs were monitored across (out of the peak 7 months where breeding usually occurs, August-February; note at some sites this extends into March-April). An asterisk depicts that insufficient data was collected to assess threats and a cross depicts insufficient data to detect breeding or breeding fate.

Pair	Visitation period (breeding season)	Total visits (days)	# Visits	Visits HP adults present	Cover- age	Main monitor/s	Additional observers
Aldinga ^{*+}	25/8/12 - 3/2/13, 13/4/13 - 19/4/13	10	10	3 (30%)	100%	Faye Lush, Joyce West	Sue and Ashley Read
Ballaparudda	13/11/12 - 27/1/13, 23/3/13	7	7	6 (86%)	43%	Elizabeth Steele-Collins	Emma Stephens, Corey Jackson
Bashams Beach	22/8/12 - 17/9/12, 10/11/12 - 28/3/13	14	14	10 (71%)	86%	Win Syson	Andrew Jeffery, Ann Turner
Callawonga*	13/11/12, 23/3/13	2	2	0	14%	Emma Stephens, Elizabeth Steele-Collins, Corey Jackson	
Carrickalinga	14/8/12 - 19/4/13	16	17	11 (65%)	100%	Wendy White	Grainne Maguire
Carrickalinga North [*]	11/11/12, 21/1/13, 17/3/13	3	3	1 (33%)	29%	Lauren Davis	Grainne Maguire
Christies Beach	21/8/12, 11/11/12, 1/2/13	3	3	0	43%	John Cobb	
Coolawang	23/11/12	1	1	1 (100%)	14%	Brenton Lush	
Hindmarsh River Mouth	6/8/12 - 5/11/12, 18/1/13 - 10/3/13	42	42	31 (74%)	86%	Andrew Jeffery	
Inman River Outlet	14/11/12 - 26/3/13	31	31	23 (74%)	57%	Ross Brittain and Janette Diment	
Lands End ⁺	30/11/12, 13/1/13 - 30/3/13	5	5	1 (20%)	43%	Bill Page, David Woollard	Emma Stephens, Corey Jackson

Pair	Visitation period (breeding season)	Total visits (days)	# Visits	Visits HP adults present	Cover- age	Main monitor/s	Additional observers
Maslin Beach	9/9/12 - 3/4/13	36	36	36 (100%)	86%	Sue and Ashley Read	Emma Stephens, Hilary Thompson, Ali Ben Kahn
Middleton	23/1/13 - 12/2/13	2	2	0	29%	Michelle Foster	
Moana Beach	13/8/12 - 22/10/12, 3/12/12 - 14/2/13	7	7	0	86%	Robert Hill	
Morgans Beach	4/8/12 - 30/3/13	15	15	0	100%	David Woollard	Bill Page, James O'Connor
Myponga Beach⁺	3/7/12 - 2/10/12	5	5	5 (100%)	43%	Michele Sawyer, Teresa Jack, Linda Stacey	
Normanville North [*]	7/9/12 - 24/10/12, 1/12/12 - 14/1/13, 1/4/13 - 4/4/13	7	7	5 (71%)	57%	Pia Pilcher	Emma Stephens
Normanville South [*]	1/8/12, 2/10/12 - 14/1/13, 1/4/13	9	9	5 (56%)	43%	Pia Pilcher	Michele Sawyer, Corey Jackson
O'Sullivans Beach	21/8/12, 11/11/12, 1/2/13	3	3	0	43%	John Cobb	
Parsons Beach	3/9/12 - 26/2/13	10	10	10 (100%)	86%	Dean Cutten	Hilary Thompson
Port Stanvac [*]	9/2/13 - 26/2/13	4	4	3 (75%)	14%	Michele Sawyer	
Port Willunga	7/8/12 - 24/4/13	53	55	50 (91%)	100%	Sue and Ashley Read, Dylan Braund	Faye Lush & Joyce West, Emma Stephens, Grainne Maguire
Sheepies beach	3/9/12 - 18/12/12, 2/2/13 - 26/2/13	8	8	3 (38%)	71%	Dean Cutten	
Shelley Beach (lady bay)*	11/11/12 - 13/3/13	14	14	9 (64%)	57%	Lauren Davis, Grainne Maguire	
Silver Sands	23/2/13	1	1	1 (100%)	14%	Faye Lush & Joyce West	
Southport	27/11/12 - 7/2/13	15	15	9 (60%)	57%	John Cobb, Sue and Ashley Read, Charles Simmons	Emma Stephens
Tunkalilla 1st alcove far east	13/3/13 - 1/4/13	2	2	0	0%	Elizabeth Steele-Collins	
Tunkalilla 3rd house east	17/12/12 - 6/4/13	7	7	6 (86%)	43%	Elizabeth Steele-Collins	
Tunkalilla far west	22/10/12 - 6/4/13	15	17	17 (100%)	71%	Elizabeth Steele-Collins	Janis Haynes
Tunkalilla first house east	21/9/12, 21/11/12 - 7/1/13, 13/3/13 - 6/4/13	8	8	6 (75%)	57%	Elizabeth Steele-Collins	Janis Haynes & Jane Robinson
Tunkalilla Heysen east	18/12/12 - 27/4/13	12	12	9 (75%)	43%	Elizabeth Steele-Collins	Terry Dennis

Pair	Visitation period (breeding season)	Total visits (days)	# Visits	Visits HP adults present	Cover- age	Main monitor/s	Additional observers
Tunkalilla mid west estuary	22/10/12, 18/12/12 - 27/4/13	12	13	11 (85%)	57%	Elizabeth Steele-Collins	Janis Haynes, Terry Dennis
Tunkalilla rocky cove far east	13/3/13	1	1	0	0%	Elizabeth Steele-Collins, Geoff Schmidt	
Tunkalilla shed caravan	21/9/12 - 22/10/12, 27/12/12 - 19/1/13, 13/3/13 - 6/4/13	7	7	4 (57%)	57%	Elizabeth Steele-Collins	Janis Haynes & Jane Robinson
Tunkalilla Tunkhead alcove	1/4/13	1	1	0	0%	Elizabeth Steele-Collins	
Tunkalilla western estuary	18/11/12 - 6/4/13	11	11	11 (100%)	57%	Elizabeth Steele-Collins	Terry Dennis
Waitpinga Beach	27/8/12, 8/10/12 - 22/4/13	18	18	13 (72%)	86%	Terry Dennis, Dean Cutten, Ali Ben Kahn	
Watsons Gap	10/11/12 - 14/4/13	24	25	25 (100%)	57%	Ann Turner, Gary Jackson	Win Syson

Figure 5. Hooded Plover monitoring sites on the Fleurieu Peninsula over the 2012/13 breeding season.



Fleurieu Peninsula 2012/2013 Survey Locations



Nesting success

Overall, there were 34 nesting attempts monitored on the Fleurieu Peninsula. This is more than in other seasons (Table 6) but relates to additional pairs being monitored, particularly at Tunkalilla. The number of fledglings is comparable to other seasons and represents a slightly higher proportion of chicks surviving of the total eggs hatching (~39%). However, it must be noted that one pair in particular at Tunkalilla accounted for 5 of the 9 fledglings produced last season, and that of the sites traditionally monitored through this project, only one of these was successful in the 2012/2013 season.

Figure 6 shows where (detected) nests were distributed across the Fleurieu Peninsula in the 2012/13 season. Most pairs had one or two nesting attempts that were detected (Table 7), with Hindmarsh River Mouth, Port Willunga and Tunkalilla western estuary each recording three nesting attempts. Maslin Beach recorded four nesting attempts, but only one of these nests successfully hatched. Table 7 summarises nesting activity of pairs according to data sheets submitted and Table 8 expands this into more detail about each nest. The earliest nests occurred in early August at the Hindmarsh river mouth and early to mid September at Port Willunga and Myponga beaches. Breeding continued well into April, particularly for pairs at Tunkalilla.

Of the 34 nests monitored, 67.6% failed during the egg stage (a loss of 53 eggs). The following causes of egg failure were suspected: fox (at Ballaparuda, 2 nests at Maslin beach), tide (Carrickalinga, Hindmarsh river, Normanville South, Shelley beach, Southport, Tunkalilla western estuary), abandonment (Maslin beach, 2 nests at Tunkalilla western estuary, Waitpinga) and avian predator (Waitpinga beach). For another 9 nests, there were no obvious clues as to cause of failure. Several unhatched/abandoned eggs were collected and dissected (see images below).

Of the 32.4% of nests that hatched, 23 chicks were observed and 9 of these chicks were confirmed as fledglings from 4 separate nesting attempts by 3 pairs. See Figure 7 for nesting attempt fates. All fledglings were from nests later in the season, with Tunkalilla far west fledging 3 chicks in late December (two of which were banded EM and DK) and 2 in April, Tunkalilla 3rd house east fledging 2 chicks in April, Tunkalilla mid west estuary fledging 1 chick in late January and Watsons Gap fledging one chick in mid January (Table 8). The latter evaded capture, despite several attempts in January by Grainne and team!

Of the 11 successfully hatched nests, 8 were actively protected via signs and/or fencing (Table 9). We had no records of failed nests with eggs where humans or dogs were implicated suggesting management is effective at reducing human-based threats. Chick fates are notoriously difficult to ascertain, with all chicks reported missing due to an unknown cause. Of the sites that fledged chicks, Watsons Gap, Tunkalilla 3rd house east and Tunkalilla mid west estuary were sites where management was implemented to improve the chances of success (see Table 9). No nest site protection was put in place at Tunkalilla far west due to the remoteness of the site and here two nests successfully fledged chicks.

Overall, an egg had a 11.8% chance of fledging a chick successfully (9 fledglings out of 76 eggs; 1.5% less than in the previous season) and a nest had a 14.7% chance of fledging at least one chick (5 nests that fledged out of 34 nests in total; 2.0% less than the previous season). In comparison to last season, while chick survival was (2.7%) higher, the rate of nests hatching was far (9.3%) lower.

Table 6. Overall summary of nests, hatching or failing at egg stage, total number of eggs and chicks observed and total chicks that fledged from the Fleurieu Peninsula during the last four breeding seasons monitored as part of BirdLife Australia's Beach-nesting Birds program.

Season	# nests	# nests hatch	# fail at egg stage	total eggs	total chicks obsv. (% of eggs)	total fledged (% of chicks)	Fledgl. /pair
2009/2010	18	9	9	49	19 (38.8%)	7 (36.8%)	0.58
(12 sites, 12 breeding pairs)							
2010/2011	36	14	22	83	26 (31.3%)	9 (34.6%)	0.47
(23 sites, 19 breeding pairs)							
2011/2012	24	10	14	60	22 (36.7%)	8 (36.4%)	0.57
(26 sites, 14 breeding pairs)							
2012/2013	34	11	23	76	23 (30.3%)	9 (39.1%)	0.45
(38 sites, 20 breeding pairs)							



Tunkalilla western estuary egg abandoned mid-December (note well formed chick inside); Heysen East single unhatched egg from a 3-egg clutch (note no sign of fertilisation or embryo development).



Figure 6. Nests found on the Fleurieu Peninsula in the 2012/13 breeding season.

Figure 7. Map of nests according to success/failure; further below are zoomed in maps of areas with multiple nests which may not be clear on the map of the whole peninsula.



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Pair	# nests	# nests managed	# nests hatch	# nests fail at egg stage	total eggs	total chicks obsv.	total fledged
Aldinga	0	0	0	0	0	0	0
Ballaparudda	2	0	0	2	4	0	0
Bashams Beach	0	0	0	0	0	0	0
Carrackalinga	1	0	0	1	3	0	0
Carrickalinga North	0	0	0	0	0	0	0
Coolawang	0	0	0	0	0	0	0
Hindmarsh River Mouth	3	2	1	2	7	2	0
Inman River Outlet	2	2	1	1	5	2	0
Lands End	0	0	0	0	0	0	0
Maslin Beach	4	4	1	3	8	1	0
Moana Beach	1	1	0	1	2	0	0
Myponga Beach	1	1	0	1	2	0	0
Normanville North	0	0	0	0	0	0	0
Normanville South	1	1	0	1	3	0	0
Parsons Beach	1	0	0	1	3	0	0
Port Stanvac	0	0	0	0	0	0	0
Port Willunga	3	3	2	1	7	5	0
Sheepies	0	0	0	0	0	0	0
Shelly Beach	2	1	0	2	2	0	0
Silver Sands	0	0	0	0	0	0	0
Southport	1	1	0	1	3	0	0
Tunkalilla 3rd house east	1	1	1	0	2	2	2
Tunkalilla Far West	2	0	2	0	6	5	5
Tunkalilla first house east	1	0	0	1	2	0	0
Tunkalilla Heysen east	1	0	1	0	3	2	0
estuary	1	0	1	0	1	1	1
Tunkalilla shed caravan	0	0	0	0	0	0	0
Tunkalilla western estuary	3	1	0	3	7	0	0
Waitpinga Beach	2	0	0	2	3	0	0
Watsons Gap	1	1	1	0	3	3	1
Total	34	18	11	23	76	23	9

Table 7. Overall summary of nests, number of nests managed, hatching or failing at egg stage, total number of eggs and chicks observed and total chicks that fledged from that site in the 2012/13 breeding season.

Table 8. Detailed summary of nest progress for each site according to data entered in the MyHoodie data portal and sent to BirdLife Australia for the 2012/13 breeding season.

Pair/location	Date	Nest update	# eggs	# chicks	Nest #
Aldinga	Aug – Feb	No nesting attempts recorded			0
Ballaparudda	13/11/2012	New nest	2		1
Ballaparudda	12/12/2012	Failed since last visit (fox)			1
Ballaparudda	18/12/2012	New nest	2		2
Ballaparudda	27/01/2013	Failed since last visit (unknown egg failure)			2
Bashams Beach	Aug-Sep, Nov-Mar	No nesting attempts recorded			0
Callawonga	Nov, Mar	No birds on territory			0
Carrickalinga	2/11/2012	New nest	3		1
Carrickalinga	6/11/2012	Failed since last visit (tide)			1
Carrickalinga Nth	Nov, Jan, Mar	No nesting attempts recorded			0
Christies Beach	Aug, Nov, Feb	No birds on territory			0
Coolawang	Nov	No nesting attempts recorded			0
Hindmarsh River Mouth	10/08/2012	Suspect nest			1
Hindmarsh River Mouth	11/08/2012	New nest	2		1
Hindmarsh River Mouth	18/08/2012	Failed since last visit (tide)			1
Hindmarsh River Mouth	2/09/2012	New nest	3		2
Hindmarsh River Mouth	5/10/2012	Chicks hatched		2	2
Hindmarsh River Mouth	11/10/2012	Chick update		1	2
Hindmarsh River Mouth	14/10/2013	Chicks failed since last visit (unknown chick failure)		0	2
Hindmarsh River Mouth	2/11/2012	New nest	2		3
Hindmarsh River Mouth	3/11/2012	Failed since last visit (unknown egg failure)			3
Inman River Outlet	14/11/2012	New nest	3		1
Inman River Outlet	16/11/2012	Failed since last visit (unknown egg failure)			1
Inman River Outlet	27/11/2012	New nest	2		2
Inman River Outlet	26/12/2012	Chicks hatched		2	2
Inman River Outlet	29/12/2012	Chick update		1	2
Inman River Outlet	14/01/2013	Chicks failed since last visit (unknown chick failure)			2
Lands End	30/03/2013	Suspect nest			1
Maslin Beach	3/10/2013	New nest	2		1
Maslin Beach	16/10/2012	Failed since last visit (abandoned)			1
Maslin Beach	23/10/2012	New nest	2		2
Maslin Beach	17/11/2012	Failed since last visit (dog or fox)			2
Maslin Beach	26/11/2012	Suspect nest			3
Maslin Beach	30/11/2012	New nest	3		3

Maslin Beach	6/12/2012	Failed since last visit (fox)			3
Maslin Beach	18/12/2012	New nest	1		4
Maslin Beach	21/01/2013	Chick hatched		1	4
Maslin Beach	30/01/2013	Chick failed since last visit (unknown chick failure)			4
Middleton Point	Jan-Feb	No birds on territory			0
Moana	9/10/2012	New nest	UC		1
Moana	22/10/2012	Failed since last visit (unknown egg failure)			1
Morgan's Beach	Aug-Feb	No birds on territory			0
Myponga	16/09/2012	Nest found	2		1
Myponga	2/10/2012	Assumed failed after 2/10/2012 (unknown egg failure)			1
Normanville North	Sep-Oct, Dec-Jan, Apr	No nesting attempts recorded			0
Normanville South	9/11/2012	New nest	3		1
Normanville South	3/12/2012	Failed since last visit (tide)			1
O'Sullivans Beach	Aug, Nov, Feb	No birds on territory			0
Parsons Beach	19/12/2012	New nest	3		1
Parsons Beach	1/11/2012	Failed since last visit (unknown egg failure)			1
Port Stanvac	Feb	No nesting attempts recorded			0
Port Willunga	14/08/2012	Scrape (no eggs)			0
Port Willunga	9/09/2012	New nest	2		1
Port Willunga	18/09/2012	Failed since last visit (unknown egg failure)			1
Port Willunga	30/09/2012	New nest	2		2
Port Willunga	5/10/2012	Nest update	3		2
Port Willunga	29/10/2012	Chicks hatched		3	2
Port Willunga	2/11/2012	Chick update (2 chicks failed, unknown failure)		1	2
Port Willunga	4/11/2012	Chick failed since last visit (unknown chick failure)			2
Port Willunga	18/11/2012	Scrape (no eggs)			3
Port Willunga	20/11/2012	New nest	3		3
Port Willunga	18/11/2012	Chicks hatched		2	3
Port Willunga	19/12/2012	Chick update (1 chick failed, unknown failure)		1	3
Port Willunga	6/01/2013	Chick failed since last visit (unknown chick failure)			3
Sheepies	4/10/2012	Scrape (no eggs)			
Shelley Beach	29/11/2012	New nest	1		1
Shelley Beach	2/12/2012	Failed since last visit (tide)			1
Shelley Beach	29/12/2012	New nest	1		2
Shelley Beach	16/01/2013	Failed since last visit (unknown egg failure)			2
Silver Sands	Feb	No nesting attempts recorded			0
Southport	21/11/2012	New nest	3		1

Southport	22/12/2012	Failed since last visit (tide)			1
Tunkalilla Far West	30/10/2012	Suspect nest			
Tunkalilla Far West	31/10/2012	Suspect nest			
Tunkalilla Far West	10/11/2012	Suspect nest or chicks	UC		
Tunkalilla Far West	12/12/2012	Chicks sighted		3	1
Tunkalilla Far West	27/12/2012	Chicks fledged		3	1
Tunkalilla Far West	19/01/2012	2 of 3 juveniles banded (DK & EM)			1
Tunkalilla Far West	19/01/2012	New nest	3		2
Tunkalilla Far West	10/02/2013	Chick hatched		1	2
Tunkalilla Far West	13/03/2013	Chick update		2	2
Tunkalilla Far West	1/04/2013	Fledged		2	2
Tunkalilla western estuary	18/11/2012	New nest	1		1
Tunkalilla western estuary	12/12/2012	Assumed nest failed (unknown egg failure; dissected egg and found 3/4 advanced chick inside, suspect abandonment)			1
Tunkalilla western estuary	12/12/2012	New nest	3		2
Tunkalilla western estuary	18/12/2012	Nest failed (abandoned)			2
Tunkalilla western estuary	7/01/2013	Suspect nest			
Tunkalilla western estuary	19/01/2013	New nest	3		3
Tunkalilla western estuary	10/02/2013	Nest failed (tide/abandoned)			3
Tunkalilla mid west estuary	18/12/2012	Suspect chicks			1
Tunkalilla mid west estuary	27/12/2012	Chick hatched		1	1
Tunkalilla mid west estuary	27/01/2013	Fledged		1	1
Tunkalilla first house east	18/12/2012	New nest	2		1
Tunkalilla first house east	27/12/2012	Nest failed (unknown egg failure)			
Tunkalilla shed caravan	Sep – Oct, Dec – Jan, Mar - Apr	No nesting attempts recorded			
Tunkalilla 3rd house east	3/02/2013	New nest	1		1
Tunkalilla 3rd house east	1/04/2013	Chicks hatched		2	1
Tunkalilla 3rd house east	6/04/2013	Fledged		2	1
Tunkalilla Heysen east	18/12/2012	New nest	3		1
Tunkalilla Heysen east	13/01/2013	Chicks hatched		2	1
Tunkalilla Heysen east	19/01/2013	Chick failed since last visit (unknown chick failure)			1
Tunkalilla 1st alcove far east	Mar – Apr	No birds on territory			
Tunkalilla rocky cove far east	Mar	No birds on territory			
Tunkalilla Tunkhead alcove	Apr	No birds on territory			
Waitpinga	22/10/2012	Scrape			
Waitpinga	10/11/2012	New nest	1		1
Waitpinga	18/11/2012	Nest failed (abandoned)			1

Waitpinga	11/01/2013	New nest	2		2
Waitpinga	16/01/2013	Nest failed (predation by gull or raven)			2
Watsons Gap	10/11/2012	New nest	2		1
Watsons Gap	14/11/2012	Nest update	3		1
Watsons Gap	9/12/2012	Chicks hatched		2	1
Watsons Gap	10/12/2012	Chick update		3	1
Watsons Gap	20/12/2012	Chick update		2	1
Watsons Gap	28/12/2012	Chick update		1	1
Watsons Gap	15/01/2013	Chick fledged		1	1

Table 9. Summary of managements across sites during the 2012/13 breeding season. An asterisk denotes nests that were never located and here an assumption of the number of eggs was made (based on the number of chicks sighted; if no chicks sighted eggs were assumed to be clutches of 2).

Site	date found	egg #	Chick(s) sighted	chick #	fledge #	Nest location	cause of failure?	Nest mgmt	chick mgmt
Ballaparudda	13/11/12	2				beach	fox	none	
Ballaparudda	18/12/12	2				foredune/face	unknown	none	
Carrickalinga	2/11/12	3				beach	tide	none	
Hindmarsh River Mouth	11/08/12	2				beach	tide	sign access	
Hindmarsh River Mouth	02/09/12	3	5/10/2012	2	0	beach	unknown (chick)	sign access, sign nest	
Hindmarsh River Mouth	2/11/12	2				unknown	unknown	none	
Inman River Outlet	14/11/12	3				beach	unknown	sign access	
Inman River Outlet	27/11/12	2	26/12/2012	2	0	beach	unknown (chick)	sign access, sign nest, rope fence	
Maslin Beach	03/10/13	2				dune face	abandoned	sign access, sign nest, rope fence	
Maslin Beach	23/10/12	2				dune	dog or fox	sign access, sign nest, rope fence	
Maslin Beach	30/11/12	3				foredune/face	fox	sign access, sign nest, rope fence	
Maslin Beach	18/12/12	2	21/01/2013	1	0	foredune/face	unknown (chick)	sign access, sign nest, rope fence	
Moana	09/10/12	2*				foredune/face	unknown	sign access, sign nest, rope fence	
Myponga	16/09/12	2				beach	unknown	sign access, sign nest, rope fence	

Site	date found	egg #	Chick(s) sighted	chick #	fledge #	Nest location	cause of failure?	Nest mgmt	chick mgmt
Normanville South	09/11/12	3				estuary/spit	tide	sign access, rope fence	
Parsons Beach	19/12/12	3				beach	unknown	none	
Port Willunga	09/09/12	2				foredune/face	unknown	sign access, sign nest, rope fence	
Port Willunga	30/09/12	3	29/10/2012	3	0	beach	unknown (chick)	sign access, sign nest, rope fence	
Port Willunga	20/11/12	2	18/11/2012	2	0	beach	unknown (chick)	sign access, sign nest, rope fence	
Shelley Beach	29/11/12	1				beach	tide	none	
Shelley Beach	29/12/12	1				beach	unknown	sign access, sign nest, rope fence	
Southport	21/11/12	3				estuary/spit	tide	sign access, sign nest, rope fence	
Tunkalilla Far West	10/11/12	3*	12/12/2012	3	3	unknown		none	
Tunkalilla Far West	19/01/12	3	10/02/2013	2	2	beach		none	
Tunkalilla western estuary	18/11/12	1				dune		none	
Tunkalilla western estuary	12/12/12	3				beach	abandoned	none	
Tunkalilla western estuary	19/01/13	3				beach	tide/abandoned	sign nest	
Tunkalilla mid west estuary	27/12/12	1*	27/12/2012	1	1	unknown		none	sign access, sign chick location
Tunkalilla first house east	18/12/12	2				foredune/face	unknown	none	
Tunkalilla 3rd house east	3/02/13	2	1/04/2013	2	2	unknown		sign access, sign nest	sign access
Tunkalilla Heysen east	18/12/12	3	13/01/2013	2	0	foredune/face		none	sign access, sign chick location
Waitpinga	10/11/12	1				beach	abandoned	none	
Waitpinga	11/01/13	2				beach	predation (gull or raven)	none	
Watsons Gap	10/11/12	3	9/12/2012	2	1	foredune/face		sign access, sign nest, rope fence	

Threats to breeding pairs

A total of 250 threat assessments were available for 25 sites and used to compile the tables below (Tables 10-14). Sites with less than four threat assessments were not included in any summary tables; Aldinga, Callawonga, Carrickalinga North, Normanville North, Normanville South, Middleton, Port Stanvac, Shelley Beach (lady bay). Sites with infrequent threat assessments (>4 assessments) are denoted by an asterisk in Table 13; Carrickalinga, Christies Beach, Lands End, Moana Beach, Myponga Beach, O'Sullivans Beach, Sheepies Beach, Tunkalilla 3rd house east, Tunkalilla first house east, Tunkalilla shed caravan. Accordingly, this data should be treated with caution due to the small sample sizes. A focus for the 2013/14 breeding season will be on increasing the number of threat assessments completed at each site, as only 57.1% (n=466) of data sheets/portal entries contained threat data.

Of the potential threats to Hooded Plovers monitored by volunteers during the breeding season, people, dogs off lead and silver gulls were most prevalent at sites on the Fleurieu (Table 10). Evidence of foxes was also commonly seen, whereas, dogs on lead, ravens, magpies and evidence of cattle were present on 10% or fewer visits. There was a bug with the data portal during its first season of use that prevented dog print data being recorded. In previous reports, evidence of dog prints has always been documented as a high occurrence.

Threat	Prop. visits present (total visits = 250)
Evidence of people (prints &/or sightings)	84.0% (210)
People sighted	68.8% (172)
Silver gulls	54.4% (136)
Dogs sighted	43.2% (108)
Dogs off lead	40.8% (102)
Foxes	29.6% (74)
Pacific gulls	19.6% (49)
Vehicles (all vehicle types)	15.6% (39)
Bird of Prey	10.4% (26)
Magpies	10.0% (25)
Cattle	8.0% (20)
Dogs on lead	7.2% (18)
Ravens	6.8% (17)
Horses	0.4% (1)

Table 10. Proportion of visits where threats were observed (this includes evidence of tracks unless specified).

Table 11 provides a summary of the proportion of sites where given threats were observed. Compared to last year people and footprints are detected at a lower proportion of sites, but this is due to several very remote sites being monitored for the first time in the 2012/13 breeding season (e.g. Ballaparudda, Sheepies and parts of Tunkalilla). Cattle were present at Tunkalilla sites and Ballaparudda, roaming onto the beach due to unrepaired fences. Vehicles on the otherhand were present at more sites, again related to the additional sites monitored in the 2012/13 season (e.g. O'Sullivans, Christies, etc). Foxes, magpies and birds of prey were detected at more sites, and dogs on lead were least prevalent.

Threat	Prop sites present (25)	Detected at:	Not detected at:
Footprints	92%		Ballaparudda, Sheepies
People	88%		Ballaparudda, Sheepies, Tunkalilla shed caravan
Silver gulls	88%		Lands End, Sheepies, Tunkalilla 3 rd house east
Dogs sighted	84%		Ballaparudda, Lands End, Sheepies, Waitpinga
Dogs off	84%		Ballaparudda, Lands End, Sheepies, Waitpinga
Vehicles	60%	Christies, Maslin, Moana, Morgan's, Myponga, O'Sullivans, Sheepies, Southport, all Tunkalilla sites	
Pacific gulls	56%		Ballaparudda, Carrickalinga, Hindmarsh River, Lands End, Maslin, Myponga, O'Sullivans, Sheepies, Tunkalilla first house east, Tunkalilla mid west estuary, Watsons Gap
Foxes	52%	Ballaparudda, Lands End, Parsons, Port Willunga, Sheepies, all Tunkalilla sites, Waitpinga	
Ravens	44%	Ballaparudda, Bashams, Carrickalinga, Inman River, Lands End, Maslin, Parsons, Port Willunga, Tunkalilla far west, Tunkalilla western estuary, Waitpinga	
Magpies	44%	Ballaparudda, Bashams, Port Willunga, all Tunkalilla sites, Waitpinga	

Table 11. Proportion of sites where threats were observed (sites are named in abbreviated form). Tracks and prints are included as evidence of threats, unless categorised separately.

Threat	Prop sites present (25)	Detected at:	Not detected at:
Birds of Prey	44%	Ballaparudda, Inman River, Maslin, Myponga, Parsons, Port Willunga, Southport, Tunkalilla far west, Tunkalilla Heysen east, Waitpinga, Watsons Gap	
Cattle	32%	all Tunkalilla sites, Ballaparudda	
Dogs on	20%	Christies, O'Sullivans, Port Willunga, Southport, Watsons Gap	
Horses	4%	Maslin	



Cattle roaming beyond broken fences onto beach, in the dunes and around the estuaries at Tunkalilla beach. Photos courtesy Elizabeth Steele-Collins.

Table 12 summarises the activities that recreationists were observed participating in. Table 13 reveals that there were distinct differences in the visitor base for sites and this can assist in tailoring and distributing awareness raising materials at the identified key stakeholder groups. Table 13 further summarises the prevalence and intensity of threats at each site separately revealing that sites have distinct threat profiles and can differ radically from one another. At some sites, predators are the main concern, while at others dogs off lead, people and vehicles dominate the threat profile.

Table 12. The main activities people were observed using the beaches for. In total, there were 1,493 people at the water's edge, 288 on the beach, 2 observed inside signed/fenced areas and 80 in the dune.

Human recreational activity (of 1,863 people observed)	% intensity
Walking	47.3% (882)
Dog walking	22.4% (417)
Surfing/swimming	13.3% (247)
Sitting/sun-baking	8.6% (161)
Fishing	4.3% (81)
Driving/using vehicles	2.8% (53)
People playing games	1.2% (22)

Table 13. The prevalence of potential threats to Hooded Plover at sites monitored (those with an asterisk have so few threat assessments, data should be treated with caution). Prevalence refers to the how frequently that threat was observed (# times/# visits). Threat prevalence is categorised as heavy, moderate, sparse or rare according to the percentage of time recorded. Common activity is derived from observations of the most common recreational activities at sites.

Site (number of threat assessments)	Heavy threats (>50%)	Moderate threats (20- 50)	Sparse threats (<20%)	Rare threats (<6%)	Common activity
Ballaparudda (7)	Silver gulls, evidence of foxes	Birds of prey, magpies	Ravens, evidence of cattle		Dog walk, walk, fish
Bashams Beach (11)	People, silver gulls, dogs off		Ravens, pacific gulls, magpies		-
Carrickalinga (5)*	People	Dogs off, ravens, silver gulls			Walk, sit/sunbake, dog walk
Christies Beach (4)*	Dogs off, dogs on, people, silver gulls, pacific gulls	Evidence of vehicles			Walk, surf/swim, dog walk
Hindmarsh River Mouth (10)	People, dogs off, silver gulls				Walk, dog walk
Inman River Outlet (31)	People, silver gulls	Dogs off	Pacific gulls, Birds of prey	Ravens	Dog walk, walk, play games
Lands End (5)*	Evidence of people	Evidence of foxes	Ravens		Walk

Site (number of threat assessments)	Heavy threats (>50%)	Moderate threats (20- 50)	Sparse threats (<20%)	Rare threats (<6%)	Common activity
Maslin Beach (18)	People, dogs off		Silver gulls, birds of prey	Ravens, evidence of vehicles, evidence of horses	Walk, dog walk, fish
Moana Beach (5)*	Dogs off, people, pacific gulls, silver gulls	Evidence of vehicles			Dog walk, walk, drive
Morgan's beach (15)	People, silver gulls, evidence of vehicles	Dogs off, pacific gulls			Sit/sunbake, drive
Myponga Beach (4)*	People, silver gulls, evidence of vehicles	Dogs off, birds of prey			Walk, dog walk, play games
O'Sullivans Beach (4)*	Dogs off, silver gulls, people	Dogs on, evidence of vehicles			Walk, dog walk, sit/sunbake
Parsons Beach (9)	Silver gulls	People, birds of prey, ravens, silver gulls, evidence of foxes	Dogs off		Fish, dog walk, walk
Port Willunga (41)	People, dogs off	Silver gulls	Dogs on, pacific gulls, birds of prey	Ravens, magpies, evidence of foxes	Walk, dog walk, surf/swim
Sheepies beach (4)*		Evidence of fox prints	Evidence of vehicles		drive
Southport (9)	People, silver gulls, dogs on, dogs off, evidence of vehicles	Pacific gulls	Birds of prey		Surf/swim, sit/sunbake, walk
Tunkalilla 3rd house east (5)*	People, pacific gulls, evidence of foxes	Dogs off, magpies, evidence of vehicles, evidence of cattle			Walk, dog walk
Tunkalilla far west (10)	Silver gulls, pacific gulls, evidence of foxes	People, magpies, ravens, evidence of cattle, evidence of vehicles	Dogs off, birds of prey		Walk, dog walk, surf/swim
Tunkalilla first house east (5)*	People, silver gulls, evidence of foxes	Dogs off, magpies, evidence of vehicles, evidence of cattle			Walk, surf/swim, dog walk

Site (number of threat assessments)	Heavy threats (>50%)	Moderate threats (20- 50)	Sparse threats (<20%)	Rare threats (<6%)	Common activity
Tunkalilla Heysen east (11)	People, evidence of foxes	Silver gulls, magpies, pacific gulls, birds of prey			Walk, dog walk
Tunkalilla mid west estuary (8)	People, evidence of foxes	Dogs off, silver gulls, evidence of cattle	Magpies, evidence of vehicles		Walk, surf/swim
Tunkalilla shed caravan (4)*	Evidence of foxes	Silver gulls, magpies, dogs off, pacific gulls, evidence of people, evidence of cattle, evidence of vehicles			-
Tunkalilla western estuary (11)	People, evidence of foxes	Pacific gulls, magpies, silver gulls, evidence of cattle	Dogs off, ravens, evidence of vehicles		Walk, surf/swim, dog walk
Waitpinga Beach (8)	People, evidence of foxes	Ravens, magpies, pacific gulls	Birds of prey		Fish, surf/swim
Watsons Gap (6)	People	Dogs off, dogs on, silver gulls, birds of prey			Dog walk, surf/swim, walk



Hooded Plovers in flight. Photo courtesy Glenn Ehmke.

Table 14 provides the average number of people, and dogs on and off lead sighted. Sites where large numbers of people have been sighted have had few visits, so that this high use is likely to be temporally biased. At all sites with the exception of Southport, dogs off lead outnumber dogs on lead, but at some sites this difference is less extreme, e.g. Myponga beach. At Watsons Gap, dogs off lead are eight times more prevalent than dogs on lead, and at Port Willunga, dogs off lead are four times more prevalent than dogs on lead.

Site (number of assessments)	Number of people	Number dogs off lead	Number dogs on lead
Ballaparudda (7)	0	0	0
Bashams Beach (11)	3.73 ± 1.07	2.27 ± 2.72	0.91 ± 0.12
Carrickalinga (5)*	2.80 ± 1.36	0.60 ± 0.27	0.40 ± 0.11
Christies Beach (4)*	77.25 ± 43.35	2.50 ± 0.92	2.00 ± 0.50
Hindmarsh River Mouth (10)	3.50 ± 1.22	1.60 ± 0.22	0
Inman River Outlet (31)	3.16 ± 0.79	0.94 ± 0.05	0.48 ± 0.03
Lands End (5)*	0.60 ± 0.60	0	0
Maslin Beach (18)	6.67 ± 1.25	1.67 ± 0.11	0.50 ± 0.05
Moana Beach (5)*	4.00 ± 0.63	2.00 ± 0.24	0.60 ± 0.11
Morgan's beach (15)	8.67 ± 3.79	1.47 ± 0.19	0
Myponga Beach (4)*	4.25 ± 1.44	0.75 ± 0.13	0.50 ± 0.25
O'Sullivans Beach (4)*	19.25 ± 15.59	12.50 ± 2.63	0.50 ± 0.25
Parsons Beach (9)	1.78 ± 1.42	0.56 ± 0.19	0
Port Willunga (41)	9.61 ± 1.45	3.73 ± 0.10	0.78 ± 0.04
Sheepies beach (4)*	0	0	0
Southport (9)	22.00 ± 4.98	1.33 ± 0.19	1.67 ± 0.22
Tunkalilla 3rd house east (5)*	4.40 ± 1.17	0.80 ± 0.22	0
Tunkalilla far west (10)	1.50 ± 0.64	0.30 ± 0.09	0
Tunkalilla first house east (5)*	14.40 ± 7.91	1.60 ± 0.52	0
Tunkalilla Heysen east (11)	3.82 ± 1.03	0.36 ± 0.08	0
Tunkalilla mid west estuary (8)	10.00 ± 4.47	0.75 ± 0.19	0
Tunkalilla shed caravan (4)*	0	1.50 ± 0.75	0
Tunkalilla western estuary (11)	2.73 ± 0.85	0.09 ± 0.03	0
Waitpinga Beach (8)	6.00 ± 1.83	0	0
Watsons Gap (6)	4.83 ± 3.08	2.67 ± 0.93	0.33 ± 0.09

Table 14. Mean (± standard error) number of people and dogs on and off leash observed at sites. Sites with an asterisk have too few threat assessments to provide accurate data.

Site Management and Awareness Raising activities during 2012/13

In the 2012/13 breeding season, the following management and community engagement activities were carried out:

Management:

- The Hooded Plover Council Response Plans continue to guide the step by step process of management once a nest is found.
- Permanent signs at access points.
- Temporary fencing and signage around nests and chicks.
- Temporary signs communicating nest failure or chick hatching success.
- The 12 fencing and 12 signage kits distributed across the Fleurieu enable management to occur in an efficient manner.
- Chick banners are now available for use where required.
- 6 new volunteers joined the monitoring program over the 2011/12 season. There are now 36 volunteers monitoring 22 pairs across the Fleurieu.
- 3 attempts to install nest camera at Maslin Beach (1st attempt, Hooded Plovers took too long to return to nest so camera removed, 2nd attempt it was raining, 3rd attempt nest had failed during the previous night).
- All permits and approvals are in place for capture and banding of Hooded Plovers on the Fleurieu Peninsula by Grainne Maguire. An additional 12 birds were flagged in January 2013. Grainne also provided further Portal training to volunteers during this visit.

Volunteer and Community Engagement:

- In October, BirdLife Australia brought 17 volunteers together to run through how the program has evolved so far and to provide data portal training. Volunteers adopted using the new online data portal system with great success and were one of the regions with the highest portal use, indicating a strong presence on the beaches and also a dedication to collecting and submitting data that is a key contributor to adaptive management of the species.
- In October, BirdLife staff also attended the AWSG shorebird conference held in Adelaide and spread awareness of the Hooded Plover recovery efforts and latest research findings. A workshop was held at Thompsons beach to raise awareness about Red-capped Plovers and their reliance on the saltmarshes, salt pans, wetlands and beaches of the Samphire Coast. In January, a return visit saw broader awareness raising carried out at the Semaphore caravan park and

Adelaide Dolphin Day to engage families in craft activities targeted at education about the value of the coast to resident shorebirds.

- To finalise the breeding season and to put all the work of the past few years in perspective, an Eastern Mainland Hooded Plover recovery meeting was held at Queenscliff over two days in mid June. Nine representatives from the AMLR's Hooded Plover program attended (5 of which were sponsored by the AMLR Board to attend). On day one, information was shared from around Australia on resident shorebird and seabird management, followed by excursions to local shorebird sites. Day 2 consisted of practical workshops to build capacity of volunteers in areas such as talking to the public, education, shorebird identification and innovative ways to raise awareness.
- The "Beyond" development at Port Elliot were provided with information about the nest and subsequent chick and Watsons Gap Port Elliot. Information provided was distributed to all residents and put on the AMLR Facebook page.
- Emma Stephens presented to the NRM Board's Coastal Ambassadors program on beach nesting birds, focusing on the Hooded Plover.
- 1000 BirdLife Australia "dogs and leashes, birds and beaches" brochures supplied to City of Onkaparinga for the "Paws on the Shores" event at Moana.
- Emma Stephens presented to Gleeson College students about Hooded Plovers students were on a camp focusing on the coastal environment.
- NRM "Walk and Talk" event at Cape Jervis where both Emma and volunteers David and Bill provided information on the Hooded Plovers at Lands End. More than 70 people attended the event.
- Hooded Plover banding featured in the NRM Local Government E-News and the District Council of Yankalilla's magazine.
- The Hooded Plover volunteers won the City of Onkaparinga Environment group award in 2013.

Hooded Plover leg flagging on the Fleurieu Peninsula

Twelve Hooded Plovers (10 adults and 2 juveniles) were captured and banded in January 2013 (see Figure 8). This makes a total of 14 Hooded Plovers that now have leg flags on the Fleurieu. Below Table 15 summarises in more detail where banding has occurred so far on the Fleurieu. More banding is planned for September 2013 and the summer of 2014.

We rely on reportings of these birds once they have been flagged in order to build up a 'history' for each flagged individual and learn about its movements, breeding partner/s and longevity. It is very early days in terms of records of these new banded birds, but already we have detected:

- Movement of juvenile DK from Tunkalilla (banded 19th Jan 2013) to Bashams beach, Port Elliot (26th Jan 2013)! Since then, DK has been seen at Hindmarsh river outlet, Parsons and Waitpinga, and just recently at Maslin beach!
- Carrickalinga Estuary birds CK and LP are still present at this site, with a third unbanded bird.
- One of the long-term breeding pair, MX, at Maslin beach disappeared at the end of the 2013 breeding season and has not been seen since. It is likely that this bird died (we do not know how old it was as it was captured as an adult, but it may have been at this site for many years). It has now been replaced by NA from Carrackalinga North.
- NA was originally captured with AR at Carrackalinga North. AR is now with an unbanded bird, using the far southern end of Maslin beach.





CK (bird on left) and BX (bird on right). Photos courtesy Grainne Maguire.

Figure 8. Hooded Plovers flagged during January 2013.



Fleurieu Peninsula 2012/2013 Flagging Sites



Beach	Date	Age	Right tarsus	Right tibia	Left tibia	notes on breeding status	partner or parent
Maslin Beach,							
SA	8/05/2012	Adult	metal	MX		non-breeding	Partner=unb
Myponga							
Beach	8/05/2012	Adult	metal	EY		non-breeding	Partner=unb
Watsons Gap							partner unb (on
estuary	18/01/2013	Adult	metal	AU		with recently fledged chick	20/1/13 banded as BX)
Parsons Beach (far SW							
end)	18/01/2013	Adult	metal	CL		not nesting	partner EV
Parsons							
Beach (far SW							
end)	18/01/2013	Adult	metal		EV	not nesting	partner CL
Waitpinga							
Beach (E end)	18/01/2013	Adult	metal	KJ		not nesting (recent failure)	partner unb
Tunkalilla						1 of 3 chicks that fledged	
Beach 3 rd				514		from Tunkalilla far western	
house east	19/01/2013	Juvenile	metal	DK		end	sibling of EM
Tunkalilla						1 of 3 chicks that fledged	
Beach 3.	10/01/2012	Juniopilo	motol			from Tunkallia far Western	sibling of DK
Notecne Con	19/01/2013	Juvenne	metai	EM		end	
	20/01/2012	A duit	motal		BV	dave age)	partner All
Carrackalinga	20/01/2013	Auuit	metai		DA	with 2 other adults	unknown caught with
estuary	21/01/2013	Adult	motal	CK		agression no nesting	
Carrackalinga	21/01/2013	Addit	metai	CIX		with 2 other adults	unknown caught with
estuary	21/01/2013	Adult	metal		IP	aggression, no nesting	CK
Carrackalinga	, 。_,	,					
North (N end)	22/01/2013	Adult	metal	NA		not nesting	partner AR
Carrackalinga	, ,					2	
North (N end)	22/01/2013	Adult	metal		AR	not nesting	partner NA
Snapper Point (Pt Willunga end)	22/01/2013	Adult	metal	HV		Port Willunga pair, not nesting, recent failure	partner unb

Table 15. A summary of leg flagged Hooded Plovers captured and banded on the Fleurieu Peninsula. All birds were captured using a noose carpet.

Roles of each participating group in the coming breeding season:

BirdLife Australia:

- Coordinate eastern mainland Hooded Plover recovery program.
- Implementation of the online data portal including training sessions.
- Hooded Plover banding and maintain resighting database.
- Workshops to build knowledge and skill sets of new and existing volunteers.
- Provide technical advice as needed.
- On-site liaisons with volunteers.
- Red-capped Plover workshops for staff and volunteers.
- Community awareness via development of new materials and activities for engaging the broader community.
- Connect Fleurieu program with other regions across SA active in Hooded Plover conservation and monitoring.

NRM Board:

- Continued support of volunteers from NRM Coast, Estuary and Marine Officers.
- Visit volunteers to provide on-site training relevant to their sites.
- Actively engage new volunteers for sites not being monitored, and to provide additional support at sites currently being monitored.
- Expansion of project and on-ground works (continue to trial nest cameras to detect and identify nest predators and to determine nest fates).
- Funding support and resourcing of program equipment (signage and fencing kits etc)
- Community awareness efforts, e.g. media, events, targeting local schools or community centres.
- Continue to work with DEWNR, Local councils and other project partners.

DEWNR:

- Oversee and administer the Hooded Plover Recovery Plan for South Australia (currently still in draft form, awaiting Ministerial approval).
- Assisting with policy and planning changes, e.g. Dog and Cat Management Plan.
- Threatened species officers providing technical advice and support (i.e. assistance with formulating council response plans, etc).

Local councils, including City of Onkaparinga, District Council of Yankalilla, City of Victor Harbor and Alexandrina Council.

- Council staff support for site management, fencing and signage.
- Enforcement of beach & dog regulations.
- Council support for awareness raising activities.

Volunteers:

- Monitoring pairs at nominated sites.
- Collecting data and entering sightings onto the online data portal (e.g. for each nest keeping records that follow through the fate of a nest; recording threats at sites; noting when birds were absent).
- Liaising with and assisting NRM/Council staff with installing fences/signs.
- The potential to liaise with the public when visiting the birds.
- Attending training events.
- Letting us know about your needs and sharing ideas/concerns about conservation of the species.

Acknowledgements

The volunteers are the people who spend hours on the beach collecting all of this information, braving all kinds of weather and human encounters, and feeling all the highs and lows their pair of birds experience. Sincerest thanks to everyone for their efforts and also for their patience when it comes to recognising that some changes to conservation management can take a long time to come about. The data collected is invaluable and helps us put into perspective how threatened each pair is and to adapt our managements to suit sites better. It also will help in future with any proposed planning or changes to regulations: statistics lend great weight to our submissions and recommendations.

An enormous thanks to Emma Stephens who is the coordinator of the Hooded Plover efforts which take place on the Fleurieu Peninsula, to Corey Jackson and Emma for their site visits and assistance with site management, and to Tony Flaherty and the Adelaide and Mount Lofty Ranges NRM Board for their support and for recognising the importance of coastal biodiversity. Special thanks to the councils and rangers involved for protecting nesting sites and supporting the project: City of Onkaparinga, District Council of Yankalilla, DEWNR (Newland Head Conservation Park - National Parks and Wildlife SA), City of Victor Harbor and Alexandrina Council.

Sincere thanks to Keith Johnson, Emily McLeod, April Bergsma, Shannon Woodcock, Keesan (Kit) Lee and Kerri-Anne Hempshall for assisting with data entry at the BirdLife Australia National Office.

This project receives financial support from the Australian Government's Caring for our Country and Adelaide and Mount Lofty Ranges NRM Board.