

***‘PROMOTING COEXISTENCE BETWEEN
RECREATIONISTS AND BEACH-NESTING
BIRDS’ PROJECT***

**MONITORING HOODED PLOVER BREEDING
SUCCESS ON THE FLEURIEU PENINSULA,
AUGUST 2009-APRIL 2010**



Photo by Glenn Ehmke: Adult Hooded Plover and 4 week old chick

**Report by Grainne Maguire, Project Manager, Birds Australia
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Birds Australia
CONSERVATION THROUGH KNOWLEDGE



**Government
of South Australia**

Adelaide and
Mount Lofty Ranges
Natural Resources
Management Board

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. 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 red-capped plover can also breed around wetlands, and exhibits more aggressive nest defense behaviour by swooping people that approach the nest. 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 harms 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.

Given the severe pressures placed on coastal breeding birds, in particular the threatened status of the Hooded Plover, Birds 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 encourage sustainable beach recreation that is sensitive to the animals that inhabit those beaches.

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:

1. 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 and South Australia 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). Try to maintain monitoring of these sites over at least 5 years for a comparison of site-based threat profiles and to try to detect 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 managers of foreshore, beach above high-tide mark, beach below high-tide mark; identify full suite of management regulations for sites in relation to access, dog, horse, camping and vehicle restrictions; assess vulnerability to climate change; 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.
10. Trial nest cameras to detect and identify nest predators and to determine nest fates. With large enough sample sizes, predation risk could be compared across habitat types and the probability of predation compared to the density of predators at sites.
11. Assess success of managements and make modifications for subsequent seasons. Managements need to adapt to local site and beach user specifications.

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

- Birds Australia Staff provide advice, workshops, training and technical support, as well as data analysis and maintenance of a national database.
- On the Fleurieu peninsula, AMLR NRM Board officers support the project and volunteers, and local council and Department for Environment and Heritage 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.

An overview of the 2009-2010 Breeding Season

Victoria

The BNB project has been running since 2006 in Victoria, with the breeding success and threats present at breeding sites monitored by Birds Australia volunteers over 4 successive breeding seasons for up to 98 pairs.

This season was the best breeding season to date! Not only were we fortunate to monitor and manage more nests, but we also saw incredibly high breeding success in two areas on the Victorian Coast, the Bass Coast and the far West (between Warrnambool and Port Fairy), bringing the state's total of fledged young to 78 for the 115 pairs monitored (0.68 chicks/pair). This increased success is a combination of less severe tides experienced in the far West, together with the cumulative benefit that community awareness and management over 4 seasons has generated.

Below are summary tables of breeding success over the four successive breeding seasons:

Table 1. Breakdown of number of pairs monitored, nests found and their fate. Data for the 2009/10 is incomplete at this stage due to a later breeding season than usual (extending into late April).

Season	Pairs monitored	Total nests	Nests failed egg	Nests hatched	Nests fledged	# fledglings	# 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	98	-	-	-	-	69	-	-

Table 2. Number of fledglings produced by pairs in Victoria (including additional pairs monitored by Phillip Island Nature Park) according to the different regions of the coast:

Region	2006/07 106 pairs	2007/08 100 pairs	2008/09 96 pairs	2009/10 115 pairs
Far West Vic	2	6	11	30
Shipwreck coast	7	3	0	4
Otway coast	0	1	3	0
Surf coast	2	4	2	2
Bellarine	3	3	4	4
Mornington Peninsula	10	6	6	7
Phillip Island	8	4	6	9
Bass Coast	4	2	4	18
Venus Bay	1	0	0	3
Lakes area, EG	2	0	0	0
Croajingalong (Marlo-Mallacoota)	4	7	0	1
<i>Total fledglings</i>	43	36	36	78
<i># chicks per pair monitored</i>	0.41	0.36	0.38	0.68

Over the 4 seasons, there have been 6511 data submissions made to Birds Australia by volunteers visiting their designated Hooded Plover pair/s in Victoria, providing a wealth of information on the nesting progress of pairs and the threats they experienced throughout the season. This enables us to have a rigorous data set where threat profiles can be generated for sites and we can make meaningful comparisons across the coast of the range and intensity of threats experienced by pairs. This data allows us to add statistical values to documents such as submissions for/against proposed developments or changes to policy/regulations at sites. For example, we can pinpoint areas with the highest non-compliance with dog regulations and detect changes over time with management effort, allowing us to recommend strategies for improving compliance and in cases where changes to regulations are proposed, to support or oppose these changes.

South Australia

Monitoring of breeding pairs was carried out on two (Eyre and Fleurieu) Peninsulas of the South Australian coast as part of the BNB project in the 2009/10 breeding season. 183 data submissions have been sent to Birds Australia so far for a total of 12 pairs on the Fleurieu and 4 pairs on Eyre. Table 3 shows the breakdown of visits and volunteers visiting sites on the Fleurieu Peninsula, of which sufficient data was collected for 9 of the 12 pairs that were visited regularly across the breeding season. The AMLR NRM Coast Estuary and Marine officers also carried out many visits through their role facilitating and supporting volunteers, and implementing nest site protection.

Table 3. Visits to pairs on the Fleurieu Peninsula during the 2009/10 breeding season, visits when the pair were present and names of monitors (as taken from data sheets submitted). 164 data submissions were made from the Fleurieu Peninsula. An asterisk depicts that insufficient data was collected to assess threats and/or certainty of breeding success.

Pair	Visitation period	Total visits	Visits pres.	Main monitor	Additional observers
Bashams beach, Port Elliot	17/09/09 – 21/12/09	12	9	Winston Syson	
Carrickalinga	10/10/09 – 1/03/10	6	5	Corey Jackson, Emma Stephens	Caroline Taylor, Sheryn Pitman
Normanville *	31/12/09 – 4/01/10	3	3	Sophie Piron, Corey Jackson	
Coolawang Beach *		1	0	Two new volunteers started at the end of the breeding season, Faye Lush and Julie Turner.	Emma Stephens, Brenton Lush
Hindmarsh River outlet, Victor Harbor	14/09/09 – 11/03/10	15	13	Andrew Jeffrey	Emma Stephens
Inman River outlet, Kent Reserve, Victor Harbor	1/07/09 – 21/3/10	27	27	Verle Wood, Ross Brittain, Terry and Helen Dennis	Janette Diment, Dean Cutten, Michelle and Jerry Foster, Emma Stephens
Maslin Beach	9/09/09 – 26/04/10	36	35	Ashley and Sue Read	Emma Stephens
Morgans Beach	11/12/09 – 23/01/10	5	3	Bill Page, Corey Jackson	
Myponga Beach *	14/10/09 – 1/02/10	6	6	Linda Stacey and friend	
Parsons Beach	1/10/09 - 19/03/10	9	6	Dean Cutten	
Port Willunga	4/10/09 - 19/04/10	31	25	Ashley Read, Emma Stephens, Ian Freney	Giles Walkley, Jock Conlon, Nikola Vollmer, Heather Browett, Jason Tyndall, Sharon Gillam
Watsons Gap, Port Elliot	21/08/09 – 10/12/09	13	12	Ann Turner	John Turner, Emma Stephens, Kerri Bartley



Figure 1. Hooded Plover monitoring sites on the Fleurieu Peninsula over the 2009/10 breeding season.

Overall, there were 18 nesting attempts monitored on the Fleurieu Peninsula. Most pairs had between one and two nesting attempts that were detected. Table 4 summaries nesting activity of pairs according to data sheets submitted and Table 5 expands this into more detail.

Of the 18 nests monitored, 50% failed during the egg stage (a loss of 30 eggs). The following causes of nest failure were reported: lost to high tide (3 nests: Bashams, Watsons Gap, Parsons), fox or dog (1 nest: Bashams), disturbance (1 nest: Normanville) and unknown (4 nests: Bashams, Hindmarsh, Carrickalinga x 2).

Of the 50% of nests that hatched, 19 chicks were observed (this including 1 dead in the nest) and 7 went on to fledge (potentially 9, however, sighting data for the chicks reaching 35 days is absent from Myponga beach). Chick fates were difficult to ascertain but at some sites the suspected causes were kestrels, foxes and heavy vehicle use.

There were also an additional 3 juveniles sighted at 3 locations but because they were of flying age it was unknown whether they had dispersed to these locations or originated there.

Overall, an egg had a 14.2% chance of fledging a chick successfully and a nest a 22.2% (4 of 18 nests produced fledglings) chance of fledging at least one chick.

Table 4. Overall summary of nests, number hatching or failing at egg stage, total number of eggs and chicks observed and total chicks that fledged definitely from that site in the 2009/10 breeding season.

Pair	# nests	# hatch	# fail at egg stage	total eggs	total chicks obsv.	total fledged
Bashams Beach	3	0	3	8	0	0
Carrickalinga *	2	0	2	6	0	0
Normanville	1	0	1	3	0	0
Hindmarsh River outlet *	1	0	1	3	0	0
Inman River outlet	1	1	0	2	2	2
Maslin Beach	2	2	0	6	6	2
Morgans Beach	1	1	0	Unk (2)	1	0
Myponga Beach	2	2	0	Unk (4)	4	Unclear (0, 1 or 2)
Parsons beach *	1	0	1	3	0	0
Port Willunga Northern Bay	1	1	0	3	2	1
Port Willunga Southern Bay	1	1	0	3	1	0
Watsons Gap	2	1	1	6	3	2
TOTALS	18	9	9	49	19	7 to 9

* plus 1 juvenile spotted at Hindmarsh outlet (January), 1 juvenile spotted at Carrackalinga (March) and 1 juvenile spotted at Parsons beach (November-December); originated from unknown locations.

Table 5. Detailed summary of nest progress for each pair according to data sheets sent in to Birds Australia for the 2009/10 breeding season.

Pair/location	Date	Nest update	Nest #
Watsons Gap	21/08/2009	3 egg nest found (signed/fenced)	1
	5/09/2009	nest fail (flooded by creek)	1
	28/10/2009	3 egg nest found (signed/fenced)	2
	21/11/2009	hatched (last visit 3/11) but not sighted	2
	23/11/2009	3 chicks sighted	2
	4/12/2009	2 chicks sighted (3 last seen 1/12; fox and kestrel in area)	2
	10/12/2009	last data sheet, chicks 20 days old	2
	3/01/2010	chicks still remaining with adults	2
	15/01/2010	adults, chicks dispersed	2
Maslin Beach	9/09/2009	3 chicks sighted (access signs)	1
	9/09/2009	chicks not seen again	1
	9/11/2009	single bird only (potential nest)	
	12/11/2009	single bird only (potential nest)	
	3/12/2009	3 egg nest found in dune	2
	28/12/2009	2 chicks sighted, plus 1 dead in nest (possibly stepped on by person walking through dunes) This nest wasn't fenced.	2
	27/01/2010	2 chicks observed flying	2
	17/02/2010	2 chicks still with parents	2
	24/02/2010	1 chick only now	2
	5/03/2010	other chick dispersed now also	2
	12/03/2010	3 juveniles seen using site	
	29/03/2010	2 juveniles seen using site	
	16/04/2010	1 juvenile seen using site	
Morgans Beach	11/12/2009	1 chick sighted (access signs and shelters installed)	1
	4/01/2010	chick present still (seen AM by CEM officer, not seen in afternoon by volunteer)	1
	23/01/2010	chick not sighted (beach heavily used by 4WDs)	1
Parsons beach	24/11/2009	2 adults, 1 juvenile observed. Scrape no eggs also observed.	
	7/12/2009	scrape no eggs still - never eventuated into a nest	
	21/12/2009	3 egg nest found on upper beach	1
	29/12/2009	failed (tide); juvenile observed again being chased by adults.	1
Port Willunga, Northern Bay	4/10/2009	3 egg nest found on foredune	1
	18/10/2009	2 chicks observed (less than one week old)	1
	19/10/2009	chicks gone	1
	25/11/2009	larger chick observed, identified as between 3-4 weeks old	1
	27/11/2009	juvenile observed, identified as flying [hatched at latest 24/10; decided this was from this site]	1
	10/03/2010	juvenile observed	1
Port Willunga, Southern Bay	8/11/2009	3 egg nest found (signed/fenced, access signs)	1
	6/12/2009	1 chick observed (recently hatched, eggs last seen 2/12), 2 eggs abandoned unhatched in nest, shelters installed	1
	10/12/2009	chick gone (last seen 8/12, suspect avian predator)	1
	24/12/2009	birds gone from site	
Carrickalinga	10/10/2009	3 egg nest found (unmanaged)	1
	12/10/2009	nest fail (unknown cause)	1
	7/12/2009	3 egg nest found (signed/fenced)	2
	10/12/2009	nest fail (unknown cause)	2
	16/12/2009	pair observed mating	
	1/03/2010	1 chick observed, between 4-5 weeks old, unknown if from site	3?

Pair/location	Date	Nest update	Nest #
Normanville	31/12/2009	3 egg nest found on estuary (not managed in time)	1
	1/01/2010	2 eggs only now, bird still incubating	1
	4/01/2010	nest gone (heavily disturbed site with people, dogs, vehicles)	1
Bashams Beach	17/09/2009	3 egg nest found on foredune (unmanaged)	1
	19/09/2009	nest fail (high tide caused dune collapse)	1
	22/10/2009	2 egg nest found on upper beach (fenced/signed)	2
	26/10/2009	3 eggs now	2
	1/11/2009	nest fail (last seen 28/10, unknown cause but human prints through fenced area), no adult birds seen	2
	5/11/2009	adults observed, definitely no chicks observed	
	25/11/2009	2 egg nest found on dune (2 signs installed)	3
	1/12/2009	nest fail (dog or fox prints), no adult birds seen	3
	25/12/2009	last data sheet	
		occasional sightings of adults during January and February	
	Hindmarsh River outlet	14/09/2009	3 egg nest found on upper beach
25/09/2009		2 eggs reported (but will assume recording error)	1
26/09/2009		3 eggs now	1
6/10/2009		nest fail (small egg fragments in nest, possibly predation or crushing), no adult birds seen	1
13/11/2009		no adults seen	
7/01/2010		pair seen with a juvenile, not known if from this site	
11/03/2010		juvenile still using site	
Inman River outlet	1/07/2009	monitored during July and October, no nesting observed	
	15/11/2009	suspect nesting	1
	18/11/2009	2 egg nest found on upper beach	1
	15/12/2009	2 chicks observed, hatched after 7/12 (signs access, plenty natural shelter)	1
	1/02/2010	2 chicks fledge	1
Myponga Beach	14/10/2009	2 chicks observed (less than one week old)	1
	21/10/2009	Only 1 chick now	1
	24/12/2009	2 chicks observed (less than one week old)	2
	28/12/2009	2 chicks gone (unknown cause)	2
	1/01/2010	3 adults observed (observer thought one might be chick from October but it would not have full black head by now)	
	1/02/2010	3 adults observed	

Threats to breeding pairs

Of the potential threats to Hooded Plovers monitored by volunteers during the breeding season, people and dogs (off and on lead) were most prevalent at sites on the Fleurieu Peninsula from 146 threat assessments at 10 sites. See Tables 6-8 below for summaries of the proportion of visits and sites where each threat was observed, and a snapshot of what activities people were commonly using the beaches for. Table 9 assesses the prevalence and intensity of threats at each site separately and Table 10 provides average number of people and dogs on and off lead sighted. Please note that these figures should be interpreted with caution as some are based on small sample sizes across a broad time frame, making these less representative of the actual prevalence and intensity of threats at these sites.

Table 6. Proportion of visits where threats were observed (this includes evidence of tracks unless specified).

Threat	Prop. visits present
People	93.8%
Evidence of dogs (prints &/or sightings)	92.5%
Dog prints	89.0%
Dogs sighted	69.9%
Dogs off lead	60.3%
Dogs on lead	41.8%
Silver gulls	32.2%
Vehicles	9.6%
Pacific gulls	6.2%
Ravens	5.5%
Horses	3.4%
Foxes	3.4%
BOP	1.4%
Magpies	0%

Table 7. Proportion of sites where threats were observed (sites are named). Tracks and prints are included as evidence of threats, unless categorised separately.

Threat	Prop sites present	Detected at:	Not detected at:
People	100%	All	
Evidence of dogs	100%	All	
Dog prints	100%	All	
Dogs sighted	90%		Parsons beach
Dogs off	90%		Parsons beach
Dogs on	80%		Parsons beach, Watsons Gap
Silver gulls	70%		Carackalinga, Normanville, Bashams beach
Vehicles *	40%	Bashams beach, Morgans beach, Maslin beach, Normanville	
Foxes	30%	Morgans beach, Bashams beach, Parsons beach	
Ravens	30%	Parsons beach, Maslin beach, Hindmarsh outlet	
Pacific gulls	30%	Port Willunga, Parsons beach, Morgans beach	
Horses	20%	Morgans beach, Maslin beach	
BOP	10%	Port Willunga	

* Vehicles detected on beaches where vehicles are not permitted are often management vehicles or in the case of Maslin beach, the ice-cream van!

Table 8. The main activities people were observed using the beaches for.

Human recreational activity (of 1935 people observed)	% intensity
Walking	45.1%
Dog walking	23.2%
Sitting/sun-baking	14.3%
Surfing/swimming	9.9%
Fishing	3.3%
In vehicles	2.6%
Whale watching	1.6%

Table 9. The prevalence and intensity of potential threats to Hooded Plover at sites monitored. 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. Intensity to the numbers of that threat type observed (e.g. number of people, dogs, density of vehicle tracks, etc) and the threats that were at highest intensity appear in **bold** text.

Site (number of surveys)	Heavy threats (>50%)	Moderate threats (20-50)	Sparse threats (<20%)	Rare threats (<6%)	Common activity
Bashams Beach (12)	People , dogs off lead	Dogs on lead	Foxes, vehicles		Dog walk, whale watch
Carrickalinga (6)	People	Dogs on lead	Dogs off lead		Walk
Hindmarsh River (14)	People , silver gulls, dogs off and on lead				Walk, dog walk
Inman River (26)	People , dogs off lead	Dogs on lead	Silver gulls		Walk, dog walk
Maslin Beach (36)	People, dogs off lead	Dogs on lead, silver gulls	Vehicles, horses	Ravens	Walk, dog walk, fish
Morgans Beach (5)	People, vehicles , dogs off lead	Horses, dogs on lead, silver gulls, foxes	Pacific gulls		Sit
Parsons beach (8)	Silver gulls , ravens, people , pacific gulls	Foxes, dog prints			Surf/swim
Port Willunga (30)	People, dogs off lead	Dogs on lead, silver gulls		Pacific gulls	Walk, dog walk, sit
Watsons Gap (6)	People	Dogs off lead	Silver gulls		Walk

Table 10. Mean (\pm standard error) number of people and dogs on and off leash observed at sites.

Site (number of assessments)	Number of people	Number dogs off lead	Number dogs on lead
Bashams Beach (12)	7.1 \pm 2.1	2.5 \pm 0.9	0.6 \pm 0.2
Carrickalinga (6)	15.3 \pm 6.7	0.8 \pm 0.8	1.3 \pm 1.2
Hindmarsh River (14)	14.2 \pm 2.6	4.5 \pm 1.1	1.9 \pm 0.4
Inman River (26)	6.4 \pm 1.6	1.2 \pm 0.2	0.6 \pm 0.1
Maslin Beach (36)	7.2 \pm 0.9	1.0 \pm 0.2	0.7 \pm 0.2
Morgans Beach (5)	18.8 \pm 7.7	4.2 \pm 1.6	0.6 \pm 0.4
Parsons beach (8)	3.2 \pm 1.2	0	0
Port Willunga (30)	16.5 \pm 3.7	3.1 \pm 0.6	1.7 \pm 0.5
Watsons Gap (6)	0.9 \pm 0.3	0.2 \pm 0.1	0

Management of breeding pairs during the 2009/10 breeding season

Six nesting sites with eggs, and an additional three sites with chicks, were managed through signage, temporary fencing and awareness activities over the breeding season out of a total of 17 breeding attempts (where data is available). See Tables 11 and 12 below. There is insufficient data to correlate management with success, however, there was a trend for unmanaged nests to have a higher fail rate at the egg stage (40% success for managed nests versus 33% for unmanaged nests). Four out of the 7 chicks that fledged had significant natural shelter (e.g. seaweed at Inman River; a creek outlet at Maslins Beach).



Figure 2. Volunteer Giles Walkley installing chick signage at Port Willunga. Photo: Emma Stephens

Table 11. Management of nests and chick sites on the Fleurieu Peninsula during the 2009/10 season.

Management	# nests	Fail egg stage	Hatch	Fail chick stage	Fledge
Signed	1	1 (1xdog or fox)	0		
Signed/fenced	5	3 (1xtide, 1xunk, 1xcrush?)	2		1
Unmanaged	9	6 (2xtide, 2xunk, 1xdist)	3	1	1
Chick sign	2			1	1
Chick sign/shelter	1			1	

Table 12. Summary of managements across sites during the 2009/10 breeding season.

Site	Site management action
Bashams Beach	2 nd nest fenced and signed (Oct). 3 rd nest signed (Nov).
Carrickalinga	Permanent signage present. 2 nd nest signed and fenced (Dec).
Normanville	
Hindmarsh River outlet	Permanent signage present.
Inman River outlet	Two chick signs installed (Dec).
Maslin Beach	Three chick signs installed (Sept and Jan).
Morgans Beach	Fence, signs and shelter were installed.
Myponga Beach	
Parsons beach	
Port Willunga Northern Bay	Two chick signs installed (Nov).
Port Willunga Southern Bay	Permanent signage present. Nest fenced and signage installed. Three signs also installed at access points. Chick shelter installed.
Watsons Gap	Permanent signage. 1 st and 2 nd nests signed and fenced.



Figure 3. Chick shelters constructed by Yankalilla Area School students. Photo: Sophie Piron



Figure 4. Stateline interviewing volunteer Ashley Read at Port Willunga. Photo: Tony Flaherty

A range of managements to reduce the impact of these potential threats to breeding Hooded Plovers were used at sites on the Fleurieu Peninsula including:

- Signs around the nesting site
- Signs around the nesting site accompanied by a rope fence
- Signs around the general area chicks were using (with specific messages relating to improving chick survival)
- Signs with a “thank you” message to the community for assisting during the nesting phase (i.e. with leashing dogs, sitting away from the fenced area etc)
- Signs at the access point
- Wooden A-frame chick shelters (built by the Normanville Natural Resources Centre with Yankalilla Area School students)
- Distribution of ‘beach-nesting birds’ brochures to beach users

- Media in local newspapers, ABC radio and television coverage on ABC's Stateline
- Permanent Hooded Plover signs at access points
- Dogs breakfast events in collaboration with the Normanville Natural Resources Centre
- School education through the Normanville Natural Resources Centre
- Training of volunteers at workshops
- Meeting of Fleurieu Councils, Onkaparinga council, Department for Environment and Heritage and NRM staff to develop Council Response Plans.
- NRM Board purchase of equipment for Hooded Plover fencing and signage kits put together and distributed to Council depot and volunteers around the Fleurieu (12 fencing and signage kits including a total of 72 signs)
- Council Response Plans – a response plan for volunteers, councils, Department of Environment and Natural Resources (DENR) and AMLR NRM Board staff to follow should fencing/signage be required.



Figure 5. Hooded Plover management training workshop. Photo: Kristy Manning

The coming breeding season August 2010 – March 2011

Suggested activities:

Birds Australia activities:

- Visit sites to assess threats and management requirements for each site specifically.
- Visit volunteers to provide on-site training relevant to their site.
- Review of management effectiveness.
- Development of better data sheets and online forms.
- Improvement of biennial count through provision of maps of defined count transects.

NRM Board activities:

- Continued support of volunteers from NRM Coast, Estuary and Marine Officers.
- Actively engage new volunteers for sites not being monitored, and to provide additional support at sites currently being monitored.
- Coordinate the biennial count on the Fleurieu Peninsula.
- Expansion of project and on-ground works (trial nest cameras to detect and identify nest predators and to determine nest fates).
- Community awareness efforts, e.g. media, events, targeting local schools or community centres.
- Continue to work with DENR, Local councils and other project partners.

- Community awareness efforts, e.g. media, events, targeting local schools or community centres.

Volunteer activities:

- Monitoring pairs at nominated sites
- Ensuring all data collected is complete (e.g. for each nest there is a start and end point to sightings; filling out data sheets for visits where birds are not observed)
- Additional training

Student research projects

Birds Australia has also been supervising several student projects looking at a range of new management techniques that have not previously been used for the Hooded Plover; aspects of red-capped plover breeding behaviour and ecology; and social studies investigating the way Australians value beaches, people's knowledge and understanding of Hooded Plovers and their reaction to different management options, and attitudes of dog owners to leashing on beaches.

The following research papers have been published in association with the BNB project:

Williams, K. J. H., Weston, M. A., Henry, S. and Maguire, G. S. (2009). Birds and beaches, dogs and leashes: Dog owners' sense of obligation to leash dogs on beaches in Victoria, Australia. *Human Dimensions of Wildlife* 14: 89-101.

Weston, M. A., Ehmke, G. C. and Maguire, G. S. (2009). Manage one beach or two? Movements and space-use of the threatened hooded plover (*Thinornis rubricollis*) in south-eastern Australia. *Wildlife Research* 36, 289–298.

Stojanovic, D., Maguire, G., Weston, M., Dickman, C. R., and Crowther, M. S. (2009). Attempted incubation and nest-maintenance behaviour of artificially deployed quail egg clutches by Hooded Plovers *Thinornis rubricollis*. *Wader Study Group Bulletin* 116 (1): 41-43.

Maguire, G. S., Stojanovic, D. and Weston, M. A. (2009). Conditioned taste aversion reduces fox depredation on model eggs on beaches. *Wildlife Research* 36: 702–708.

Maguire, G. S., Duivenvoorden, A. K., Weston, M. A., and Adams, R. (2010) Provision of artificial shelter on beaches is associated with improved shorebird fledging success. *Bird Conservation International* *in press*.

Weston, M. A., Ehmke, G. and Maguire, G. S. (2010). Nest Return Times of a Beach-nesting Plover in Response to Static versus Mobile Human Disturbance. *Journal of Wildlife Management* *in press*.

The following papers are in preparation:

Response distances of shorebirds in south eastern Australia to human disturbance: towards ecologically meaningful buffers.

Abstract: Disturbance to shorebirds by people is growing in extent and intensity and is considered a conservation threat. Most management of disturbance to wildlife relies on the inverse relationship between animal responses and the distance between them and a stimulus (e.g., a person). Buffers are often used to separate threatening stimuli, such as humans, from wildlife but with few exceptions buffer widths are based on little empirical information. We measured the distance at which a response (i.e., flight initiation distance [FID]) occurred among 28 of Australia's 36 regularly occurring shorebird

species when presented with an approaching human (n = 760 approaches in Victoria, south eastern Australia). Species differed in their FID, with species whose eyes were higher above the substrate (a surrogate for visual ability to detect threats) having longer FIDs ($F_{1,26} = 35.439$, $p < 0.001$; $R^2 = 0.557$). Mean FIDs for species were 18.6 - 126.1 m (n = 370 approaches by a walker). Depending on the species, FID was significantly influenced by the starting distance of the human approach, flock size, previous exposure to humans and stimulus type (walker, jogger, walker with dog). The FIDs reported suggest that current buffer designations will reduce disturbance to many but not all shorebird species tested.

Preferences, patterns and rates of beach use by Australian coastal residents.

Abstract: Whilst beaches are one of the most popular recreational landscapes in Australia and habitat for many unique species, the degree to which they are visited and their value to Australians is virtually unstudied. We surveyed 385 Australians from a population of 2,800 coastal residents from South Australia, Victoria, New South Wales and Queensland. We used a letter-drop questionnaire with 29 questions exploring rate of beach use, activities undertaken at beaches, features deemed important when choosing a beach destination, and features detracting from enjoyment of the beach. Over 99% of respondents use their local beach, with 90% nominating beaches as their most valued recreational environment. Most respondents used the beach for walking (91.4%; 37% of walkers accompanied by a dog) or swimming (78.9%). Respondents (N=338) valued clean, uncrowded beaches with opportunities to view wildlife. They also considered the most important beach facilities to be toilets, showers, shade, rubbish bins, surf life savers and food outlets (N=331). Factors that detracted from beach enjoyment were intensive or intrusive recreational use (e.g. vehicles on beaches) and difficult access (e.g. long distance from carpark). Respondents wished for improvements in beach management related to dog access and litter. Generally, Australians appear to hold high regard for the pristineness of a beach but interestingly this was not linked with the habitat characteristics of a beach; this suggests that further efforts need to be made to highlight this important connection and to build support for conservation of the 'ecosystem' as a whole.

The following research is currently being analysed and written up:

- Knowledge and understanding of Hooded Plovers and community preferences for conservation management actions.

Acknowledgements

A sincere thanks to all the volunteers who participate in observing Hooded Plovers and collecting data. If it weren't for people like yourselves, keeping an interest and watching out for these special birds, they could easily be overlooked and find themselves on a path to extinction – but you are helping turn things around. The data you collect 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.

Thanks to Adelaide and Mount Lofty Ranges NRM Board for all their support and for doing a tremendous job at coordinating and implementing Hooded Plover conservation on the Fleurieu Peninsula.

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