Photo credit: Philippa Beckerling

A RESOURCE KIT FOR LAND MANAGERS

September 2025

Beach-nesting Birds Management Plan

Walpole – Denmark Region

Photo credit: Natalie Bell

Beach-nesting Birds Management Plan

Walpole – Denmark Region

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Contents

Plan Objectives

This Management Plan aims to:

- Provide an overview of the Beach-nesting Bird (BNB) Program
- Establish roles and responsibilities of Project Partners within the BNB Project for the Walpole-Denmark region
- Establish monitoring and breeding site protection protocols for the region
- Document regional BNB breeding site occupancy
- Report on regional BNB breeding success and population trends
- Compile site profiles, including threat profiles, within the region
- Formulate mitigation actions and management recommendations to address threats identified within the region

Beach-nesting Birds in southwest WA

In the southwest of WA, 4 species of beach-nesting shorebirds rely on coastal habitats for nesting and include:

- Western Hooded Plover (*Thinornis cucullatus tregellasi*)
- Red-capped Plover (*Charadrius ruficapillus*)
- Australian Pied Oystercatcher (*Haematopus longirostris*)
- Sooty Oystercatcher (*Haematopus fuliginosus*)

Hooded Plover (Photo credit: Glenn Ehmke)

Red-capped Plover (Photo credit: Tegan Knowles)

Sooty Oystercatcher (Photo credit: Dan Lees)

Pied Oystercatcher (Photo credit: Andrew Silcocks)

Figure 1: The four species of beach-nesting shorebirds that occur within the southwest of Western Australia.

These beach-nesting shorebirds nest in exposed beach habitats along the Walpole - Denmark region. Their breeding seasons fall within spring and summer which coincides with the time when beaches are most used by people, leading to human-wildlife conflict. They lay their highly camouflaged eggs in a simple scrape on the sand and incubate for 28 days. If their nests survive, they raise their vulnerable chicks on busy beaches for five weeks, before the chicks are old enough to fly. Therefore, these birds face a multitude of different threats, some of which are natural to their ecology, but the bulk of threats are now human-related.

The most sensitive species out of all is the Hooded Plover and it has been heavily studied and used as a flagship for beach-nesting bird conservation. Western Hooded Plovers are listed as a *Priority 4* species under the *Biodiversity Conservation Act 2016*, and Hooded Plovers (Eastern subspecies) are listed as *Nationally Vulnerable* under the *EPBC Act 1999*. Most of the information in this plan is specific to Hooded Plovers, but it is applicable to the other species owing to their similarities.

While Hooded Plovers can flock in groups in the non-breeding, winter months, they typically occur as highly territorial pairs, where each pair will occupy their own stretch of beach (varying in size up to ~1km). They make simple nest-scrapes in the sand and typically lay three eggs. Adult birds can nest anywhere above the high-tide mark, including the mid to upper beach with seagrass deposits, and on bare to sparsely vegetated foredunes and dunes. Their well-camouflaged eggs are extremely difficult to spot and take 28 days to hatch. Once chicks hatch, they cannot fly for five weeks and need to forage on the beach and intertidal rock platforms to survive. The parents do not feed the chicks but accompany them closely, warning them in to hiding if threats approach.

People, unleashed dogs, horses and vehicles on beaches not only pose a direct threat of crushing, but they also disturb incubating and brooding adults that will temporarily leave the nest and chicks to maximise camouflage and wait for the threat to depart the area. As a result, eggs and chicks are exposed to harsh temperatures, and to predators such as ravens, magpies, foxes, and gulls. This is particularly true of disturbances caused by unleashed dogs, where adults can spend long periods away from the nest and chicks.

While the birds can re-nest, even up to seven times in a given season, the likelihood of the eggs or chicks surviving is so low in the absence of conservation efforts, that pairs can have zero breeding success in their lifetime. Even birds occupying beaches that might be considered remote, are still within human reach, especially considering off-road vehicle access, coastal development, weed and pest animal spread.

Beach-nesting Birds Program Overview

National Beach-nesting Birds Program

In 2006, BirdLife Australia embarked on a project to promote coexistence between recreationists and beach-nesting birds, focusing mainly on the threatened Hooded Plover. Key to conservation success has been the coordinated and consistent approach to monitoring, threat mitigation responses, stakeholder engagement and public education messaging over this time.

BirdLife Australia coordinates the recovery of beach-nesting birds and its stakeholders. The aims of this collaborative recovery approach are to:

1. Improve breeding success and population resilience of beach-nesting birds. This is via:
    - On-ground threat mitigation at priority sites across the species range.
    - Research to overcome key knowledge gaps to advance our success in recovery. This includes evaluation, improvement, and adaptation of best practice actions for conservation.
    - Education to shape sustainable beach use behaviours.
2. Protect and restore critical habitat so that the current (and recent historical) distribution is maintained and protected, and

3. Develop tools, resources, capacity, and supportive policy to ensure long-term sustainability and consistent delivery of recovery actions.

WA Beach-nesting Birds Program

While BirdLife Australia's Beach-nesting Bird Program formally expanded to include southwest Western Australia in 2023, the Walpole – Denmark region has maintained a substantial commitment to Hooded Plover and beach-nesting bird conservation for many years. Active conservation and monitoring of beach-nesting birds and their habitat has been undertaken by the Department of Biodiversity, Conservation and Attractions (DBCA), volunteers and volunteer groups. Initial surveys date back to the 1990's, supported by periodic stakeholder consultations, culminating in the release of a collaborative *Hooded Plover Ten Year Management Plan for Western Australia* in 2002.

Established in 2016, the Denmark Bird Group has grown steadily and actively participates in shorebird surveys and biannual counts. These passionate volunteers aim to raise the community's level of knowledge and awareness of the local and regional birdlife, including the conservation of beach-nesting birds. Their primary mission to conduct bird-focused activities and advocacy that lead to positive outcomes for the conservation of birds and their habitats has included promoting recognition of the Wilson Inlet and the 70 plus bird species it supports, including migratory shorebirds and beach-nesting species. Through their advocacy efforts, the critical habitat at the mouth of the Wilson Inlet is now protected as the Djerrt Mia Bird Sanctuary.

In 2012, BirdLife Australia's Dr Grainne Maguire facilitated several Hooded Plover Workshops in Western Australia, introducing the state to the online data portal (*MyBeachBird* Portal) for systematic BNB sighting documentation. The regional BNB program has steadily gained momentum over the last decade, with notable acceleration in recent years following the establishment of a dedicated BirdLife Australia Beach-nesting Bird staff position in Western Australia from 2023 - 2025 (supported by funding from the Western Australian Government's State NRM Program).

Walpole - Denmark Region

The Walpole and Denmark region, shown in Figure 2 and 3, extends from Mandalay Beach in the west to Ocean Beach in the East.

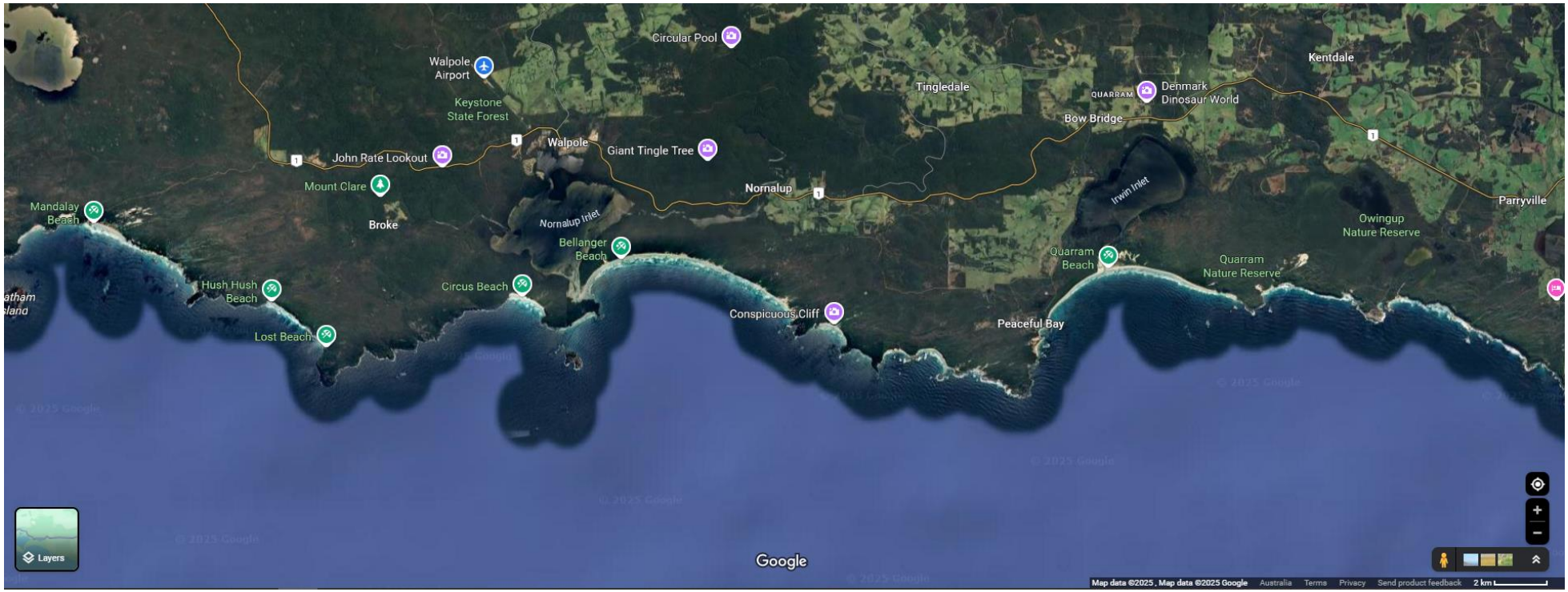

Figure 2: Walpole region showing the western (Mandalay Beach) and eastern (Sharp Rock Beach) extent of the region.

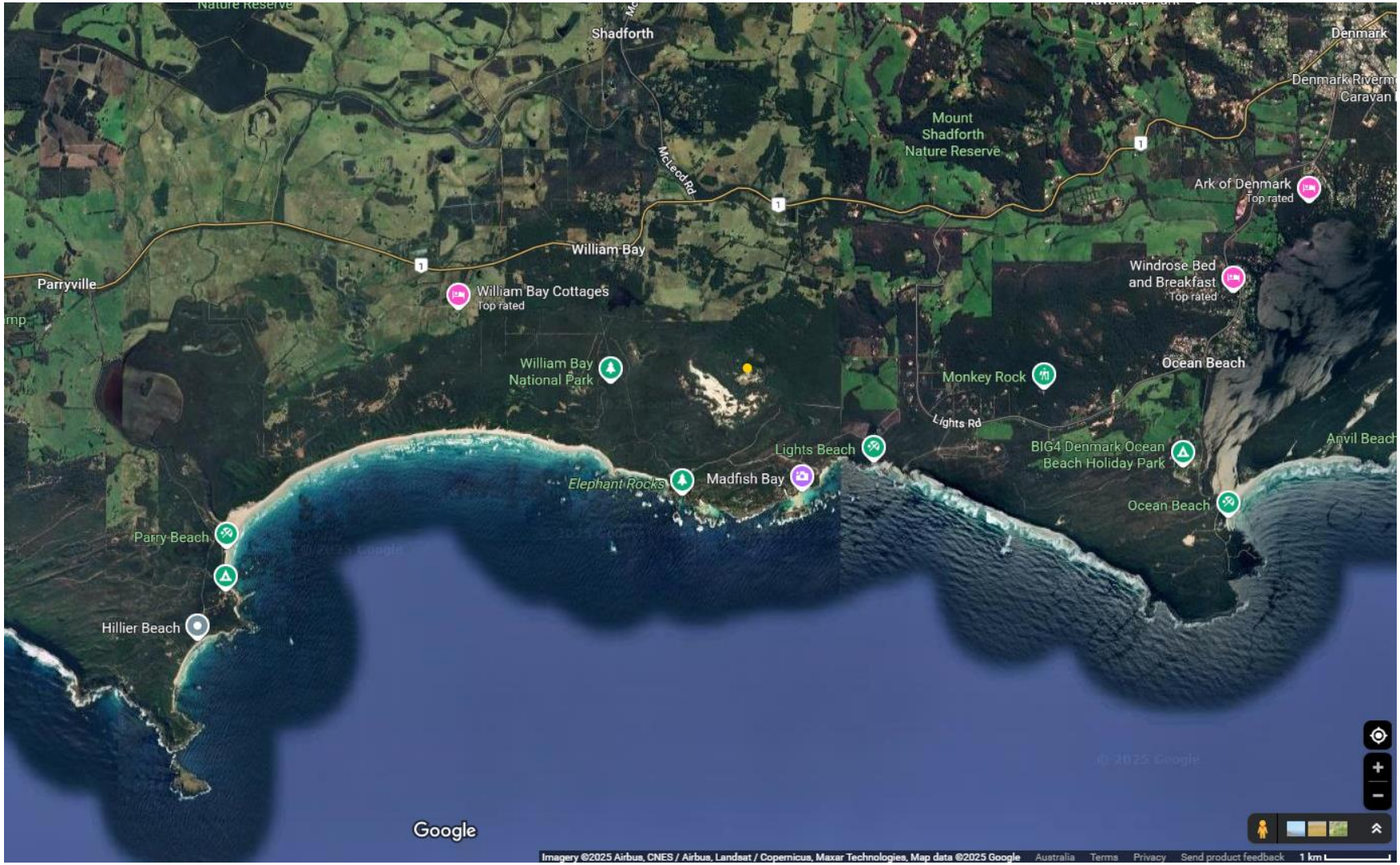

Figure 3: Denmark region showing the western extent (Hilliers Beach), and the eastern extent (Ocean Beach East Channel) of the region.

Walpole - Denmark Region Program Partners

Beach-nesting bird recovery is multi-faceted and involves multiple stakeholders working together toward common aims and recovery targets. Within the Walpole - Denmark region the following stakeholders participate in the program:

- BirdLife Australia:
    - National Beach-nesting Birds (BNB) Team, Melbourne
    - WA-based BNB staff - Beach-nesting Birds Project Officer
    - Volunteers
- Land Managers:
    - Department of Biodiversity, Conservation and Attractions
    - Shire of Denmark
    - City of Albany
- Additional stakeholders and project partners:
    - WA BirdLife
    - Denmark Bird Group
    - Friends of Djerrt Mia Bird Sanctuary
    - South Coast NRM
    - South West NRM
    - William Bay National Parks Association
    - Denmark Environment Centre
    - Binalup Aboriginal Corporation
    - Greenskills

Roles and Responsibilities of Program Partners

Delivery of on-ground recovery actions for protection of Hooded Plover nesting sites, require well-defined roles so that actions can occur in a timely manner, with all required approvals and permissions. Furthermore, ensuring all program participants are aware of the sensitivities of the species, need for training and structured reporting, is crucial to maintaining best practice. Below the key roles and responsibilities of each of the major active participants in the Walpole - Denmark region are outlined:

BirdLife Australia

National BNB Team (Victoria)

- Develop and guide strategic direction, prioritisation and coordination of the conservation of beach-nesting birds at a national scale.
- Coordinate the National BNB citizen science program: online volunteer inductions, mentoring and support.
- Provide advice, online training and technical support for participants in the program including volunteers, land managers, bylaws officers and educators.
- Guide and maintain best practise protocols for monitoring, management and conservation messaging.
- Manage data collection via the *MyBeachBird* Portal.
- Initiate and maintain a national network for information sharing and supporting BNB conservation which includes a biannual newsletter, social media, events and biennial conference.
- Develop resources for volunteers, education and awareness raising materials and events including initiating Plover Appreciation Day on September 16 each year.
- Carry out research to improve recovery efforts which includes research into species ecology, behavioural ecology, threat ecology, social science, human behaviour and conservation investment effectiveness, and connecting researchers across Australia.
- In conjunction with project partners, define and adapt population level, regional and local priority actions for species recovery. This is often independent of current recovery actions defined by Federal and State governments as these are largely outdated and often inaccurate due to the time lag in policy updates.
- Maintain ethics and permit approvals for monitoring, on-ground interventions and research techniques (e.g. banding of the birds, use of remote cameras).
- Analyse and review data to maintain an adaptive management recovery approach.
- Coordinate the national biennial BNB population count, map and report on findings.
- Advocate for better habitat management, policy and planning that secure long-term protection of the species and their habitats.
- Coordinate emergency response action for bird injuries, entanglements or oil spill.

WA-based BNB Project Officer

Between July 2023 and August 2025, BirdLife Australia's project titled 'Beach-nesting Birds: flagships for engaging the community in coastal sustainability' employed a part-time WA-based

Project Officer supported by funding from the Western Australian Government's State NRM Program. The following Project Officer responsibilities may continue beyond August 2025 depending on funding availability.

- Coordinate the WA BNB citizen science program: volunteer inductions, mentoring and support.
- Provide advice, training and technical support for participants in the WA program including volunteers, land managers and educators.
- Manage WA data collection via the *MyBeachBird* Portal.
- In conjunction with project partners, define and adapt population level, local priority actions for species recovery.
- Coordinate regional BNB bi-annual stakeholder meetings and upskilling sessions.
- Coordinate the Hooded Plover banding program across the Walpole - Denmark region for Population Viability Analysis and tackling key knowledge gaps.
- Analyse and review WA data to maintain an adaptive management recovery approach.
- Assist the national team with biennial BNB population count coordination in WA.
- Advocate for better habitat management, policy and planning that secure long-term protection of the species and their habitats.
- Coordinate WA awareness-raising events and community workshops.

BirdLife Australia Volunteers

Any volunteers from the group who actively participate in BNB monitoring or site protection are formally registered, as part of the BirdLife Australia BNB Program, due to the strict ethical protocols and permit conditions that require volunteers to have formal inductions, training and to be identifiable as Hooded Plover volunteers. Volunteer roles and responsibilities include the following:

- Volunteers officially register to the BirdLife Australia BNB program and agree to 'Conditions of participation'.
- Volunteers undertake the required Monitor/Citizen Science Inductions via the BNB Hub.
- BirdLife Australia registered volunteers monitor the birds primarily during the breeding months, through repeated visits to one or more known breeding beaches. They record standardised data fields into the *MyBeachBird* Portal.
- Trained volunteers assist with on-ground conservation actions such as setting up signs and fences, or assisting with set up. They also maintain the signs and fences during monitoring visits, fixing these if they have been tide impacted for example.
- Running or assisting at educational events or stalls.

- Participate in the biennial count surveys by surveying one or more standardised routes.
- Attend regional BNB bi-annual stakeholder meetings and upskilling sessions.
- Mentoring new volunteers, media, advocacy and community liaison are also additional roles volunteers may be involved in.

Land Management Agencies

Beach-nesting birds occur across beaches of the Walpole - Denmark region that are managed under several different jurisdictions by different agencies. These agencies and their respective roles are listed below:

Department of Biodiversity, Conservation and Attractions (Frankland District)

- Work collaboratively with BirdLife Australia staff and volunteers.
- Implement and/or assist with Hooded Plover nest/chick protection responses on beaches within DBCA tenure.
- Monitor breeding birds and site-based threats.
- Invest in local on-ground works that improve breeding success or habitat condition including fencing, signage, fox control and weed control.
- Host meetings and provide logistical support with venues etc. for events and meetings.
- Attend regional BNB bi-annual stakeholder meetings and land manager upskilling sessions.
- Work with other departments to ensure the species and their habitats are considered in relevant policies, planning, communications and bylaws.
- Mentor new staff and ensure succession planning.
- Participate in, and provide logistical advice and support for beach access for banding of Hooded Plovers.
- Engage the local communities and raise awareness through events, advertisements, print media and social media.
- Engage key stakeholder groups and work towards improved beach user behaviours.
- Assist, where possible, with targeted compliance patrols, in particular when there are active nests/chicks.
- Participate in, and provide logistical advice for beach access for, the Biennial Beach-nesting Birds Population Count.
- When any beach-management activities or events are planned, refer to the *MyBeachBird* Portal for current Hooded Plover breeding locations and if activities or events overlap, liaise with BirdLife Australia about considerations to be made. The *Hooded Plover Event*

Management Protocol is available on the BNB Hub. Contact the BNB Team (beachnestingbirds@birdlife.org.au) if you need assistance in accessing the document.

Local Government Authorities: Shire of Denmark

- Work collaboratively with BirdLife Australia and volunteers.
- Implement breeding site management.
- Monitor breeding birds and site-based threats.
- Invest in local on-ground works that improve breeding success or habitat condition including fencing, signage, fox control and weed control.
- Assist, where possible, with additional dog regulation patrols, particularly when there are active nests/chicks.
- Host meetings and provide logistical support with venues etc. for events and meetings.
- Attend regional BNB bi-annual stakeholder meetings and land manager upskilling sessions.
- Work with other departments to ensure the species and their habitats are considered in relevant policies, planning, communications and bylaws.
- Mentor new staff and ensure succession planning.
- Engage their local communities and raise awareness through events, advertisements, print media and social media.
- Engage key stakeholder groups and work towards improved beach user behaviours.
- Participate in, and provide logistical advice for beach access for, the Biennial Beach-nesting Birds Population Count.
- When any beach-management activities or events are planned, refer to the *MyBeachBird* Portal for current Hooded Plover breeding locations and if activities or events overlap, liaise with BirdLife Australia about considerations to be made. *Hooded Plover Event Management Protocol* is available on the BNB Hub. Contact the BNB Team (beachnestingbirds@birdlife.org.au) if you need assistance in accessing the document.

Additional Stakeholders and Project Participants:

There are several conservation organisations and groups who have actively supported the conservation of beach-nesting birds through provision of volunteer contacts, promoting the project or by working alongside to support the Project.

BNB Monitoring methods

Standardised monitoring of breeding sites began in Victoria in 2006 with the launch of the Beach-nesting Birds program. Trained citizen scientists follow strict protocols for monitoring the birds over the course of the entire breeding season (August to March). These protocols protect the birds, their habitat, and the monitors conducting the work.

During each visit to a BNB breeding site, the observer/s thoroughly search the length of the territory for the breeding pair. Pairs needed to be monitored regularly (at least monthly) with a minimum of seven visits throughout the season spanning from August/September to March. Each breeding attempt is then followed through time with the aim of determining the success of each attempt, in particular for both the egg and chick phases. During these monitoring visits, BNB breeding data (e.g., number of birds, behaviour, evidence of nesting, etc.) is collected.

Additionally, a rapid threat assessment of the sites is completed on every visit, which facilitates the collection of data on threats such as beach users, off-leash dogs, mammalian, and avian predators as well as evidence in the form of tracks, prints and traces. This was a critical component of the data collection, enabling us to assess trends in threats over time and their response to mitigation efforts, and also to be able to interpret breeding success and failure in relation to these threats.

Data from monitoring visits is entered by volunteers into BirdLife Australia's *MyBeachBird* data Portal. All data used in reporting is vetted by BirdLife Australia's Beach-nesting Birds experts for accuracy and breeding summaries that are generated using standardised decision-making rules, including minimum sample sizes for inclusion.

Full monitoring guidelines can be accessed via the Beach-nesting Birds Hub.

Protection of nest and chick sites – Regional Steps

As nests in vulnerable locations, or chicks on busy beaches, can fail rapidly, a well-defined response plan is required to ensure a timely response.

Below outlines the steps for protecting beach-nesting bird breeding sites within the Walpole - Denmark region:

1. Volunteer or land manager locates a new nest or observes chicks at a site as part of their regular monitoring.
2. If on DBCA tenure, the volunteer reports the nest or chicks using the 'management alert' function in the *MyBeachBird* Portal. This automatically sends an email to frankland.district@dbca.wa.go.au which will then be forwarded to the appropriate staff members. This process ensures continuity with alerts forwarded to alternative staff members when primary contacts are unavailable.

   If on Shire of Denmark tenure, volunteer reports the nest or chicks using the 'management alert' function in the MyBeachBird Portal. This automatically sends an email to enquiries@denmark.wa.gov.au.

   If it is within the City of Albany tenure (who manage Ocean Beach, east of the Wilson Inlet), select the 'management alert' function to notify the City of Albany. The City of Albany automatically approve signage/fencing of breeding sites by trained volunteers and participants.
3. Land manager (or trained volunteer, on Shire Tenure) will refer to "A Practical Guide to Beach-nesting Birds" manual (hereafter referred to as the BNB Management Manual), and using the flow charts will assess whether management is required or not, and if required, what type of management is recommended (signage at access point, signage on beach flanking nest site, temporary fence around nest site, or a combination of these).
4. On DBCA tenure, if site management is required DBCA will install the appropriate site management (signage and/or fencing). DBCA may call on trained volunteers to either assist or install site management. On Shire of Denmark tenure, if site management is required, the Shire and/or trained volunteers) will install site management, Volunteers are required to gain approval for site management from the Shire prior to installing temporary fencing

and/or signage. On City of Albany tenure (Ocean Beach site only), trained volunteers are to install site management.

5. Hooded Plover site protection equipment kits are stored at DBCA Walpole depot and at the Shire of Denmark depot, and if volunteers are installing site management, land managers are to arrange best time and place for collection of equipment.
6. If BirdLife Australia volunteer/s have installed site management on Shire land without land managers presence, they are to email the Shire of Denmark enquiries@denmark.wa.gov.au or the City of Albany reserves@albany.wa.gov.au with a very short summary of management in situ (i.e. one or two sentences) and a photo.
7. If any variances to management protocol outlined in the BNB Management Manual or if the birds occur at a new site that has not previously been managed, the land manager or volunteer is to contact BirdLife Australia staff to discuss options. The Beach-nesting Birds Manual can be found in the land managers section of the BNB Hub https://beachvol.birdlife.org.au/login/index.php?pathway=4.
8. Volunteers and land managers are to ensure the *MyBeachBird* Portal has been updated to show that site protection has been put in place.
9. Volunteers and/or land managers may share responsibility for checking and maintaining signage and fencing.
10. Once the nest or chicks are no longer using the site, management will be removed. For chick sites, at least 3 visits where chicks have not been sighted are required before removal of the management to ensure this is a true breeding failure.

Key Findings

Population size and occupancy

The Hooded Plover Biennial Count, occurring since 1980, rallies hundreds of skilled participants across eastern mainland Australia to survey suitable ocean beach habitat for Hooded Plovers (eastern subspecies) over several weeks in November. During this count, all other species of resident beach-nesting birds, including several tern species, are also recorded, enabling an assessment of the use of ocean beach habitats by these species. Fixed survey routes, first established in 2010, are surveyed during the biennial count so that direct comparisons of species abundance can be made across years.

After the successful establishment of BirdLife Australia's Beach-nesting Birds Program in Western Australia in 2023, three regions in the south-west including the Walpole - Denmark region (falling within the 'Denmark and West' region in the Biennial Count), were included in the 2024 Beach-nesting Birds biennial count for the first time in the count's history.

21.6km of the region's 112.1km of habitat was surveyed in the November 2024 BNB biennial count in the 'Denmark and West' region (see Figure 3). The surveyed distance was below target levels, primarily due to the remoteness of survey routes and challenging or limited access. BirdLife Australia will partner with land managers ahead of the 2026 biennial count to develop logistical solutions and secure site access.

Figure 4: Survey routes covered in the 'Denmark and West' region as part of the 2024 Population Count.

Figure 4 below, shows the species distribution of beach-nesting shorebirds within the 'Denmark and West' region. Numbers of each species were recorded as follows:

- Hooded Plovers: 11 adults
- Red-capped Plovers: 68 adults and 2 juveniles.
- Pied Oystercatcher: 11 adults.
- Sooty Oystercatchers: 11 adults.

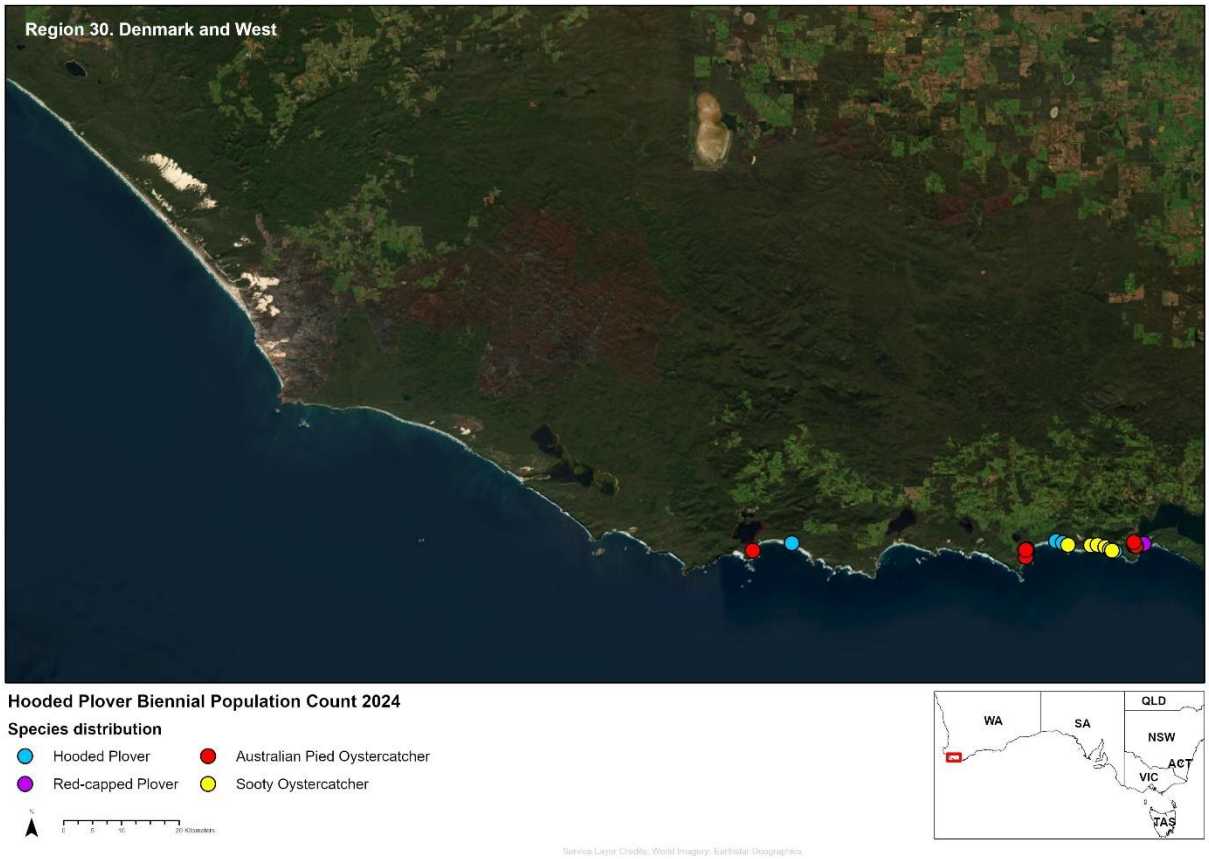

Figure 5: Species distribution from the 2024 Population Count.

As this is the first biennial count to include Western Australia, comparison of beach-nesting bird numbers and densities between counts is not possible. This will, however, help to provide a baseline estimate of populations for regions including Walpole – Denmark region with continued counts allowing us to investigate trends in the future.

Full access to the biennial count Report can be found here.

Breeding success rate

The following table summarises the breeding success data for the 2024-25 season within the Walpole - Denmark region. Note that while additional nests and chicks were observed during the season, breeding success data has only been included for those breeding attempts that received consistent monitoring throughout the season.

Table 1: Breeding success for the 2024-25 seasons.

Site	# visits to pair season	Nests	Failed nests	Hatched nests	Fledged nests	# eggs	# chicks observed	# fledged
Mandalay Beach	9	1	1	0	0	2	0	0
Mazzoletti Beach East	10	1	0	1	0	2	2	0
Lights Beach West	16	1	1	0	0	3	0	0
Lights Beach (east)	28	1	1	0	0	3	0	0
Ocean Beach East Channel/Djerrt Mia Bird Sanctuary	23	1	0	1	1	1	1	1

Hooded Plover chicks achieve 'fledgling' status when observed flying, typically at around 5 weeks of age, marking a successful breeding attempt. With only one confirmed fledgling from the five monitored pairs, the fledglings per pair rate for this season is 0.2. Population maintenance requires 0.4-0.5 fledglings per pair each breeding season. The region's low number of fledglings is attributed to the combination of poor nest success and low chick survival rates.

Notably, one of the two chicks at Mazzoletti Beach was confirmed alive at 3 weeks of age. However, without surveys during the critical two weeks leading to fledging age, this breeding attempt was recorded as unsuccessful. The chick was banded without a flag, so any future sighting of a Hooded Plover with only a silver band would indicate successful fledging of the Mazzoletti chick. Such confirmation would improve the fledglings per pair rate to a more appropriate level for population maintenance.

Individual site breeding results can be seen in the site profiles later in this report.

Banding Summary

BirdLife Australia's State NRM Community Stewardship Project facilitated specialised banding operations in the Walpole - Denmark region during November 2024 and March 2025. Victorian and Perth-based BirdLife Australia banders undertook field expeditions to southwest Western Australia, resulting in the successful banding of 8 Western Hooded Plovers across the two seasons (1 in 2024, 7 in 2025). This achievement represents a significant milestone for the region, as these 8 newly banded birds complement dedicated monitoring and managing efforts by local bird groups, individuals and land managers. The following table provides details of the 8 Hooded Plovers currently banded in the Walpole - Denmark region.

Table 2: Banded Western Hooded Plovers within the Waple - Denmark region.

Date banded	Location	Flag ID	Age
11/5/2024	Mandalay Beach	TK (left leg)	Adult
3/24/2025	Ocean Beach	BK (right leg)	Juvenile
3/24/2025	Ocean Beach	KA (right leg)	Adult
3/24/2025	Lights Beach (West)	JA (left leg)	Adult
3/24/2025	Lights Beach (West)	LN (right leg)	Adult
3/25/2025	Mazzoletti Beach	Silver band only - no flag	Chick
3/26/2025	Conspicuous Cliffs	JL (right leg)	Adult
3/27/2025	Djerrt Mia Bird Sanctuary	ZK (right leg)	Adult

The banding program can significantly boost community engagement and monitoring efforts, as volunteers and program participants develop personal connections with individually identifiable birds. The monitoring of these flagged individuals, combined with the genetic analysis of blood samples and morphometric measurements, will provide a greater understanding of this threatened species and will ultimately inform ongoing conservation and habitat protection efforts.

Threats and Management

Comprehensive reviews of threats (including references) and more detailed information about management options for each threat can be found in "A practical guide for managing beach-nesting birds in Australia" (hereafter referred to as the BNB Management Manual). The BNB Management Manual is available to download from the 'Land managers, professionals and on-ground protection' section of the BNB Hub:

https://beachvol.birdlife.org.au/login/index.php?pathway=4.

Below are the most critical management prescriptions set out for land managers along the southwest of Western Australia.

Recreational beach use

Recreational beach use can have one of the greatest impacts on beach-nesting bird breeding success, due to the impacts of:

- Egg and chick crushing.
- Disturbance of incubating birds leading to exposure of the eggs to lethal temperatures and to predators.
- Disturbance of chicks leading to increased energy expenditure (running to and from cover), starvation and exposure to extreme temperatures, and increased exposure to predators.

It has been shown that when breeding sites on beaches used by people (and their dogs/horses/vehicles) are signed and fenced, beach-nesting bird breeding success is greatly improved– to the equivalent of pairs which breed on remote beaches with very little exposure to human-based threats. The chances of egg and chick crushing are reduced, and people have a visual buffer that they can adhere to, thus reducing disturbance impacts.

Appendix 1 outlines the current breeding site protection response plan to be followed when there are reports of vulnerable beach-nesting bird nests or chicks in the southwest of WA. This provides a chain of response and the steps that should be followed.

For staff implementing the on-ground management, basic steps for installing signage and fencing around vulnerable beach-nesting bird breeding sites are found below. Note we adapt the protective set up around nesting sites once the eggs have hatched, as chicks are then highly mobile and thus the 'fencing' does not encompass the full area they will use – they will roam around and feed below the high-tide mark.

If you are looking for advice on, or templates for, beach-nesting bird signage contact BirdLife Australia's BNB Team at beachnestingbirds@birdlife.org.au.

Protection of the breeding site during the egg phase

Materials needed

- Minimum of 8-10 star pickets/stakes (plastic caps needed if using metal pickets). Plastic stakes such as these are recommended as they are relatively light-weight and easy to put into sand. It is a good idea to choose bright coloured stakes for sites where vehicles are permitted.
- 50-60 m of colourful nylon rope (4-6 mm diameter).
- Mallet or flat rock for hammering in pickets/stakes.
- 2-4 signs affixed on pickets/stakes (2 at either end and option of 2 facing water along front).
    - Laminated signs – Need to be affixed to plyboard backing (need tacks or staple gun, plus wood glue to affix sign to board; nails/cable ties to affix board to stake/picket).
    - Corflute signs - Need cable ties to affix sign to stake/picket. Corflute signs last longer than laminated ones in most conditions.
- Tape or cable ties to fasten rope to pickets/stakes and to strengthen at ends.
- Knife/scissors to cut rope.
- Binoculars.

Instructions for installation

- The fence needs to be big enough to keep the nest's location secret – leave at least 10-15 m either side of nest.
- Signs need to be at least 10 m out from edge of fences (so people approaching to read signs do not disturb incubating bird). Erect signs as low on beach as the high tide allows.
- Avoid extreme weather (heat, cold, rain, strong wind) – unless nest has been found in heat and fence needs to urgently go up – then work very quickly or put it up in sections allowing for time in between for the bird to incubate.
- Do not spend more than 35-40 minutes putting it up - and this is in good, mild conditions.

- The trick to fencing quickly is to lay your stakes out first – spacing them out and making sure you have enough to cover area. Then hammer them in solidly, they should roughly be 1.4 m high. Then start from one end and unravel and tie/fix rope to each stake as you go (make sure your rope is not in a knot prior to getting to site, or have it on a reel for ease of unravelling).
- If very hot (between 27 to 32°C) but fence must go up because at immediate risk, then spend 10 minutes maximum installing the fence. If hotter than 32°C, put up multiple signs quickly and come back in better conditions for fence. If very windy, assess how quickly eggs are getting buried. Abandon fencing if this is beginning to happen and just put signs up. Come back in better conditions.
- Look around for predators before putting up fence, if ravens or gulls are close by, wait till they go or carefully redirect and disperse them from the area first and make sure they are gone before you approach nesting spot. Make sure there are no off-leash dogs approaching area.
- Make sure you never lose sight of eggs as you go about putting fence up.
- Once fence is complete, walk away along water's edge so birds see you leaving. Once about 60-80 m away, see if birds are going back on nest. If they still are reluctant to return, place yourself at about 100 m and bob down and watch through binoculars. Make sure they come back to nest! If not, you might have to walk well away (1 km), wait for 30 minutes, walk back and if still not back on, fence needs to come down and just leave signs up. [This should not happen if you have used the right materials and the fence is big enough!]

Figure 6: Examples of beach-nesting bird breeding signage: Red-capped Plover nesting signage (left) and Hooded Plover chick signage (right).

Figure 7: Hooded Plover signage and protective fencing installed at the beach.

Protection of the breeding site during the chick phase

After hatching, the signage and fencing need to be adapted as the chicks use a bigger area and do not stay in the nest or in the fenced area. Chicks will run about below the high-tide mark and on the beach to find food. The steps to follow in protecting a site with chicks are:

- If possible, arrange to meet a volunteer on site who knows where birds are and the area they use to help locate the family of birds.
- Before moving signs/fences, you must know where the chicks have hidden and be very careful not to walk into this area – keep an eye on them while you are there in case they move.
- You may need to move signs to encompass new foraging area – if this is a large area, you will need two signs at either end and extra signs along the beach, marking an area of upper beach.
- Switch from a standard nesting sign to a 'chicks on the beach' sign.
- If the birds are using a small area, you can consider fencing this off – as fences can be a great refuge for chicks to run within.
- If the chicks are using a bigger area of beach (i.e. greater than 100-150 m), then the fence might not be feasible. Consider fencing two ends of the area.
- A large canvas banner 'chicks on the beach, dogs on a leash' (see below) is very useful for wide beaches or sites with lots of visitors.
- If native cover is limited, place 3-4 A-frame 'chick shelters' along length of beach the birds are using; these need to be dug in 10-15 cm deep, sand evened out so there are no big crevices inside, and camouflaged on outside with sand (not seaweed – this could attract predators).

- When placing each shelter, do not travel along upper beach, move down to water's edge each time.
- Shelters need to face water and are best on the upper beach, halfway between dune base and high-tide mark.
- It is useful if a chick update sign can be used at the access points with updates and key dates outlined in a permanent marker.

Figure 8: Large 'Chicks on the beach!' canvas banner (left), Hooded Plover chicks sheltering under 'chick shelters' (right).

Figure 9: Temporary rope ends demarking the area the chicks use with chick shelters placed within and signs at either end of the fenced area.

Figure 10: Temporary rope ends demarking the area the chicks use on a busy beach, with chick shelters placed within and signs at either end of the fenced area.

Regulating dog access

Off-leash dogs on beaches are considered one of the greatest threats to beach-nesting birds, due to:

- Depredation or capture/maiming of flightless chicks
- Depredation of eggs
- Crushing of nests
- Disturbance of incubating birds leading to exposure of the eggs to lethal temperatures and to predators
- Disturbance of chicks leading to increased energy expenditure (running to and from cover), starvation and exposure to extreme temperatures, and increased exposure to predators

Dog access is one of the more difficult areas of management for conserving beach-nesting birds due to the need for an integrated approach across multiple agencies, high levels of resources to implement and enforce regulations, and polarised views often present within local communities.

Changes to or introduction of dog regulations can be met with public outcry from local dog walkers, and it is important that consistent steps be taken when reviewing whether change is warranted and how to tackle this change. More damage can be done than good by implementing major changes to access with limited public consultation and where there has been no prior investment in education or improving compliance. If dog regulations are to be reviewed, breeding data and site-specific advice in relation to beach-nesting birds can be provided by BirdLife Australia's BNB team.

Steps to reviewing dog access and improving compliance

1) Overlaying current dog regulations, where they exist, against the distribution of breeding beach-nesting birds: are pairs sufficiently protected within their range? If breeding pairs are failing within off-leash areas or unregulated areas, there needs to be consideration of changing/introducing the current zoning to be at least seasonal (permitted during the non-breeding months, between April and July) on leash access.
2) Determining the availability of off-leash areas in the region of interest:
   - Are there adequate off-leash areas available across the region?
   - Can an alternative off-leash areas be created if needed? E.g. dog parks.
3) Identifying all the land managers and ensuring a consistent, integrated approach within a given region.
4) Investigating current levels of compliance with dog regulations where they exist: poor compliance will need to be addressed.
5) Seeking resources to carry out the below steps to improve compliance:
   a) Education campaign: In order to bring about change there needs to be motivation for this change. This can be achieved by using the Hooded Plover as a flagship species and educating dog walkers about the threats that off-leash dogs pose to these birds. There are multiple ways to tackle education:
      - Targeted brochures and website information.
      - Local maps that clearly define the different zones of dog access and provide interpretation about threatened wildlife.
      - Signage at beaches which provides information about the ways dogs impact the birds
      - Provision of dog leashes with conservation messaging (as an incentive to change).
      - Face to face education via ranger patrols (step one should not be to fine dog walkers, instead to explain why poor compliance is such an issue of concern), trained volunteers, and events such as Dog's Breakfasts.
      - Newspaper articles to publicly debate and explain the issue.
   b) Targeted enforcement: Without any perceived consequences, regulations can be viewed as unimportant and irrelevant to beach users and thus ignored. Enforcement of regulations can have a flow-on effect, as other beach users may observe compliance with regulations and follow suit.
      - Regular patrol and enforcement of regulations where a log of hours expended patrolling, rates of compliance and identity of offenders is maintained in order to

implement a two-step approach to enforcement**:** step 1: education/warning, step 2: fine/penalty.

- If resources are limited, it can be beneficial to dedicate specific periods within the breeding season to intensive patrol. This can be timed around when pairs are actively nesting or have chicks.
- Patrols out of normal business hours as research into beach use has revealed a distinct dichotomy in beach use where locals tend to use the beach outside of work hours, either early morning or evening.
- Documenting and publicising enforcement results will reinforce perceived consequences and assist with changing social norms.

6) If the above steps to improving compliance have not been effective over time (maximum 5 years), and the breeding success of the birds has not improved, then stricter restrictions to access need to be implemented, that is, either seasonal dog prohibition or year-round dog prohibition.

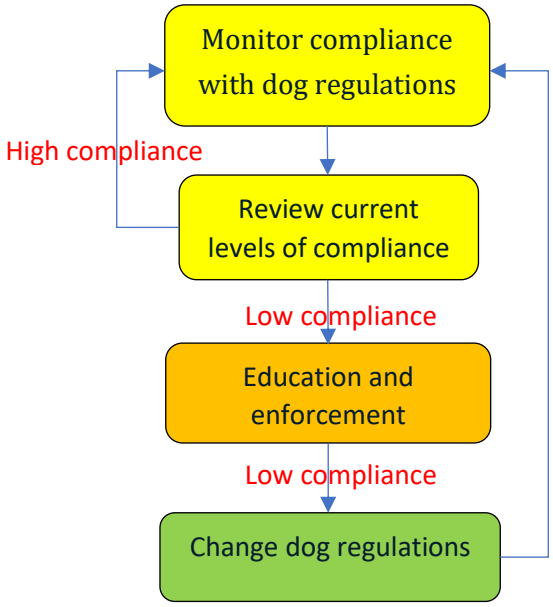

Figure 11: Flowchart showing the step-by-step guide approach toward reviewing dog access and improving compliance.

Full access to 'Review of Dog Impacts to Beach-nesting Birds and Management Solutions' can be downloaded here: https://beachvol.birdlife.org.au/login/index.php?pathway=4

Vehicle access

Vehicles pose a direct and major threat to beach-nesting birds via:

- Direct strike of adults, crushing of nests and chicks
- Compaction of the lower beach, which depletes their invertebrate (food) resources
- Severe sediment disruption and erosion leading to habitat loss
- Destruction of dune vegetation

Best practice protocols for beach access by vehicles

The following steps are recommended for mitigating the risks of driving on beaches. These were primarily established for off-road vehicle access by critical user groups, such as rangers, council staff, contractors, and researchers:

- Vehicle users should be made aware of the threats to beach-nesting birds and if possible, of the current nest/chick locations
- Drivers must exercise extreme caution when traversing the area
- Access to the site is via designated tracks and pathways only
- The beach is not accessed in the period one hour either side of high tides. Access should only occur at times of low or medium tide where there is enough room for the vehicle or machinery to move along the beach and keep below the high-tide mark. Consideration must be given to how many hours the vehicle will be out on the beach, leaving enough time to return along the beach before the tide has risen
- All machinery, vehicles and equipment are driven along the water's edge to minimise the likelihood of crushing flightless chicks and disturbing nesting birds and chicks
- All machinery, vehicles and equipment are driven at low speeds (~25 km/h)
- Drivers slow down further when passing signed nesting areas
- Night driving and driving in poor weather or low light conditions should be avoided where possible. In conditions of poor visibility, speeds must be further reduced, and extreme caution exercised

Other recreational activities

Horse riding, hang gliding, use of drones and other recreational activities on beaches can negatively impact beach-nesting birds during the breeding season. Please contact BirdLife Australia's Beach-nesting Birds team for more advice around these less widespread activities. Recommendations for managing horse riding can be found on page 152 of the BNB Management Manual: https://beachvol.birdlife.org.au/login/index.php?pathway=4.

Event management

Events on the beach or adjacent to the beach, can have impacts on beach-nesting birds via:

- Increasing the number of people near an active breeding site, leading to lethal disturbance for eggs and chicks.
- Crushing of the eggs or chicks during event set up or the event itself.
- Increasing predators at the site if the event leaves behind litter.
- Crushing of dune vegetation and/or intense disruption/compaction of beach habitat by large crowds of people.

Key event management considerations:

- An alternative location should be sought wherever possible to avoid events occurring at priority beach-nesting bird breeding locations.
- If an alternative location cannot be sought, altering the timing of the event to avoid the breeding season is the next most ideal response, that is opting for early April to late July.
- If neither a change of location or date is possible, land managers should contact BirdLife Australia's Beach-nesting Birds team or local volunteers to seek current information on the breeding status of the birds at the proposed location.
- If eggs are present, contact local volunteers or Birdlife Australia's Beach-nesting Birds team to see if there is enough data to predict a hatching date. This is to ensure there will not be chicks present on the proposed dates of the event.
- If chicks are present, the event should not occur at this site due to impossible nature of predicting where chicks will be at the precise time of the event. They can roam up to several kilometres and this can occur within the space of a day.

- For nests with eggs, a buffer zone shown in Figure 11 should be adhered to. A 'buffer' is defined as the required distance you need to be away from the active nest. This area can be passed by along the water's edge only, but no activity can be carried out within or in front of the buffer zone. Typically, signage and rope fencing plus additional volunteer wardens to steer people away from the buffer zone are effective at protecting the birds during an event.

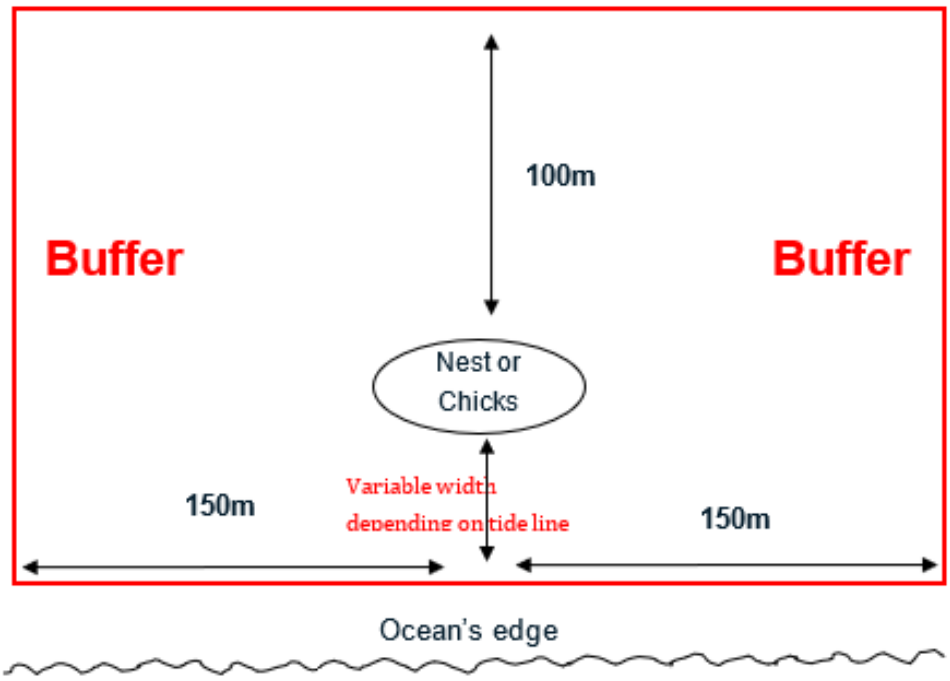

Figure 12: Diagram indicating the buffer zone (highlighted in red) around nests or chicks during an event.

Recommended best practice event protocols

1. Event personnel setting up, packing up and present during the event

Event staff walking on the beach can adversely affect the survival of nests and chicks of beach-nesting birds in direct ways (crushing) and indirect ways (disturbance). Furthermore, if the event personnel are too close to breeding sites, there are added risks of prolonged disturbance.

Any event staff using the beach must ensure that:

- They are aware of the current nesting situation on the beach so as to exercise extreme caution when traversing the area – this condition can be met by briefing all staff prior to the day about the location of nesting birds and again on the morning of the event.
- Access to the event site is via designated tracks and pathways only.

- Ideally, the beach is not accessed in the period one hour either side of high tides, as when the tide is at its highest, the person has no choice but to walk above the high-tide mark.
- They walk along the water's edge on the wet sand, and they do not enter the upper beach or dune.
- They do not pause within the buffer zone/s around breeding birds but only pass by the area as is necessary.
- They act on the event day to ensure that the buffer zone is kept people-free and this may involve regularly conversing with event attendees to explain why.

2. Vehicles needing access to the beach

It is assumed that only event staff will require vehicle access to the beach. This protocol is designed for these staff using vehicles for setting up and packing up the event, as well as on the day of the event.

Event staff accessing the beach with vehicles must ensure that:

- They are aware of the current nesting situation so as to exercise extreme caution when traversing the area.
- Access to the site is via designated tracks only.
- The beach is not accessed in the period one hour either side of high tides, but only at times of low or medium tide level with enough room for the vehicle to be below the high-tide mark. In the case of emergency vehicles needing access to the site, this would not apply, however, care should still be taken to avoid the nesting areas and drive as close to the water's edge where possible.
- All vehicles are driven along the water's edge to avoid nest crushing and minimise disturbance of nesting birds.
- All vehicles are driven at low speeds (~25 km/h) and in poor weather or low light conditions, speeds are further reduced.
- Drivers remain vigilant for any movement of birds at the water's edge and slow down further if they spot birds or their chicks and wait for them to move out of the way.
- Vehicles and staff do not stop within 300 m of the birds.

3. Crowds traversing the beach and attending the event

- An announcement at the beginning of the event should be broadcasted to inform the public of the location of breeding birds and the need to keep well away from the signed areas.
- Event marshals need to remind attendees as the event progresses of the presence of breeding birds and the need to keep out of the buffer zone, particularly if they see attendees breaching the buffer zone.
- Volunteer wardens must be present on the day of the event, specifically set up at the edges of the buffer zone/s to reinforce signage and keep attendees out of the area. Wardens are also there to raise awareness about the birds and answer questions by the public.
- Signage around the buffer zone indicates that attendees are to walk past the area along the water's edge and not to linger in the signed area. They are asked not to enter the upper beach or dune.
- Beach access is encouraged via designated pathways and these are clearly demarked for attendees.
- Fencing around the breeding site is as wide as allows attendees to pass by the water's edge and this can be widened and shortened as the day progresses and the tide height changes, by having additional lengths of rope and stakes to bring the two sides out to the water's edge.

Figure 13: View from inside buffer zone of fence line, signage, wardens sitting nearby and crowd further behind the fenced area

Predator control

The benefits of landscape scale fox control to small mammals and ground-nesting birds are highly apparent from successful programs such as the Southern Ark Project in East Gippsland, Victoria and the Western Sheild conservation program in Western Australia. For the benefits to transfer to beach-nesting birds, programs such as these need to encompass the foreshore environment. Small-scale or isolated control programs don't work because they fail to reduce the overall predator population that continuously threatens these vulnerable species. Therefore, effective predator control must cover large, connected areas to ensure beach-nesting birds can survive and recover.

Avian predator control is less clear as all identified avian predators are native species, hence are a protected part of the ecosystem. Ravens, magpies, and gulls have become overabundant as they thrive on human habitation and urbanisation. Unfortunately, these species have also been identified as major egg and chick predators. One recommendation to controlling these avian predators is to keep our beaches clear of litter including food scraps.

Recommendations

- Targeted fox control is carried out near key beach-nesting bird sites.
- If adequate resources are available, carry out fox control once before the breeding season commences (July/August) and once in the middle of the season (November/December).
- Encourage the public to report fox and/or fox den sightings to the land managers.
- To determine the effectiveness of predator management, liaise with BirdLife Australia's BNB team about installing a remote camera at nest/s to detect and identify predators in the area. Please be aware that camera installation is subject to acquiring appropriate permits and regulatory approvals.
- Conduct an education campaign on free roaming cats and their impacts on wildlife to encourage pet owners to confine cats to their premises.
- If feeding of wildlife is an issue, conduct an education campaign on the negative impacts on feeding wildlife to encourage people to refrain from feeding birds such as gulls, magpies, and ravens.
- Provide bins for beachgoers to dispose of their rubbish and ensure these are firm closing and emptied regularly. Access to rubbish can increase the presence of some predators, such as ravens.

Weed control

Weed invasions of the dunes can impact beach-nesting birds by:

- Limiting nesting habitat availability, whereby the dunes become covered in dense weeds and birds are left with only a narrow strip of upper beach available for nesting.
- Altering the beach profile; some weeds particularly Marram Grass (*Ammophila arenaria*) and Sea Wheat-grass (*Thinopyrum junceiforme*), create cliffing of foredunes and bind sand so greatly that the incoming sea then takes sand from the beach as dune sand is inaccessible.
- Intensifying impacts of rising sea levels and storm surges, as birds are forced to nest on the beach where nest losses to tidal inundation are more likely.
- Outcompete native grasses which the birds are adapted to utilising for protective cover.

Recommendations

General coastal weed removal activities

- If weed control is planned for the coastal environment, ensure current maps of beach-nesting bird breeding locations are sought from BirdLife Australia's BNB team to look for any overlap between planned activities and location of vulnerable breeding sites.
- Ensure weed control is carried out during the non-breeding months (April – July).
- If weed control needs to occur during the spring or summer months, only hand pulling or spraying will be appropriate, no mechanical removal should occur during breeding months.
- For any planned weed control during spring or summer, it will be critical to liaise with BirdLife Australia's BNB team to establish a work plan that accounts for any active nests or chicks in the area. This will mean that an experienced observer will need to check the area in the lead up to weed control.

Targeted weed removal to improve beach-nesting bird habitat

- Conduct mapping of major weeds [Marram Grass, Sea Wheat-grass, Sea Spurge (*Euphorbia paralias*), Sea Rocket (*Cakile maritima*), Pyp Grass (*Ehrharta villosa*), Beach Daisy (*Arctotheca populifolia*)] that threaten beach-nesting bird habitat resilience in the long term.
- Overlay maps of beach-nesting bird distribution to select priority sites for weed removal.
- Ensure funding is available for the initial weed control project and follow up removal for at least 3 years to ensure the project is viable.
- Carry out targeted control at breeding sites where weeds have greatly reduced nesting habitat availability – note timing below!

- Ensure weed control is carried out during the non-breeding months (April – July).
- If weed control needs to occur during the spring or summer months, only hand pulling or spraying will be appropriate, no mechanical removal should occur during breeding months.
- Liaise with BirdLife Australia's BNB team to establish a work plan that accounts for any active nests or chicks in the area. This will mean that an experienced observer will need to check the area in the lead up to weed control.
- Ensure follow up monitoring is carried out after weed control to remove seedlings.
- Replant with native grasses that are beach-nesting bird friendly (e.g. Hairy Spinifex *Spinifex hirsutus* and Beach Spinifex *Spinifex longifolius)* and maintain habitat suitability.
- Consider impacts of removing weeds near areas where people access the beach. The resultant areas of bare sand may become attractive to human/vehicle intrusions, so that some protection (signage, temporary fencing, re-plantings) of these newly created habitat areas may need to occur promptly.

Coastal planning and coastal on-ground works

Coastal residential development

Residential developments on the coast can result in:

- Direct loss of habitat (and loss of future habitat resilience, i.e. capacity to retreat) if development occurs in the dune system or immediately behind the dune.
- Increased visitation to beaches resulting in greater need to protect breeding sites, carry out education and enforcement patrols, and to attempt to mitigate human-based threats.
- Formalising access to beaches and addition of infrastructure in the primary dune which limits nesting habitat and resilience to climate change, as there is little room for inland retreat.
- Residents creating their own informal access points (if formal access is not provided) which leads to trampling of habitat (and nests and chicks in situ). This can then prompt erosion control measures which can further reduce nesting habitat availability.
- Increases in domestic animals (cats and/or dogs) exacerbating predation pressures on nearby nesting sites.

Recommendations

- Ensure council planners have access to spatial layers of key beach-nesting bird breeding territories.
- Consider proximity to beach-nesting bird breeding locations in all facets of coastal planning.
- Plan alternative beach access for residents from developments.
- Ensure residential developments close to the coast are pet free and if this is not appropriate, ensure there are alternative areas for off-leash dog walking (e.g. dog exercise parks and implement cat curfews.
- Ensure all new residents are given an educational pack to increase their awareness of local threatened birds and how to do no harm.

Coastal armouring

Armouring the coast by creating sea walls, groins, and placing rocks/boulders on the beach to protect coastal infrastructure and assets, can result in:

- Reduction of available habitat to beach-nesting birds due to modifications of beaches.
- Altered natural dune mobility and sand replenishment processes affecting current and future habitat availability for beach-nesting birds.
- Potential impacts on food availability if marine processes are impacted, e.g. wrack deposits.
- Loss of breeding sites due to addition of structures that do not naturally belong at the site (e.g. rocks/boulders).
- Loss of vegetation on the upper beach and/or dune resulting in the loss of natural hiding places for chicks of beach-nesting birds.

Recommendations

- Explore alternatives to coastal armouring and long-term solutions compared with short term fixes.
- Seek expert advice (including from coastal geomorphologists) on modelling the changes to beaches in the short and long term before commencing armouring works.
- Ensure armouring is not carried out directly within key beach-nesting bird breeding sites.
- Carry out the works only during the non-breeding months (April-July).
- Encourage works crew to adhere to “Best practice vehicle beach access protocols” prescribed on page 33 during construction works.

- Explore ways of carrying out the armouring that result in minimal changes to the natural setup of the beach.

Artificial Estuary Opening

Artificial estuary opening refers to the process of manually creating a channel to reconnect an estuary to the ocean, typically when it's been naturally closed off by a sandbar. This involves large machinery on the beach, is often done to alleviate flooding or manage water levels, but it can also have ecological impacts. Beach-nesting birds can be impacted by:

- Direct loss of beach-nesting bird habitat due to altered site.
- Direct impacts of nest and chick loss due to machinery and works on beaches.
- Disturbance which can lead to nest abandonment.
- Disruption of food webs and foraging opportunities.

Recommendations

- Seek expert advice on modelling the changes before commencing artificial opening of estuary.
- Where the proposed opening occurs in proximity to known breeding sites, seek to carry out the on-ground works only during the non-breeding months (April-July).
- Liaise with BirdLife Australia's BNB team to establish a work plan that accounts for any active nests or chicks in the area. This will mean that an experienced observer will need to check the area in the lead up to and during the works.
- If working in a location adjacent to or passing by known breeding sites, ensure works crew adhere to "Best practice vehicle beach access protocols" prescribed on page 33 during construction works.

Sand carting and extraction

Extraction and carting of sand from some beaches to replenish sand at other beaches has been identified as highly detrimental to beach-nesting bird habitat. It can result in:

- Direct loss of beach-nesting bird habitat due to removal of sand.
- Increases in tidal inundation of nests at sites where sand has been removed.

- Reduction of food availability to beach-nesting birds if sand is extracted from below the low water mark or dredge spoil dumped on current foraging area.
- Loss of beach-nesting bird breeding sites due to excessive disturbance caused by the on-ground works.
- Altered natural dune mobility and sand replenishment processes affecting habitat availability for beach-nesting birds.
- Direct impacts of nest and chick loss due to machinery and works on beaches.

Recommendations

- Seek expert advice on modelling the changes to beaches in the short and long term before commencing sand extraction and carting works.
- Seek alternative locations to ensure that sand carting or dredge spoil dumping is not carried out on key beach-nesting bird breeding sites.
- Where dredging occurs in proximity to known breeding sites, seek to carry out the on-ground works only during the non-breeding months (April-July).
- If dredging needs to occur during the spring or summer months, ensure dredge spoil dumping is not carried out on key beach-nesting bird breeding sites.
- Liaise with BirdLife Australia's BNB team to establish a work plan that accounts for any active nests or chicks in the area. This will mean that an experienced observer will need to check the area in the lead up to the works.
- If working in a location adjacent to or passing by known breeding sites, ensure works crew adhere to "Best practice vehicle beach access protocols" prescribed on page 33 during construction works.
- Explore uses of dredge spoil for improving habitat for beach-nesting birds.

Dune stabilisation works

Efforts to stabilise dunes by controlling erosion are carried out using three main methods in Australia. They are sand drift fencing where fences with a fine mesh/netting material are erected along the base of the dune or at angles within the dune to hold sand in place and stop the natural sand drift, brush matting which involves laying of dense mats of dry, cut brush (or dune matting) over bare patches of sand, and, by revegetating the upper beach and dunes with plants. These methods can impact beach-nesting birds in the following ways.

- Sand drift fencing:

- Restricts birds from accessing the dunes, as Hooded Plovers in particular, prefer to walk and run, and rarely fly. They will be unlikely to nest behind the fence in the dunes as flying to and from the nest alerts predators to the nest location. Thus, dune nesting habitat becomes lost.
- Creates a barrier for flightless chicks who cannot access dune vegetation to hide in and cannot escape predators and become easier prey as they are trapped at the base of the fence line.

- Brush matting:
  - Reduces habitat suitability by covering all bare patches of sand, particularly dune blowouts which are the favoured nesting habitat of Hooded Plovers.
  - Pushes beach-nesting birds to nest on the upper beach which is more prone to disturbance and direct crushing compared with the dune, as well as being more prone to inundation.
- Revegetation:
  - Altering beach habitat if the inappropriate species are selected for revegetation. Past dune stabilisation efforts using introduced grasses such as Marram Grass have resulted in severe ecological consequences, with these species now recognised as invasive weeds. Appropriate revegetation should focus on low-profile native vegetation characteristic of the upper beach and primary dune zones within the specific site.

Recommendations

- Ensure works are not carried out on key beach-nesting bird breeding sites.
- If brush matting is essential, then it should be used strategically and sparingly. It should not be used to cover bare sand patches or blowouts at beach-nesting bird sites, particularly on the foredune and base of the dune.
- Ensure brush matting is removed once native plants have regenerated underneath to help return habitat to its original condition.
- If sand drift fencing is needed for dune stabilisation, ensure long sections within bird territories do not have the mesh fabric installed to enable nesting and chick access behind fencing.
- Carry out dune stabilisation works during the non-breeding months (April – July).
- If vehicles are involved, ensure works crew adhere to "Best practice vehicle beach access protocols" prescribed on page 33 during stabilisation works.

- Ensure selected plants are suitable for the site, such as native grasses that are beach-nesting bird friendly (e.g. Hairy Spinifex *Spinifex hirsutus* and Beach Spinifex *Spinifex longifolius)* and maintain habitat suitability.

Beach clean-ups

Litter, discarded fishing line and other marine debris can pose a risk to beach-nesting birds through:

- Direct entanglements that can lead to injury or death.
- Attraction of predators, e.g. scavenging silver gulls, ravens, foxes.

Beach clean-ups carried out to remove litter and debris are beneficial to beach-nesting birds, however if conducted during the breeding season, they can:

- lead to high risks of egg or chick crushing (as cleaners approach the upper beach and dune to collect debris).
- disturbance of nesting birds and their chicks.

Recommendations

- Carry out beach clean-ups during the non-breeding months (April - July).
- If clean-ups are essential during spring and summer, all crew or participants must be informed of the risks to beach-nesting birds and warned to stay below the high-tide mark.
- Maps of known beach-nesting bird breeding sites can be provided to participants, as well as pictures of the birds to help with identification.
- If vehicles are involved, ensure works crew to adhere to "Best practice vehicle beach access protocols" prescribed on page 33 during works.
- Contact can be made with the BNB Team to check if there are active nests/chicks in the planned beach clean-up location.

Beach wrack removal

Beach wrack refers to the natural material that washes up from the sea into the surf zone and onto our beaches. Beach wrack is made up of seagrass, seaweed, and other organic material including both living and dead animals. Beach-nesting birds feed on invertebrates associated with beach wrack. Beach-nesting birds often select breeding sites based on this food availability. Studies have shown that beaches with more wrack tend to have higher densities and diversity of invertebrates,

directly correlating with increased food availability for birds. Along with foraging opportunities, beach wrack also provides critical resting microhabitat for the birds and their chicks.

Removal of wrack from the beach, usually for aesthetic and recreational value, regularly involves large earthmoving equipment. Beach wrack removal can negatively impact beach-nesting birds by:

- Disrupting their habitat and taking away critical resting microhabitat.
- Increasing disturbance of nesting birds and their chicks.
- Increasing chances of direct crushing of eggs or chicks, especially with machinery on the beach.
- Removal/reduction of their food sources.

Recommendations

If wrack removal is necessary for specific reasons (e.g., safety concerns, access), it should be done in a targeted and limited manner, and consider the following:

- Ensure works are not carried out on key beach-nesting bird breeding sites.
- Contact can be made with the BNB Team to check if there are active nests/chicks in the planned wrack removal area.
- Where wrack removal occurs in proximity to known breeding sites, seek to carry out the on-ground works only during the non-breeding months (April-July).
- Liaise with BirdLife Australia's BNB team to establish a work plan that accounts for any active nests or chicks in the area. This will mean that an experienced observer will need to check the area in the lead up to the works.
- If vehicles are involved, ensure works crew to adhere to "Best practice vehicle beach access protocols" prescribed on page 33 during works.

Regional Threat Analysis

Threats to Hooded Plovers and other beach-nesting birds primarily impact breeding success and habitat suitability through both natural and human-induced pressures. While natural threats such as high tides, storm surges, and natural predators, their impacts have intensified due to altered beach morphology and overabundant predator populations thriving in urbanised environments. Human-based threats pose particularly severe challenges because birds have not evolved strategies to cope with these recent pressures, including introduced weeds and predators, off-leash dogs, and direct human disturbance. The following analysis examines local threats that have been documented across the Walpole - Denmark region.

Two levels of threat assessments can be collected during a monitoring visit. A partial threat assessment collects information on the threats that are directly observed (within 100m of the birds) during the monitoring visit. The full threat assessment includes additional information on the evidence of threats that have been present recently at the site, via prints and tracks, within the same area. Table 4 shows the number of each threat assessment types that was collected during these seasons, this ranged for zero threat assessments up to 17 partial and 14 full assessments which were collected at Lights Beach East.

Table 3: Number of partial and full threat assessments collected at sites within the Walpole -Denmark region during the 2023-24 and 2024-25 season.

Walpole-Denmark WA	Partial	Full assessments
Mandalay Beach	2	2
Bellanger Beach	1	1
Conspicuous Cliff	1	0
Freddies Beach	1	1
Beach SW of Peaceful Bay	1	0
Peaceful Bay Swim Beach	1	0
Quarram Beach	1	0
Boat Harbour	1	1
Beach East of Boat Harbour	0	0
Hilliers Beach	0	0
Parrys Beach	2	1
Mazzoletti Beach Middle	3	3
Mazzoletti Beach East	**10**	**10**
Lights Beach West	**10**	**6**
Lights Beach East	**17**	**14**
HP_Back Beach	1	1
Djerrt Mia Bird Sanctuary	1	0
Poddy Shot Bay	0	0

Ocean Beach East Channel	**11**	**9**

Threat assessments collected at all monitored sites over the 2023/2024 and 2024/2025 breeding seasons have been used to provide an overview of the recreational activities that people undertake at Hooded Plover sites in the Walpole - Denmark region. People that were walking, sunbaking and surfing made up the large proportion of recreationalists, while dog walking and fishing were a lot less popular (Table 5).

Table 4: The proportion of people undertaking different recreational activities at Hooded Plover monitoring sites in the Walpole -Denmark region.

Walkers	People Sunbaking	Surfers	Dog walkers	People Fishing	People playing games
36%	35%	17%	9%	3%	0%

To examine how common a greater range of threats are at sites in the Walpole - Denmark region, we examined sites where at least ten partial threat assessments had been collected over the two seasons. These sites are highlighted bold in Table 4. The results are outlined in each individual site profile.

Site Profiles

The following pages provide descriptions of individual sites within the Walpole - Denmark region, and includes the location, site profile, beach morphology, Hooded Plover pair identity (if individuals are banded), key user groups and key threats (if sufficient data is available) specific to each site. The user group and threat data are taken directly from the *MyBeachBird* Portal and can be used to understand each site and ultimately guide management of these important beach habitats.

The sites included below are the sites that have been monitored regularly as part of the program. Sites with a minimum of seven monitoring visits per season include a nesting summary. Site-specific user groups and primary threats are detailed for sites where sufficient data exists. For each of these sites, the highest-ranking threats, up to a maximum of five, are displayed.

Symbols used for threats are as follows:

	**People walking**		**People overall**
	**People sitting/ sunbaking**		**Dogs off lead**
	**Surfers/swimmers**		**Dogs on lead**
	**Dog walker**		**Dog (prints)**
	**People Fishing**		**Passerine (prints)**
	**People playing Games**		**Silver Gulls**

Mandalay Beach

Location: -35.011112, 116.543610

Site Profile: Managed by Department of Biodiversity, Conservation and Attractions, with access via Mandalay Beach Road.

Beach Morphology: The 1.4 km long beach faces southwest, with scattered rocks at the eastern end and a wave-washed granite point bounding the western end. Cliff-top boardwalk provides beach access to this relatively remote site. Beach is backed by dunes with frequent blowouts and extensive areas of bare or sparely vegetated substrate.

Pair Identity: TK (left) and unbanded.

Nesting Success:

Survey years	# Visits	# Nests	# Chicks	Total fledglings
2023/2024	Insufficient data	-	-	-
2024/2025	9	1	0	0

Mandalay Beach entry via boardwalk.

Bellanger Beach

Location: -35.015945, 116.754608

Site Profile: Managed by Department of Biodiversity, Conservation and Attractions with access via Bellanger Road and various other 4 WD tracks.

Beach Morphology: Bellanger Beach forms a 10 km south-facing crescent between a rocky eastern headland and the mouth of Nornalup Inlet to the west, with large dune blowouts punctuating the shoreline.

Pair Identity: Unbanded.

Nesting success: Data collection was insufficient for detailed analysis; however, nesting attempts have been documented at this site.

Temporary site management installed during the second Hooded Plover nest recorded on Bellanger Beach during the 2024-25 season. Photo credit: DBCA.

Conspicuous Cliff

Location: -35.039753, 116.843529

Site Profile: Managed by Department of Biodiversity, Conservation and Attractions accessible via Conspicuous Beach Road.

Beach Morphology: A 1.5 km southwest-facing cove beach bounded by rocky headlands, with a small brook entering near the centre of the site and several dune blowouts backing the shoreline.

Flag ID: JL (right leg)

Nesting success: Insufficient data.

Conspicuous Cliff site looking west across the brook.

Parrys Beach

Location: -35.028275, 117.161987

Site Profile: The western portion of Parry Beach (west of Parry Inlet) is managed by the Shire of Denmark, while the eastern portion falls under the Department of Biodiversity, Conservation and Attractions. This monitoring site encompasses Parry Inlet and the beach west of the inlet.

Beach Morphology: This 1km east-facing beach stretches from rocky outcrops in the south to Parry Inlet in the north, with the site encompassing both the beach and inlet.

Nesting success: Insufficient data, although it is noted as an important site for Red-capped Plover and Pied Oystercatchers with breeding recorded.

Parry Beach in front of Parry Inlet, demonstrating the heavy use of off-road vehicles at this site.

Mazzoletti Beach Middle/Mazzoletti Beach East

Location: -35.016605, 117.202942

Site Profile: Managed by Department of Biodiversity, Conservation and Attractions, with access via Greens Pool or Parry's Beach. Mazzoletti Beach contains two separate sites within the Portal (Middle and East) that have been grouped together in this site profile for convenience.

Beach Morphology: This 6.5 km predominantly south-facing beach forms a gentle curve between Greens Pool (a separate monitoring site) to the east and Parry Inlet to the west, with backing dunes featuring sparsely vegetated areas.

Pair Identity: Unbanded. One chick from this pair was banded but too small to be flagged. Future sightings of a Hooded Plover with only a silver leg band (no flag) will confirm the identity (and survival of) of the Mazzoletti Beach chick.

Nesting Success:

Survey years	# Visits	# Nests	# Chicks	Total fledglings
2023/2024	Insufficient data	-	-	-
2024/2025	10	1	2	0

Key user groups:

			
56%	**23%**	**15%**	**1%**

Key threats:

			
100%	**50%**	**40%**	**30%**

Hooded Plover chick seeking refuge in amongst the tyre tracks along Mazzoletti beach, 2025 (Photo credit: Lisa Nicholson).

Lights Beach West

Location: -35.021427, 117.272751

Site Profile: Managed by Department of Biodiversity, Conservation and Attractions, with access via Lights Beach Access Road.

Beach Morphology: Lights Beach West consists of several small (less than 100m) stretches of coast featuring a brook, scattered rocks, and expansive low-lying dune systems. The site's low elevation makes beach nests vulnerable to flooding, as demonstrated by the inundated 2024-25 season nesting attempt.

Pair Identity: JA (left leg), LN (right leg)

Nesting Success:

Survey years	# Visits	# Nests	# Chicks	Total fledglings
2023/2024	Insufficient data	-	-	-
2024/2025	16	1	0	0

Key user groups:

				
41%	**25%**	**18%**	**14%**	**2%**

Key threats:

		
100%	**33%**	**33%**

Hooded Plover at the brook (top left); JA and LN foraging at the water's edge. Photo credit: John Anderson (top right); Protective site management installed at Lights Beach West, with incubating Hooded Plover to the right. The photograph clearly shows this nest location's susceptibility to inundation. Photo credit: Kirsty Anderson (bottom photo).

Lights Beach (east)

Location: -35.023975, 117.281227

Site Profile: Managed by the Shire of Denmark, with access via Lights Beach Access Road.

Beach Morphology: This 1 km site consists of three distinct beaches east of the Lights Beach car park, all bordered by rocky outcrops and featuring varying widths of sandy beach.

Pair Identity: Unbanded

Nesting Success:

Survey years	# Visits	# Nests	# Chicks	Total fledglings
2023/2024	14	1	0	0
2024/2025	28	1	0	0

Key user groups:

				
37%	**32%**	**16%**	**15%**	**1%**

Key threats:

				
100%	**100%**	**86%**	**64%**	**50%**


Entry to Lights Beach (east), highlighting its popularity as a dog off-leash site.

Djerrt Mia Bird Sanctuary

Location: -35.021271, 117.328476

Site Profile: Managed by the Shire of Denmark. The 'Friends of the Djerrt Mia Bird Sanctuary' (of the 'Denmark Bird Group') install and maintain the temporary fencing and signage for the Djerrt Mia Bird Sanctuary.

Beach Morphology: Located at the mouth of Wilson Inlet where it meets the Southern Ocean at Ocean Beach, the Djerrt Mia Bird Sanctuary occupies a unique estuarine environment. The inlet is separated from the ocean by a sandbar that blocks the opening much of the year, creating a protected refuge for diverse bird species, including beach-nesting birds.

Pair Identity: Several unbanded Hooded Plovers are frequently sighted at Djerrt Mia Bird Sanctuary. The pair that uses Ocean Beach East Channel also use this site. It is an important site for rearing chicks.

Nesting Success:
Although Hooded Plover nesting has not been recorded at this site over the last two years, it has been noted that the Ocean Beach Hooded Plover parents and chick (2024-25) utilised this site whilst the chick was flightless and highly dependent on its parents. The Djerrt Mia Bird Sanctuary has also been recorded as an important Red-capped Plover and Pied Oystercatcher breeding site.

Djerrt Mia Bird Sanctuary with temporary signage and fencing installed (left); Denmark Bird Group Volunteers, Glenda and Judi, assisting at a BNB awareness-raising event (right).

Ocean Beach East Channel

Location: -35.024696, 117.333069

Site Profile: Beach to the west of Wilson Inlet is managed by the Shire of Denmark and to the east of Wilson Inlet is managed by the City of Albany.

Beach Morphology: A 2.5 km southwest-facing crescent beach bounded by rocky headlands. The eastern section becomes isolated during parts of winter and spring when Wilson Inlet is artificially opened, with dunes featuring several large blowouts on the inlet's eastern side.

Pair Identity: KA (right), ZK (right)

Nesting Success:

Survey years	# Visits	# Nests	# Chicks	Total fledglings
2023/2024	16	1	2	0
2024/2025	23	1	1	1

Key user groups:

				
52%	**23%**	**12%**	**11%**	**3%**

Key threats:

				
100%	**100%**	**89%**	**78%**	**67%**

Ocean Beach East Channel dune habitat (left) and 'KA' showing off its new blue leg flag. Photo credit: Dan Lees (right).

Conclusions and Future Directions

Effective conservation of Hooded Plovers, and other beach-nesting birds, in the Walpole - Denmark region requires a comprehensive, multi-faceted management approach that addresses the diverse threats facing this vulnerable species. The following future directions outline priority actions, from community engagement and regulatory enforcement to direct habitat management, designed to create measurable improvements in breeding success of beach-nesting birds.

While the Walpole - Denmark region has a core group of highly dedicated volunteers, land managers and stakeholders, **growing the volunteer numbers and expanding this network** would significantly boost monitoring efforts and ensure more immediate management responses. Concentrating monitoring efforts on 8-10 strategically selected key sites would ensure regular data collection and comprehensive documentation of breeding success rates and threats. This targeted approach should be supported by adaptive management practices including biannual stakeholder meetings and ongoing data reviews.

Current compliance with vehicle and dog regulations in Hooded Plover breeding areas should be assessed, with enhanced enforcement procedures implemented where needed. Priority should be given to **expanding ranger presence during critical breeding periods**, implementing rapid response protocols for disturbance incidents, and **strengthening community education** through improved signage and awareness programs. With several sites lacking permanent shorebird signage, installing educational signs at popular recreational locations is recommended to increase awareness of beach-nesting birds.

Strategic weed removal and feral predator control represent essential conservation interventions for Hooded Plovers. Through staged weed removal and subsequent **native revegetation**, the sparse vegetation structure critical for predator detection and nest site selection can be restored. **Maintaining effective predator control programs** before and during breeding seasons is fundamental to enhancing beach-nesting bird reproductive success.

The expansion of BNB program volunteers and implementation of integrated management strategies requires coordinated effort and sustained commitment from all stakeholders. With sufficient resources, continued partnerships, and community support, the Walpole-Denmark region has the potential to develop an effective BNB program that ensures long-term protection and population sustainability of beach-nesting birds.

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We hope we haven't overlooked anyone. Note this list does not include all the new volunteers and stakeholders who have come on board from 2025. A huge thank you to all those people who have volunteered their time to help with the conservation of beach-nesting birds.

Some of the wonderful Walpole - Denmark regional stakeholders: attending the 2024-25 season debrief in May 2025; assisting with Hooded Plover Banding at Mazzoletti Beach March 2025.

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Thank you

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