A Review of Dog Impacts to Beach-nesting Birds and Management Solutions

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Threats facing Beach-nesting Birds

Beach-nesting birds are a suite of birds including resident shorebirds and migratory seabirds which nest on beaches and estuaries around Australia. Resident beach-nesting birds include, Pied and Sooty Oystercatchers, Hooded Plovers, Beach Stone-curlews, Red-capped Plovers as well as the Tern species. This suite of birds is highly threatened due to their key habitats being those highly favoured by people for recreation and due to the overlap in the timing of the breeding season (typically spring and summer months) with the peak of beach use. Their vulnerability is intensified by their highly camouflaged eggs and chicks, and susceptibility to disturbance.

Beach-nesting shorebirds face a range of threats, of which dogs have been identified as a major threat (Maguire et al. 2008). Among other threats are those of habitat loss (e.g., weed infestations, coastal development, sea-level rise), crushing of the nests and chicks (e.g. by people, horses, vehicles), predators (e.g. foxes, birds of prey) and disturbance (leading to lethal exposure of eggs or chicks, starvation of chicks, or undefended eggs or chicks being predated). Resolving problems associated with invasive species will contribute substantially to the conservation prospects of beach-nesting birds and the most logical place to start is with those under direct human control, such as domesticated animals.

Dogs and their Impacts on Beach-nesting Birds

DISTURBANCE: Domestic dogs are known to chase adult beach-nesting birds (Retallick and Bolitho 1993; Weston and Morrow 2000; BirdLife Australia database 2006-2018) which can lead to prolonged absences from the nest or brood. Chasing and the unpredictable movement, proximity and speed (Burger 1986; Glover *et al.* 2011) of unrestrained dogs are traits that do not promote 'habituation', the process of wildlife learning to reduce response intensities or frequencies with increasing exposure to the stimulus (Lafferty 2001; Sastre *et al.* 2009). Rather, these attributes promote 'sensitization', or enhanced response frequencies or intensities with increasing exposure to stimuli (Glover *et al.* 2011).

Walkers accompanied by dogs often evoke greater responses from ground-dwelling birds than people alone (Sime 1999; Lord *et al.* 2001; Taylor *et al.* 2007; Sastre *et al.* 2009). Glover *et al.* (2011) showed that of eight shorebirds tested, stimulus type (walker, jogger, walker with leashed dog) significantly influenced Flight Initiation Distance (FID) of three species. Excluding joggers, all three species had the highest FID when approached by a person with a leashed dog, rather than by a walker. Lambert and Ratcliff (1979) and Taylor *et al.* (2005) suggest that it is likely that dogs are seen by ground-dwelling birds as much more of a threat than people, as dogs are more likely to catch and kill them or their chicks.

Weston and Elgar (2007) demonstrated that highest frequencies of shorebird nest absences were in response to people accompanied by unleashed dogs, and this was more than double that of people approaching alone or with a leashed dog. Similarly, studies from elsewhere in the world reveal that nesting shorebirds will respond from more than double the distance, flush more frequently and remain off their nests for longer periods when a person was accompanied by a dog than when alone (e.g. Page *et al.* 1977; Yalden and Yalden 1990; Hoopes 1993). Furthermore, chicks are highly sensitive to dog presence on beaches, ceasing feeding from greater distances and spending longer periods in hiding (Hoopes 1993; Weston and Elgar 2005). These disturbances are lethal to the eggs

and chicks when they are for prolonged periods, e.g. a dog is in close proximity for an extended period, or when there are multiple disturbances over the course of the day.

EGG PREDATION: The predatory impacts of domestic dogs are documented for birds worldwide, including devastating impacts on threatened species populations (Taborsky 1988; Diamond 1989; Genovesi and Duprae n.d. in Brickner 2000). Dogs have been observed eating beach-nesting bird eggs in southern Australia (Hanisch 1998; T. Ryan pers. comm.) and eating model (quail) eggs from artificial nests mimicking shorebird nests on beaches (Stojanovic 2008; Weston *et al.* 2012; Cribbin 2012).

EGG CRUSHING: Domestic dogs have been known to partially or entirely destroy shorebird nests, by running over these and crushing the eggs and this includes those protected with symbolic fencing (e.g. Western Snowy Plover nests, cited in U.S. Fish and Wildlife Service 2007; experimental beach-located nests, Weston *et al.* 2012; Hooded Plover nests, B. Baird pers. comm., E.Woehler pers. comm., T. Ryan pers. comm.; BirdLife Australia remote camera data 2010-2011). On average dogs cover more ground than a person walking due to their exploratory movements around the beach (e.g. covering 2.5km on 850 m of beach) and will run into the dunes from the beach 1.5 times per walk on average (Schneider 2013). One dog fitted with a satellite tracker for example moved 33 km in a 3 km stretch of beach (Schneider 2013). This greater use of the upper beach and dune by dogs off leash means that there is a higher likelihood of dogs encountering and crushing and/or predating eggs and chicks. It is also a contributing factor to the higher disturbance elicited by dogs.

CHICK PREDATION: Dogs have also been identified as one of the major contributors to chick mortality of beach-nesting birds. While records of chick fates are rare (as observers are rarely present when the chicks die), there have been repeated observations of flightless shorebird chicks in Victoria and South Australia where they are closely monitored, being chased and killed by off leash dogs (BirdLife Australia database 2013-2018). In addition, necropsies on four Hooded Plover chick bodies have revealed dog attack and trauma/haemorrhaging as the cause of death (Rod Collins Deakin University unpublished necropsies 2014-2018). One of these necropsied chicks was the subject of a radio-tracking study where Tom Schmidt, the Deakin University researcher, tracked the signal to a rubbish bin at the beach entry point, to find the body of the chick hidden at the bottom of the bin in a bag of dog faeces (Schmidt 2017). Unleashed dogs have also been observed killing Piping Plover chicks (Cairns and McLaren 1980; U.S. Fish and Wildlife Service 1996) and New Zealand Dotterel chicks (Wills *et al.* 2003), which are analogous to Australian beach-nesting species.

Managing Dogs on Beaches

As the human population and their companion dogs increase in number, so does the demand for dog access to shared open spaces. For example, of 380 coastal residents in south-eastern Australia, 36.8% owned a dog of which 93.6% took their dog to the beach (Maguire *et al.* 2011). On Australian beaches (90%, Weston and Elgar 2005; 82%, Williams *et al.* 2009) or US beaches (93%; Lafferty 2001), the majority or at least a substantial proportion of dogs are unrestrained, and this includes areas where dogs are not permitted off-leash or at all, such as national parks (88%, 1991-98, Dowling and Weston 1999; 64%, Arnberger *et al.* 2005), recreation reserves (22%, Austria, Arnberger and Eder 2008), wetland reserves (100%; Antos *et al.* 2007) and buffers (68%, Weston *et al.* 2009). Desire for increased access and poor compliance with some management restrictions becomes a major

management challenge for decision makers who must balance the needs of multiple users of public open spaces, as well as the potential for environmental impacts (Johnston et al. 2013; Le Corre et al. 2009; Walsh 2011).

Designation of No dog, On leash and Off leash beaches

Prominent among dog control on beaches are 'no dog' areas, on-leash areas (sometimes constrained seasonally or according to time of day) and dedicated off-leash areas (Weston and Stankowich 2014). Dog management regimes may work in two distinct ways: 1) they may instil desirable on-site behaviour (e.g. leashing at a location) or 2) displace behaviour which is undesirable at one site to a more appropriate location (e.g. where dog walkers travel to designated off leash areas to enjoy leash free dog exercise).

A study by Maguire et al. (2018) revealed that the number of dogs using beaches varied significantly between different management zones, with effective control (off leash but under voice control) areas being visited more frequently and receiving the highest number of dogs compared to year-round on leash areas, and no dog areas receiving a very low frequency of visits. An explanation for use, albeit very low levels, of 'no dog' areas is the tendency for owners of poorly socialised or aggressive dogs to deliberately visit these areas to avoid other dogs. It would appear however that the greatest positive effect of dog regulations may be to divert dog walkers to more appropriate beaches (Maguire et al. 2018).

Compliance and attitudes toward dog leashing

Satellite trackers placed on 155 dog collars as part of a study exploring the differences in space use of dogs in on-leash and off-leash areas along multiple beaches west of Melbourne, revealed no differences in space use between sites and this was because on on-leash beaches the majority of dogs were off-leash (Schneider 2013). Similarly, Maguire et al. (2018) found that regardless of dog management regulations, unleashed dogs were more common than leashed dogs on beaches (overall, 23.8% were leashed of 2,698 dogs observed during the study). Thus, leashing regulations in place to mitigate impacts on threatened beach-nesting birds don't appear to effectively minimize dog impacts.

Dog owners may not leash their dogs because they consider dog exercise important, because leashing is not expected by their peers (social norms), and if they interpret no harm in their dog roaming (Sterl et al. 2008; Williams et al. 2009). In several social studies of beach user attitudes and perceptions, it is apparent that dog walkers significantly differ from non-dog walkers, often underestimating their impacts on threatened species such as the Hooded Plover, and expressing discontent at regulations and exclusions as a whole (Williams et al. 2009; Maguire et al. 2013).

When comparing sites under differing prevailing dog management, compliance with regulations was highest at 'no dog' sites with 82% compliance on average, and the lowest rates of compliance occurred at year-round on-leash areas with only 21% compliance on average (Maguire et al. 2018).

No dog areas are most effective at protecting shorebirds

Overall, the higher compliance evident in 'no dog' areas in comparison to areas maintaining on-leash access (albeit in some areas with seasonal or temporal restrictions), poses an interesting conundrum in terms of required levels of protection for sensitive wildlife areas. Long-term conservation programs for beach-nesting birds, for example, focus on achieving coexistence between recreation and wildlife, i.e. dogs must be leashed when using beaches where the birds breed. The observed low compliance with leashing regulations across multiple studies however suggests this is an ineffective

approach. The alternative is to prohibit dog access from these sensitive beaches, however this must be approached carefully and coupled with education to ensure community conflict does not arise (Johnston et al. 2013). One part of the solution is to ensure adequate provision of alternative off-leash areas to divert users away from environmentally sensitive areas.

Public perception of beach management

In a study of beach use and preferences of coastal residents in south east Australia, Maguire et al. (2011) revealed high levels of dissatisfaction at current beach management. The most common suggested improvements were around implementing and enforcing regulations, and improved zoning of activities on beaches, primarily appropriate allocation of zones for activities such as dog walking. There were distinct groups of people wanting dog free access versus those wanting increased off leash access (Maguire et al. 2011). The implementation of education and enforcement strategies is likely to alter the comparative effectiveness of different dog regulations. Delivery of education can occur in many forms from passive information brochures and website information, to targeted community events such as 'Dogs Breakfasts' and one-to-one liaison with a ranger or education officer, the latter, more engaging options being preferred by most survey respondents (Maguire et al. 2013).

Changes for successful outcomes

BirdLife Australia has worked extensively with councils across Victoria and South Australia to improve dog regulations on Hooded Plover breeding beaches. We have seen significant improvements in Hooded Plover, a southern beach-nesting bird species, breeding success when off leash dogs have been minimised or prohibited from areas. An example is the prohibition of dogs from the Mornington Peninsula National Park in 2016, where fledgling production doubled in comparison to the decade prior and tripled when compared to the three seasons immediately prior. In numerical terms this took the average from 6 fledglings for 28 breeding pairs (in one season as few as a single fledgling was produced), to 12.5 fledglings after the changes were implemented.

Furthermore, birds that occupied some of the worst impacted beaches where numbers of dogs off leash were highest, produced fledglings where they had had zero success in over a decade.

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