

Kelp Gulls as predators of large African Penguin chicks: observations at Possession Island, Namibia

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Large *Larus* gulls are well known predators of the eggs and chicks of other seabirds (Burger & Gochfeld 1994). The South African Kelp Gull *L. (dominicanus) vetula* is generally acknowledged to be a predator of the eggs and chicks of local seabirds (e.g. Cooper 1974; Crawford et al. 1982). However, little information has been published on their predatory capacity and capabilities (e.g. Williams 1990). Here we document observations on the predation of large African Penguin *Spheniscus demersus* chicks at Possession Island, Namibia, in the 1991–92 austral summer breeding season.

On two occasions we had evidence of Kelp Gulls being able to carry penguin chicks which weighed 1.1 kg. This is heavier than the maximum recorded weight, 1.047 kg, of any southern African Kelp Gull and 200 g heavier than the mean weight of 924 g for this gull species (Maclean 1985). On the first occasion, a marked chick which weighed 1.125 kg was found three hours later, 130 m from the colony, with marks that indicated that the gull had dragged the chick at least the last 30 m.

On the second occasion, a Kelp Gull was seen to seize a marked penguin chick whose weight the previous day had been 1.1 kg. The gull hovered over the chick and seized the chick by its head. Then, flying low at up to 3 m off the ground, the gull carried the chick a short distance before dropping it. It did this

twice until the chick was 50 m clear of the penguin colony. The gull was chased off. The chick was still alive and, seemingly, little damaged. It was returned to its nest site but was found dead the next day.

The Kelp Gull population at Possession Island increases from some 700 birds during the austral winter to some 1700 during the breeding season. Peak predation by gulls on other seabirds at the island occurs in February when newly fledged gulls join adults and are quite brazen. Many healthy, attended penguin chicks are lost in this season.

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"It should be a fantastic parrot. It cost an arm and a leg."

Seabirds are not tasty to all Cape Fur Seals

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Cape Fur Seals *Arctocephalus pusillus pusillus* have been observed to prey on seabirds on various occasions and at varying intensities around South African and Namibian islands. The seabirds that mainly fall prey to these seals are the African Penguin *Spheniscus demersus*, Cape Gannet *Morus capensis*, Cape Cormorant *Phalacrocorax capensis*, Crowned Cormorant *P. coronatus* and Bank Cormorant *P. neglectus* (Cooper 1974; Shaughnessy 1978; Rebelo 1984; Marks et al. 1997; Navarro 2000; Crawford et al. 2001; Ward & Williams 2004; David et al. in press; Du Toit et al. submitted). Three of these species are listed as Vulnerable (Barnes 2000). Therefore, considering that the total seal population exceeds one million, featuring on the seals' menu could have serious implications for a seabird's conservation status.

In Namibia, important seabird colonies are within foraging distance of four large seal breeding colonies (Van Reenen, Atlas and Wolf bays, and Cape Cross). Together these colonies comprise more than half a million seals, roughly two thirds of the Namibian population. Analysis of nearly a thousand seal scats (faeces), collected at these colonies over one year, yielded only two scats, collected at Cape Cross, with seabird remains in them (<0.1%). The remains (feathers) were identified as belonging to an African Penguin and a juvenile of one of the cormorant species (either Cape or Bank Cormorant). Adult female seals are found at the colonies nearly year-round, alternating regular foraging trips at sea with shore visits to their pups, therefore the majority of the scats collected were probably deposited by them. The results indicate that adult females have little or no taste for seabirds.

Adult males are found in large numbers only during the breeding season at three of

the colonies, and they mainly fast at this time. However, at Cape Cross, large numbers of males can be found at most times of the year, because this colony serves as both a breeding and a resting site. It is therefore quite possible that the couple of scats that were seabird positive at Cape Cross were deposited by male seals. Other studies have indicated that seabird predation is concentrated around seabird colonies, and is perpetrated by only a handful of individual male seals, mostly sub-adults or adults, that have specialized in this predatory technique (e.g., Navarro 2000; Du Toit et al. submitted). To reduce the incidence of seabird predation, it seems that the only effective measure is to cull the 'outlaws', and not to reduce the entire seal population.

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Do Turnstones prey on seabird eggs in southern Africa?

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Ruddy Turnstones *Arenaria interpres* are common migratory visitors to southern African shores where some nonbreeding individuals remain throughout the year. Elsewhere they are well established as predators of tern and gull eggs. The Turnstones walk near the tern or gull colony and, if they see an exposed egg, run in, tap a hole in it, and quickly suck up the contents.

Turnstones have been recorded preying on eggs of ground-breeding Sooty Terns *Sterna fuscata* and Greybacked Terns *S. lunata* in Hawaii (Crossin & Huber 1970), Common Terns *S. hirundo* and Royal Terns *S. maxima* in North America (Loftin & Sutton 1979; Morris & Wiggins 1986), Common Gulls *Larus canus* and Common Terns in Europe (Brearey & Hilden 1985), and of Slenderbilled Gulls *Larus genei* in north-western Africa (Von Westernhagen 1968). Based on the species whose eggs have been predated elsewhere, Turnstones would, in southern Africa, be capable of preying upon the eggs of Damara Terns *Sterna balae-narum*, Roseate Terns *S. dougallii*, Swift Terns *S. bergi* and, potentially, Caspian Terns *S. caspia*, and on the eggs of Hartlaub's Gulls *Larus hartlaubi*, Greyheaded Gulls *L. cirrocephalus* and, potentially, Kelp

Gulls *L. (dominicanus) vetula*. There is no indication that Turnstones would prey on guarded eggs of penguins, gannets or cormorants, although this cannot be precluded.

Despite the numbers of Turnstones that occur in southern Africa, predation of tern and gull eggs has not been reported. Is this because nobody has looked for it or because it doesn't happen?

Opportunities to witness Turnstone predation on tern or gull eggs is certainly limited in southern Africa. The majority of terns and gulls breed on island nature reserves to which access is substantially restricted. The lucky few who have access to the islands are generally focused on the colonies of larger seabirds. They generally avoid, or spend minimal time near, the tern and gull colonies because these birds are readily disturbed, giving Kelp Gulls a chance to prey on their eggs or chicks. It is thus possible that predation of eggs by Turnstones could be occurring without being seen and reported.

There may be factors that reduce the likelihood of Turnstones preying upon eggs in southern Africa. One factor may be the richness of the inter-tidal areas at the islands where terns and gulls breed. The rocky shores of southern African islands probably

provide richer invertebrate food resources for Turnstones than the sandy shores where most Turnstone predation of eggs has been reported. Additionally, guano from other seabirds at the islands should provide richer invertebrate feeding opportunities than at localities elsewhere (Bosman & Hockey 1986). Rich and easily available invertebrate food may keep Turnstones along the shore and less likely to visit tern or gull colonies in southern Africa.

However, Turnstones are established generalist and opportunist foragers, therefore predation of eggs is likely to occur in southern Africa and has just not been reported so far. I forecast that the most likely time for Turnstone predation on eggs in southern Africa is in February to March. This is when Turnstones need to put on fat prior to their return migration to far-northern breeding areas. It is also the height of the dry season in western parts of southern Africa (where most regional seabirds breed) and eggs may provide a useful source of water. February and March coincide with the initial breeding period of Hartlaub's Gulls and Swift Terns. Further, observations in North America indicate that eggs laid early in the breeding season are particularly vulnerable to Turnstone predation (Morris & Wiggins 1986).

Only persistent watching, ideally from a

hide, is likely to reveal whether Turnstones prey upon the eggs of southern African seabirds. This is a potential project for students visiting Robben Island where there is often a large breeding colony of Swift Terns and Hartlaub's Gulls. It could usefully be part of a broader project to document causes of brood failure in these species.

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"Can you do anything to stop him chasing ambulances?"

The lower Berg River wetlands as a roost site for coastal birds

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This article is in response to an article in BN about the importance of counting birds at roosts (Harebottle & Wheeler 2004).

Due to an exceptionally early start to the Summer 2004 Coordinated Waterbird Count on the Berg River, the counters on Section 2 (Cerebos Pans to the Berg River mouth) found birds in numbers not normally recorded, for example, 937 Common Terns *Sterna hirundo* and 740 Cape Cormorants *Phalacrocorax capensis*.

The conclusion was that these, especially the terns, may be using the area as a night roost. On previous counts, skeins of Cape Cormorants were seen flying down-stream before counting was scheduled to start. The Winter 2004 count was a late start and the counters on Section 1 (bridge to mouth) found, at midday, 11 000 Cape Cormorants roosting on the piers and the beach between. While carrying out regular winter counts of the terns, it was observed that the islands and roadways amongst the salt pans were filled with Cape Cormorants after sundown, with additional birds carrying on further up-stream.

Table 1. Numbers of Cape Cormorants counted on 20 August 2004 at the river entrance of Port Owen.

Time	Cape Cormorants
17:00–17:15	1 500
17:15–17:30	2 300
17:30–17:45	2 400
17:45–18:00	3 500
18:00–18:15	4 900
18:15–18:30	7 400
18:30–18:45	2 600
Total	24 600

On the evening of 20 August 2004, my wife and I parked at the river entrance of Port Owen and, over a two-hour period, counted the skeins of Cape Cormorants as they flew past (Table 1). In addition, 100 White-breasted Cormorants *Phalacrocorax lucidus* were also counted.

The combined population of Cape Cormorants of South Africa and Namibia was estimated to be 216 000 birds (Wetlands International 2002). This count represents 11.2% of that total population. The average South African population estimated for the period 1994/95 to 1999/2000, was 81 000 birds (Marine and Coastal Management). This count represents 30.4% of that total.

The flight path was interesting. Birds could be seen flying along the coastline and turning sharply between the piers, following the course of the river, but at high tide, when the marsh was flooded, they changed course and flew directly over the flooded area. The White-breasted Cormorants did not follow the river but cut the bend by flying over the marsh, enabling the two species to be counted separately.

The mass of roosting birds on the islands and road ways did not consist solely of Cape and White-breasted cormorants; there were also Great (Eastern) White Pelicans, herons and egrets, Darters, Hartlaub's and Kelp gulls, Swift, Common and Sandwich terns, indicating that the wetlands of the lower Berg River are important both as a feeding area during the day, and as a safe sanctuary for many more birds at night, at least during the winter.

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Lesser Flamingo breeding attempt at Kamfers Dam, Kimberley

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The Lesser Flamingo *Phoeniconaias minor* has a fairly widespread distribution in southern Africa (Williams & Velásquez 1997). The population has been estimated at 40 000 (Simmons 1997), 55 000 (Cooper & Hockey 1981) and 60 000 birds (Del Hoyo et al. 1992; Williams & Velásquez 1997). It has been suggested that the southern African population has decreased since the early 1980s by about 15 000 birds or 27% (Simmons 1996, 1997).

In southern Africa, Lesser Flamingos breed at Sua Pan in Botswana (Hancock 1990; McCullough & Irvine 2004) and Etosha Pan in Namibia (Berry 1972; Simmons 1996, 1997). At least 12 breeding attempts at sites in South Africa have been unsuccessful (e.g., Uys & Macleod 1967; Brooke 1984) and it is unlikely that South Africa has suitable wetlands for mass breeding (Simmons 1996, 1997; Anderson 2000a).

Large numbers of Lesser Flamingos fre-

quent Kamfers Dam (2824DB), a perennial wetland located just north of Kimberley, South Africa. Since 1991, bi-annual surveys of the dam's flamingos and other waterbirds have been undertaken (Anderson 2000a) while latterly (since November 1995), monthly surveys of the flamingos have been undertaken (Anderson unpubl. data). Kamfers Dam supports large numbers of Lesser Flamingos, with 19 566 individuals counted in October 1998 (Anderson 2000a), 57% of the southern African population (Simmons 1996). More recently (June 2003), c.36 000 Lesser Flamingos were counted, c.95% of the southern African population (Anderson unpubl. data; Fig. 1).

On 24 January 2004 c.14 500 Lesser Flamingos and c.530 Greater Flamingos were present at Kamfers Dam. It was also noted that c.2000–2500 nests were present at the southeastern corner of the Dam (Fig. 2). Two newly constructed nests contained added

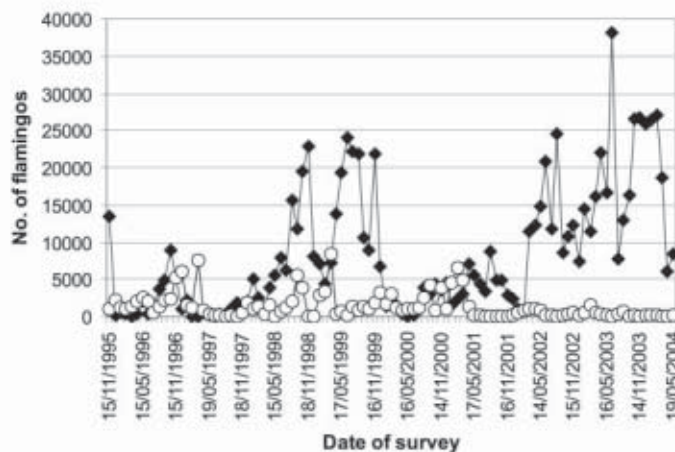


Figure 1. The number of Lesser Flamingos (diamonds) and Greater Flamingos (circles) counted at Kamfers Dam between November 1995 and May 2004.



Figure 2. Large numbers of nests were present at Kamfers Dam during the water-bird survey conducted on 24 January 2004.



Figure 3. Two of the nests contained eggs, presumed to belong to Lesser Flamingos.

eggs (Fig. 3). The eggs were collected, measured (50.6×81.8 mm; 54.1×88.6 mm) and deposited in the egg collection of the McGregor Museum, Kimberley. Their dimensions suggest that they belong to Lesser Flamingos.

Lesser Flamingos have previously constructed nests at Kamfers Dam, at the southeastern and the northwestern corners of the dam. On 24 January 2004, it was noted that the nests in the northwestern corner of the dam (which previously numbered several hundred) had all but disintegrated. In the southeastern corner, both weathered and newly constructed nests were present. Despite nest-building, only on one previous occasion had egg-laying taken place. On 31 March 1994, six addled eggs were collected (Anderson 1994a), with their measurements indicating that they belonged to Greater Flamingos (87.4 ± 6.0 , 54.7 ± 1.5 mm). In contrast to the Lesser Flamingo, the Greater Flamingo breeds more regularly at sites other than Sua and Etosha pans in southern Africa (e.g., Boshoff 1979; Daneel & Robertson 1982; Anderson 2000a).

It is not clear why Lesser and Greater Flamingos do not complete their breeding attempts at Kamfers Dam. Disturbance by dogs and humans, as well as an often rapidly receding water level, may be responsible (Anderson 2000a). In order to solve these two problems and perhaps promote breeding of flamingos, Anderson (1996) proposed that

a flamingo breeding island should be constructed. Recent concern has also been expressed about Kamfers Dam's deteriorating water quality and its possible effect on flamingos (Van Niekerk 2000; T. Szep in litt.). Independent studies by Prof. Val Beasley (Department of Veterinary Biosciences, University of Illinois) and co-workers, and T. Szep (College of Nyiregyhaza, Hungary), M.D. Anderson and S.E. Piper (School of Botany & Zoology, University of Natal) will commence in the near future to study the health of Kamfers Dam's flamingo population and water quality effects on these birds.

Elsewhere in southern Africa, flamingos are threatened by a variety of factors, including soda ash and salt mining, disturbance by low-flying aircraft, collisions with fences and utility lines, fluctuating water levels, pollution of wetlands, and human interference (Hall 1983; Brooke 1984; Aves 1992; Simmons 1996, 1997; Williams & Velásquez 1997). As a result, both the Lesser and Greater Flamingo are listed as Near-threatened (Anderson 2000bc). The Lesser Flamingo is also listed as globally Near-threatened (Collar et al. 1994).

Kamfers Dam is an important site for flamingos (Anderson 2000a) and other waterbirds (e.g., Anderson 1994b). As such it is recognized as a Natural Heritage Site (Anderson & Koen 1994; Abrahams & Anderson 2001a) and an Important Bird Area (Barnes & Anderson 1998), but a submission for recognition of the wetland as a Ramsar

site was not successful (Abrahams & Anderson 2001a, J.H. Koen in litt.). Kamfers Dam and its flamingos are a dominant feature of Kimberley's landscape. The magnificent spectacle of thousands of pink and white birds, against a backdrop of an urban skyline, is used in many tourism marketing documents. Kamfers Dam is therefore important for ecotourism (Abrahams & Anderson 2001b; Abrahams & Anderson 2002; Biggs et al. 2003a,b; Anderson & Biggs 2004), especially in view of the recently completed Kimberley bird guide project (Biggs et al. 2003a,b; Anderson & Biggs 2004). The conservation of the dam's flamingos is therefore important, not only for the tourism and economic benefits to the city, but also in terms of conserving the southern African population of, in particular, the Lesser Flamingo. Successful breeding by both Lesser and Greater Flamingos at Kamfers Dam would improve the value of Kamfers Dam, both for tourism and conservation.

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Forget the stork – delivery by duck

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European tradition has White Storks delivering human babies. This obviously isn't true (or maybe the decline in stork numbers is due to over-work!). On the other hand ducks, and some other waterbirds, may well be responsible for "delivering babies", but in this case, baby wetland plants and small animals.

Recent studies in Europe and North America have shown that waterbirds do not convert everything they eat and that viable seeds and invertebrate eggs may pass through their digestive systems to be excreted in their faeces. One result is that seeds or eggs may be transported from the wetland where a bird fed to other wetlands some distance away.

To date, the plants whose seeds may be viable after duck delivery are from widespread wetland plant genera: *Potamogeton* pond weed, *Carex* sedges, *Scirpus* rushes, *Sparganium* bur-reeds, *Salix* willows, *Polygonum* (= *Persicaria*) knotweed, *Ranunculus* wetland buttercups, and *Ruppia* (Mueller & Van der Valk 2002; Figuerola et al. 2003).

Transport of invertebrate eggs by waterbirds seems less common, but it has been

shown that eggs of *Cladocera* water fleas and of Corixidae water boatmen, as well as statoblasts of freshwater bryozoans, can all be viably transported by waterfowl (Figuerola et al. 2003).

Not all waterfowl act as delivery agents to the same extent. Most effective are the omnivorous or herbivorous dabbling waterfowl, e.g. Mallard, Pintail, Shoveller, Teal, and Coot. These species ingest vegetation, or filter ooze, which contains seeds or eggs. The particular species so far studied in the northern hemisphere do not occur naturally in southern Africa but there are related local species occupying equivalent ecological niches. These are, respectively, the Yellow-billed Duck, Cape Shoveller, Red-billed Teal and Cape Teal and Red-knobbed Coot. Ducks that feed on invertebrates, e.g., Goldeneye, and Wood Duck, consume far less plant material and the seeds and eggs that may be held on or within it.

Seeds and eggs are more likely to remain viable after bird consumption if they are excreted within twelve hours of being eaten,

but some, in progressively smaller numbers, may be retained and remain viable for up to a day or more. The period that seeds and eggs are held within the bird probably relates to frequency of feeding. A bird eating often will pass excreta frequently, whereas a bird travelling, especially on migration, may go for some time without feeding and so excrete at less frequent intervals. Comparative studies of fruit-eating bats and birds indicate that, whilst bats freely excrete when in flight this, fortunately for us diurnal humans, is less common in birds. Probably after a long flight, excretion occurs again only once a bird has started to eat at its new destination.

It follows that most bird-transported seeds and eggs will be deposited close to where the bird ingested them either in the same wetland or in another wetland within a short flight distance. However, when seeds or eggs are consumed shortly before a longer, e.g. migratory flight, they may be transported considerable distances. Since the viability of ingested seeds and eggs decreases with increasing time inside the bird, it follows that most transport of viable material will be within the first six hours after ingestion. As ducks can maintain flight speeds of 60 km/h, this indicates dispersal of up to 360 km. Radio-tracked ducks in Europe are known to travel up to 1240 km within 24 hours, indicating a maximum range for dispersal of viable seed and eggs.

The average number of viable eggs or seeds transported by an individual duck at any one time is small, i.e., five. This may seem unimportant as a means of dispersal. However, a single duck has been estimated to transport between 5000 and 10 000 seeds within a three-month period (Mueller & Van der Valk 2002). Multiply this by the number of ducks within a region or flyway and the potential for the establishment of viable seed at distant wetlands becomes significant.

When seeds or eggs are transported to other wetlands where the same species already occur, duck delivery may not be ecologically significant, though it may be

genetically so. Duck delivery becomes ecologically important when the birds transfer eggs and seeds to wetlands where these plant or animal species do not already occur. On the local scale, this may be between existing pools and newly-created, post-flood pools within the same or adjacent riverine systems. On a wider scale, this may help diversify newly restored wetlands, as in the prairie pothole area of North America. In a southern African context, "duck delivery" could lead to establishment of wetland species at newly created farm dams, or at vleis after irregular flooding.

In a Western Cape province context, the distance between regional wetlands is mostly within the 60 km range in which there is a higher probability of viable seeds or eggs being deposited. In a wider context, several local waterbird species migrate regularly to other regions. These include the vegetarian/omnivorous Redknobbed Coot and the South African Shelduck, both of which could be "deliverers", and the Southern Pochard which, being invertivorous, is less likely to "deliver". Elsewhere in southern Africa, the Pygmy Goose and the whistling ducks, omnivores which are nomadic between seasons or years according to which systems are in flood, are likely candidates for propagule dispersal.

The field is open for a southern African student to work on this scientifically "hot" issue in terms of purely southern African species. If, in the future, you see somebody going around wetlands and carefully scooping up and bagging waterbird poop, it may not be a heat-struck loony but a researcher investigating waterfowl delivery!

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