

Short communication

Assessing conservation priorities in the Benguela ecosystem, South Africa: analysing predation by seals on threatened seabirds

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Abstract

Cape fur seals (*Arctocephalus pusillus pusillus*), a protected species, have become abundant in the Benguela ecosystem off the west coast of southern Africa (present population size about 1.5–2 million animals), and are killing substantial numbers of red data book species of seabirds (African penguin *Spheniscus demersus*, Cape gannet *Morus capensis*, Cape cormorant *Phalacrocorax capensis*, bank cormorant *P. neglectus* and crowned cormorant *P. coronatus*). The decision has been taken to reduce the impact of seal predation by selectively culling seals which are witnessed killing seabirds. Between 1993 and 2001 a total of 153 seals, which were killing fledgling gannet chicks, were culled.

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1. Introduction

Abundant protected marine mammals can impact threatened seabird species through predation. In the Benguela ecosystem off the west coast of southern Africa, predation by Cape fur seals (*Arctocephalus pusillus pusillus*) on seabirds has been known for several decades, but was thought to be carried out by a few “rogue” seals, which are opportunistic predators. This predation was believed to be occasional and not to have a significant effect on bird populations. However, recent research has revealed that predation is extensive around several seabird colonies and could be detrimental to these species.

At least five species of seabird in the Benguela ecosystem are known to be killed by seals, including African penguin (*Spheniscus demersus*), Cape gannet (*Morus capensis*), Cape cormorant (*Phalacrocorax capensis*), bank cormorant (*P. neglectus*) and crowned cormorant (*P. coronatus*). These species breed only in South Africa,

Namibia and southern Angola and all are classified in terms of criteria of the World Conservation Union (IUCN) as threatened or near threatened (Barnes, 2000). The reasons for this threatened status become clear when one considers that the penguin population declined by 90% since 1910 (Ellis et al., 1998), the gannet by 30% between 1956 and 1996 (Barnes, 2000) and the bank cormorant by 44% since 1980 (Crawford et al., 1999).

By contrast, Cape fur seals are now abundant in the Benguela system, having increased from a low level at the start of the 20th century to about 1.5–2 million animals at its close (Butterworth et al., 1995). Seals were severely reduced by indiscriminate killing from the early 17th to the late 19th centuries, and only acquired legal protection in 1893. During that period at least 23 island colonies became extinct (Shaughnessy, 1984). Controlled harvesting of seals was carried out in South Africa from the early years of the 20th century until 1990, when it was stopped by government, during which time over 2.5 million seals were killed (Wickens et al., 1991).

Regular population censuses of the Cape fur seal by means of comprehensive aerial surveys of all breeding

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colonies began in 1971. From then up to 1993 the average population growth was about 3.5% p.a. (Butterworth et al., 1995). The population size in 1893 is unknown and, therefore, the rate of growth from the date of protection up to 1971 cannot be estimated. It is interesting, however, that the post-1971 seal population expansion was achieved in the face both of the strong growth of the South African commercial fishing industry, which was established in 1948, and of the continuation of legal harvesting up to 1989.

The diet of Cape fur seals has been investigated by means of shipboard surveys involving the collection of seals at sea on the offshore feeding grounds since 1954. Rand (1959a) collected 245 seals from 1954 to 1956 and 1647 seal stomachs were examined by Marine and Coastal Management (MCM: formerly Sea Fisheries Research Institute, Cape Town) from 1971 to 1990 (David, 1987a; Lipinski and David, 1990; Punt et al., 1995). Examination of stomach contents showed that they eat mainly fish and squid, with minor quantities of crustaceans. The most important species in the diet were the commercially important sardine (*Sardinops sagax*), anchovy (*Engraulis capensis*), horse mackerel (*Trachurus trachurus capensis*) and two species of hake (*Merluccius capensis* and *M. paradoxus*) (Rand, 1959a; David, 1987a). In Namibia, the non-commercial pelagic goby (*Sufflogobius bibarbatus*) was the dominant prey (David, 1987a). It was very rare to find any evidence of predation on seabirds, as only two stomachs containing bird remains were found in 1647 examined.

This evidence implies that seabirds are not a normal prey item of seals on the offshore foraging grounds. Neither did Rand (1959b) mention predation by seals when discussing the high survival rate of fledged Cape gannet chicks on the six gannet breeding islands in southern Africa. However, occasional predation around seabird colonies was reported as long ago as 1937 (Rand, 1959a) and by others (Bourne and Dixon, 1973; Rebelo, 1984; Crawford and Cooper, 1996). Cooper (1974) witnessed frequent predation by seals on adult penguins around Dassen Island in 1971–1972 and it may be that regular predation around the colonies was a normal occurrence, but escaped attention due to the paucity of observers. Recently, predation on seabirds has been confirmed around six islands in South Africa and five in Namibia.

2. Results and discussion

The most recent data (Table 1) show that for penguins, gannets and Cape cormorants this predation is substantial (MCM unpublished data; Marks et al., 1997; Crawford et al., 2001) and, in particular, is believed to be unsustainable on the small penguin colony at Lamberts Bay (Fig. 1), which is predicted to

become extinct by the year 2011, if the present rate of predation continues (Crawford et al., 2001).

Around Malgas Island, where fledgling gannets take their maiden flights from January to March each year, seals lie in wait to attack the unwary birds when they land in the water. This predation was monitored in 1991, 1993, 1996 and 1999–2001. During the November 2000 to March 2001 fledging season, it was estimated that at least 4785 fledged gannet chicks were killed by seals out of an estimated chick production of 64 500 (7.4%). Given the poor conservation status of the gannet, in order to reduce this mortality, the South African government implemented a seal culling programme in 1993. Only seals witnessed attacking gannets were culled. In total, 153 seals around Malgas Island were killed between 1993 and 2001.

One of the objectives of the cull was to investigate whether seabird mortality could be reduced by removing the offending seals, which could indicate that specific individuals had learnt to prey on seabirds. During the first year, in February/March 1993, there was no change in the kill rate of gannet chicks by seals, which remained at about seven chicks/h both pre- and post-culling. However, a post-culling reduction in mortality was achieved in 1999 and 2000. In February/March 1999 the kill rate of gannet chicks was reduced from 7 to 2.25 per hour and in February/March 2000 from 8.5 to 1.5 per hour.

Examination of 94 seal carcasses revealed that all were juvenile or subadult/adult males aged 2–10 years. The probable explanation for this is that most mature females have a dependent pup and must make regular feeding trips to sea alternating with visits to the colony to feed their pup. Hence, females are more focussed in their foraging efforts than males. Their trips normally last from a few days up to about 2 weeks, depending on the availability of food. They swim to the nearest known feeding ground and return as quickly as they can to their pup, which must meanwhile survive on its accumulated blubber reserves (Rand, 1967; David and Rand, 1986; David, 1987b).

Protecting species from extinction may require inter-ventive management, such as the removal of problem predators. Where seal populations are abundant or depleted they may require special management measures. For example, the question of culling abundant marine mammals, which may potentially compete with humans for valuable fish resources has recently been raised (Yodzis, 2001). On the other hand, in the case of a declining species, special commercial fishery mitigation measures may be necessary to assist its recovery, as in the case of the Steller sea lion (*Eumetopias jubatus*, Thomas and Thorne, 2001).

Marine and coastal ecosystems are increasingly under threat of disruption and degradation by mankind's activities (Jackson et al., 2001; Pimm et al., 2001). Cases

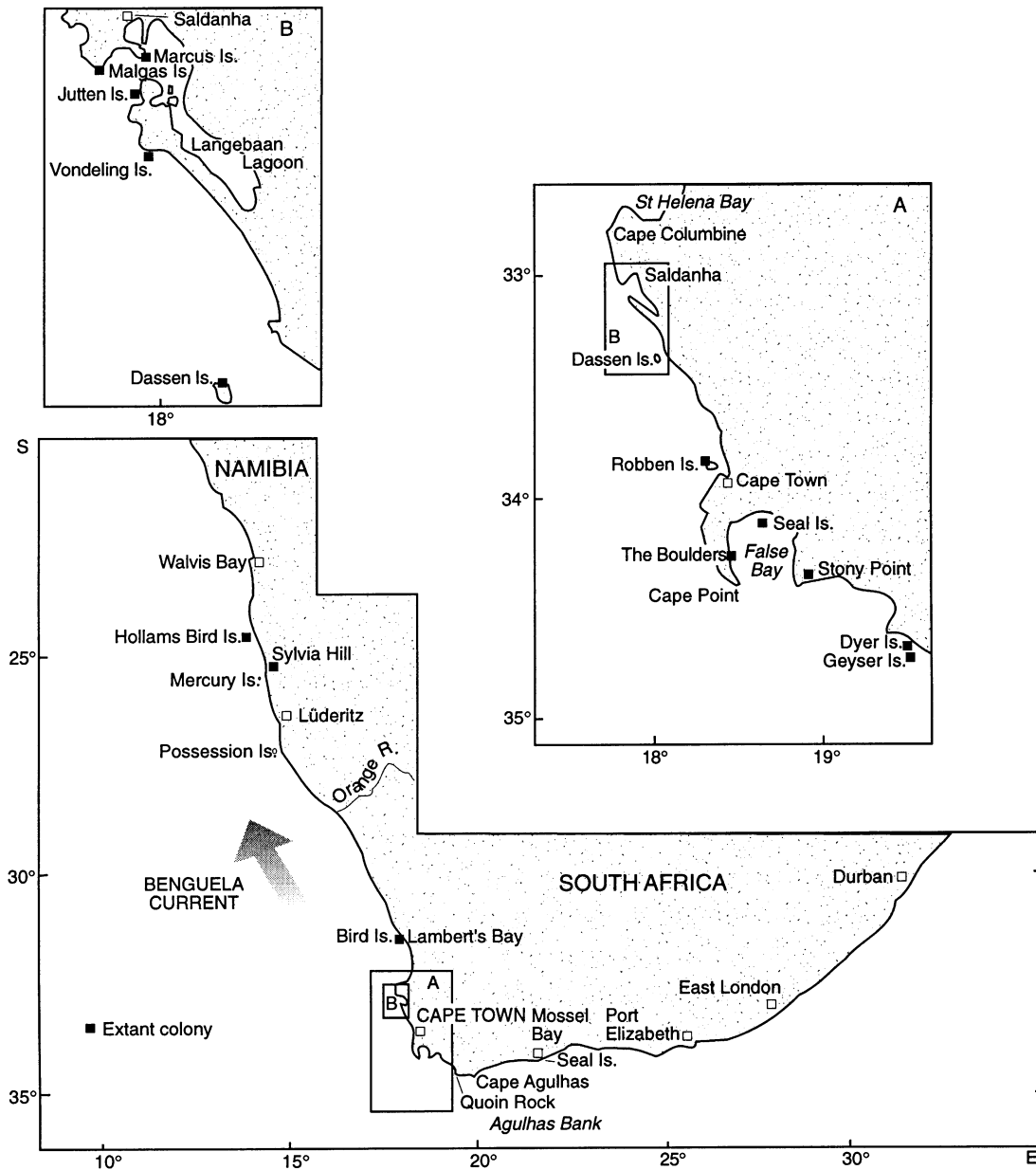


Fig. 1. Map of the southern African coastline showing African penguin breeding locations.

where abundant mammals can impact threatened species through predation illustrate that unexpected difficulties may complicate seemingly simple conservation issues and highlights the need to progress towards ecosystem-based management. Marine mammals and birds attract public interest and funds for conservation (Malakoff, 2001). They also draw our attention to the vexed question as to which species, if any, deserve priority in marine ecosystem management.

In the Benguela ecosystem, because of the favourable conservation status of the Cape fur seal and the unfavourable status of several seabird species, the decision has been taken to reduce the impact of seals which prey on seabirds by selectively culling some seals and taking

measures to prevent seals displacing seabirds from breeding sites, such as on Mercury Island, Namibia (Crawford et al., 1989).

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