



going
up...

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Cape Cormorants extend their range

The Benguela upwelling ecosystem off the west coast of southern Africa is one of the most productive coastal regions in the world. Strong winds blowing along the coast drive the upwelling of cold, nutrient-rich bottom waters, which promotes large blooms of diatoms and other phytoplankton. Historically, these blooms supported vast schools of sardine and anchovy, but overfishing caused the stocks of these species to collapse in the 1960s and their recovery has been limited by ongoing fishing pressure.

Off South Africa, a combination of changing environmental conditions and continued fishing on the west coast has seen a marked shift in the distribution of small pelagic fish from the west coast to the south coast over the past two decades. This has disadvantaged the local seabirds because there are few breeding islands along the south coast. Cape Cormorants are more flexible both in terms of their breeding sites and their diet than African Penguins or Cape Gannets, but still their numbers in South Africa have

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almost halved from about 107 000 pairs in the late 1970s to some 57 000 pairs in the early 2010s.

This decrease occurred at west coast colonies, with the number of pairs breeding from Robben Island eastwards almost doubling over the same period (see Crawford et al. 2016, *Afr. J. Mar. Sci.* 38: 373–383). They haven't colonised the islands in Algoa Bay to the same extent that penguins and gannets have, but their numbers are creeping up there and some 7000 pairs now breed on Robberg Peninsula near Plettenberg Bay. Currently, some 70 per cent of the South African population breeds at Dyer Island, which is the single most important site for the species in the world.

We've known for some time that Cape Cormorants breeding off the west coast have to work harder than those at south coast colonies. Adults provisioning small chicks have longer foraging trips, travel farther from their colonies and make more dives than adults breeding on Dyer Island (Hamann et al. 2012, *Afr. J. Mar. Sci.* 34: 233–240). Further evidence of the poor feeding conditions experienced off the west coast comes from the first observations of Cape Cormorants attempting to steal bait from handlines. During

winter 2014, flocks of up to a hundred gathered at snoek boats fishing around Dassen Island and in St Helena Bay.

Namibia suffered even more from overfishing, because its ambiguous political status prior to independence allowed nations from all over the world to fish in its waters. The pelagic fish populations were reduced to such low levels that their niche was taken over by jellyfish, salps and other zooplankton of little value as food for seabirds.

The virtual collapse of pelagic fish stocks, particularly off southern Namibia, has been catastrophic for the seabirds breeding in this region. Numbers of penguins and gannets have decreased by nearly 90 per cent since the 1950s. However, pelagic fish are more abundant off northern Namibia and numbers of Cape Cormorants in this area have benefited from the provision of artificial breeding platforms constructed to allow guano harvesting. As a result, their declines have been more modest – only halving since the early 1980s, compared to the 75 per cent decrease farther south.

In the 1990s, a few hundred pairs of Cape Cormorants were found breeding on Baía dos Tigres off the coast of southern Angola for the first time. By 2005 there were 2630 pairs and a recent aerial survey found that their numbers had increased to more than 16 000 pairs breeding in some 350 scattered colonies (Mendelsohn and Haraes 2018, *Namibian J. Environ.* 2). This means that Angola now supports about 13 per cent of the global breeding population of Cape Cormorants. Perhaps even more impressively, Mendelsohn and Haraes counted some 250 000 individual cormorants, a clear indication of the importance of the area for this Endangered species.

It is encouraging to see threatened Benguela seabirds on the margins of their former core range. Baía dos Tigres also supports populations of Great White Pelicans, Kelp Gulls and Royal, Swift and Damara terns. The island currently has no formal protected status, but the Angolan government is apparently considering declaring it and the waters surrounding it a marine protected area. Such status is clearly warranted.

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...and down

Collapse of the world's largest King Penguin colony

King Penguins are renowned for breeding in large colonies, partly for protection from predators and partly because they are less than agile ashore and need sheltered, gently sloping landing beaches with flat areas nearby for breeding. Like their larger cousin, the Emperor Penguin, they don't build a nest, but instead balance their single egg on their toes and keep it warm with a generous roll of belly skin.

Breeding birds space themselves remarkably evenly – just far enough apart to not quite reach their neighbours with their outstretched flippers or long, sinuous neck. A 2018 study in the *Journal of Physics D* (51: 164004) by Richard Gerum and colleagues used aerial images of colonies to show that King Penguins behave like molecules in a liquid, a state which is a compromise between maintaining a high density while still having the flexibility to allow the colony to accommodate disturbances. This helps them to resist incursions by would-be predators such as Brown Skuas or giant petrels without incurring the wrath of their neighbours every time they adjust their position during their long incubation and brood shifts.

King Penguins breed exclusively on sub-Antarctic islands, where ice-free waters year-round allow them to feed their chicks even in the depths of winter. They feed mainly on myctophid fish, which they dive 200 to 300 metres deep to catch, and most of their prey is caught at the Antarctic Polar Front. Unfortunately for King Penguins, this oceanographic boundary, which divides Antarctic and sub-Antarctic waters, is shifting south with global warming. Robin Cristofari and colleagues recently raised concerns that King Penguins breeding at more northerly sites, such as South Africa's Prince Edward Islands or the neighbouring French Crozet Islands, are particularly at risk from climate change (*Nature Climate Change* 8: 245–251). They



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argue that as the Polar Front moves south, the penguins will be unable to make the long commute to obtain food for their chicks. Birds from the Crozets already travel some 800 kilometres each way and if they have to commute even farther, their visits to the colony will become so infrequent that the chicks will die of starvation.

Hot on the heels of this alarming news, a paper by Henri Weimerskirch and colleagues (*Antarctic Science* 30: 236–242) reported a dramatic collapse in the world's largest King Penguin colony, at Morne du Tamaris on Île aux Cochons, one of the seldom-visited western Crozet Islands. This colony, which supported more than 400 000 pairs in the 1980s, has dwindled to a mere 60 000 pairs. It was only following an aerial survey of the island conducted during the Antarctic Circumnavigation Expedition in December 2016 that the decline was detected. Subsequent examination of satellite images suggests that the decrease in colony size since the 1980s has been gradual rather than the result of a sudden catastrophe such as a seismic event or an outbreak of disease.

Could this calamitous decline be the result of the long commute to the Antarctic Polar Front? This seems unlikely because other King Penguin colonies at the Crozets have remained more or less constant over the past three decades, apart from a short-term decrease in the late 1990s. When last visited in the 1980s, Île aux Cochons still had introduced populations of feral cats and house mice and while it is conceivable that these predators may have played a role in the colony collapse, they are not known to have a large impact on penguins elsewhere.

The decline of the Morne du Tamaris King Penguin colony has been offset to some extent by the formation of a new colony closer to the coast, which now supports some 17 000 pairs. However, this is only a tiny fraction of the number lost from the main colony. Hopefully the French authorities will authorise the first ground visit to the island in more than 30 years to try to discover what has gone wrong at this most important of breeding sites for King Penguins.

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