drowning IN noise

Sound pollution adds to penguins' problems

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Increased shipping traffic in Algoa Bay in the Eastern Cape is threatening the last stronghold of the African Penguin.

African Penguin numbers have been decreasing ever since humans first reached their colonies. Their guano was removed, their eggs eaten and they were even used as fuel for ships' boilers. And once direct exploitation ceased, oil spills and competition with purse-seine fishing industries for sardines and anchovies continue to impact them. In Namibia, overfishing in the 1960s caused the stocks there to collapse, taking with them the local penguin population.

Penguin competition with fisheries for food is the subject of ongoing debate in South Africa. Since the late 1990s, dwindling fish stocks off the west coast have seen penguin colonies there slump. From 2008, an experiment in which the Fitz was involved monitored the impact of fishing closures around breeding islands on penguin foraging effort and breeding performance. The experimental islands were switched periodically, confirming the benefits of closures to penguins, but this conclusion is still contested by fishery scientists. Sadly, while scientists squabble over the results, penguins still receive little respite from fishing pressure and their numbers continue to fall.

As if that weren't bad enough, new threats have arisen. In 2016, offshore bunkering started in Algoa Bay in the Eastern Cape. By refuelling at sea, large ships such as bulk carriers can maximise their profits by carrying more cargo. Algoa Bay is ideally situated on the major shipping route around southern Africa, but it is also a marine biodiversity hotspot, with St Croix and Bird islands home to important populations of African Penguins and other endangered seabirds.

In addition to the risk of accidental oil spills – several small spills have already oiled many birds – the ships create significant noise pollution. In a recent paper (*Science of the Total Environment* 2022, doi: 10.1016/j.scitotenv.2022.157878), we estimated noise emissions from maritime traffic in Algoa Bay during the past decade. Since 2016, twice as many vessels have visited the bay each year and the number of bulk carriers has increased ten-fold, doubling the volume of underwater noise from ships' engines. Algoa Bay is now one of the noisiest bays in the world.

Penguins are sensitive to underwater noise. They avoid areas subject to seismic surveys, and another Fitz study (McInnes et al. 2020, *Ibis* doi: 10.1111/ibi.12806) revealed the importance of acoustic communication for group foraging in African Penguins. Adult penguins work together to corral fish schools, greatly increasing their foraging success, but this only works if there are enough adults to form foraging groups – an example of an Allee effect. Increased underwater noise levels could exacerbate the challenges faced by penguins at sea and further reduce prey availability for them, on top of the impacts of fisheries and climate change.

The increased shipping noise has been especially hard on the penguins from St Croix Island, which lies right next to the main bunkering area. With the collapse of penguin numbers at west coast islands, St Croix became the largest African Penguin colony in the world in 2008. Since bunkering started, penguin numbers on St Croix Island have decreased dramatically, falling from 8600 breeding pairs in 2014 to a record low of only 1200 pairs in 2022. This is one of the fastest decreases of an African Penguin colony on record. We have observed high mortality of adult penguins during monthly beach surveys in Algoa Bay since bunkering started.

Unless we act now, the situation is likely to deteriorate further, as global maritime traffic is predicted to increase two- to six-fold by 2050. The associated increase in underwater noise levels will have ecosystem-wide impacts. Algoa Bay is home to large numbers of marine mammals, which are also sensitive to underwater noise. Urgent management interventions such as spatial and temporal ship exclusion zones are required to limit the impacts of ship noise on African Penguins and other marine predators.

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