

Fossil finds shed light on penguins' evolutionary past

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Only one penguin species lives in Africa today -- the endangered black-footed penguin, or *Spheniscus demersus*. But newly found fossils confirm that as many as four penguin species coexisted on the continent in the past. Credit: Daniel Thomas

Africa isn't the kind of place you might expect to find penguins. But one species lives along Africa's southern coast today, and newly found fossils confirm that as many as four penguin species coexisted on the continent in the past. Exactly why African penguin diversity plummeted to the one

species that lives there today is still a mystery, but changing sea levels may be to blame, the researchers say.

The fossil findings, described in the March 26 issue of the *Zoological Journal of the Linnean Society*, represent the oldest evidence of these iconic tuxedo-clad seabirds in Africa, predating previously described fossils by 5 to 7 million years.

Co-authors Daniel Thomas of the [National Museum of Natural History](#) and Dan Ksepka of the National [Evolutionary Synthesis](#) Center happened upon the 10-12 million year old specimens in late 2010, while sifting through rock and sediment excavated from an industrial steel plant near Cape Town, South Africa.

Jumbled together with [shark teeth](#) and other fossils were 17 [bone fragments](#) that the researchers recognized as pieces of backbones, breastbones, wings and legs from several extinct species of penguins.

Based on their bones, these species spanned nearly the full size spectrum for penguins living today, ranging from a runty pint-sized penguin that stood just about a foot tall (0.3 m), to a towering species closer to three feet (0.9 m).

Only one penguin species lives in Africa today—the black-footed penguin, or *Spheniscus demersus*, also known as the jackass penguin for its loud donkey-like braying call. Exactly when penguin diversity in Africa started to plummet, and why, is still unclear.

Gaps in the fossil record make it difficult to determine whether the extinctions were sudden or gradual. "[Because we have fossils from only two time periods,] it's like seeing two frames of a movie," said co-author Daniel Ksepka. "We have a frame at five million years ago, and a frame at 10-12 million years ago, but there's missing footage in between."

Humans probably aren't to blame, the researchers say, because by the time early modern humans arrived in South Africa, all but one of the continent's penguins had already died out.

A more likely possibility is that rising and falling sea levels did them in by wiping out safe nesting sites.



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Credit: Daniel Thomas.

Although penguins spend most of their lives swimming in the ocean, they rely on offshore islands near the coast to build their nests and raise their young. Land surface reconstructions suggest that five million years

ago—when at least four penguin species still called Africa home—[sea level](#) on the South African coast was as much as 90 meters higher than it is today, swamping low-lying areas and turning the region into a network of islands. More islands meant more beaches where penguins could breed while staying safe from mainland predators.

But sea levels in the region are lower today. Once-isolated islands have been reconnected to the continent by newly exposed land bridges, which may have wiped out beach nesting sites and provided access to predators.

Although humans didn't do previous penguins in Africa in, we'll play a key role in shaping the fate of the one species that remains, the researchers add.

Numbers of black-footed [penguins](#) have declined by 80% in the last 50 years, and in 2010 the species was classified as endangered. The drop is largely due to oil spills and overfishing of sardines and anchovies—the black-footed penguin's favorite food.

"There's only one [species](#) left today, and it's up to us to keep it safe," Thomas said.

More information: Thomas, D. and D. Ksepka (2013). "A history of shifting fortunes for African penguins." *Zool. J. Linn. Soc.*

Provided by National Evolutionary Synthesis Center (NESCent)

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