

Yellow-eyed penguins feed in straight lines off the Otago coast

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(Phys.org) —A research team at the University of Otago has discovered that the endangered and endemic yellow-eyed penguin forages in straight lines for several kilometres by following furrows in the seafloor scoured out by fishing trawlers.

Using GPS dive loggers the researchers monitored the penguins' movements over three years showing the birds use furrows scoured on the seabed by otter boards from trawl nets to find food, particularly blue cod.

"This research is unique as it shows for the first time that not only do flying seabirds follow fishing vessels, but also penguins, with the latter [foraging](#) after a trawler has gone through a particular area," says lead research Professor Philip Seddon.

The researchers say that blue cod and other bottom feeders are likely to forage around the seafloor lines because they are attracted to the marine life stirred up and exposed by the action of the nets being dragged behind fishing trawlers.

The lines made by the otter boards, which keep the mouth of the trawl net open, are up to 15cms wide and two centimetres in depth on a north-east to south-west axis. They can remain on the sea floor for a year or more and are clearly visible.

GPS dive loggers were attached to the back of the birds to determine the

depth the penguins dive, their locations and line of travel and how far they swim in one foraging trip. Lines on the seafloor were located by using video footage taken by a remote operated vehicle launched from the University's research vessel *Polaris II*.

Many penguins swim to a depth of between 60 and 70 metres to feed during multiple dives (up to 80) over several hours before returning to shore. The penguins can travel up to 120 kilometres in one trip, while foraging in the mid-shelf fishing grounds some 20 kilometres off the Otago Peninsula.

The study shows that the birds also revisit the lines on subsequent occasions and might develop a visual memory of the area, say researchers.

"It appears that using the lines for foraging is particularly related to bad breeding years when [penguins](#) are more likely to go further out to sea to find blue cod and other bottom feeders. This might also be due to the individual preference of some birds though," says Dr Thomas Mattern, the first author of the paper reporting these results.

However the researchers say that one of the downsides of foraging around the trawl lines might be that an exclusive diet of blue cod, which tends to be low in nutritional value, could affect breeding.

As yet there is no confirmation of this hypothesis and further research is needed to determine if there is any relationship between foraging patterns, diet quality and breeding success in the 500 yellow-eyed penguin pairs that still exist around the New Zealand mainland.

This research was supported by the Yellow-Eyed Penguin Trust and has recently been published in the open access journal *PloS ONE*.

More information: Mattern T, Ellenberg U, Houston DM, Lamare M, Davis LS, et al. (2013). "Straight Line Foraging in Yellow-Eyed Penguins: New Insights into Cascading Fisheries Effects and Orientation Capabilities of Marine Predators." *PLoS ONE* 8(12): e84381. [DOI: 10.1371/journal.pone.0084381](https://doi.org/10.1371/journal.pone.0084381)

Provided by University of Otago

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