

# Antarctic hotspot: Fin whales favor the waters around Elephant Island

May 28 2021

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Fin whale in the Southern Ocean. Credit: AWI Ocean Acoustics Group

During the era of commercial whaling, fin whales were hunted so intensively that only a small percentage of the population in the Southern Hemisphere survived, and even today, marine biologists know little about the life of the world's second-largest whale. That makes the findings of researchers from the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) and the Johann Heinrich von Thünen Institute for Sea Fisheries, which show that a large number of the baleen whales regularly frequent the krill-rich waters surrounding Elephant Island, all the more welcome. Evidence for this is provided by underwater sound recordings from the region, where in the peak month of May, so many fin whale vocalizations can be heard that the individual

calls merge into a veritable chorus of sound, as the research team now reports in the journal *Royal Society Open Science*. In view of this, the marine biologists call for protective measures for this important habitat so as not to jeopardize the apparent recovery of the fin whale population.

Fin [whales](#) are still rare and, according to the textbooks, normally appear in groups of three to a maximum of seven. As such, AWI marine biologist Elke Burkhardt was all the more surprised when in the late southern summer of 2012, while on an expedition in the Scotia Sea on board the German research icebreaker Polarstern, she counted more than 100 hundred fin whales in the waters north of Elephant Island. Was this a chance find, or did it mean that such large numbers of the world's second-largest baleen whale gathered here regularly? And if so, why?

To answer this question, in January 2013 Burkhardt and her team installed a mooring with two underwater acoustic recorders and a device used to determine the food supply in the coastal area northwest of the island. Over a period of three years, from January 2013 to February 2016, the instruments recorded the soundscape of the underwater world and gathered data on the food supply in the upper water column. By doing so, they helped identify one of the southern fin whale's most important habitats.

"Our observations from Polarstern were no fluke. As our results show, from December to August the whales regularly inhabit the waters surrounding Elephant Island. Here they not only hunt Antarctic krill, but also search for mates. Our recorders registered the most fin whale calls precisely in the season when the breeding period begins for the Southern Hemisphere population," Burkhardt reports.

Fin whales can be identified by the low-frequency calls that are typical of the species: "Humans would probably only perceive them as vibrations in the pit of the stomach, since their central frequency is

roughly 20 hertz, making them exceptionally deep," explains Burkhardt. Male Fin whales that are ready to mate and want to attract females emit these bass sounds in rapid, regular intervals. "Their courtship behavior may also explain why, in the month of May, our instruments recorded so many of these calls that they merged and were barely discernable as individual sounds," says the AWI marine biologist.

## **New arguments in favor of a marine protected area around Elephant Island**

She was thrilled to discover the numerous fin whales around Elephant Island: "If this aggregation really is an indication that the fin whale population is growing, it would represent a notable achievement for the international whaling moratorium, which entered into effect 35 years ago," she explains.

At the same time, the new findings are a cause for concern. "On the one hand, Antarctic krill are extensively fished in the Scotia Sea; on the other, the region, which is extremely important for fin whales, is frequently visited by cruise ships. That makes it all the more important to comprehensively protect the waters around Elephant Island, and to regulate both krill fishing and tourism in order to avoid harming the fin whale stocks," Burkhardt says. Accordingly, the soundscape should be recorded at regular intervals to document any changes in the population.

## **Where do the fin whales from Elephant Island spend the winter?**

While analyzing the underwater recordings, the research team discovered another interesting detail: the 20-Hz pulse also contains an accompanying sound with a frequency of 86 Hz. This in turn resembles the fin whale calls that Chilean [marine biologists](#) had previously

recorded off the coast of central Chile—particularly at the time of year when the instruments at Elephant Island rarely recorded the sounds of the baleen whales. Was it possible that the same whale population produced the sounds in both regions, and that it moved back and forth between the South Shetland Islands, which Elephant Island belongs to, and the Pacific coast of Chile?

"It is believed that fin whales produce population-specific accompanying higher frequency sounds, which can be used to distinguish between different populations. If this is the case, we can likely conclude that those fin whales that inhabit the waters surrounding Elephant Island in the southern summer may give birth to their calves in the warmer waters off Chile's Pacific coast later in the year, and that these whales regularly travel between the two regions," says Burkhardt.

However, to verify this, further studies are required. To this end, the Bremerhaven-based research team has installed additional underwater recording devices, which will tentatively be retrieved in 2022, in the vicinity of the island. The marine biologists are currently analyzing their underwater recordings from the period since 2016. And the first excerpts are promising: in the summers after 2016, Elephant Island continued to be a favorite gathering place for [fin whales](#).

**More information:** Elke Burkhardt et al, Seasonal and diel cycles of fin whale acoustic occurrence near Elephant Island, Antarctica, *Royal Society Open Science* (2021). [DOI: 10.1098/rsos.201142](https://doi.org/10.1098/rsos.201142)

Provided by Alfred Wegener Institute

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