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Aerial surveys hot on the minke trail

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A new method of surveying whales may revolutionise the study of whale populations in Antarctica and inform conservation decisions by the International Whaling Commission (IWC).



Credit: Australian Antarctic Division

For the last 20 years, researchers surveying whale populations have been restricted to ships that lack the reinforced hulls able to penetrate the pack ice surrounding the Antarctic mainland.

‘The IWC has been counting whales in the Southern Ocean since 1978 and evidence of a decline in numbers is of increasing concern,’ says Dr Nick Gales, Leader of the Australian Marine Mammal Centre. ‘However, it is difficult to know whether the decline is genuine or if it is due to the limitations of the ship-based survey technique.’

A group of CSIRO statisticians in collaboration with the Australian Antarctic Division have recently developed and trialled an innovative aerial survey program. It aims to establish whether minke whales specifically are actually in decline or simply moving further into pack ice habitats out of sight from research vessels.

The aerial survey via a fixed-wing aircraft has been proven to be a success in the pilot study completed in December 2008.

‘A team in Germany have been using helicopters to monitor Antarctic minke whales but this wasn’t appropriate for our survey due to its vast area,’ said CSIRO Mathematics and Information Sciences Research Fellow Dr Natalie Kelly, who ran the operations in Antarctica.

Flying transects in a large square grid spanning 60 600 km² across east Antarctica, a C212-400 twin turbo prop military transport aircraft carried the team of four observers and a flight leader. A range of cameras installed underneath the plane took high definition video and still images along with infra-red imagery to detect whales hidden from view by the ice and to monitor ice cover.

‘The video and photographic equipment worked without a hitch and we hope this novel data will help push the

boundaries of aerial surveying of marine mammals,' Kelly said.

The three-week survey was conducted from a skiway near Casey Station with the route systematically designed to capture a wide range of sea ice habitats. The team collected over 41 hours of data and is using statistical methods to determine where whales were spotted and estimate local population size, taking into account the randomly moving pods feeding in the Antarctic waters.

The team from CSIRO are excited by the preliminary results.

'We saw just under 500 whales: 372 killer whales, 76 Antarctic minke whales and 27 unknown species. The majority of whale sightings (both minkes and, to a lesser extent, killer whales) were made in areas with 20 per cent sea ice concentration. So we're pretty certain minke whales are in the sea ice in significant numbers in this area of east Antarctica,' said Kelly.

The team hopes to compare the aerial survey results to data collected by colleagues from ship-based surveys. But to account for yearly fluctuations and migration trends, Kelly says 'the aerial surveys would have to run for many years in the same spot to provide statistically robust trend information'.

The results from the pilot aerial survey will also influence survey design for this year's summer count, with the statisticians putting more sampling effort into areas with lower sea ice cover. 'We are pretty sure the whales aren't in high ice concentrations unless they are growing legs, or flippers like seals,' said Kelly wryly.

The aerial survey was commended by Environment Minister Peter Garrett during the opening of the Southern Ocean Research Partnership in Sydney in March this year. 'The data ... will be presented in June at the next meeting of the International Whaling Commission in Madeira, Portugal, as a further example of the innovative, non-lethal whale research Australia is championing as the way forward for whale research in the future,' he said.

Dr Kelly stated, 'Longer term, it is hoped that these results from the aerial survey program will be considered with the German helicopter surveys to provide a better understanding of where Antarctic minke whales are congregating during the summer months, and if this can explain the decline in their numbers.'

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