

Lonely moments in the Southern Ocean



Peter Shaughnessy experienced some nervous moments while catching crabeater seals on a tiny icefloe in the Antarctic.

Peter Shaughnessy remembers vividly the time he and his colleagues spent standing on a small ice floe in the Antarctic as the *Aurora Australis* circled away in preparation for its second attempt to collect them. Perhaps that was the moment he swore he'd never join another Antarctic expedition.

Shaughnessy, a principal research scientist with CSIRO's Division of Wildlife and Ecology at Canberra, was braving the Antarctic autumn to learn more about the movements of the crabeater seal, an important predator in the Southern Ocean food web. His work involved fitting two seals with satellite-linked radio transmitters and collecting blood samples for scientific analysis.

Crabeater seals are abundant in the pack ice zone that surrounds Antarctica. Their population is estimated at 10-12 million. The seals use the pack ice surface for breeding, moulting and resting. They feed on krill and dive frequently to 300 metres and occasionally to 430 m, but little else is known about their movements.

The seals to be tracked were located on May 1, 1993. Shaughnessy and his five field assistants were lowered by crane over the ship's side in a metal 'basket'. They caught the seals with a hand net and tranquillised them with a combination of ketamine and diazepam (valium) given intramuscularly. Transmitters were attached with epoxy glue to the hair on the seals' backs. The seals moult in December and the instruments fall off when the hair is shed.

Adrift in the ocean

Both instrumented seals moved several hundred nautical miles west and one then headed east for a shorter distance. These results are similar to those found for three drifting buoys fitted with satellite-linked radio transmitters that were set free at the same time by sea-ice scientists from the Australian Antarctic Division and from the CRC for Antarctic and Southern Ocean Environment.

According to Dr Ian Allison, the buoys drifted west with the wind and currents close to Antarctica. They gradually diverged north (due to southerly storms), crossed the Antarctic divergence, entered the zone of westerly winds and currents, then gradually headed east. The crabeater seals are using the currents to move while staying in the same general area. These results are similar to those obtained from two animals tracked during an earlier study in the southern spring of 1989.

A second project on crabeater seals involved the collection

of blood samples from six seals. This study was to determine baseline physiological characteristics of the blood and to seek indications of internal parasites or disease (with Dr Paul Cooper of the Australian National University).

The project also sought indications of phocine distemper virus (prevalent in harbour seals of the North Sea a few years ago) and initiated a comparative study of crabeater seal populations through electrophoretic analysis of isozymes. This technique uses variation in the structure and electric charge of individual proteins and enzymes in the blood (or other body tissues) to demonstrate variation between populations.

In this study, the aim was to decide if crabeater seals form one large interbreeding population surrounding Antarctica, or comprise a series of smaller populations with little gene flow between them.

Shaughnessy says the last seal was caught on an ice floe smaller in area than a house and smaller than any other he had worked on.

'The seal fumbled its escape, allowing us to slip the net over its head as we slipped over the ice,' he says. 'After the work was completed, the ship had the difficult task of collecting us without tipping our tiny floe.'

'The ship lost manoeuvrability, so it required a second approach to the ice floe. To achieve that it described a circle of 500 metres' diameter. It was lonely standing there watching the ship move away. I was relieved to hear the deck officer explain his actions to us over the walkie talkie radio.'

Shaughnessy's work with crabeater seals was one of many studies undertaken during the ninth Antarctic voyage of Australian National Antarctic Research Expeditions' (ANARE) 1992-93 season.

The main aim of the two-month Voyage 9 expedition was to study the physics, biology and chemistry of the Southern Ocean and their influence on Earth's climate. That project was conducted by oceanographers from CSIRO Division of Oceanography and from the Antarctic CRC led by Dr Steve Rintoul.

The research is part of Australia's contribution to the World Ocean Circulation Experiment (WOCE), a major international study seeking to develop ocean models for predicting climate change and to collect the data needed to test them.

An article about Peter Shaughnessy's work with fur seals will appear in the next issue of Ecos.

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