The *fur seal* fights back

Liz Pope, Wildlife and Ecology

New Zealand fur seals, once hunted almost to extinction, are again thriving in Australia's southern waters.

Wayne Deeker

In 1892, the slaughter of New Zealand fur seals (*Arctocephalus forsteri*) in Western Australian waters was outlawed. The ban came just in time for the seals, which, along with most other marine mammals of Australia's southern coast, had been hunted for a century.

No one knows how many New Zealand fur seals existed before their 'discovery' by Europeans, nor was the exact toll of hunting recorded. But scientists estimate that tens of thousands were killed. In fact, demand for the seals' luxurious pelts was so great that by the time they were protected by law, the species had almost disappeared.

One hundred years on, the survivors are once again being tracked from west to east across Australia's southern coastline. This time, however, the 'hunters' have gathered evidence of the fur seal's recovery. A five-year study of New Zealand fur seals, led by CSIRO seal specialist Dr Peter Shaughnessy, has found their population in Australian waters is about 34 600 and rising.

Shaughnessy is from the Division of Wildlife and Ecology at Canberra. He and his team of surveyors have mapped the location and approximate size of every New Zealand fur seal rookery. Colonies on Kangaroo Island in South Australia have also been repeatedly surveyed. Their numbers have shown an exponential increase similar to that of the most rapidly-expanding seal populations in the Southern Hemisphere.

The survey results have added much to the existing information on fur seal numbers in Australian waters. Studies from 1983-1990 estimated the population to be somewhere between 2000 and 7000. But these studies – conducted incidentally or at times when seals were not easily surveyed – were not accurate.

New Zealand fur seals are one of eight species in the southern fur seal genus. Most live around southern oceanic islands and landmasses. The species is split into two geographically distinct populations, the more abundant occurring around New Zealand and its sub-Antarctic islands. The Australian population has a wider range (23° longitude from The Pages, SA, to Cape Leeuwin, WA, with a small group at Maatsuyken Island off the south coast of Tasmania) and is more dispersed than

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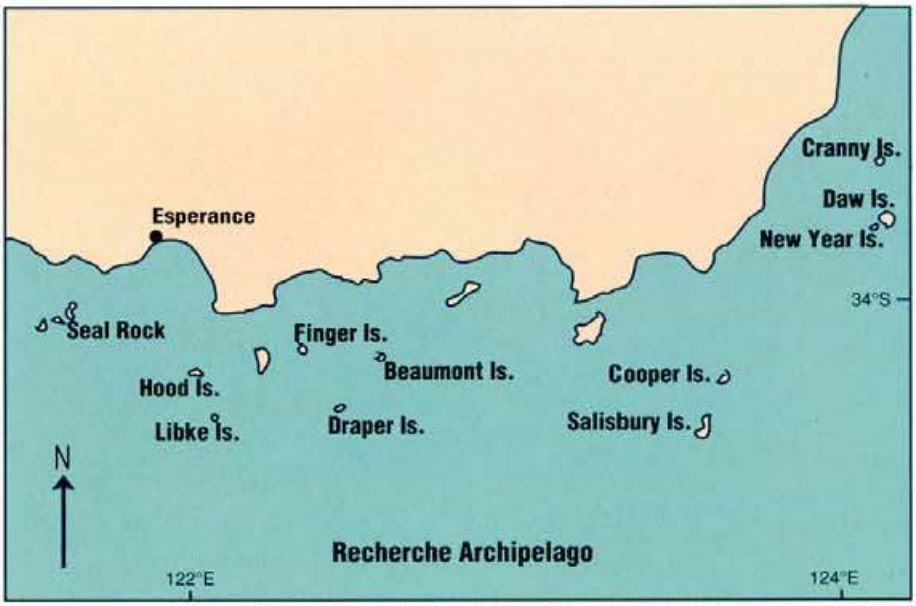
the New Zealand population, with most colonies containing few individuals. The New Zealand fur seal overlaps with the Australian sea lion (*Neophoca cinerea*) on the south coast of WA and in SA.



Counting seals

Shaughnessy's study consisted of two parts. First, he identified all the breeding sites in Australian waters and determined abundances at each. This research took place during a major survey in the 1989-90 summer (with smaller surveys in the years before and after). The South Australian and Western Australian coastlines were searched by boat. When colonies were found, the survey team stopped to assess the population (see story page 11).

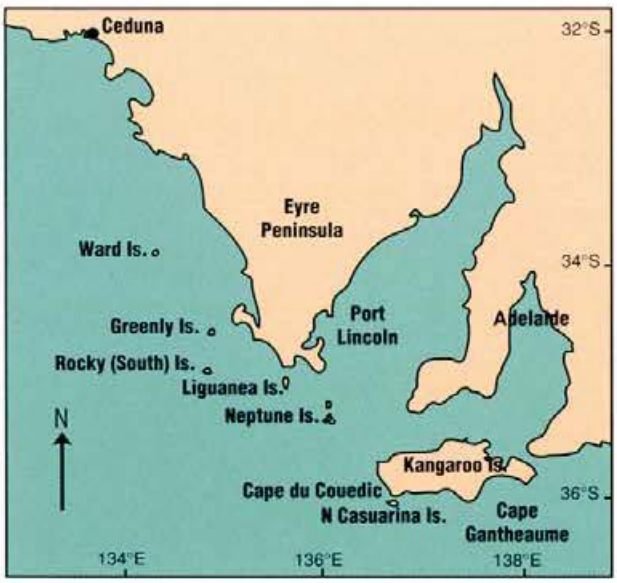
Most of the surveying takes place in late January or early February, when large adult males are out of the way. The males, which weigh up to 190 kilograms and are highly aggressive towards intruders, make life difficult for researchers.

Assessing fur seal numbers is difficult for other reasons too. Females rush into the sea when alarmed, and colonies are in inaccessible areas on islands or at the base of steep cliffs. Most importantly, an unknown proportion of the population may be at sea at any one time.

Pups are chosen for the survey because they are the only age class ashore all at once, and are easily recognised by their small size and black fur. The total population size can be calculated from pup numbers, though adjustment must be made for whether the populations are increasing, decreasing or steady, since the proportion of pups to adults varies accordingly.

Direct counting is a useful assessment technique only when the population is very small, and when all animals are visible. At many colonies Shaughnessy's team simply counted the pup population. With large or partly obscured populations, however, the mark/recapture technique was used to determine an accurate population estimate. This method is labour-intensive, requiring at least four people, and numerous trips to the colony.

The team inspected 123 islands or rocks in SA, landing on 50, and 88 in WA, with 25 landings. These surveys revealed 16 breeding colonies in WA and 13 in SA. Sixteen of those sites were previously unknown. In 1990, 1429 pups were counted in WA, and 5636 in SA. Extrapolating to other age groups, and allowing for the proportion of seals in an increasing population, this gives a total New Zealand fur seal population of about 34 600 for 1990.



Neptune Islands, just below the Eyre Peninsula, has 49% of the total, with more than 3400 pups in the 1990 season. A concentrated area around Kangaroo Island (including the Neptune Islands) is home to 77% of Australia's New Zealand fur seals.

The second part of Shaughnessy's study involved monitoring populations around Kangaroo Island during five summers since 1988. These sites were selected because they are the most suitable for repeat surveying, with reasonable vehicle and foot access. One of the initial five sites proved unsuitable, leaving Nautilus Rock and Nautilus North at Cape du Couedic, the nearby North Casuarina Islet and Cape Gantheaume (100 km to the east), for repeat surveying.

Most of the Kangaroo Island populations are increasing at an exponential rate (15- 20% a year), with substantial increases in pup numbers over the five years. Populations at two of those sites, Cape Gantheaume and Nautilus North, are increasing at a similar rate to the most rapidly expanding populations in the Southern Hemisphere, with increases of 16% and 19% a year respectively. The North Casuarina population (visited twice only) is not expanding as rapidly, presumably because it is an older colony and therefore closer to its carrying capacity.

Most colonies are expanding their ranges. Three South Australian colonies (Cape du Couedic, Cape Gantheaume and Ligunea Island) have been established within the last few decades. The expansion is likely to continue for a long time, since space does not appear to be limiting in most cases. It is not known whether an eventual limit to the population increase will come from limits to the seals' physical space or food supply.

The Kangaroo Island region is thought to have higher biological productivity than other areas within the fur seal's range in WA and SA, including the Great Australian Bight. In environments where nutrients are scarce, small increases in biological productivity greatly enhance marine

Christening Libke's island

Searching for seals has resulted in an unexpected honour for one of Dr Peter Shaughnessy's intrepid assistants. It seems John Libke employs a sixth sense (or a well-defined fifth one) when faced with the challenge of locating New Zealand fur seal colonies.

During an expedition in the summer of 1989-90, the survey team (in a yacht) approached an unnamed island in the Recherche Archipelago south of Esperance. Conditions were too rough to swim ashore, and a few adults, but no seal pups, could be seen. The island was scored as a non-breeding colony, despite Libke's claims that he could smell seals, which had been indicative of breeding colonies previously.

A year later, a ship called Sanko Harvest sank while trying to take a shortcut through the archipelago. As a result, the seal pups on Hood Island were covered with oil. The people who went to aid the seals found a thriving colony 10 kilometres from the wreck, exactly where Libke had reported them the year before.

In February 1992, the island had 240 pups, making it the second largest colony in Western Australia. Later that year, Libke was rewarded for his unique talent. The Western Australian Geographic Names Committee formally accepted the name Libke Island.

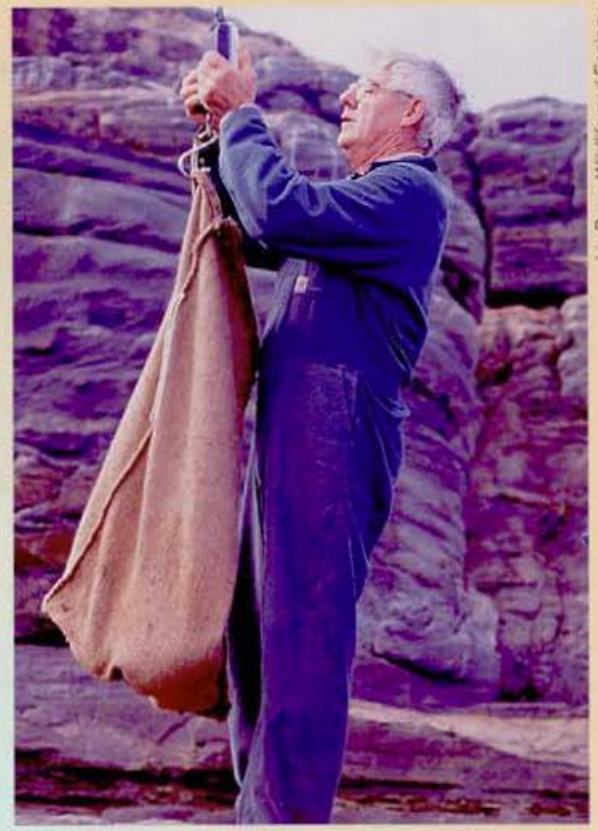
As we went past an island, says Shaughnessy, recalling the January 1990 field trip, we'd all stand up on deck and look for seals. If we saw any pups or adult males, we'd go ashore and assess them more carefully.

The team usually went ashore in a dinghy, or, if conditions were too rough, swam ashore wearing wetsuits. Sometimes they were thrown onto sharp rocks by large waves. According to Shaughnessy, that part wasn't much fun.

'The surveys begin around mid-January, towards the end of the breeding season, when few of the "stroppy" territorial males are still around,' Shaughnessy says. 'They hold us up all the time and make life pretty difficult.

'We carry a "salad tosser" (a semi-circle of aluminium rod on an aluminium pole) which is used to prod males in a sensitive spot near the fore flippers, or we rattle it on the rocks. It's very effective at making them run away.'

Shaughnessy says marking and recapturing animals gives a better estimate of the population size than straight counting. With counting, some are inevitably missed, giving an underestimate. Only pups are marked, because they are the only age class where all individuals are ashore at once. With simple maths, their total numbers can be estimated.



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Seal detector extraordinaire: John Libke weighs a fur seal pup during a recent visit to Kangaroo Island.

Marking and recapturing allows the variance of the estimate to be calculated, so that estimates from different years can be compared. This is impractical with counting, and one can't tell if different counts are statistically different.

Shaughnessy and his four assistants (often from the National Parks Service), aim to mark and release about half the pups in the colonies. Assistants catch a pup and hold it, head forward, between their knees, then with scissors, snip off a two-finger-width strip of dark guard-hair, leaving a grey-white stripe down the animals head. The most pups the team has captured, marked and released in one day is 1217.

A few days later, they are 'recaptured'. The pups are not actually caught, just visually identified. This exercise is carried out by two or three people. One person holds a notebook and the others call out 'marked' or 'not marked' as they walk through the colony and sight individual pups.

'Giving the pups a haircut is a more visible marking technique than other methods,' Shaughnessy says. 'Pups hide from you, but they're inquisitive. They hide under a rock ledge, but they want to see what's happening.

'The only part you can see is their front end. Paint-marks or flipper-tags can't always be seen when the pups are hiding, but big grey stripes on their dark heads are visible.'

Nicholas Briks

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Main picture: A view of the Kangaroo Island colony.
Insets: Fur seals pups are surveyed because they are the only age class ashore all at once.

food supplies. Nutrient-rich areas therefore attract a concentration of fauna.

Earlier studies of sea lion (*Neophoca cinerea*) colonies in the Kangaroo Island region have suggested that the high productivity may reflect a lessening of the nutrient-depleted Leeuwin Current as it runs eastward along the south coast of Australia, with a corresponding increase in food availablity. Sea lions, like the New Zealand fur seals, depend on the productivity of near-shore waters which are most influenced by the Leeuwin Current.

During winter, the prevailing winds in southern Australia are westerly and, as the Leeuwin current is also flowing most strongly at this time of year, the current reaches its eastern limit. As it flows eastward it mixes with the outflow from the Great Australian Bight, potentially increasing the productivity of the waters by the time they reach the foraging grounds of the large populations of sea lions and fur seals in South Australia.

During summer, the high pressure weather systems that dominate the south coast of Australia cause consistent south-easterly winds, which have the effect of blocking, and in some cases reversing, the flow of the eastward moving Leeuwin Current. This, in turn, facilitates minor upwellings of relatively nutrient rich, cool water as well as the development of thermoclines in on-shelf waters of South Australia. These are evident in areas where the continental shelf is narrow, such as the south-west corner of Kangaroo Island and the southern tip of the Eyre Peninsula.

Life on the rocks

Seals come to Kangaroo Island in late summer to reproduce on rocky sites. The fur seal's choice of haul-out (come-ashore) sites is limited by geology. South Australian seals never form colonies on harsh, limestone rocks, which shred even tough boots. The fur seals favour the few islands with suitably smooth igneous rocks.

Shaughnessy's colleague Simon Goldsworthy studied the breeding behaviour of the fur seals at Kangaroo Island. He observed that breeding males begin coming ashore during mid-October. By late November, they are vigorously competing for territory. Adult females, pregnant from the previous year, begin arriving in late November to give birth to a single pup soon after. Female numbers ashore peak at about December 25 and 90% of pups are born between December 3 and January 6.

Adult male numbers peak about a week after Christmas, when fertile females are at their most numerous. Most of the females are pregnant again in a week. For the males, November and early January are times for little else except mating, fighting and sleeping.

Females choose positions on shore depending on shelter and comfort. Males defend their territories to keep rivals away from their females, conspicuously monitoring their patches from elevated rocks.

Males robust enough to maintain the most female-desirable territories have access to the most mating opportunities, and hence greater reproductive output. Territorial males do most of the mating, though a few opportunistic non-territorial males are successful as well. Non-breeding animals are excluded from the breeding area.

Two or three days after mating, females return to the ocean to feed, leaving their pups on shore. Pups instinctively stay near where their mothers left them, though they sometimes attempt the possibly lethal practice of trying to suckle from a nearby female. The returning mothers find their pups first by returning to where they left them, then calling, and finally by scent when they are close to their pups.

Initially the mothers feed at sea for about two days, increasing to five to 11 days as the pups mature. They maintain this regular cycle of feeding and suckling until the pups begin taking solid food at about six months.

By the end of January, most males have returned to sea. The on-shore population then consists of females and pups, and non-breeding individuals including juveniles (individuals between one and four years).

Attitudes

Unfortunately, not everyone is happy about the seals' recovery. There is an inevitable conflict between large seal populations and humans (the fishing industry and residents). It happens in California, and it is happening here already, says Shaughnessy.

Fishermen believe seals compete for the same species, but it has never been shown that removing seals causes an increase in the fish catch, he says. Seals do have a wide variety of tastes, yet it is not clear which species the seals are eating, nor whether the competition is real. No one has done a proper dietary study in this country.

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Dr Peter Shaughnessy and his assistant Chris Bald enjoy the view at Kangaroo Island.

Concerns also exist about the fishing and shark nets in which the seals become entangled, and about the damage caused by other flotsam. Shaughnessy's pet hate is the blue plastic bands from bait boxes, which garrotte the seals.

Despite these problems, however, Shaughnessy says it is possible for people to live in harmony with the fur seals. There is already a thriving tourist industry at Kangaroo Island, and the sea lions there are accustomed to people.

Fur seals are more difficult to approach than sea lions, living at the bottom of steep cliffs, but Shaughnessy believes that people would pay to see them. In this way, the species nearly destroyed by humans, may become icons for conservation education.

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More about fur seals

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