Marine Biodiversity Hub

National Environmental Science Programme

Aerial survey monitors right whales off southern Australia

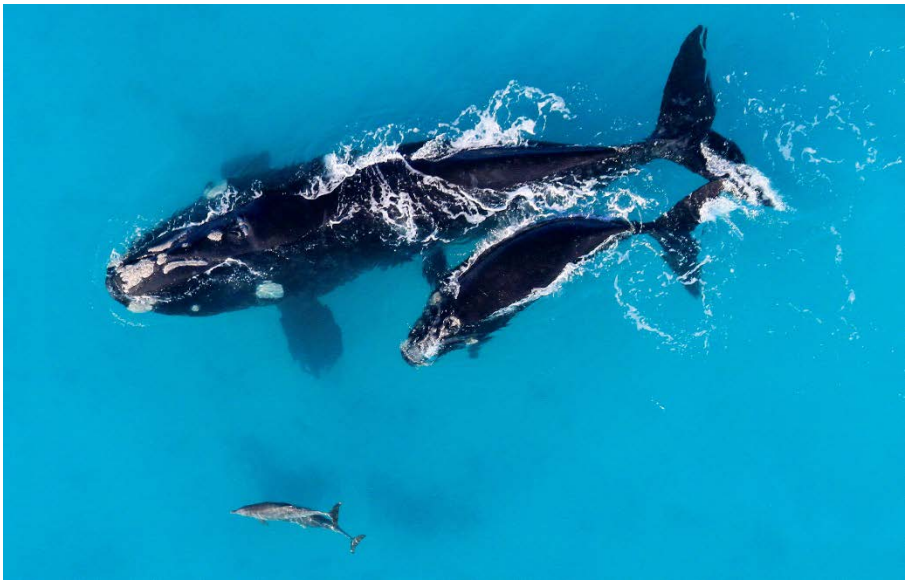
A long-term aerial survey of right whales of southern Australia is charting the recovery of the species and providing a basis for monitoring the effects of environmental change.

Southern right whales, *Eubalaena australis*, were hunted almost to extinction in the Southern Hemisphere during the 19th Century. Signs of recovery have been apparent since the 1950s, particularly since the mid-1970s when their harvest was ceased. The rate of recovery has been monitored off southern Australia since 1993 in an annual survey led by WA Museum.

Some 700 animals including about 250 cow and calf pairs are now seen each year, with a steady 7% increase in population size. Identifying photo-graphs taken during the survey add clues to how the whales live and breed. In the longer-term, the survey results will help scientists evaluate the effects of changes occurring in the oceans around Antarctica. Surveys conducted in 2015 are being funded by the National Environmental Science Program Marine Biodiversity Hub as part of its aim to improve knowledge, management and monitoring of key marine species and ecosystems.

Western and eastern populations

Southern right whales grow to about 18 metres and 60 tonnes, and are thought to live for some 50 years. They range from tropical to Antarctic waters (to about 65° South) feeding mainly on krill when available, and copepods at lower latitudes. In Australia, right whales occur between Exmouth (WA) and Hervey Bay (Qld), though genetic evidence suggests the Australian population is divided into western and eastern sub-populations, each of which is experiencing a different rate of recovery (the eastern sub-population shows little recovery).



Between May and October, Australian right whales migrate from higher latitude feeding grounds to calving and nursery grounds in coastal Australian waters. Image: Andrew Halsall, WA Museum

Southern right whale conservation status in Australia

jurisdiction	*listing*	*legislation*
Commonwealth	endangered	Environment Protection and Biodiversity Act 1999
NSW	endangered	Threatened Species Conservation Act 1995
SA	vulnerable	National Parks and Wildlife Act 1972
TAS	endangered	Threatened Species Protection Act 1995
VIC	threatened	Flora and Fauna Guarantee Act 1988
WA	vulnerable	Wildlife Conservation Act 1950

The southern coast between Cape Leeuwin (WA) and Ceduna (SA) is the main wintering and calving ground of Australia's western sub-population, with major calving areas at Doubtful Island Bay, east of Israelite Bay (WA) and Head of Bight (SA). Less than 10% of reproductively mature females calving on the Australian coast in any one year appear to use the coast off Tasmania, Victoria, New South Wales and eastern South Australia.

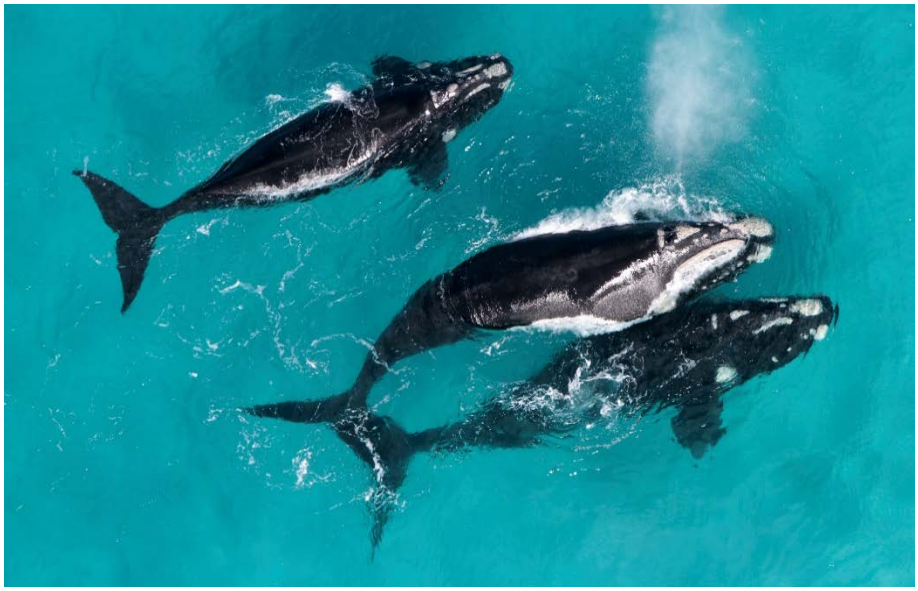
Circling from Cape Leeuwin to Ceduna

The annual aerial survey covers some 1700 kilometres of coastline between Cape Leeuwin, Western Australia and Ceduna, South Australia. This is where the majority of Australian western sub-population spends winter and spring, peaking in number towards the end of August. Adult females give birth there on average every three years and the remainder of the population appears less regularly.

A pilot and a photographer search out to 1.8 km from the coast at a minimum altitude of 150–200 m during about 40 hours of flying time spread across four to five days. Most animals, particularly cows accompanied by their calves of the year, are easily observed in the relatively clear waters. When whales are sighted, a count is made, the sighting position is recorded, and individuals are circled for photography at the minimum permissible height.

Images of the callosity pattern on the heads of the whales are taken for photographic identification, and body marks such as white or grey dorsal blazes are photographed. A small proportion of calves are born as partial albinos, white with dark spotting, the body colour turning to grey as the animal matures. Sightings information and photographs are catalogued for computer-assisted comparison with those already available from WA and elsewhere, including the Antarctic, allowing the tracking of individual sighting histories.

Patterns in the location of individuals over time can shed light on whale behaviour. For example, birth takes place in nearshore waters; individual whales, particularly calving females, tend to return to the same locations to breed; and the residency period of female-calf pairs in calving areas is significantly longer (about 70 days) than that of lone adults (about 21 days). In addition, observed changes in factors such as conception rates may be related to the availability of food (copepods, krill) on southern feeding grounds south of 40°S.



Right whales can be identified by large patches of raised tissue on their heads called callosities. The callosity begins to emerge shortly after birth, and its placement and pattern is unique to each individual. The outline of the callosities is defined by millions of tiny, light-coloured crustaceans called cyamids that live on the whales' heads. Images: Andrew Halsall, WA Museum

Adding up the numbers

Some 2020 individuals have been identified by the survey and a sightings database contains 3582 individual records, of single, or groups of, animals. The estimated size of that part of the population found in the survey area is 2750. Given the very much smaller number in the eastern Australian sub-population, the western population recorded between Cape Leeuwin and Ceduna is considered to represent the majority of the 'Australian' population, which now probably now numbers about 3000. This may be about one third of its original size before whaling.

It is important to continue these annual surveys to record how the population is faring under current conditions of total protection, particularly if ocean warming is affecting its food supply, and hence possibly conception rates, in the colder waters of the Subantarctic and Antarctic. Climate and oceanographic change have the potential to affect habitat availability and food availability for southern right whales. Changes in ocean currents and water temperatures could affect migration, feeding, and calving site selection. The changes could lead to decreased productivity and different patterns of prey distribution and availability.

The NESP Marine Biodiversity Hub is funded by the Australian Government's National Environmental Science Programme. Our goal is to assist decision-makers to understand, manage and conserve Australia's environment by funding world-class biodiversity science.

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