

# TRACKING GIANTS OF THE DEEP

When you find yourself 40 nautical miles out to sea in a six-metre zodiac, and about to voluntarily position yourself within metres of a surfacing blue whale - the largest animal on Earth - a number of questions spring to mind, not the least of which is 'what are we doing here?!'. Let me explain.

Every year great whales, such as blue and humpback whales, migrate south during spring to their summer feeding grounds in the cold waters of Antarctica, and north in autumn, to their warm-water breeding grounds. However, while some locations along the Australian coast are well known rest areas for migrating whales, the medium and large scale movements of these animals remain largely unknown.

Baleen whales are important consumers of marine resources, and come under a high level of management and research attention. Knowledge of their medium to large scale movements is fundamental to informed debate on the diverse manner in which humans interact with whales. So, *what are we doing here?*

**We are trying to answer some basic questions: Where do these whales go to feed and breed? What routes do they take on their migrations? Do animals from different populations intermingle when feeding in Antarctic waters?**

Unfortunately, it can be difficult to answer these seemingly simple questions. Whales live most of their lives in remote regions of oceans and

*A deployed satellite tag (antenna visible within circle) on a humpback whale.*

coastlines and they are often shy and elusive. Species such as blue and humpback whales travel thousands of kilometres a year, and their summer ranges take them well into Antarctic waters. To get answers to our questions, we need a way of tracking whales' movements remotely over time.

Through the new Australian Centre for Applied Marine Mammal Science, a team of researchers from the Australian Antarctic Division (AAD) is developing a whale tag which, once attached, transmits location information to satellites orbiting the Earth. Studies of at-sea movements of whales have been limited, due to the difficulty of reliably attaching satellite tags. Because of a whale's size, tracking devices must be attached to the animals as they swim. The tags used in most studies of large-scale cetacean movements tend to be long and are implanted under the skin, effectively anchored in the muscle layer.

The AAD team is designing smaller tags for satellite telemetry work, which will be implanted only into the blubber of whales. Blubber contains very few blood vessels or nerves, so using small tags, which can hold well in the blubber, reduces the invasiveness of telemetry work.

The team has recently returned from deploying the latest prototype tags on blue whales in Western Australia, in collaboration with the Centre for Whale Research. The centre's large power vessel, *RV Whalesong II*, is used as a mothership and sighting



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platform, while their six-metre, rigid-hulled, semi-inflatable zodiac is used for the tagging work.

The tags comprise the latest miniaturised transmitting electronics available, with minimum battery power to achieve the tracking duration. The electronics and battery are encased in epoxy and high grade stainless steel and/or titanium components, which are almost completely inert in body tissues. The tag has been developed jointly by the AAD and Sirtrack Ltd, New Zealand and its design continues to improve with testing.

The satellite tags are deployed via a modified pneumatic line-thrower from the zodiac, 3-15 m from the whale. The tag penetrates the whale's skin and blubber and sometimes the dense connective tissue layer that encases the muscle mass. A flexible transmitting aerial extends about 17 cm from the top of the tag. The positioning of the tag is species specific, but aims to give the aerial maximum time out of the water, each time the animal surfaces. This is generally close to the whale's dorsal midline, between the dorsal and pectoral fins.

The tag transmits a signal to the Argos satellite system for weeks to months. Because of the superficial application of the tag, it will eventually be rejected from the blubber, much like a splinter, and fall out.

The data we hope to collect is of strategic importance in the management of human-whale interactions and threatening processes, and particularly to the economically significant whale watching and petroleum industries. As whale numbers continue to increase, interactions with ships, in major shipping channels, will increase. The information is of particular relevance for the conservation of threatened species, such as the southern right whale and blue whale, and to international forums such as the International Whaling Commission.

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MIKE DOUBLE

*The whale tagging team approaches a whale in their zodiac.*