



USIMS scientist heading largest behavioural study on humpback whales

By Dr Inke Falkner

Peregian Beach, approximately 140km North of Brisbane on Queensland's Sunshine Coast, is currently the location for the first of four experiments in one of the largest research studies on effects of noise on whale behaviour. More than 50 scientists and volunteers from 14 countries have gathered to study the behaviour of migrating whales that are on their way from the breeding grounds in the Great Barrier Reef to their feeding grounds in the Southern Ocean.



Humpback whale at Peregian Beach.

This is the first of four experiments in a major 4 year research project conducted by researchers from the University of Sydney, University of Queensland, Curtin University of Technology, the Australian Marine Mammal Centre and the Defence Science and Technology Organisation, with the support of colleagues, students and volunteers from around the world. The study builds on HARC (Humpback Whale Research Collaboration), a successful international collaboration established in 2002 for the study of humpback whale behaviour at Peregian, and studies by Curtin University off the Australian west coast.

The project aims to determine how humpback whales respond to the noise of seismic surveys, how this compares with their normal behaviour, and the longer term biological significance of any behavioural reaction. The program is funded by the E&P Sound and Marine Life Joint Industry Program (an international funding agency supported by the oil and gas industry) and the United States Bureau of Ocean Energy Management, Regulation and Enforcement. Professor Doug Cato, Adjunct Professor at the University Of Sydney Institute Of Marine Science, is Chief Scientist of the project. Dr Michael Noad and Dr Rebecca Dunlop, both from the University of Queensland, are respectively scientist-in-charge and field director of the Peregian experiments. "This project goes well beyond previous studies of behaviour of baleen whales and the effects of noise on their behaviour," comments Professor Cato regarding the study.

Peregian Beach is one of the best places in the world to study humpbacks. It lies on the migratory path of the east Australian humpback population and during the four week field season at least 3,000 animals will migrate along the Peregian Beach shoreline within a distance of 10km.



These days travel routes are safe, however from 1952-1962, east Australian humpbacks were hunted almost to extinction. Since whaling ceased, east Australian humpback whales have shown a remarkable recovery. Numbers have been increasing steadily by more than 10.5 % per year since the early 1980s. The size of the current population is estimated to be around 15,000. Humpback whales, unlike other baleen whales, are known for their long and complicated songs, which appear to be a breeding display. The vocalisations of this population have been studied since 1982.

The research team is conducting behavioural response or playback studies to understand how humpbacks respond to noise from natural and anthropogenic sources, in particular seismic air guns. These are used in geological surveys to explore the sea floor. The guns create sound waves by firing compressed air into the water column which then bounces off the sea floor and is collected by an array of receivers.

The experimental setup is complex and involves several teams working both on boats and on the shore. Two teams on small boats are tagging and following individual whales while a third team on a larger vessel, tows the air gun. All boats make behavioural observations. The tags are recording the sound produced by the whale and the three dimensional motion of the whale. Several teams at elevated locations on the shore are tracking the whales using surveyor's theodolites and binoculars, as well as recording the number of whale pods, their



Scientists trying to tag a whale with the tag attached to a long pole. .

swimming path and behaviour. Thanks to the wireless network the data can be directly transferred to the base station. 'Cyclops-Tracker', a software program that has been specifically developed by the team for this research (Dr Eric Kniest, University of Newcastle), records and visualizes this multifaceted behavioural data. In addition five acoustic buoys have been deployed along the coast provide acoustic tracking of all vocalizing whales. The sounds are

radioed back to the base station and the tracks are included in Cyclops-Tracker, giving an overlay of visual and acoustic tracking and behaviour in almost real time. Four long term acoustic loggers (Curtin University) are moored over a wider area and will record the sounds throughout the experiment.

The experimental design includes observations before, during and after exposure to air gun sounds as well as controls in which the vessel tows the air gun without firing, and studies in the absence of the vessel.

An enormous effort was put into organizing the logistics for the field season. Fourteen houses and some apartments have been rented and dinners arranged at the local surf club twice a week. The volunteers are very happy with the arrangements and are highly



motivated, which is needed as the days are long and the work requires a lot of focus. Everybody agrees that the scale and complexity of the project is unmatched.



Dr Dunlop preparing a D-tag which will be attached to a whale to record whale sounds and motion.

The research has attracted considerable attention from locals as well as from overseas. An article featuring the program was published in the 'Sunshine Coast Daily' and the 'Courier Mail' on 5 October and several community meetings were held. There have also been interviews with ABC radio as well as AAP interviews and local TV.

If you would like to find out more about the team and the research program please visit

www.brahss.org.au.