Collection of baseline data on humpback whale (*Megaptera novaeangliae*) health and causes of mortality for long-term monitoring in Western Australia

Holyoake, Carly*[1], Stephens, Nahiid[1], Coughran, Douglas[2], Bejder, Lars[3] & Warren, Kristin[1]

[1] School of Veterinary and Biomedical Sciences, Murdoch University, Murdoch, WA, 6150
[2] Nature Protection Branch, Department of Environment and Conservation, Locked Bag 104, Bentley Delivery Centre, WA, 6983
[3] Murdoch University Cetacean Research Unit, School of Biological Sciences & Biotechnology, Murdoch University, Murdoch, WA 6150
C.Holyoake@murdoch.edu.au

In 2009, an unprecedented number of humpback whales (*Megaptera novaenangliae*) (n=46) were found dead or dying on WA beaches. This compares to an average of less than five humpback whales each year in the preceding two decades. Speculation on causes of increased marine mammal mortalities usually focuses on starvation, disease or anthropogenic impacts, or some synergistic combination of these. The current situation is that very little is known about the health of the WA humpbacks in terms of their nutritional status, disease or level of adverse human interactions. We propose to aid in the investigation into increased mortalities by conducting opportunistic post-mortem examinations over a five year period. The project aims to:

- identify and characterise factors associated with humpback whale strandings and;
- determine baseline and epidemiological information on disease levels and the nutritional status of stranded humpback whales.

The data and archived tissues collected will provide an invaluable baseline, thus allowing for the early detection of adverse impacts from natural and anthropogenic pressures and retrospective assessment for the incidence of currently unidentified or poorly-described pathogens.

The response of fish to petroleum seismic surveys - ear damage, caged and wild fish behaviour and long term monitoring of fish chorusing activity after seismic.

Salgado Kent, Chandra*[1] & McCauley, Robert[1]

[1] Centre for Marine Science and Technology, Curtin University, Perth, WA, 6152
c.salgado@cmst.curtin.edu.au

Experiments in Fremantle showed hearing damage in caged pink snapper (*Pagrus auratus*) by approaches to 5-10 m range with a single 20 cui air gun (2003, J. Acoust. Soc. Am. 113(1):638-642) with correlating shifts in behaviour (2008, Bioacoustics 17:205-207) strongly suggestive of compromised hearing resulting form the exposure. Further experiments on fish ear damage with respect to seismic were conducted in the Timor Sea in 2006 with caged snapper (*Pristipomoides multidens*), passed at 221-327 m with a 3090 cui seismic array and in 2007 at Scott Reef with caged snapper (*Lutjanis kasmira*) passed with a 2055 cui seismic array at 45-74 m. While fish exposed to the large sources showed small amounts of sensory epithelia damage this was low and barely above damage levels observed in control fish. Reasons for the disparity in fish ear damage produced between the short range single air gun and the longer range multiple air gun sources are explored. The behaviour of caged fish passed with a seismic source appears to be correlated to cage size, with smaller cages inhibiting behavioural responses. Sonar transects run perpendicular to a 2055 cui seismic pass in Scott Reef showed evidence of persistent individual fish and school avoidance out to 200-400 m. A seismic survey run inside Scott Reef lagoon which had historically monitored regular evening fish chorus present, produced small aberrations in fish chorusing behaviour but did not appear to alter fish vocal activity over a 24 month post-seismic period.

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