

The effects of human interaction for successful management for a humpback whale (*Megaptera novaeangliae*) breeding ground in the Turks and Caicos (Caribbean Sea).

OTIONOS research and services

INTRODUCTION

The Humpback Whale *Megaptera novaeangliae*, is a cosmopolitan species found in all the major ocean basins (Clapham and Mead 1999), and all but one of the subpopulations (that of the Arabian Sea) migrate between mating and calving grounds in tropical waters, usually near continental coastlines or island groups, and productive colder waters in temperate and high latitudes. In the north east pacific humpbacks migrate from the Gulf of Alaska and Vancouver Island to over winter in the Hawaiian Islands, South East Japan and southward along the west coast of Baja as far as Costa Rica. In the southern hemisphere humpbacks migrate from summer feeding spots around Antarctica to New Zealand, Tonga, many other south pacific islands, east and west coasts of Australia, Africa and South America. In the north west Atlantic (NWA), Six distinct feeding aggregations have been identified: Gulf of Maine, Gulf of St Lawrence, Newfoundland/Labrador, West Greenland, Iceland and North of Norway (including Bear Island and Jan Mayen). The major present-day NWA breeding and calving area in the West Indies extends from Cuba in the west down the island chain as far as Venezuela; the largest breeding aggregations occur on Silver and Navidad Banks near the Dominican Republic (IWC Scientific Committee, 2002, 2003). The best available abundance estimate for the West Indies group of breeding aggregations is 10,752 in 1992-93 (Stevick *et al.*, 2003). A small population of humpbacks migrate to the Cape Verde Islands in the winter from there feeding grounds in the north east Atlantic (Wenzel *et al.*, 2003).

A long-known but poorly described winter breeding ground is thought to exist at the Turks and Caicos Islands eastern most Island of salt cay, the Turks bank. This aggregation of whales around salt cay was previously assumed to be transient, due to en-route positioning to and from the infamous Silver bank. However, the Turks bank offers very similar habitat and conditions to the well described Silver bank plateau, just 90 nautical miles south east of the Turks bank. The Silver bank, a marine sanctuary for breeding humpbacks is estimated to attract one of the highest concentrations of breeding humpback whales on the planet.

This potential breeding ground is under increasing risk of disturbance from a growing tourism industry. Over 1 million visitors are attracted to the beaches and oceans of the TCIs annually, with about two thirds arriving at Grand Turk on cruise ships. In the TCIs 75% of tourists arrive between the months of December and May, and tourism showed a growth rate of 12% in 2010 (www.turksandcaicostourism.com/news). In 2008 Carnival Corp. opened a brand-new cruise terminal that is a destination in its own right, with retail shops, a recreation area right on the beach and a huge pool. During this season research excursion on the Turks bank, a significant increase in unlicensed tour operators and transient vessels conducting whale watching excursions was present compared to the previous season. Humpback whale based tourism in the TCIs is largely unregulated, with operators promoting the possibility to swim with these wild animals.

The presence of boats around cetaceans is known to induce behavioural changes in many of the species exposed to these activities (Sousa-Lima *et al.*, 2002; Williams *et*

al., 2002; Stokin *et al.*, 2008). Scheidat *et al.*, 2004., noted increased swim speed and decreased path linearity to be significant by humpback whales in response to approaching boats in Machalilla National Park, Ecuador. Schaffar *et al.* showed that humpback whales significantly increased their dive time and decreased the directness of their path when boats were present within 1000m of the animals. The effect of linearity also proved to increase with the number of boats in their main breeding ground of New Caledonia. It is important to measure avoidance strategies locally and be able to estimate the energetic cost and the sensitivity of the whales. Cow-calf pairs are the most common focal group encountered due to the fact that they are slower moving and easier to find. They are obviously the most vulnerable to the effects of human disturbance due to the massive energetic requirement of the calf. In 2006, more than 9800 whale watchers visited Tonga for the possibility to swim with a humpback whale; this contributed approximately 1.89 million dollars or approximately 15% of foreign income to the Tongan economy (Kessler *et al.*, 2011, Economists@Large 2008). Kessler *et al.*, 2011, outlines the huge importance of this revenue in countering the government pressure to resume harvesting of humpbacks in the Kingdom of Tonga by the Japanese. These studies all suggest the need for precautionary measures and practical managerial strategies to minimise the negative impacts of cetacean based tourism while promoting the future conservation of animals on their breeding grounds. It has been commented by the International Whaling Commission (52nd meeting, June 2000) that 'swim with' programs can be considered highly invasive and should be monitored for impacts.

RESEARCH

Research, utilising a range of quantitative and socio-economic survey techniques will be used to quantify the current level of disturbance from tourism with the hope of preparing useful information on recommended management to ensure a sustainable future for whales and the human livelihoods dependent on this growing industry. This research would be conducted in collaboration with the Department of Environment and Maritime Affairs (DEMA), the government agency in charge of managing the marine resources of the TCI.

Existing data collected over the past two winters (2011-2012) is suggesting the area around salt cay on the eastern side of the Turks bank may represent a valuable breeding ground as oppose to the migratory corridor (as previously thought). More data is necessary to be able to prove this critical habitat as a valuable breeding area and estimate population size.

In addition to validating the area as a viable breeding ground and measuring the effects of local tourism practices, such as the effects of snorkelling with these wild animals, the research findings will support management strategies that will enhance the protection and regulation of this sensitive resource. By conducting a comprehensive abundance survey we can begin to estimate the carrying capacity of this resource and possibly identify zones that may require additional protection from boat traffic (such as predominant nursing areas). We will aim to provide sound data that can be used in collaboration with DEMA to develop a much needed localised code of conduct for whale operators in the area.

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Study outline

Breeding ground versus migratory corridor investigation:

Identify site fidelity of individual whales and measure duration of stay per season and compare between seasons.

Measure and compare the relative abundance throughout the season as a parameter to determine habitat use.

Size the calves using photogrammetric technique to determine area as calving ground.

Identify male territory and fidelity using acoustic data, photo ID and recording mating behaviours/ displays.

Measure differences in group/ sex dynamics throughout the season and compare to other breeding grounds.

Effects of human Interference:

Identify the reaction of humpback whales toward a variety of approaching boats.

Identify the reaction of humpback whales toward snorkelers in the water.

Identify tourism pressure and potential pressure.

Management:

Determine whether the research area represents a valuable humpback whale breeding ground.

Identify breeding stock and identify carrying capacity for tourism.

Analyse boat approach and swim with data and use approach techniques for code of conduct.

Offer workshops for whale operators to explain lessons learned and outline best practices.

Use baseline monitoring data as a comparable for future trends and conservation.