

ARABIAN SEA HUMPBAC WHALES: CANARIES FOR THE NORTHERN INDIAN OCEAN? (SC/62/SH20)

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ABSTRACT

Both historic whaling data and recent field research confirm the presence of a resident sub-population of humpback whales in the western Arabian Sea (Breeding Stock X). This endangered population is geographically, demographically and genetically isolated and is thought to have been greatly reduced in size by Soviet whaling in 1966; it likely remains severely depleted. Current threats to this population, including incidental capture in fishing gear, coastal development and hydrocarbon exploration have increased in recent years and, coupled with possible underlying health issues, raise significant concerns about this population's viability. When compared with effort and resources aimed at other whale stocks, Breeding Stock X receives disproportionately meagre support for its research and conservation, whilst its status, health and the precautionary principle, imply that it merits at least the same level of concern.

KEYWORDS

Humpback whales; Fisheries, Gillnets, Incidental catches, Noise, Arabian Sea, Conservation, Sustainability.

INTRODUCTION

Both historic whaling data and recent field research confirm the presence of a resident sub-population of humpback whales in the western Arabian Sea (Breeding Stock X) (Mikhalev, 2000; Minton *et al.*, 2008). Whilst, the most recent data are from Oman, historical records indicate a distribution that also includes Yemen, Iran, Pakistan and India (Brown, 1957; Mikhalev, 2000; Minton *et al.*, 2008; Reeves *et al.*, 1991; Slijper *et al.*, 1964; Wray and Martin, 1983; Yukhov, 1969). Data on reproductive parameters collected during illegal Soviet whaling operations in 1966, as well as observations of calves and recordings of humpback whale song off the coast of Oman, indicate that this sub-population adheres to a Northern Hemisphere breeding cycle, with peak calving taking place between January and May (Mikhalev, 2000; Minton *et al.*, in press).

Genetic analyses of tissues sampled from humpback whales in Oman and elsewhere in the Western Indian Ocean provide further evidence for a discrete Arabian Sea sub-population and reveal that animals from Breeding Stock X (Stock X) are reproductively isolated from the Southern Hemisphere breeding stocks from which they originated with a long-term maternal gene flow rate of less than 6 individuals per generation (Pomilla *et al.*, 2006; Rosenbaum *et al.*, 2009). These studies also showed that there is no evidence of current exchanges with these neighbouring areas. Similarly, photo-identification studies reveal a relatively high incidence of re-sightings of individuals off the coast of Oman in autumn and spring, and a lack of tail fluke matches with neighbouring Indian Ocean populations (Minton *et al.*, 2010; Minton *et al.*, in press).

Pomilla *et al.*, 2006 and Rosenbaum *et al.*, 2009 reported reduced genetic diversity within Stock X compared with known diversity for other whales sampled from Breeding Stocks A, B and C, suggesting that population abundance is low. Mark-recapture estimates using three different pairings of tail fluke photographs collected in Oman (Arabian Sea) over a period of four and a half years yielded a population estimate of 82 individuals (95% CI=60-111). This figure may be considered an underestimate as surveys did not include the complete range of Stock X. However, the total sub-population, throughout its range, is considered unlikely to exceed a few hundred individuals and has been officially designated as endangered in the IUCN Redlist of Endangered species (Minton *et al.*, 2008). It is also compelling to note that levels of mitochondrial differentiation between Oman and other Indian Ocean breeding grounds are around ten times higher than among the other breeding grounds (the pair-wise FST range between Oman and other Indian Ocean breeding populations reported by Rosenbaum *et al.* (2009) was between 0.11 and 0.15).

Analysis of scarring on the caudal peduncle region of photographically identified humpback whales in Oman in 2003 indicated that between 30-40% of all whales examined were likely to have been involved in entanglements with fishing gear (Minton *et al.* in press). Fishing effort off the coast of Oman and in other parts of the Arabian Sea is increasing rapidly (Ministry of Agriculture and Fisheries, 2002; Ministry of National Economy, 2009; FAO, 2007) and drifting and set gillnets as well as fish traps are already widely used (Stengel & Al Harthy, 2002).

The Report of the workshop on the Comprehensive Assessment of Southern Hemisphere humpback whales (SC/58/Rep 5) echoes previous IWC reports that acknowledge the precarious conservation status of this sub-population and strongly recommend that further research be undertaken on humpback whales in the Northern Indian Ocean to aid in protection of the stock. In spite of these repeated recommendations, there is currently no active conservation management of humpback whales in the Arabian Sea and no budget allocation for research or related studies from any range state host government.

RECENT FINDINGS: AN ALARM CALL

The dedicated humpback whale surveys that were undertaken in Oman between 2000 and 2006 were not continued during 2007, 2008 and 2009, and records are therefore limited to incidental sightings and strandings for this period. However, in January/February 2010 a dedicated small-boat survey for cetaceans (humpback whales in particular) was undertaken using techniques similar to those used previously in Oman (Minton *et al.*, 2008). The Gulf of Masirah, near Masirah Island, on the Arabian Sea coast of Oman (Figure 1) was chosen as a site that had previously yielded relatively high encounter rates with humpback whales in autumn months (October-November). Encounter rates for humpback whales in previous years in this area averaged 0.15 individuals per hour during small boat surveys. During the 2010 survey, which comprised 39 hours of effort over a two week period, no humpback whales were sighted. Indeed only one sighting of a cetacean was recorded (a Bryde's whale mother-calf pair), in contrast to previous years when several species were consistently recorded in the area (Minton *et al.*, in press b).

Although the paucity of cetacean records on this recent survey may be attributable to seasonal variation, the survey also highlighted a marked increase in fishing activity and coastal development. During previous surveys 5-6 large fishing vessels (Arabian Dhows which each deploy drift nets up to 2.5nm in length) were encountered per day on average, compared to up to 60 per day during 2010. This reflects a known expansion in fishing effort in the area (and in Oman generally) with, for example, the number of registered fishing vessels doubling from just over 5,500 in 2006 to over 11,000 in 2008 (Oman Ministry of National Economy, 2009). At the coastal town of Duqm (Figure 1) construction of a large industrial port and dry docks is underway (total investment cost is approximately US\$1,096 million), which includes 1,300 hectares set aside for development of fishery related industries (OER, 2007). During the 2010 cetacean survey, dredging activities associated with port construction were detected acoustically at distances exceeding 40nm. When the port becomes active, vessel traffic from one of the world's busiest shipping lanes (Kaluza *et al.*, 2010) which passes to the east of Masirah Island, will be diverted inshore across known humpback whale habitat into Duqm.

Threats related to coastal development and fishing were also noted to have increased in Dhofar, in the south of Oman. In previously surveyed areas of relatively high humpback whale abundance, around Hasik and the Hallaniyat Islands (Figure 1), new ports, harbours, fast-ferry terminals and coastal resorts are under construction and fishing effort has increased. Coastal towns that were accessible only by boat or helicopter during the surveys of the early 2000's, are now linked to the capital by major highways, allowing for the introduction of larger scale commercial fishing effort (and associated export), tourism and industrial initiatives.

While encounter rates for live cetaceans in the recent survey are much lower than previous surveys, the number of stranded cetaceans (and other marine wildlife such as sea turtles) recorded during 2010 has increased in comparison to previous years. The majority of stranded cetaceans in the area were baleen whales (n=10 during the period February to May 2010 including seven unidentified whales and three Bryde's whales). Of these stranded individuals, three were entangled in gillnets and at least one other showed evidence of entanglement. Incidental records from 2007 to 2009 reveal a similar level of stranding incidents and at least one humpback whale was observed to have been incidentally captured in a gillnet at sea during this period (Hamed al Gheilani, Ministry of Fisheries Wealth, pers comm. supported by photographs).

For a population with low genetic diversity, a further threat to humpback whales in Oman may be disease. A recent analysis of the Oman humpback whale photo-ID catalogue showed persistent occurrence of Tattoo Skin Disease (TSD), which was observed in 25.6% of 43 whales examined. While not thought to be lethal, persistent TSD infection may decrease overall fitness and render whales more vulnerable to other mounting pressures (Van Bresse and Van Waerebeek, 1996; Van Bresse *et al.*, 2009) including the anthropogenic pressures detailed here.

Following the 2010 surveys, humpback whales were recorded incidentally in other parts of the Arabian Sea and Sea of Oman (previously known as the Gulf of Oman). In February 2010 shore-based sightings near Hasik in Dhofar (Figure 1) included a resighting of an individual photo-identified during previous surveys. In May 2010,

four sightings were recorded by dedicated Marine Mammal Observers on board a seismic vessel near the Gulf of Masirah. Further seismic surveys are planned for June and both these, and subsequent exploration/exploitation of hydrocarbon reserves, represent further threats to cetaceans in the area (McCauley *et al.*, 1998; Weller *et al.*, 2002; Gordon *et al.*, 2003).

CONCLUSION

Threats to humpback whales in Oman, and indeed baleen whales generally in the wider region, are known to be increasing as fisheries activities, coastal development and other pressures expand and intensify. In parts of the Arabian region, coastal development over the past two decades has progressed at a scale and pace perhaps greater than anywhere else in modern history. Human populations are also rising rapidly (for example, Oman's population growth rate is among the highest in the world at 3.14%) and there is a continuing demographic shift towards coastal areas (Ministry of National Economy, 2009).

In light of the lack of any explicit conservation measures, threats to coastal cetaceans such as humpback whales are likely to continue to escalate. This may prove too much for this population of humpback whales and urgent conservation action is therefore required. It should also be noted that continued monitoring of population trend may not statistically reveal a decline within the time frame needed to address threats: a declining trend may not be evident over statistical confidence limits (Taylor *et al.*, 2000).

As a rare, geographically, demographically and genetically isolated population, with a unique year-round residency in sub-tropical waters of the Arabian Sea, Stock X presents many opportunities for study and is worthy of conservation. Our knowledge of the humpback whales of the Arabian Sea, though not advanced, far exceeds our understanding of any of the other large whale species known to inhabit this region and for which evidence of isolation and regional distinctiveness also exists. This concept can be extended to yet other taxa in the Indian Ocean, which face similarly escalating threats and for which humpback whales may ultimately represent a miner's canary for the region.

A recent western gray whale population estimate (Reilly *et al.*, 2008) suggests a population of between 113 and 131 individuals; an estimate which exceeds that for the humpback whales off the coast of Oman. Although this western gray whale population estimate is derived from feeding grounds alone, the authors suggest that this represents the entire population and the stock is therefore designated as critically endangered. In contrast the Arabian Sea humpback whale population was not considered critically endangered because of the possibility that its range extends into other areas of the Arabian Sea. Due to media attention, Russian government involvement, and funding from government, NGO's and hydrocarbon companies, the attention, funding, and research efforts dedicated to western gray whales far exceeds that for the humpback whales of Stock X. However, we believe, given mounting anthropogenic threats, coupled with possible underlying health issues, such as the liver abnormalities detected by Mikhalev (2000) and TSD, the precautionary principle should dictate that we treat Arabian Sea humpback whales with at least the same level of concern as western gray whales.

We request that the IWC find ways to consider working annually on Stock X, and requests support for the encouragement of governments in the population's range states, as well as relevant NGO's and industries, to dedicate more resources and attention towards research and conservation efforts for this population, which may otherwise face extinction in the foreseeable future.

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Figure 1. Map of Oman showing main humpback whale surveys areas (only areas C and D are relevant to this document).

