

## ARABIAN SEA HUMPBACK WHALES 2011 UPDATE: RESIGHTS, BUBBLE FEEDING AND HOTSPOTS

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### ABSTRACT

The 2010 report of the Scientific Committee (IWC/62/Rep 1) expressed grave concern for the resident 'Arabian Sea humpback whale population'. The Committee made strong recommendations for additional research to monitor the status of this Endangered population which has a restricted range, is reproductively isolated, has a very small population size ( $n=82$  (95% CI=60-111)) and is known to interact with humans with negative consequences. A survey during March 2011 resulted in 47 sightings of humpback whales representing approximately 12 individuals. Sightings included a mother-calf pair, observation of competitive behaviour and frequent feeding including use of 'bubble cloud' and 'bubble net' structures, all of which have been rarely witnessed in Oman on previous surveys. At least three known individuals were identified, among them those that have been re-sighted as many as four times previously and those that have been previously photographed at the same location. Song was recorded on numerous occasions from the survey vessel and one Cornell MARU was deployed resulting in acquisition of over 20 days of continuous recordings which are undergoing analysis. Threats from fishing activity, coastal development and vessel traffic were documented, and an apparent attack on a humpback whale by false killer whales was witnessed. Numerous other cetacean species were recorded, including other large whales (blue whales, Bryde's whales and sperm whales – all with calves – and numerous small cetaceans). The majority of sightings were clustered around Ras Hasik and all feeding behaviour, including that by humpback, blue and Bryde's whales occurred within 2-3 kilometers of this apparent 'hotspot'. Further research is recommended which may be best determined via the Conservation Management Planning process.

### KEYWORDS

Humpback whales, Arabian Sea, Conservation, Feeding, Acoustic Research, Competitive behaviour.

### INTRODUCTION

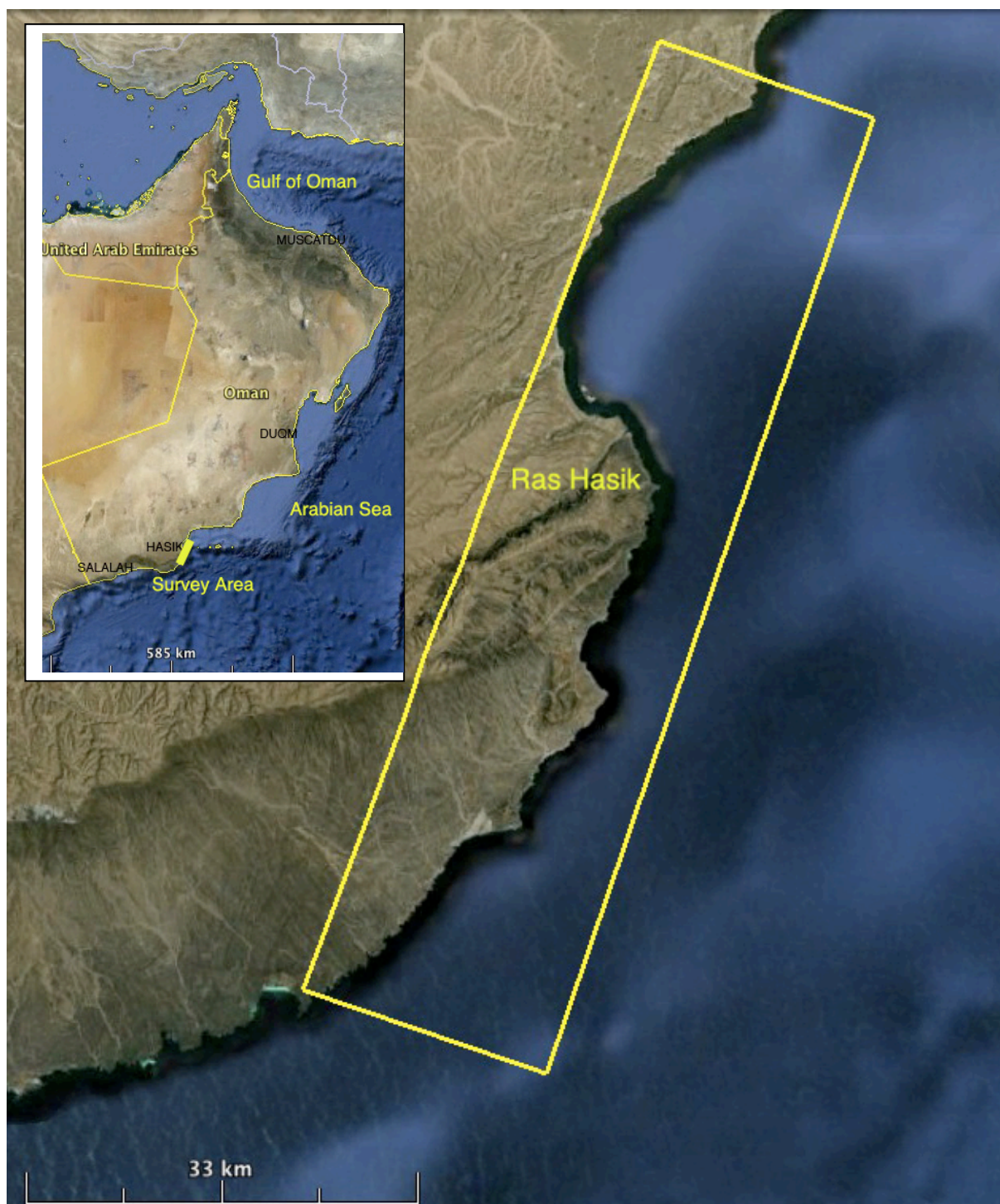
Both historic whaling data and recent field research confirm the presence of a resident sub-population of humpback whales in the Arabian Sea (Mikhalev, 2000; Minton *et al.*, 2008). Whilst the most recent data are from Oman, historical records indicate a distribution that also includes Yemen, Iran, Pakistan and India and potentially other states of the NIO region (Brown, 1957; Mikhalev, 2000; Minton *et al.*, 2008; Reeves *et al.*, 1991; Slijper *et al.*, 1964; Wray and Martin, 1983; Yukhov, 1969). Mikhalev (1997) reported on the biology of 238 humpbacks taken by Soviet pelagic whaling operations in November 1966 off the coasts of Oman and Pakistan. Based on the material collected from these whales, Mikhalev (1997) argued that these animals had a mating season that lasted from January to May which is coincident with other Northern Hemisphere humpback populations. Recent recordings of song and observation of calves in Oman supports this hypothesis (Minton *et al.*, in press). Mikhalev (1997) also recorded evidence of feeding in the same area based on analysis of stomach samples. 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; half of the eight genetic haplotypes recorded from humpbacks sampled off Oman are unique to the region (Pomilla *et al.* 2010; Rosenbaum *et al.*, 2009). A 2008 comparison of the Oman tail fluke photo-ID catalogue with those from Madagascar, Mozambique and Zanzibar did not yield any matches, providing further evidence for the discrete nature of the Arabian Sea humpback whale population (Minton *et al.* 2010b).

Analyses of photo-identification images also reveal a relatively high incidence of re-sightings of individuals off the coast of Oman. These provide the basis for the population estimate of 82 (95% CI=60-111) individuals (Minton *et al.* 2010a). The population was recently listed as Endangered by the IUCN (Minton *et al.* 2008) and is considered very vulnerable to escalating threats (Baldwin 2003, Baldwin *et al.* 1999, Baldwin *et al.* 2010).

Analysis of scarring on the caudal peduncle region of photographically identified humpback whales in Oman indicates that between 30-40% are likely to have been involved in entanglements with fishing gear (Minton *et al.* 2010a). Eight humpback whales were recorded entangled (live) in fishing gear in Oman during the decade 1990-2000 (Baldwin 2003), a further live-entanglement was documented in 2008 (Baldwin *et al.* 2010), and anecdotal information of another entanglement (leading to mortality) is documented for 2011. There have been limited humpback whale strandings in the region (Baldwin 2003), presumably due to low population abundance, whilst strandings of Bryde's whales and sperm whales are relatively frequent (Baldwin *et al.* 2010).

## 2011 FIELD SURVEY, OMAN

The most recent field survey of Arabian Sea humpback whales was conducted in Dhofar, Oman in March 2011 and follows previous surveys in Oman conducted between 2000 and 2006 and in 2010, reported at previous IWC Scientific Committee meetings. Surveys were conducted between 6<sup>th</sup> and 29<sup>th</sup> March 2011 and included approximately 110 hours of survey from a small research vessel and 37 hours of shore-based surveys. The location of the survey is shown in Figure 1, below. Planned surveys further offshore around the Hallaniyat Islands were not attempted due to recent Somali pirate activity in the area.



**Figure 1.** Survey area in the Arabian Sea around Ras Hasik in the province of Dhofar, southeastern coast of Oman. General survey area is delineated by yellow box.

Surveys resulted in 47 sightings of humpback whales, including 22 from the vessel and 25 from shore. This total represents approximately 12 individuals, many of which were sighted repeatedly over the course of the survey. Biopsy techniques were employed resulting in collection of eight tissue samples of humpback whales for DNA analyses.

Sightings of humpback whales included surface-active behaviour by groups of up to five individuals, which appeared to be competitive. Interactions between individuals within such groups was energetic; whales were fast-moving, frequently changing direction, performing rolls, tail-slaps and flipper-slaps, barely avoiding collision in many instances and sometimes exhibiting body glances. Song was recorded frequently during the course of the survey and on one occasion an individual was apparently 'displaced' by another individual who then took to singing in the same location, after multiple breaching, tail and flipper slapping by both individuals. All previous sightings of humpback whales in Oman have been of singletons or pairs, or, much more rarely, groups of three.

Sightings of humpback whales also included a rare record of a mother-calf pair; confirmed sightings of mother-calf pairs of this species in Oman include just eight records, including 2 in 1997, 5 in 2000 and 1 in 2009. The calf was estimated to be 5-6 metres in length. Calves of blue whale, Bryde's whale and sperm whale were also recorded amongst sightings of other cetaceans (see Table 1, below).

**Table 1.** Cetaceans sighted during surveys between 6<sup>th</sup> and 29<sup>th</sup> March 2011 around Ras Hasik, Oman

Species	Number of sightings
<i>Megaptera novaeangliae</i>	47
<i>Balaenoptera musculus</i>	6
<i>B. brydei</i>	4
<i>Physeter macrocephalus</i>	2
<i>Tursiops</i> sp.	3
<i>Sousa chinensis</i>	9
<i>Delphinus capensis</i> cf <i>tropicalis</i>	26
<i>Grampus griseus</i>	2
<i>Pseudorca crassidens</i>	1
Unidentified whale	9
Unidentified dolphin	4

Based on these data and those from previous surveys (Minton *et al. in press*), it is apparent that the area around Ras Hasik is important for cetaceans. Using spatial eigenvector mapping modeling approach, Corkeron *et al* (in prep) demonstrate that the Dhofar region of Oman in general can be expected to be important for humpback whales. Their analysis shows that the clustering of humpback whales along parts of the Dhofar coast (including the area around Ras Hasik) revealed by field surveys throughout Oman is not a sampling artefact, but a result of the whales' ranging behaviour. It can be expected that several 'hotspots' similar to that found at Ras Hasik occur along this coast and other parts of the Arabian Sea humpback whale population's range. Given the restricted nature of this range, such sites are of high conservation importance suggesting the need for a spatially-explicit management program that incorporates these areas. Further information on the oceanographic, ecological and other potential reasons for use of this habitat by humpback whales is required and will be useful for development of a regional Conservation Management Plan for this population.

#### PHOTOIDENTIFICATION

During the course of surveys, whales were photographed as part of ongoing photo-identification studies. Photographic data are still undergoing analysis, but at least three distinctive individuals were recognized in the field and represent animals that were first photographed in 2001. Among them are individuals that have been re-sighted as many as 4 times in the intervening years, as well as individuals that have been photographed in the same location (Ras Hasik) on multiple occasions. Preliminary analysis suggests a relatively high incidence of animals showing caudal peduncle scarring from fishing net entanglement, as has been documented previously (Minton *et al.* 2010a).

#### FEEDING

Feeding was observed on a number of occasions during the course of the survey by humpback whales, blue whales and Bryde's whales. All feeding was observed around Ras Hasik or within 2-3 kilometers south of this headland. Feeding was observed during 16 of the 47 humpback whale sightings, with most feeding activity in the

late afternoon. Only one feeding event was recorded in the morning; all other occurred after 1500hrs and most at around 1700hrs. Survey effort began between 0700hrs and 0800hrs and generally ceased at about 1800hrs.

On numerous occasions feeding by humpback whales involved use of bubble structures, including both 'bubble clouds' and 'bubble nets' (Clapham and Robbins pers. comm.). Bubble clouds consisted of two (occasionally just one) large bursts of bubbles reaching the surface followed by a whale or pair of whales surfacing, most often vertically, with mouths agape. Bubble clouds were observed on 14 occasions between 6<sup>th</sup> and 27<sup>th</sup> March. Bubble nets were formed from a continuous stream of fine bubbles blown in a circle (there was no evidence of spiral or columnar formations) with whales surfacing at the edge of the circle. Bubble nets were seen on two occasions (7<sup>th</sup> and 11<sup>th</sup> March) involving a pair of whales on one occasion and two pairs of whales feeding at the same location on the other. Bubble clouds were also recorded during the bubble net feeding event by the two pairs of whales, with clouds being the more frequently used of the two techniques. Analysis of photographs is underway to determine the apparent individual-specific nature of the bubble feeding behaviour. The likely prey, based on underwater observations post-feeding events, was small fishes. Throughout the course of the survey bait balls of small, surface-schooling fishes, manta rays, feeding sea birds and other signs of high productivity were more apparent than in most other years during which surveys have occurred in Oman, and similar to 2000 when feeding by humpback whales was also relatively frequently recorded and mother-calf pairs were sighted at the Hallaniyat Islands.

### ACOUSTIC RESEARCH

One Cornell MARU was deployed at Ras Hasik, Oman (17.396N, 55.308E) on 8 March 2011, and was retrieved 30 March 2011. The unit recorded continually at 2kHz for the entire deployment, resulting in approximately 7GB of recordings. These have yet to be analysed. Vocalizations, including song, were also recorded during the course of the survey from the vessel using a hydrophone recording at 16bits 44 kHz. Additional acoustic research, including continuous passive recording is planned in several other locations in Oman from October 2011 onwards.

### THREATS

The recent survey reaffirmed the presence of both natural and anthropogenic threats to humpback whales in Oman. Fishing activity occurs at the site where humpback whales were most frequently recorded (Ras Hasik) and a new fishing harbour is under construction at the nearby town of Hasik. Fast-vessel transport from Ras Hasik to service the construction of a resort at another known humpback whale site (As Sawda, Hallaniyat Islands) was observed to occur on regular basis (several times per week). Additional vessel traffic was recorded in the area, including large cargo vessels that had apparently deviated from the shipping lane which passes seaward of the Hallaniyat Islands to instead take a route between the Islands and Ras Hasik. It is speculated that this unusual course of action may have been related to the high incidence of pirate activity in offshore waters of this area. All such traffic increases the likelihood of vessel collision with humpback whales and other cetaceans.

An apparent attack on a humpback whale by a pod of false killer whales was witnessed on 26<sup>th</sup> March. Approximately 30 individuals from a pod of up to 100 false killer whales (mixed with Risso's dolphins) approached and surrounded a lone adult humpback whale, which began tail slapping and side flicks, as well as flipper slaps and body rolls in between stationary periods just beneath the surface. False killer whales appeared to be charging the whale, at one point ramming into its flanks and at another crowding on top of the whale which lay just beneath the surface. After one hour, the whale began to move away from the area and the false killer whales departed from the scene.

### CONCLUSION

Previous work in Oman has revealed the urgent need to conserve a small population of isolated humpback whales that is under increasing threat from human activity. The current survey adds to the developing base of knowledge on Arabian Sea humpback whales, raises some interesting questions about behaviour, and further highlights an important location in Dhofar where feeding, competitive behaviour and song are recorded and where sightings of numerous other cetacean species is relatively frequent. It is possible, indeed probable, that other such sites exist in Dhofar and other parts of the Arabian Sea humpback whale's range. These hotspots are an important consideration in conservation management planning. Further research and monitoring of the Arabian Sea humpback whale is required, including additional work on acoustics, habitat use, photo-identification, genetics, feeding and other behaviours, as well as more detailed study of threats. All such research is best determined via a regional Conservation Management Planning process.

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