

## The trade in sharks and their products in the United Arab Emirates



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### ABSTRACT

The rapid growth in the demand for shark products, particularly fins, has led to the worldwide overexploitation of many elasmobranch species. Although there are growing concerns about this largely unregulated and unmonitored trade, little information still exists about its dynamics, the species involved and the impact of this pressure on stocks in various regions. Our study provides the first attempt at characterizing the trade in shark products from the United Arab Emirates (UAE), the fourth largest exporter in the world of raw dried shark fins to Hong Kong. A review of trade records and informal interviews with local traders confirmed that the UAE is being used as hub in the broader North Indian Ocean region for the trade in shark products with the Emirati fishery minimally contributing to this trade. Results based on morphological identification of sharks ( $n = 12,069$ ) and DNA barcoding of tissue samples ( $n = 655$ ) indicated that the trade was made up of at least 37 species. The most abundant families represented at the Dubai study site were the Sphyrnidae (9.3%), Lamnidae (9%) and Alopiidae (5.9%). While information was mostly limited to shark products originating from the UAE and Oman, results indicated that 45.3% of species traded were considered to be at high risk of global extinction based on the IUCN Red List Global Assessments. Since many of the species found during this survey are likely part of stocks shared with other countries, regional cooperation and management will be crucial to ensure their long term survival.

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### 1. Introduction

The vulnerability of sharks to fishing is directly linked to their K-selected life histories but also to the growing market for shark products, a major driver for the exploitation of many species (Stevens et al., 2000; Clarke, 2002; FAO, 2009). Among fishery commodities, shark products, including meat, fins, oil, skin, cartilage, and jaws, are highly diverse and versatile in both their usage and their value (Clarke, 2004; Hareide et al., 2007). Reports indicate that the greatest quantity of international trade in shark products is in the form of fresh, chilled or frozen, unspecified, shark meat (Clarke, 2004). Other shark derived products have a wide range of utilization (Rose, 1996; Vannuccini, 1999) and yet trade in these products appears to fluctuate over time with substantial declines documented indicating they are unlikely to be driving shark catches (Clarke, 2004). On the other hand, the demand for shark

fins, and their high value, is a major driving force for shark mortality worldwide with estimates ranging between 26 and 73 million sharks killed annually to supply fin markets (Clarke et al., 2006b) out of an estimated 63–273 million sharks captured annually (Worm et al., 2013).

The biggest market for shark fins is China, although huge markets exist in Japan, Hong Kong, Singapore and Korea (Vannuccini, 1999). For decades, Hong Kong has been the center of the world trade in shark fins handling between 50% and 85% of global shark fin imports from at least 85 countries (Clarke, 2002, 2004). From 1998 to 2011, Spain, Indonesia, the United Arab Emirates (UAE), Taiwan and Japan comprised the top five countries exporting shark fins to Hong Kong (Clarke et al., 2006b; Hareide et al., 2007; Anon, 2012). However, this trade remains largely understudied and little information is available on the geographic origin of these fins and the species from which they originated (Clarke et al., 2006a).

There are growing concerns regarding the ability of shark populations to sustain fishing pressures driven by market demand in parallel with trade growth (Camhi et al., 1998; Baum et al., 2003; Clarke et al., 2007). Improved and accurate data on shark trade

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volumes and their products are necessary to determine the relative importance of trade as a threat to species, trends in exploitation, and to examine the potential role of trade regulations as an additional measure for shark conservation (Camhi et al., 1998; FAO, 2009).

In the past 15 years, the UAE has emerged as a regional market for fish and has become a hub for fish exports to Gulf Cooperation Council (GCC) countries, the Middle East, Africa and Europe (EU) (Al Mousa et al., 2008). Recent research indicates shark fisheries in the UAE are essentially driven by shark fin export markets (Jabado et al., 2014a) with reports showing exports up to 500 mt of dried raw fins annually to Hong Kong, playing a crucial role in the international shark fin trade as a regional export hub (Fowler et al., 2005; Hareide et al., 2007; WildAid, 2007). However, much of the trade in sharks and their products remains unregulated with little information available regarding species and quantities involved. Since different species have varying natural capacities to respond to fishing pressure, any management and conservation efforts require reliable species-specific catch and trade data (Abercrombie et al., 2005; Clarke et al., 2006a; Holmes et al., 2009).

Various methodologies for characterizing the shark fin trade are now available and include market surveys as well as genetic methods. Using molecular techniques to identify shark species and their body parts from specimens morphologically difficult to identify, or to confirm morphological species identification has become an accepted technique (Shivji et al., 2002; Clarke et al., 2006; Holmes et al., 2009). Because the UAE plays such an important role in the global shark fin trade, a study was urgently needed to characterize shark products traded from this key location. Therefore, the aims of this study were to (1) investigate national and international trade dynamics of various shark products; (2) assess species composition and geographic origin of sharks involved in the trade; (3) confirm field identifications by barcoding a subsample of species from the survey site; (4) assess the conservation status of traded species.

## 2. Materials and methods

### 2.1. Study site, samples and species identification

Data collection was ongoing from October 2010 until the end of September 2012 at the Deira fish market in Dubai, the only auctioning site in the UAE for sharks destined for the international trade (Fig. 1). Whole sharks and fins are auctioned here daily from 17:00 to 20:00 h. Data were collected four times a month until January 2012 and then twice a month until September 2012 (Jabado et al., 2014b). While on some days sharks were transported from other emirates (Abu Dhabi and Sharjah) to this site, the large majority of sharks and fins auctioned in Deira originated from Oman. Whole sharks were typically offloaded from trucks and identified to the lowest possible taxonomic level using keys from Compagno et al. (2005) and Last and Stevens (2009), and their geographic origin was recorded. Samples originating from fresh or dried fins could not be identified to species level and only information about their capture location was noted. Furthermore, sharks here were displayed side by side on a platform, making it difficult to move large specimens. Therefore, at occasions, accurate identification was not possible since key morphological characteristics (i.e. fins) were not always visible. To confirm the accuracy of these identifications, tissue samples from 655 specimens originating from Omani transshipments and belonging to 27 morphologically identified species were collected. All samples were immediately preserved in 95% ethanol, and taken to the laboratory for storage at  $-20^{\circ}\text{C}$  until required for analyses.

A total of 182 tissue samples from three species, including great (*Sphyrna mokarran*), scalloped (*S. lewini*) and smooth (*S. zygaena*) hammerheads, were sent to the Red Sea Research Center for genetic analyses. DNA extractions, PCR amplifications and sequencing were undertaken following methods described in Spaet and Berumen (2015).

A total of 473 tissue samples (including 11 fin samples) representing 26 species were sent to the University of Guelph for

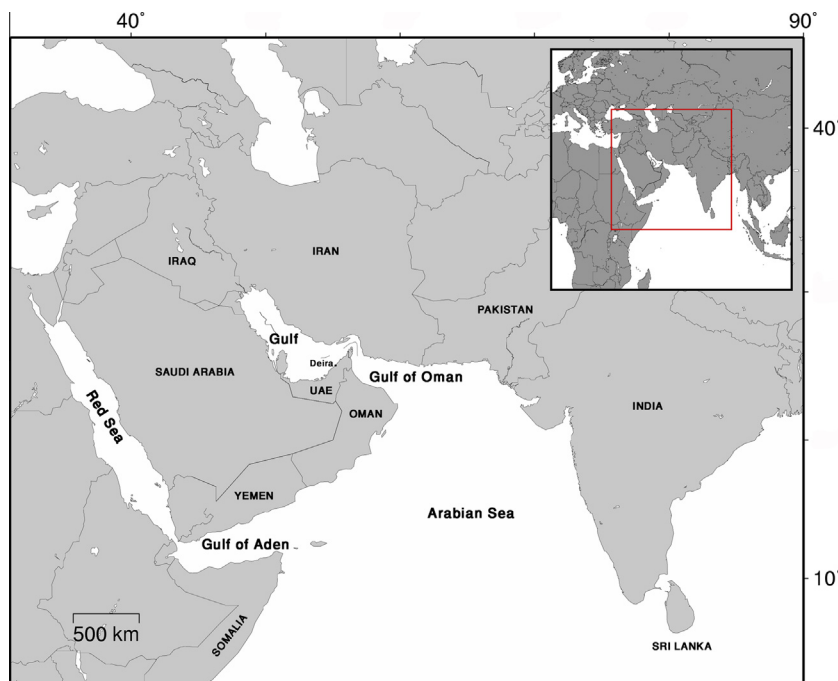


Fig. 1. Map of the Arabian region indicating the Deira market site where the trade survey was conducted.

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