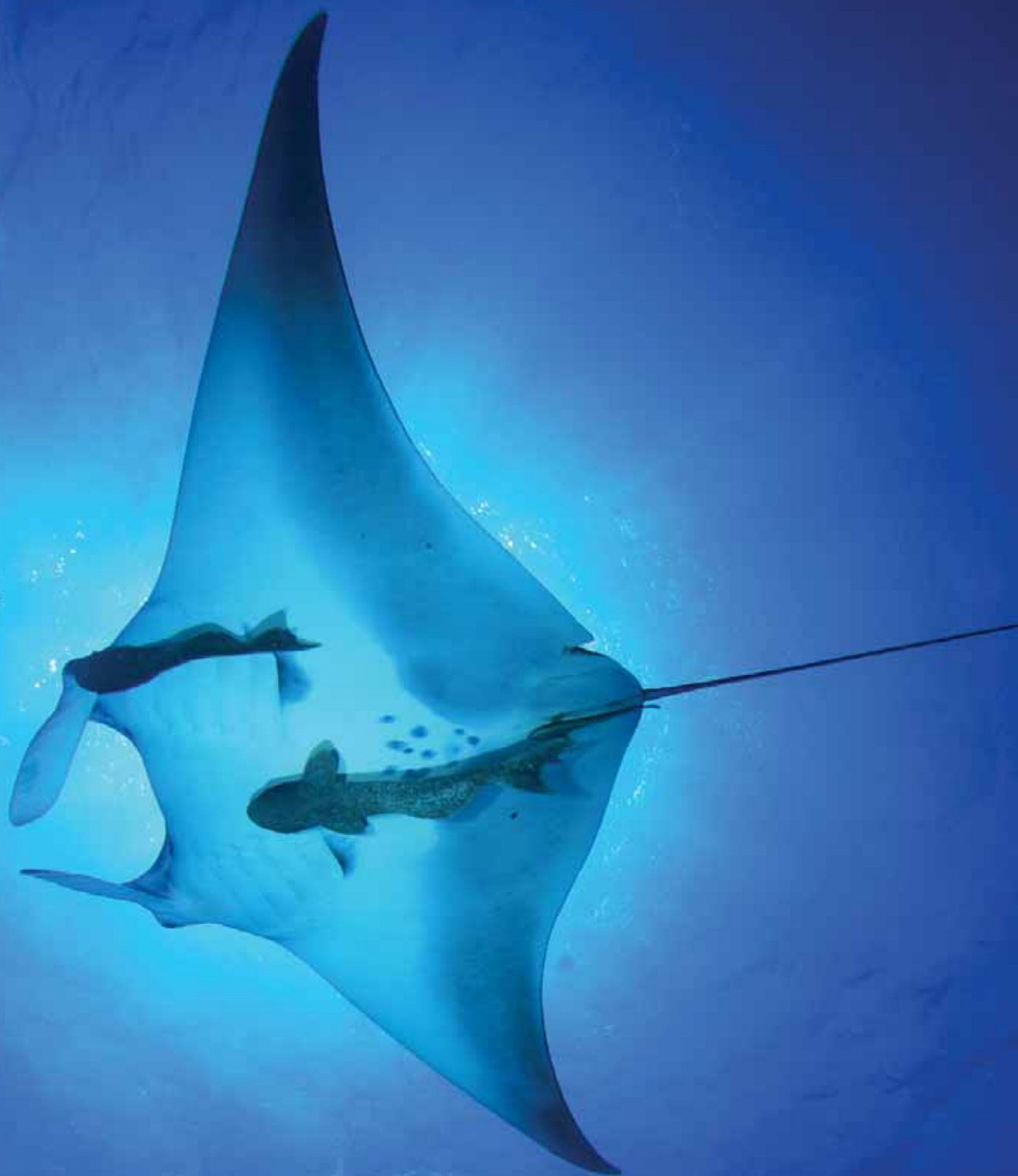


TRAFFIC
REPORT

THE SHARK AND RAY TRADE
IN SINGAPORE

MAY 2017

Boon Pei Ya





TRAFFIC REPORT

TRAFFIC, the wildlife trade monitoring network, is the leading non-governmental organization working globally on trade in wild animals and plants in the context of both biodiversity conservation and sustainable development. TRAFFIC is a strategic alliance of WWF and IUCN.

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THE SHARK AND RAY TRADE IN SINGAPORE

Boon Pei Ya



Manta Ray

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Whale shark

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SINGAPORE SHARK

AND RAY TRADE 6 YEAR TRADE ASSESSMENT: 2005-2014*

SHARK FINS **2nd** LARGEST RE-EXPORTER & IMPORTER IN THE WORLD BY VALUE (USD)

59.6% of imports from



Total Imported*
14 114 tonnes



Total Re-exported*
12 405 tonnes

71.3% of re-exports to



SHARK MEAT **14th** LARGEST IMPORTER IN THE WORLD BY VOLUME

68.8% of imports from



Total Imported*
7 213 tonnes



Total Re-exported*
6 116 tonnes

64.6% of re-exports to



RAY AND SKATES**

IMPORT (2014) 1 650 tonnes

RE-EXPORT (2014) 156 tonnes

**Data only available for 2014

90% of imports were not re-exported, suggesting that the majority of imports catered for the domestic market

Major trading partners:



Singapore traded in **5 CITES-listed Shark species.**
(> 3000 kg from 2005-2014*)

Basking shark
Cetorhinus maximus



Oceanic Whitetip Shark
Carcharhinus longimanus



Scalloped Hammerhead Shark
Sphyrna lewini



Great Hammerhead Shark
Sphyrna mokarran



Porbeagle
Lamna nasus



TRAFFIC
The wildlife trade monitoring network

*The reclassification of trade codes for shark fins which occurred twice (in 2008 and 2012) and the suspected combined recording of trade for shark fins and meat twice (in 2008 and 2011) limited a comprehensive ten-year trade data analysis. While insights into trade dynamic over a 10-year period is provided, detailed analysis focused on two periods: 2005-2007 and 2012-2014.

ACRONYMS

ASEAN	Association of Southeast Asian Nations
AVA	Agri-Food and Veterinary Authority of Singapore
AHTN	ASEAN Harmonised Tariff Nomenclature
CA	Competent Authority (product code)
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COFI	FAO Committee on Fisheries
FAO	Food and Agriculture Organization of the United Nations
HS Code	Harmonized Commodity Description and Coding System, also known as the Harmonized System of tariff nomenclature
ICA	Immigration and Checkpoints Authority of Singapore
IE Singapore	International Enterprise Singapore
IE Statlink	International Enterprise Singapore Trade Statistics
IPOA-Sharks	International Plan of Action for the Conservation and Management of Sharks
ISSCAAP	International Standard Statistical Classification of Aquatic Animals and Plants
ITC	International Trade Centre
IUU	Illegal, unreported and unregulated (fishing)
NGO	Non-governmental Organization
NPOA	National Plan of Action
RMFO	Regional Fisheries Management Organization
STCCED	Singapore Trade Classification, Customs and Excise Duty
WCO	World Customs Organization

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EXECUTIVE SUMMARY

The types of shark commodities traded internationally are diverse with shark meat and fins being the primary commodity types. Shark meat is reported to be the most traded by quantity (120 305 t imported globally in 2013, the last year for which full global data are available) while shark fins are the most valuable (USD214 million worth of global imports in 2013). Skates and rays¹ are suspected to constitute a sizeable proportion of the global shark meat trade, while rays are often overlooked in the fin trade. There is also a growing market for Mobuild Ray gill plates for use as a health tonic and/or as cures for various illnesses.

Singapore is known to play a major role in the global trade and consumption in shark and ray parts though a country-specific analysis has not been conducted recently. Based on this, TRAFFIC and WWF undertook an exercise to understand the scale of this trade involving Singapore, and the role it plays. This assessment describes the characteristics of shark product trade through Singapore over a ten-year period, from 2005 to 2014 as well as the current regulatory systems in place. The primary sources of data were the Singapore government trade statistics body IE Statlink (for the years 2005-2014) to determine Singapore-specific trade dynamics, Food and Agriculture Organisation (FAO) fishstat (for the years 2005-2013) to undertake comparison in global trade and CITES trade database. However, the reclassification of shark fins by Singapore Customs (and those captured in the IE Statlink database) occurred twice in 2008 and 2012 where frozen shark fins were suspected to be combined with frozen shark meat in 2008 to 2011. A lack of accurate interpretation of that data from the Singapore government limited a more comprehensive ten-year trade data analysis. Nevertheless this report is the first proper detailed report for Singapore, where assessments in the past have been global overviews. It provides some insight into trade dynamics over the 10 year period, but focuses on more detailed analysis for two consecutive periods over six years, from 2005 to 2007 and from 2012 to 2014.

Imports and exports of shark fin

Analysis of FAO data for the world's top 20 shark trading countries highlights that Singapore was the world's second-largest importer and exporter of shark fins in value terms, after Hong Kong, for both time periods of 2005 to 2007 and 2012 to 2013. Average imports and exports of all shark fin products increased by 43.6 % and 29.9% respectively, when comparing data for both time periods. Exports recorded a high of 2422 t from 2012-2013, representing 10.3% of the total world export and making Singapore the second largest exporter after Thailand. Import recorded at a high of 2702 t for the same period, representing 13.3% of the world imports, ranking it as the world's third largest importer, after Malaysia and Hong Kong. Prices for exports and imports over the two assessed periods however, decreased by 51% and 44.6% respectively. Despite this, Singapore still occupied the world's second highest rank in trade values. The lack of distinction between frozen and dried shark fins - the former of which can weigh four times as much as dried fins due to additional water content - requires further scrutiny for a more accurate representation of the trade volume, including potentially higher volumes of trade. Singapore does not have a domestic shark fishery and domestic export of locally processed shark fins makes up only 2.6% of the total export. Singapore defines domestic exports as either primary commodities grown or produced in Singapore or goods which have been transformed, that is, manufactured, assembled or processed in Singapore; it classifies all domestic exports of shark products as products of processors in Singapore.

Analysis of Singapore-specific data from IE Statlink showed that Singapore imported 14 114 tonnes (averaging 2352 tonnes/year) and exported a total of 12402 tonnes (averaging 2067 tonnes/year) of shark fins over the six years studied. Trade was recorded with a total of 68 countries and other unspecified countries from Africa, Americas, Oceania and Asia. Numbers of both export and import trading partners decreased, when comparing 2005 to 2007 and 2012 to 2014. Exports

headed mostly to countries within the Asia-pacific region, with 99.2% and 99.996% of the total volume of exports heading to countries within the Asia-pacific region in 2005 to 2007 and 2012 to 2014 respectively. The top three destinations was dominated by China (Hong Kong, mainland China and Taiwan), making up 71.3% of total exports, with Hong Kong receiving the lion's share of Singapore's shark fins for both periods. Shark fin imports on the other hand originated from outside this region, the top three countries in descending order being Spain, Uruguay and Namibia, making up 59.6% of total imports. Hong Kong and Spain remained the largest importer and exporter for shark fins to and from Singapore, for both time periods. Namibia emerged as a new source country for Singapore recorded from 2012.

Shark species in trade

Trade in CITES listed sharks as recorded for the past 10 years on the CITES trade database revealed that of the 30 shark species listed on CITES, five species of shark were reported to be traded by Singapore: Basking Shark *Cetorhinus maximus*, Porbeagle *Lamna nasus*, Oceanic Whitetip Shark *Carcharhinus longimanus*, Scalloped Hammerhead Shark *Sphyrna lewini* and Great Hammerhead Shark *Sphyrna mokarran*. Basking Sharks were all imported from New Zealand, with one record of re-export to Hong Kong, while the Porbeagle was imported exclusively from Spain. Collectively, more than 3000 kg from the five species were traded during the period assessed.

Beyond the CITES-listed species in trade, it was not possible to determine specific volume of trade by species based on FAO data, however interview with Singapore's Marine and Land Product Association, the country's largest shark traders association, stated that shark fin from the Blue Shark *Prionace glauca* dominated the market, which comprised as much as 70% of the market. Other key species traded includes Mako *Isurus* spp., various requiem sharks (*Carcharhinus* spp.), School Shark *Galeorhinus galeus*, Spotted Estuary Smooth-hound *Mustelus lenticulatus*, guitarfish, thresher sharks and dogfish sharks.

Import and export of shark meat

For shark meat, according to FAO data, Singapore moved up the ranks: from being the 18th biggest exporter of meat by volume in 2005 to 2007 to the 14th biggest exporter by volume in 2012 to 2013. Singapore was the 14th biggest importer of meat by volume for both time periods. Analysis of national trade data showed that Singapore exported a total of 6116 t of shark meat, while imports recorded a total of 7213 t, over the six years assessed. A comparison of this data for the two time periods of 2005 to 2007 and 2012 to 2014 showed that average annual exports and imports both decreased by 36.0% and 31.3% by quantity respectively while prices for exports and imports also decreased by 34.8% and 46.0% respectively – this trend is inconsistent with suggestions by FAO in 2015 that shark meat, while currently under-utilized by international markets, was predicted to expand. Future monitoring of this aspect is required to determine shark meat trade dynamic.

Contrary to the trade in shark fins, domestic export of locally processed shark meat makes up 76.7% of the total export. Over these six years, Singapore traded shark meat with a total of 51 countries and other unspecified countries from Africa and Europe. As with the shark fin trade trend, the total number of trading partners has decreased over time. The top three destinations of shark meat from Singapore were The Republic of Korea, Brazil and Italy, which make up 62.6% of total exports, with Brazil only being a new destination from 2012; top three sources of shark meat imports on the other hand were Taiwan (which alone constituted 55.4% of total imports), followed by The Republic of Korea and Mauritius; collectively these three countries made up 68.6% of total imports. The species of shark meat traded through Singapore is unknown and there were no CITES listed species for the shark meat trade recorded on the CITES trade database².

¹ “The term “shark and rays” refers to all species of sharks, skates, rays and chimaeras (Class Chondrichthyes).

² This is not surprising given the recent listing of species most likely to be in trade to and from Singapore did not come in to effect until September 2014.

Import and export of rays and skates

Harmonised Systems Code (or HS Code) is a six-digit international nomenclature developed by the World Customs Organisation (WCO) for the classification of goods and is used globally to measure and classify products in trade. These commodity codes for rays and skates only came into effect in 2012. From 2012 to 2014, Singapore traded ray and skate products with 21 countries, with neighbouring Malaysia and Indonesia being the two predominant trading partners for both import and export. Export volumes decreased by 70.0% and number of export destinations increased from three to five. Domestic export volumes are small but are an indication of an existing processing market. Import volumes were much higher at a maximum of 1650 t in 2014 as compared to 156 t of exports in the same year, which suggests that majority of the imports are for domestic consumption. The number of source countries decreased from 15 to 11. Price of re-exported frozen rays and skates decreased slightly by 17.1%. At the time of the assessment, Singapore did not have a commodity code specific to mobuild gill plates to allow analysis of that trade.

CITES trade regulation

A total of 30 shark and ray species have so far been listed in CITES Appendix I and II. Of the 107 threatened ray and skate species, only eleven are listed in the CITES appendices. At the time of the assessment, Singapore only had product code listing for five Appendix II species, and none were in place for the seven sawfish species listed in Appendix I or the Appendix II manta ray species.



Rays found for sale in Singapore

RECOMMENDATIONS

Globally, many shark and ray species are currently traded at levels that far exceed what can be sustainably sourced. In addition, the current lack of genuinely sustainable shark and ray fisheries systems, or adequate traceable systems with appropriate trade data recording, means that demand for shark and ray products is inevitably being met from either unsustainable or entirely unknown sources – this is the case with Singapore. Under-reporting is a primary concern. Although Singapore submits annual reports to the CITES Secretariat, it is necessary for the government to be able to report trade information at a much greater resolution given the fact that it is among the world's top three traders with much of the global trade going through Singapore. Therefore, a fundamental and overarching recommendation from this study points to the need for the Singapore government to go beyond minimum reporting requirements given the scale of the global trade involving the country, and the need for more transparency and accountability. These are explained further below.

Information in this report highlights the need for Singapore to immediately scrutinise current practises including its HS codes for product types and species. For example, the HS Codes corresponding to shark commodity categories that are reported to FAO do not completely match with the Singapore Trade Classification, Customs and Excise Duties (STCCED) codes for shark products. Collection and reporting of accurate trade information by key exporters and importers such as Singapore therefore is essential in making trade more transparent and traceable. Only then can responsible consumer choices be effective in reducing directed fisheries in sharks and rays. However, the current incomprehensive reporting system lends itself to suspicions regarding the country's trade from unsustainable and untraceable sources. The elucidation of re-export volumes is particularly important to monitor domestic consumption, which is currently not possible using current customs statistics. Distinct commodity codes have been used in Hong Kong for example, the world's prominent shark trader, which allows for a more accurate and consistent indication of the scale of the trade.

The geographic position of the country as a leading trade entrepôt also requires robust trade controls and interventions to ensure responsible trade in shark and ray products globally. The international momentum and accountability requirements from key trading countries provides the much needed justification for Singapore to put in place, immediately, a recording and reporting mechanism to regulate its shark and ray trade, specifically in an effort to proactively minimise the risk or any speculations that Singapore is contributing to the global shark crisis.

1) Establish at least four product-specific codes

At the time of the assessment, product-specific codes were not separated into at least four categories: unprocessed dried, processed dried, unprocessed frozen and processed frozen. In order to monitor levels of shark trade, there needs to be distinct commodity codes for shark fin and meat products: unprocessed dried, processed dried, unprocessed frozen and processed frozen. These codes allow adjustments for double-counting, where for example, fins are first imported as a raw product to Singapore and re-exported to another country for processing which may be then re-imported to Singapore for sale. With the predicted emerging market for mobuild gill rakers, there was also a similar need to set up a distinct commodity codes for this product in order to better monitor its trade. Since this analysis was completed, the Agri-Food and Veterinary Authority of Singapore (AVA), the national CITES management authority, has reported to TRAFFIC that product-specific codes have been established, including for gill rakers.

2) Establish recording systems for CITES Appendix I and II listed species

At the time of the assessment, Singapore only had product trade codes for five of the 30 CITES Appendix I and II listed species and therefore, establishing product trade codes for the remaining

species was a priority; recording systems should have species-specific codes that cover all CITES Appendix I and II species and species categories. AVA has since reported to TRAFFIC that codes for rays were established since December 2016; details which are currently unknown at present.

As these species have been subjected to a CITES oversight and regulation process, such information is critical to ensure accurate and transparent monitoring of all CITES-listed species, and that trade is conducted in a legal and sustainable manner. This is in addition to the necessary CITES permits from AVA for the import and export of CITES-listed species. Future monitoring and analysis of such information will enable a better understanding on the scale of the trade.

3) Revisit product codes established by the World Customs Organization (WCO)

Modification of the commodity coding system for shark products set by WCO is necessary in order for meaningful trade monitoring to continue. The aforementioned product-specific commodity codes should be considered by the WCO, without which under-reporting will continue by the world's largest shark and ray trading countries/territories, which will impede regulatory systems. Agri-Food and Veterinary Authority of Singapore (AVA), as the national CITES management authority, should provide in-country support for these commodity coding changes at the WCO level and also at the ASEAN level.

4) Collaboration with Stakeholders for improved traceability

Singapore Customs, AVA, the Marine and Land Products Association, traders, retailers and researchers, are urged to co-operate to analyse all available data sources and collaboratively develop management decisions and traceability systems for the shark and ray trade industry, which does not currently seem to be present. In some cases, there appears to be inconsistent reporting of trade data. As a start, availability of detailed trade data based on product specific codes, including for those reported to have been recently established, as well as seizure data would enable a more comprehensive understanding of Singapore's trade dynamics. Traders, distributors and retailers interested in offering certified-sustainable chondrichthyan products should also be actively engaged, perhaps through the Marine and Land Products Association, to participate in constructing trade monitoring systems that support traceability and effective management.



Sharks and rays found for sale in Singapore

INTRODUCTION

Chondrichthyans (comprising sharks, rays and chimaeras) are one of the most speciose predators today with top-down control of marine ecosystem structure and function. However, their life history traits: typically slow growth, maturing late, and producing few young, result in them being particularly vulnerable to overfishing and slow to recover from depletion. It is estimated that one-quarter of chondrichthyans are threatened worldwide, with more than half facing elevated risk (Dulvy *et al.*, 2014) and a recovery in threatened shark stocks has not yet been observed (Anon., 2014). While an estimated one-third of threatened sharks and rays are subject to targeted fishing, some of the most threatened species have declined due to being secondary catch in fisheries targeting other species (Dulvy *et al.*, 2014). Chondrichthyan catch, which is targeted or a secondary catch while targeting other fish species, is retained due to the high and sometimes increasing value of chondrichthyan meat, fins, livers, and/or gill plates (Lack and Sant, 2009). The lack of effective management is widespread throughout chondrichthyan fisheries; an assessment of 173 shark populations, comprising 46 species with a high intrinsic biological vulnerability, found that 87% had a high management risk and 13% had a medium management risk (Lack *et al.*, 2014).

The global trade in shark commodities was estimated to be USD818.4 million in 2011—a figure which is likely to be substantially below the true value (Dent and Clarke, 2015). Despite the size of the global market for shark-derived products, its key characteristics are relatively unknown due to the difficulty in obtaining accurate information. Supply chains are not well understood, and in many cases the roles that individual countries/territories play in the production, trading, processing and consumption of shark products have not been described in any detail.

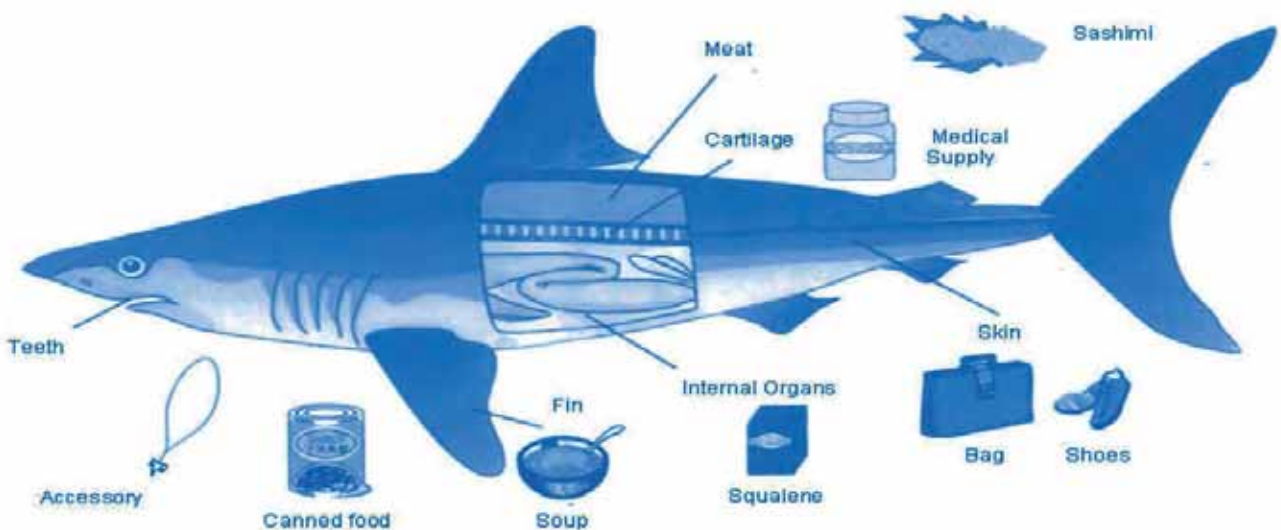
Singapore has long been known as an important “port of call” for traders. Due to its strategic geographic location, robust financial and trading infrastructure, and reliable legal, regulatory, and tax framework, Singapore has emerged as Asia’s most important commodities trading hub (Tay, 2015) and is the 14th largest merchandise exporter in the world (Anon., 2015a). Singapore’s importance as a major entrepôt also applies to the shark and ray trade. However, Singapore’s relevant trade data have yet to be assessed in detail. This is essential as trade analysis can aid regulation compliance monitoring and interpretation of overall stock status (Clarke, 2014). The purpose of this study is to assess the trade information available within Singapore to monitor the country’s role in the global shark trade better. This will in turn inform regulatory mechanisms to restrict the access of illegal and unsustainable shark products to Singapore’s market.

International Trade in Sharks and Singapore

The types of shark commodities in international trade are diverse and include meat, fins, skin, oil, cartilage, jaws and teeth (Figure 1). The greatest quantity by weight of shark product traded is in the form of shark meat while shark fins are the most valuable (Clarke, 2004). The world's major shark producers generally export both shark meat and fins but the markets for these two commodities are largely distinct from each other, with little overlap between importers (Dent and Clarke, 2015). Skates and rays are suspected to constitute a sizeable proportion of the shark meat trade, and while some species of ray fins are highly prized by shark fin traders, it is currently not possible to detect the presence of rays in the fin trade (Dent and Clarke, 2015). A recent trend in the traditional Chinese medicine (TCM) industry to use Mobulid ray gill plates — product name 膨鱼鳃 *Peng Yu Sai* — as a health tonic and/or medicine for illnesses ranging from Chicken Pox to cancer (Hilton and O'Malley, 2011) has led to the emergence of its widespread trade and correspondingly increased landings of mobulids in the past decade (Ward-Paige *et al.*, 2013; Whitcraft *et al.*, 2014). Shark liver oil and shark skin, which is used for leather, are also traded but in relatively minimal quantities. Moreover, skates and rays did not have a dedicated Harmonized Systems Code (or HS Code, a six-digit international nomenclature developed by the World Customs Organization (WCO) for the classification of goods and is used globally to measure and classify products in trade) before 2012, and therefore extremely limited trade data on these products are available as they are often recorded under aggregated seafood commodity categories (Dent and Clarke, 2015).

The following sections mainly focus on the two main products internationally traded: shark fins and shark meat, and a brief overview of the current state of the mobulid (manta and mobula rays) ray gill plate trade and Singapore's role in each.

Figure 1. Illustration of the range of products derived from sharks (Image sourced from Global Guardian Trust, Japan)



Shark Fins

Shark fins have been a traditional element of Chinese haute cuisine with a reputation for being expensive and a status symbol, driving an Asian demand for shark fins (Clarke *et al.*, 2007). This particularly lucrative trade in fins (not only from sharks, but also of shark-like rays such as wedgefish and sawfish) has been estimated to be worth USD400–550 million annually and equates to 26 to 73 million individual sharks being killed for the largely unregulated trade (Dulvy *et al.*, 2014).

According to statistics from the Fisheries and Agriculture Organization of the United Nations (FAO), Singapore was one of the principal destinations in East and Southeast Asia for shark fins from 2000 to 2011. The others were mainland China, Hong Kong Special Administrative Region (henceforth referred to as Hong Kong), Taiwan, Malaysia and Viet Nam. Reported chondrichthyan landings and the trade in shark fin peaked in 2003–2004 and subsequently levelled out at quantities 17–18% lower in 2008 to 2011 (Dent and Clarke, 2015). The decline has been attributed to overfishing (Davidson *et al.*, 2015), with average shark exploitation rates long exceeding the average rebound rate for many shark populations due to their late maturity and slow reproduction (Worm *et al.*, 2013), and the same scenario is likely for manta rays *Manta* spp. (Dulvy *et al.*, 2014). A decrease in market demand could be another factor leading to this decline: there have been new mainland China austerity measures curbing government officials' expenditures and backlash against artificial shark fin products with the growing conservation awareness among consumers (Anon., 2015a). There has also been increased regulation of finning and trade bans (Dent and Clarke, 2015). At the same time, new figures suggest Thailand has surpassed Hong Kong as the world's largest exporter, and its main trading partners—Japan and Malaysia—may be among the world's top four importers, particularly of small, low-value fins (Dent and Clarke, 2015).

Singapore is a global trading hub for shark fins, being the second-largest importer and exporter in value terms after Hong Kong based on trade data reported to the FAO from 2000 to 2011 (Dent and Clarke, 2015). Similar to Hong Kong, Singapore is an importer and re-exporter with minimal domestic shark production (Lack and Sant, 2010). From 2000 to 2011, Singapore took an average of 10% and 9% share (equivalent to USD40 million and USD28.6 million) of total world imports and exports of shark fins respectively (Dent and Clarke, 2015). Globally, by volume, Singapore is fourth (after Hong Kong, mainland China and Malaysia) for imports, and sixth (after Hong Kong, Thailand, Indonesia, mainland China and Taiwan) for exports, with an average of 7% (1127 t) and 5% share (864 t) of total world imports and exports by volume respectively (Dent and Clarke, 2015). This reveals the relatively higher unit value of Singapore's fin trade which is about USD35/kg for both imports and exports (Dent and Clarke, 2015).

“Exporters”, mainly in the case of shark fins but also to a lesser extent in the case of shark meat, includes both primary producers (such as Indonesia and Spain) that contribute to shark capture, and re-exporters. Singapore's role as a re-exporter however is not well documented and it is unknown how much of this trade is pure trade or processing trade, the latter constitutes raw products being imported, processed in Singapore then re-exported as a processed product; although it is believed to be involved in processing to some extent (Dent and Clarke, 2015).

In March 2016, AVA reported that although there is no domestic shark fishery, there is occasional incidental shark landings by local fishing vessels and more importantly, there are landing of sharks by foreign flagged fishing vessels which operate on the high seas (J. Yap, AVA, in *litt.* to P. Boon, April 2016).

Shark Meat

Consumption of shark meat has been recorded since the fourth Century (Vannuccini, 1999). Although shark meat is currently eaten in many parts of the world, there are some countries with customer resistance to the meat which has led some sellers intentionally to mislabel shark meat to overcome this cultural barrier to its consumption (Bornatowski *et al.*, 2010). Although chondrichthyan capture production peaked in 2003–2004, there has been steady growth of the shark meat trade at 4.5% per year from 2000 to 2011, which suggests that shark meat was previously under-utilized by international markets, although they are likely to continue to expand (Dent and Clarke, 2015). This increase in trade may be due to the wider application of restrictions on shark finning³ which, if complied with, requires the landing of the shark meat associated with the fins. If the same amount of fins are landed as previously by a fisher then this will translate into larger quantities of shark meat available for trade (Dent and Clarke, 2015). The increase in trade of shark meat may also be related to the relative drop over time in the cost of shipping frozen product around the world.

The world's largest consumers of shark meat are found in South America and Europe, with the most important importers being Italy, Brazil, Uruguay and Spain (Dent and Clarke, 2015). The first two countries import shark meat from large shark producers such as Spain and Taiwan while Uruguay is an important importer of unprocessed shark meat from the same major producers and re-exporter of processed shark meat supplying the rapidly expanding Brazilian market (Dent and Clarke, 2015). In general, compared to shark fins, markets for shark meat are much more diverse and geographically dispersed, and are therefore predicted to have more potential for expansion (Dent and Clarke, 2015).

Prior to this current study, there was no reported analysis of the trade of shark meat in Singapore.

Rays and Skates

Ray and skate meat comprises more than half of the taxonomically differentiated chondrichthyan landings over the past four decades. Five of the seven most threatened chondrichthyan families are rays: sawfishes, wedgefishes, sleeper rays, stingrays and guitarfishes (Dulvy *et al.*, 2014). Shark-like rays such as sawfish and wedgefish in particular are highly sought after for the fin trade (Dulvy *et al.*, 2014) but a lack of trade data on skates and rays does not allow for their detection in the fin trade. Most countries only started recording trade in ray and skate meat after a 2012 World Customs Organization (WCO) recommendation for all 179 of its members to implement specific commodity codes for it (Dent and Clarke, 2015).

Since at least the 1990s, a market for gill plates from manta and mobula rays has emerged and expanded, driving the growth of targeted mobulid fisheries in Sri Lanka, India, Indonesia and the Philippines (Croll *et al.*, 2015). Manta or mobula gill plate trade was reported as an export trade from India, Indonesia, Mozambique and Sri Lanka (Dent and Clarke, 2015). Secondary markets include mobulid cartilage and mobulid meat and skins (Heinrichs *et al.*, 2011). The gill plates trade was valued at an estimated USD30 million in 2013 (Whitcraft *et al.*, 2014) with Guangzhou the epicentre, representing over 99% of the market — trade involving Singapore represented an estimated 0.28% of the total trade (Hilton, 2011). Singapore and Hong Kong have also been identified as involved in intermediate stages of the gill plate trade (Mundy-Taylor and Crook, 2013).

³ The practice of removing the fins from sharks and discarding the remainder of the body.

International Policy on Sharks and Related Legislation in Singapore

FAO International Plan of Action for Sharks

The growing awareness of the precarious situation for shark populations led to the adoption of the FAO International Plan of Action (IPOA) for Sharks by the FAO Committee on Fisheries (COFI) in 1999. It stipulated that shark fishing States should implement national programmes for the conservation and management of shark stocks through National Plans of Action (NPOAs) for Sharks. Even though many major shark fishers have introduced conservation measures and also joined the international fight against illegal, unreported and unregulated (IUU) fishing, there has been an overall slowness in implementing the IPOA for Sharks. Singapore has only been a member of FAO since 15 June 2013 and is also a member of COFI.

CITES

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was established as an intergovernmental agreement to ensure that the international trade in wild animals and plants does not threaten their survival. CITES subjects international trade in specimens of selected species to certain controls; all import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system. Each Party to the Convention must assign one or more Management Authorities to administer that licensing system and one or more Scientific Authorities to advise on how trade has impacted the status of the species.

According to the Convention, species listed in CITES Appendix I are those threatened with extinction and are prohibited from trade under all but exceptional non-commercial circumstances, for instance for scientific research. Species listed in CITES Appendix II are not necessarily now threatened with extinction but they may become so unless trade is closely controlled. Appendix II listed species can only be internationally traded under permits authorized by national authorities. Trade of species listed in CITES Appendix III are regulated in at least one country, which has asked other CITES Parties for assistance in controlling the trade. Conditions of trade for species in each of the appendices are shown in Annex I of this report. A total of 30 shark and ray species have so far been listed in CITES (Table 1). It should be noted that of the 74 shark species and 107 ray and skate species that are threatened (Dulvy *et al.*, 2014), only 12 sharks and 18 ray and skate species are listed in the CITES appendices.

Table 1. Shark and ray species listed in the CITES appendices

	Common Name	Scientific Name	Year listed in CITES
Appendix I	Dwarf Sawfish	<i>Pristis clavata</i>	2007
	Small-tooth Sawfish	<i>P. pectinata</i>	2007
	Southern Sawfish	<i>P. perottet</i>	2007
	Common Sawfish	<i>P. pristis</i>	2007
	Green Sawfish	<i>P. zijsron</i>	2007
	Knifetooth Sawfish	<i>Anoxypristis cuspidata</i>	2007
	Freshwater Sawfish	<i>Pristis microdon</i>	2014
Appendix II	Whale Shark	<i>Rhincodon typus</i>	2001
	Basking Shark	<i>Cetorhinus maximus</i>	2001
	White Shark	<i>Carcharodon carcharias</i>	2004
	Oceanic Whitetip	<i>Carcharhinus longimanus</i>	2013
	Silky Shark	<i>Carcharhinus falciformis</i>	2016
	Scalloped Hammerhead	<i>Sphyrna lewini</i>	2013
	Smooth Hammerhead	<i>S. zygaena</i>	2013
	Great hammerhead	<i>S. mokarran</i>	2013
	Porbeagle	<i>Lamna nasus</i>	2013
	Bigeye Thresher Shark	<i>Alopias superciliosus</i>	2016
	Pelagic Thresher Shark	<i>A. pelagicus</i>	2016
	Common Thresher Shark	<i>A. vulpinus</i>	2016
	Reef Manta Ray	<i>Manta alfredi</i>	2013
	Giant Manta Ray	<i>Manta birostris</i>	2013
	Giant Devil Ray	<i>Mobula mobular</i>	2016
	Spinetail Devil Ray	<i>Mobula japanica</i>	2016
	Bentfin Devil Ray	<i>Mobula thurstoni</i>	2016
	Box Ray	<i>Mobula tarapacana</i>	2016
	Pygmy Devil Ray	<i>Mobula eregoodootenkee</i>	2016
	Shortfin Pygmy Devil Ray	<i>Mobula kuhlii</i>	2016
	Atlantic Pygmy Devil Ray	<i>Mobula hypostoma</i>	2016
	Lesser Guinean Devil Ray	<i>Mobula rochebrunei</i>	2016
	Munk's Pygmy Devil Ray	<i>Mobula munkiana</i>	2016

Despite the 30 shark and ray species listed in CITES Appendix I and II, very few countries/territories report shark and ray species-specific trade data (Mundy-Taylor and Crook, 2013). Most CITES-listed shark meat and fin trade is reported under more general shark commodity codes, which include: (a) fresh and frozen shark meat, (b) shark fins in various forms, and (c) other shark products including dried and salted meat, frozen fillets and oil (Mundy-Taylor and Crook, 2013). There are no universal ray-specific commodity codes that would include mantas, with trade in rays being reported under codes for “Rajidae” or included in more general fish codes (Mundy-Taylor and Crook, 2013).

Singapore acceded to CITES in November 1986 and started its implementation on 9 February 1987 (Lye, 1999). Implementation of the Convention varies between Parties (Anon., 2015b). Singapore was assessed by CITES as having a Category 1 legislation since March 2002, which means it has legislation that is believed generally to meet the requirements for effective implementation of CITES (Anon., 2002). The CITES management, scientific and enforcement authority of Singapore is the same government agency: AVA. AVA maintains contact with the Marine and Land Products Association (a shark traders’ association based in Singapore) on CITES issues and issues circulars and advisories to seafood traders and declaring agents to inform them of new CITES listings of sharks and rays and to comply with CITES requirements (J. Yap, AVA, in *litt.* to P. Boon, September 2015).

Adherence to CITES is regulated in Singapore under the Endangered Species (Import and Export) Act which became effective on 17 March 1989 (Lye, 1999). The Act requires a permit from the AVA for the import, export, re-export or introduction from the sea of all CITES listed species. It provides powers of search, entry, and seizure to facilitate investigation and enforcement. It was amended in 1992 to provide for stricter control on domestic trade in endangered species. The inclusion of transshipment or transit cases in the Act came into effect in March 2006 when AVA was given further enforcement powers to investigate goods in Free Trade Zones (FTZs) and enforcement actions could be made based on the markings, labels or claims that a product contains a part or derivative of a CITES species, without having to prove that this part or derivative is actually present in the product. The general penalty for breaches of this Act is a fine of up to SGD10 000 (USD7100) or imprisonment for up to 12 months or both. The Act also states more specifically that any person who trades or introduces from the sea any species without a permit or has in his possession or under his control, or who sells, offers or exposes or advertises for sale, or displays to the public such species imported or introduced from the sea without a permit may be fined up to SGD50 000 (USD35 500) for each species (but not to exceed in the aggregate SGD500 000 (USD355 100) or imprisonment for up to two years or both.

Other national legislations applicable to the shark and ray trade are the Fisheries Act and the Wholesome Meat and Fish Act. The Fisheries Act regulates the marketing and distribution of fish and the use and control of fishing ports and harbours. It states that any person who lands or sells fish caught by use of poisons, explosives or trawl nets, or fish caught within prohibited areas, may be fined up to SGD10 000 (USD7100) or imprisoned for up to 12 months or both. The Wholesome Meat and Fish Act states that it is an offence to import, export or transship any fish product without a licence and permit. The penalties for breaches, such as trade without a licence, include a fine of up to SGD50 000 (USD35 500) or imprisonment for up to two years or both.

In accordance with Singapore's Regulation of Imports and Exports Act 1995, all commercial import, export, re-export consignments of both CITES and non-CITES listed wildlife have to be declared through TradeNet. TradeNet is an online platform that facilitates the exchange of information within the trade and logistics community led by Singapore Customs, the Infocomm Development Authority of Singapore, the Economic Development Board and the enterprise development agency, SPRING Singapore. All import and export declarations which have been approved by Singapore Customs are compiled through the trade statistics website, IE Singapore Statlink, since 1 April 2003. These data exclude postal packages which are based on particulars furnished by the Singapore Post Pte Ltd and goods supplied to non-Singapore registered aircraft, stores and ships.

Compliance-monitoring Systems for sharks

Within Singapore, AVA works together with Singapore Customs, the Immigration and Checkpoints Authority of Singapore (ICA) and the Singapore Police Force to implement import control systems. AVA staff from the wildlife section and the import and export regulation department are trained in shark fin identification of CITES listed shark species, both using morphological identification and DNA testing (Lye F.K., AVA, pers. comm. to P. Boon, June 2015). However, AVA has expressed that sharks are generally not traded in whole body form, but as processed products, such as fillets, dressed meat or fins. This makes it challenging to identify and differentiate such parts and products of CITES-listed shark species from other shark species and for Customs or checkpoint officers effectively to enforce the CITES listing (Yap, 2015). CITES shark product seizures have taken place over the past 10 years (Lye F.K., AVA, pers. comm. to P. Boon, June 2015) but seizure data were not made available to TRAFFIC.



Great white shark

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METHODS

This report is based on work carried out between March 2015 and April 2016; interviews with the Marine and Land Products Association were held in April 2016. The collection of trade data from various agencies underpins the key analysis of Singapore's role in the shark and ray trade, which took place between March–October 2015. A review of published and unpublished literature was carried out. The libraries and databanks of the following institutions were of particular help:

- **FAO fishstat**
 - For comparison with global trade
- **IE Statlink (the Singapore government trade statistics body)**
 - For Singapore's trade data: all shark and ray trade data from all trading partners
- **CITES Trade Database**
 - For Singapore's CITES listed trade data
- **Trade Map, International Trade Centre**
 - For counter-checking trade data recorded by Singapore's trade partners

Other methods used include a combination of desk-based analysis and interview-based consultations.

Interviews

Formal and informal interviews were held with representatives from the following organizations:

- CITES Scientific and Management Authority: Singapore Agri-Food and Veterinary Authority (AVA)
- Marine and Land Product Association

Data analysis

All financial data reported in nominal prices were adjusted for inflation using food consumer price indices (CPIs) from the Monetary Authority of Singapore with a common base year (2005), before being converted to USD.

RESULTS AND DISCUSSION

There is no shark fishery in Singapore (F. Lye, AVA, in *litt.* to P. Boon, June 2015) and all shark products traded stem from imports. In the national trade statistics, domestic exports are defined as either primary commodities grown or produced in Singapore or goods which have been transformed i.e. manufactured, assembled or processed in Singapore; re-exports refer to all goods which are exported from Singapore in the same form as they had been imported without any transformation. Singapore therefore classifies all domestic exports of shark products as products of processors in Singapore.

Singapore's Role in the Global Chondrichthyan Trade

Research on the FAO Fishstat database, based on the International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP) Code 38 for sharks, rays and chimaeras, showed that in 2005 to 2013, Singapore recorded an average 3.8% of total world exports of chondrichthyans in volume terms and 9.2% by value (3665 t or USD52 million), while the equivalent figures for world imports were 3.6% of volume and 10.2% of value (4467 t or USD64 million). No FAO data were available for 2014 at the time of this study. It should be noted that FAO import data may include double counting of imports which transit through a third country (i.e. re-imports will be counted as imports twice) (Dent and Clarke, 2015). There were only four commodity categories in the chondrichthyan trade data declared by Singapore to FAO. These categories and the corresponding HS code/s used by Singapore's national trade database IE Statlink are shown in Table 2 (J. Yap, AVA, in *litt.* to P. Boon, September 2015).

Table 2. FAO commodity categories and corresponding Trade Codes (latest, 2012 edition) used by Singapore's national trade database IE Statlink

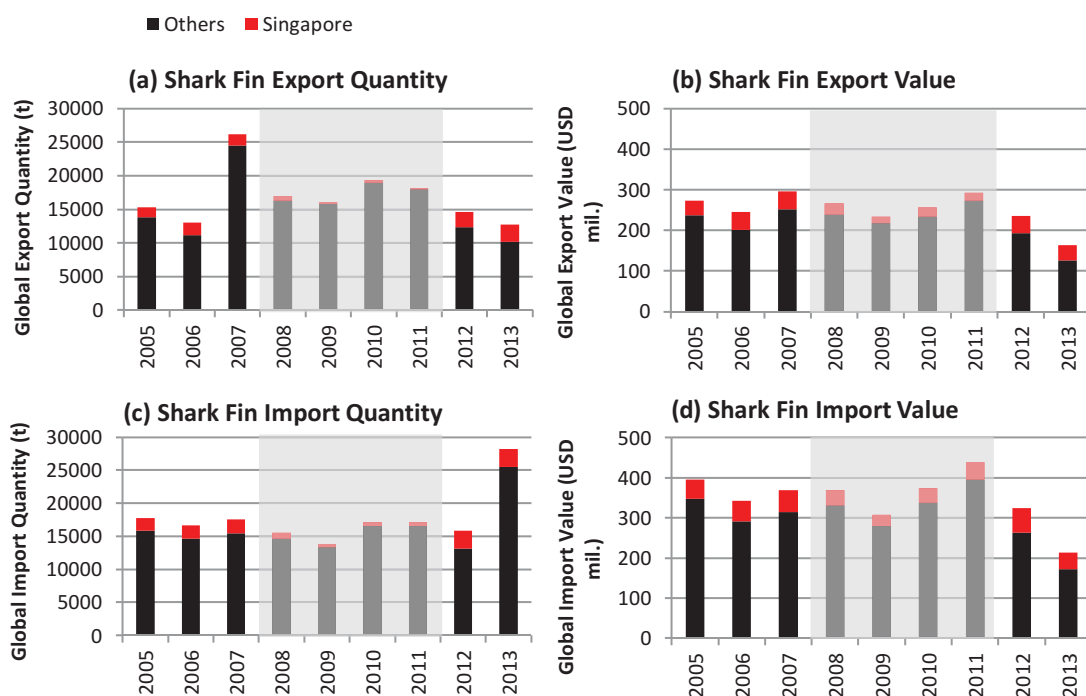
FAO commodity category	HS Code	HS Description
Shark fins, dried, salted, etc.	03055920	Marine fish dried but not smoked <ul style="list-style-type: none"> • Shark, dried, salted • Shark porbeagle, dried, salted • Shark scalloped hammerhead, dried, salted
Shark fins, prepared or preserved	16042019	Sharks fins for immediate consumption not in air-tight containers (see Table 3 for product details)
Sharks nei, fresh or chilled	03028100	Dogfish and other sharks fresh or chilled excl livers and roes (see Table 3 for product details)
	03044900	Other fish fillets fresh or chilled <ul style="list-style-type: none"> • Shark fillet/cut, chilled • Shark porbeagle, fillet/cut, chilled • Shark scalloped hammerhead, fillet/cut, chilled
Sharks nei, frozen	03038100	Dogfish and other sharks frozen excl livers and roes (see Table 3 for product details)
	03048900	Other fish fillets frozen <ul style="list-style-type: none"> • Shark fillet/cut, frozen • Shark porbeagle, fillet/cut, frozen • Shark scalloped hammerhead, fillet/cut, frozen • Shark basking fillet/cut, frozen • Shark great white fillet/cut, frozen • Shark whale fillet/cut, frozen

For the purpose of this report, the former two FAO categories were grouped and analysed as shark fins while the latter two were grouped and analysed as shark meat. Due to a postulated change in trade recording from 2008 to 2011 (i.e. as discussed in the next section, frozen shark fins were combined with frozen shark meat), the analysis is restricted to focus on the two periods from 2005 to 2007 and 2012 to 2014. In the FAO data, as some countries/territories recorded rays and skates in aggregate FAO categories that include shark meat, the shark meat analysis also includes ray and skate data.

Singapore recorded an average 10.3% of total world exports of shark fins in volume terms and 15.5% by value (1697 t or USD42 million) in 2005 to 2007 and 17.9% in volume terms and 20.5% by value (2422 t or USD40 million) in 2012 to 2013. The equivalent figures for world imports were 11.8% of volume and 14.0% of value (2047 t or USD51 million) in 2005 to 2007 and 13.3% in volume terms and 19.1% by value (2702 t or USD51 million) in 2012 to 2013. (Figure 2).

A comparison of FAO data of the top 20 shark fin trading countries/territories based on Dent and Clarke (2015) revealed that Singapore moved from the 3rd biggest exporter of fins by volume in 2005 to 2007 to the 2nd biggest exporter by volume in 2012 to 2013 (Annex II, Table II-1). Singapore was the 3rd biggest importer of fins by volume for both time periods (Annex II, Table II-2). By value, Singapore remained both the 2nd biggest exporter and importer of fins for both time periods (Annex II, Table II-1 and Table II-2).

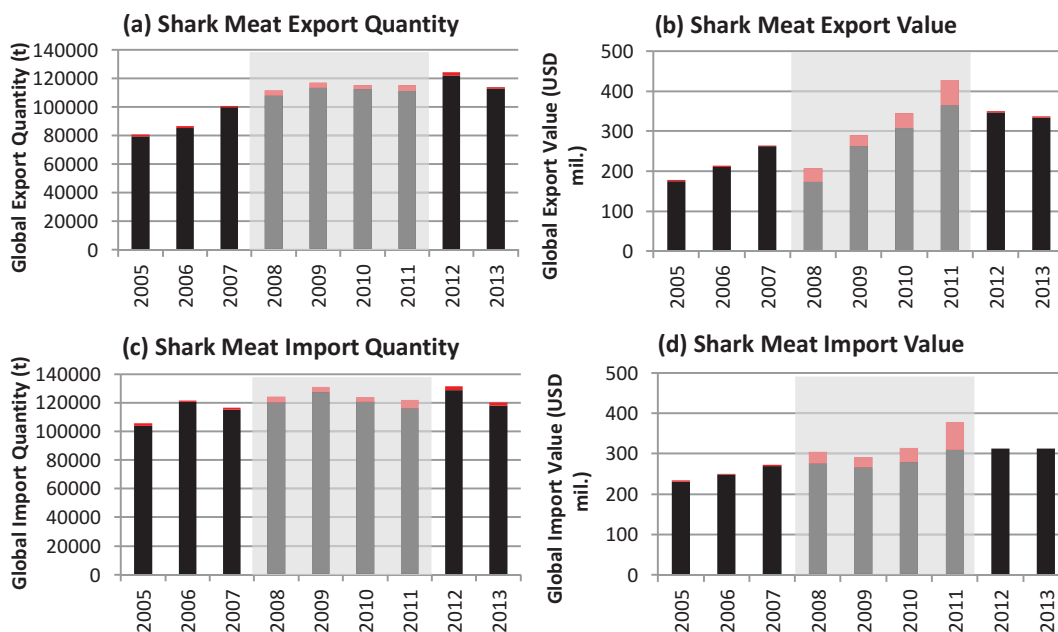
Figure 2. FAO annual global shark fin export (a,b) and import (c,d) from 2005 to 2013 by quantity (a,c) and price (b,d)



For shark meat, Singapore's exports were 1.4% of total world imports in volume terms and 1.2% by value (1240 t or USD3 million) in 2005 to 2007 and 1.2% in volume terms and 0.7% by value (1476t or USD2 million) in 2012 to 2013. The equivalent figures for world imports were 1.3% of volume and 1.0% of value (1418 t or USD2 million) in 2005 to 2007 and 2.1% in volume terms and 1.0% by value (2665 t or USD3 million) in 2012 to 2013 (Figure 3).

A comparison of FAO data of the top 20 shark meat trading countries/territories listed in Dent and Clarke (2015) revealed that Singapore moved from the 18th biggest exporter of meat by volume in 2005 to 2007 to the 14th biggest exporter by volume in 2012 to 2013 (Annex II, Table II-3). Singapore was the 14th biggest importer of meat by volume for both time periods (Annex II, Table II-4). By value, Singapore moved from the 18th biggest exporter of meat in 2005 to 2007 to the 17th biggest exporter in 2012 to 2013 (Annex II, Table II-3) and moved from the 18th biggest importer of meat in 2005 to 2007 to the 14th biggest importer in 2012 to 2013 (Annex II, Table II-4).

Figure 3. FAO annual global shark meat export (a,b) and import (c,d) from 2005 to 2013 by quantity (a,c) and price (b,d)



Singapore Trade Recording

Singapore's national trade database IE Statlink, records trade for sharks and rays according to six HS codes. It is subjected to amendments every four to six years. Countries/territories adopting the HS Code may make provisions for further subdivisions beyond the 6-digit level. In 2003, the ASEAN Harmonized Tariff Nomenclature (AHTN) was jointly developed by ASEAN member countries to facilitate trade within ASEAN. Since then, the HS codes in the AHTN are harmonized at 8-digit level across all ASEAN member countries. The Singapore Trade Classification, Customs and Excise Duties (STCCED) are adopted from the AHTN. For the purpose of categorization for this report, the 8-digit HS codes used in Singapore for shark products were further categorized into three shark commodities: shark fins, shark meat, rays and skates (Table 3).

It is noted that the HS Codes corresponding to shark commodity categories reported to FAO (Table 2) do not completely match with the STCCED 2012 HS Codes for shark products (Table 3). Three HS Codes in STCCED 2012: Shark fins for immediate consumption in airtight containers (HS 16042011), Shark fins (HS 03057100) and smoked shark (HS 03054900) were not included in the data provided to FAO. AVA could not clarify this matter before the publication of this report.

Five aggregate HS codes in STCCED 2012: (HS 03044900, HS 03048900, HS 03054900, HS 03055920, HS 03019939) consisting of 17 product codes were not included in this study's analysis as data by CA codes were not made available at the time of the study, and these aggregate HS Codes included CA codes that were not shark or ray species.

Table 3. Trade Codes of shark and ray products used by Singapore's national trade database IE Statlink and corresponding categories. Orange highlights indicate HS code changes affected how frozen shark fins were recorded; green highlights indicate product codes not included in this analysis due to aggregate HS codes.

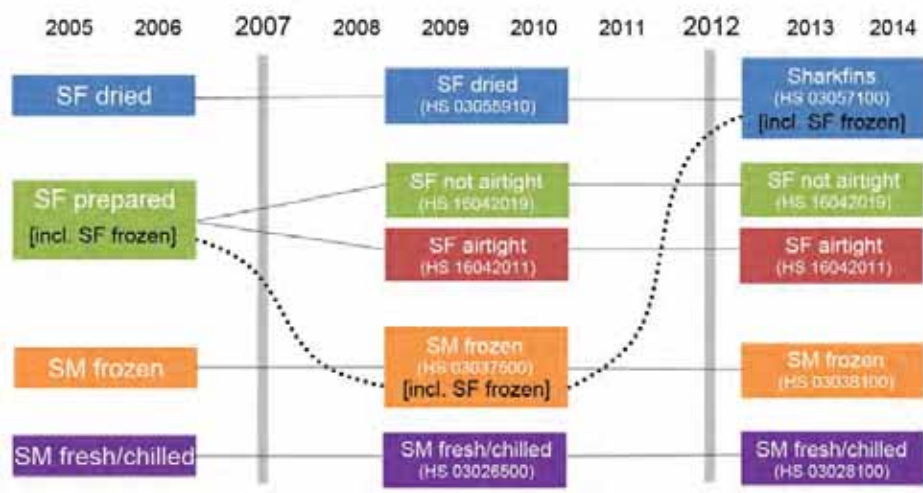
Product Code	Item Description	HS Code		HS Code Description
		May 2011 (14th Edition)	Jan 2012 (15th Edition)	Jan 2012 (15th Edition)
Shark Fins				
FFP0SKFFU	Shark Fin, frozen			
FFP2SKFFUB	Shark Basking's Fin, frozen	03037500		
FFP2SKFFUG	Shark Great White's Fin, frozen			
FFP2SKFFUW	Shark Whale's Fin, frozen			
FFP0SKFDU	Shark Fin, dried (with skin), unprocessed		03057100	Shark Fins
FFP2SKFDUB	Shark Basking's Fin, dried (with skin), unprocessed	03055910		
FFP2SKFDUG	Shark Great White's Fin, dried (with skin), unprocessed			
FFP2SKFDUW	Shark Whale's Fin, dried (with skin), unprocessed			
FFP3SKFPDU	Shark Fin Porbeagle, unprocessed	none		
FFP3SKFSDU	Shark Fin Scalloped Hammerhead, unprocessed	none		
FFN0SKF	Shark Fin, canned			
FFN2SKFG	Shark Great White's Fin, canned	16042011		Shark fins for immediate consumption in airtight containers
FFN2SKFW	Shark Whale's Fin, canned		16042011	
FFN3SKFP	Shark Fin Porbeagle, canned	none		
FFN3SKFSH	Shark Fin Scalloped Hammerhead, canned	none		
FFP2SKFDPB	Shark Basking's Fin, dried, ready for use			
FFP2SKFFB	Shark Basking's Fin, frozen, ready for use			Shark fins for immediate consumption not in airtight containers
FFP0SKFDP	Shark Fin, dried, ready for use			
FFP0SKFF	Shark Fin, frozen, ready for use			
FFP2SKFDPG	Shark Great White's Fin, dried, ready for use	16042019		
FFP2SKFFG	Shark Great White's Fin, frozen, ready for use		16042019	
FFP2SKFDPW	Shark Whale's Fin, dried, ready for use			
FFP2SKFFW	Shark Whale's Fin, frozen, ready for use			
FFP3SKFSHDP	Shark Fin Scalloped Hammerhead, processed, ready to use	none		
FFP3SKFPDP	Shark Fin Porbeagle, processed, ready to use	none		
FFP0SKFSU	Shark Fin, salted (with skin), unprocessed		none	
FFP2SKFSUG	Shark Great White's Fin, salted (with skin), unprocessed	03056910	none	
FFP2SKFSUW	Shark Whale's Fin, salted (with skin), unprocessed		none	
Shark Meat				
FFC0DF2	Dogfish, whole, chilled	03026500		Dogfish and other sharks fresh or chilled excluding livers and roes
FFC0SK2	Shark, whole, chilled		03028100	
FFC3SK2SH	Scalloped Hammerhead Shark, whole, chilled	none		
FFC3SK2P	Porbeagle Shark, whole, chilled	none		
FFF0DF2	Dogfish, whole, frozen			Dogfish and other sharks frozen excluding livers and roes
FFF0SK2	Shark, whole, frozen	03037500		
FFF0SK2M	Shark moro, whole, frozen		03038100	
FFF3SK2SH	Scalloped Hammerhead Shark, whole, frozen	none		
FFF3SK2P	Porbeagle shark, whole, frozen	none		

Product Code	Item Description	HS Code		HS Code Description
		May 2011 (14th Edition)	Jan 2012 (15th Edition)	Jan 2012 (15th Edition)
FFP0XFCSK	Shark, fillet/cut, chilled	03041900	03044900	Other fish fillets, fresh or chilled
FFP3XFCSKP	Shark Porbeagle, fillet/cut, chilled	none		
FFP3XFCSKSH	Shark Scalloped Hammerhead, fillet/cut, chilled	none		
FFP0XFFDF	Dog Fish, fillet/cut, frozen	03042900	03048900	Other fish fillets, frozen
FFP0XFFSK	Shark, fillet/cut, frozen			
FFP2XFFSKB	Shark Basking, fillet/cut, frozen			
FFP2XFFSKG	Shark Great White, fillet/cut, frozen			
FFP2XFFSKW	Shark Whale, fillet/cut, frozen			
FFP3XFFSKP	Shark Porbeagle, fillet/cut, frozen	none	03054900	Other fish smoked
FFP3XFFSKSH	Shark Scalloped Hammerhead, fillet/cut, frozen	none		
FFP0SKK	Shark, smoked	03054900		
FFP0SKDS	Shark, dried, salted	03055990	03055920	Marine fish dried but not smoked
FFP3SKPDS	Shark Porbeagle, dried, salted	none		
FP3SKSHDS	Shark Scalloped Hammerhead, dried, salted	none		
Shark Live				
FFL0SK2	Shark, live	03019939	03019939	Other marine fish, live
FFL3SK2P	Shark Porbeagle, live	none		
FFL3SK2SH	Shark Scalloped Hammerhead, live	none		
Rays and Skates				
FFC0RY2	Ray, whole, chilled	none	03028200	Rays and skates fresh or chilled excluding livers and roes
FFF0RY2	Ray, whole, frozen	none	03038200	Rays and skates frozen excluding livers and roes

Prior to 2007, shark fins were recorded under two basic categories: a general shark fin category which covers shark fins not for immediate consumption; and another category covering prepared, ready for use shark fins. In 2007, the latter category was split into two further categories: shark fins for immediate consumption in airtight containers, and not in airtight containers. According to the 2012 edition of seafood product codes, the general shark fin code (HS 03057100) and the code covering shark fins for immediate consumption not in airtight containers (HS 16042019), each consists of both frozen and dried fins (Table 3). As trade data were only available by HS codes and not CA codes, data adjustments could not be made to correct for frozen fins which are four times heavier than their dried equivalents (Dent and Clarke, 2015).

A drastic decrease in trade of prepared shark fin quantities from 2008 to 2011 (Annex IV, Figure IV-1) along with an associated increase in frozen shark meat export (Annex IV, Fig IV-2) during the same period led Dent and Clarke (2015) to postulate that frozen shark fins were reported as prepared shark fin through 2007 and then as frozen shark meat from 2008 to 2011 (Dent and Clarke, 2015; Figure 4). The same Dent and Clarke (2015) report stated that in 2012, Singapore's shark commodity coding system underwent another revision that removed the specification of "dried" from the description of the general (unprepared) shark fins code. The sharp increase in reported traded quantities of shark fins in 2012 as compared with dried shark fins in 2011, and results of Dent and Clarke's (2015) comparison of trading statistics between Singapore and Hong Kong, led to a postulation that frozen shark fins were moved from the commodity code for frozen shark meat to the general shark fins code in 2012 (Figure 4).

Figure 4. Diagrammatic representation of the postulated Singapore commodity code revisions in 2007 and confirmed code revisions in 2012. SF = shark fins; SM = shark meat.



In this study, AVA and Singapore Customs were consulted on the postulated commodity code revisions. Singapore Customs claimed that frozen shark fins were classified under the same HS code as frozen shark meat in all the three versions of the STCCED i.e. 2003, 2007 and 2012 that covered the 10 years timeframe of this analysis (D. Chia, Singapore Customs, in *litt.* to P. Boon, September 2015). Nonetheless, a comparison of the May 2011 and January 2012 product code list provided by AVA showed that frozen shark fins were first recorded as frozen shark meat (HS 03037500) before January 2012 and then recorded as general shark fins (HS 03057100) after January 2012 as postulated by Dent and Clarke (2015) (Table 3, Figure 4). We were not able to obtain the product code list before 2007 to check on the other postulated commodity code changes during that period before the publication of this report.

A check of the monthly trade data for the three commodity codes suspected to be affected showed that changes in trade volumes started in January of 2008 and January of 2012, which provides additional evidence for Dent and Clarke (2015) FAO’s postulation, as opposed to changes in trade volumes by market forces for example. Moreover, unit values of frozen shark meat (HS 03038100) suddenly increased in 2008 and dropped again to pre-2008 levels in 2012 (Annex IV, Figure IV-2). Given that shark fins have a much higher unit value than shark meat, this supports the postulation that frozen shark fins were categorized with frozen shark meat during the period 2008 to 2012.

Trade data of mobulid gill plates cannot be obtained as the HS Code specific to this commodity was not yet in place during this assessment. These are likely to be recorded under a generic HS 03057900 “Other edible fish offal” which covers CA products 1) fish bone, 2) fish gill/fin/lip/guts, and 3) fish skin.

IE Statlink covers trade data of all products while trade data for CITES-listed products were obtained from the CITES trade database. CITES shark product codes in AHTN are presented in Table 4. As with the non-CITES products, trade data by product codes were not available from IE Statlink or other sources. Trade route data i.e. air, land or sea, were also not available from IE Statlink.

Table 4. CITES Shark and Ray Product Codes in the ATHN

HS Code	Product Code	Product Description	CITES Appendix	Unit Quantity
Fish Skin, Leather				
41039000	CPP0NDASP	Stingray species	-	pieces
41039000	CPP0NSHARK	Non-CITES shark species	-	pieces
41139000	CPP0NPRGL	Blue shark (<i>Pronace glauca</i>)	-	pieces
41139000	CPP0NDASP	Stingray species	-	pieces
Shark Bone, Teeth (non-consumption)				
05069000	CPP0NSHARK	Non-CITES Shark bone	-	pieces
96011000	CPP0NSHARK	Non-CITES Shark teeth	-	pieces
Game Trophy and Collection				
97050000	CPP0NSHARK	Non-CITES Shark teeth	-	pieces
97050000	CPP2NCACA	Great white shark (<i>Carcharodon carcharias</i>)	2	pieces

The following sections present the results of general trade trends per the three shark and ray commodities.

Trade in Shark Fins

As a result of the difficulty in accurately estimating Singapore's trade in the four-year period from 2008 to 2011 (i.e. as discussed above, frozen shark fins were combined with frozen shark meat), this section restricts its focus to the period from 2005 to 2007, and also the years 2012 to 2014. All shark fins are traded through Singapore via shipping (M. Foo, Marine and Land Product Association, pers. comm. to P. Boon, April 2016).

Singapore imported 14 114 tonnes (averaging 2352 tonnes/year) and exported a total of 12402 tonnes (averaging 2067 tonnes/year) of shark fins over the six years studied. This trade was recorded with with a total of 68 countries/territories and other unspecified locations (referred to as OC i.e. "other countries", in the figures) from Africa, Americas, Oceania and Asia. Exports headed to 23 countries and other unspecified country/s in Africa while imports originated from 65 countries/territories and other unspecified locations from Africa, Americas, Oceania and Asia. Exports headed almost exclusively to countries/territories within the Asia-Pacific region, which received 99.2% and 99.996% of exports in 2005 to 2007 and 2012 to 2014 respectively (Figure 5, Annex III).

The top three destinations were Hong Kong, mainland China and Taiwan, which combined made up 71.3% of total exports. Shark fin imports on the other hand originated from outside this region, the top three sources in descending order being Spain, Uruguay and Namibia, which made up 59.6% of total imports. Only 32.8% and 24.7% of total volume of imports were sourced from countries/territories within the Asia-Pacific region in 2005 to 2007 and 2012 to 2014 respectively (Figure 6, Annex III). Domestic exports consisting of entirely processed goods made up only 2.6% of the total export in the six years.

Figure 5. Trade flow maps of annual average shark fin export quantity in 2005 to 2007 (top) and 2012 to 2014 (bottom) from Singapore. OC = "Other Countries" (unspecified locations)

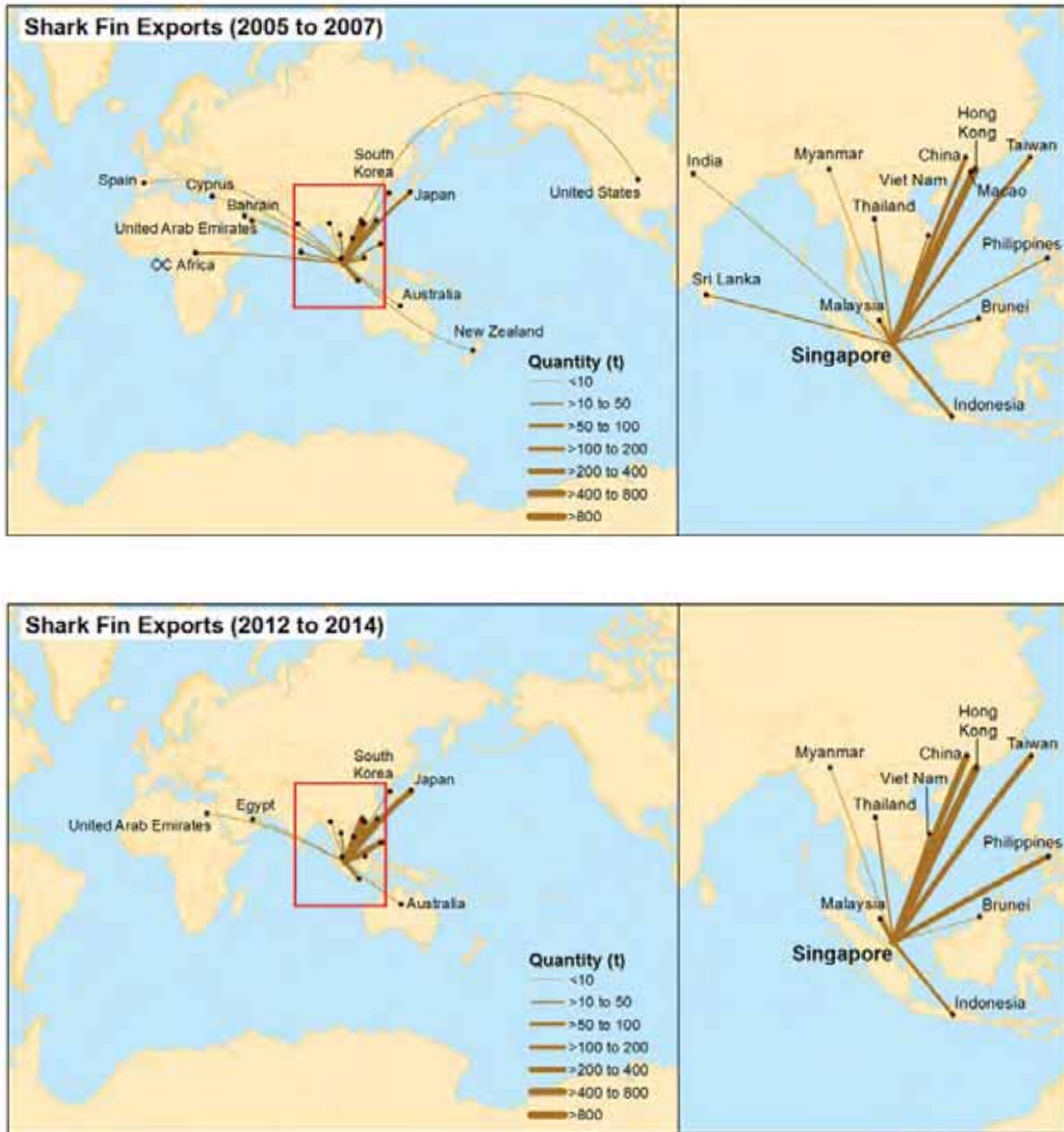
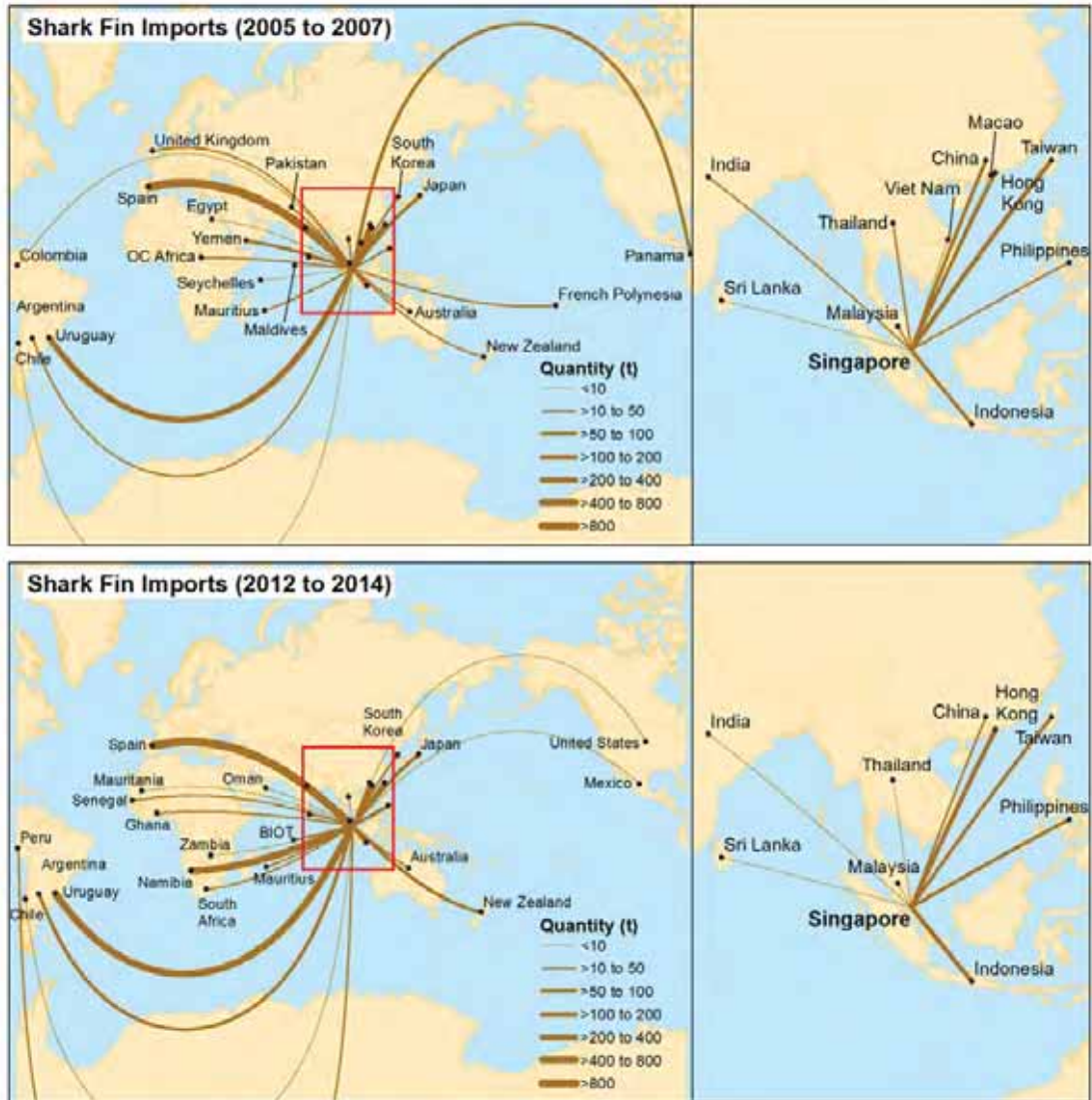


Figure 6. Trade flow maps of annual average shark fin import quantity from top 30 source countries/territories in 2005 to 2007 (top) and 2012 to 2014 (bottom) to Singapore. OC = “Other Countries” (unspecified locations), BIOT = British Indian Ocean Territory



When comparing the two time periods, average annual exports and imports both increased by 43.6% and 29.9% respectively (Figure 7, Figure 8a). The total number of trading partners decreased, from 19 countries/territories and unspecified locations in one region in 2005 to 13 countries/territories in 2014; imports came from a maximum of 46 countries/territories and unspecified locations from two regions in 2007 but dropped to a low of 27 countries/territories in 2014.

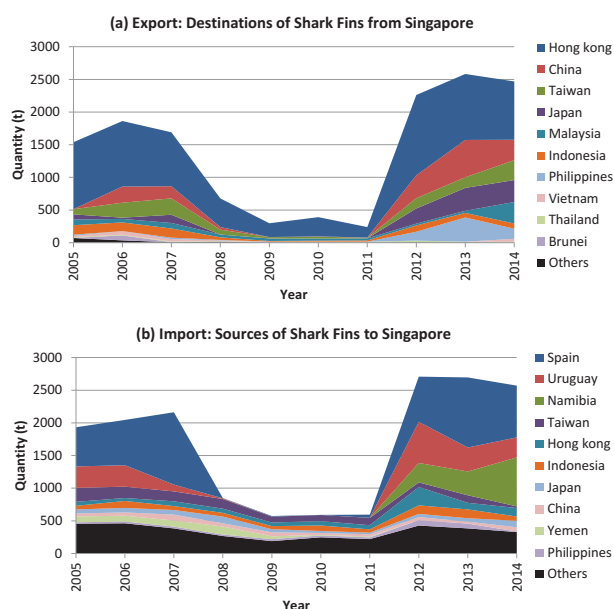
The top three destinations for exports in 2005 to 2007 were Hong Kong, Taiwan and mainland China which received 75.6% of all shark fin exports from Singapore, at an average of 952 t, 186 t and 145 t of shark fins per year respectively; in 2012 to 2014, Hong Kong, mainland China and Japan took in 72.3% of all shark fin exports from Singapore, at an average of 1044 t, 412 t and 306 t per year respectively (Figure 7a, Annex III). The top three sources of imports to Singapore in 2005 to 2007 were Spain, Uruguay and Taiwan, which were the source of 60.3% of Singapore's shark fin imports at 800 t, 254 t and 180 t respectively; in 2012 to 2013, the top three source countries were Spain, Namibia and Uruguay, which were the source of 66.1% of Singapore's imports at 853 t, 470 t and 435 t per year respectively (Figure 7b, Annex III). It was previously reported that Singapore's imports from Spain grew rapidly from 4 t in 2000 to 1107 t in 2007 (Dent and Clarke, 2015). However, the current findings from 2012 to 2014 seem to suggest that this increase has levelled off. It is also interesting to note that there were no import data from Namibia before 2012.

Due to the changes in trade recording in 2007 and 2012, unit value trends by commodity are not conclusive (Annex IV). The unit values calculated from aggregate prices of shark fin commodities on the other hand showed that although exports and import quantities both increased, re-export prices decreased 51% from an average of USD24.2/kg in 2005 to 2007 to USD11.9/kg in 2012 to 2014 while price for imports decreased 44.6% from an average of USD24.6/kg in 2005 to 2007 to USD13.6/kg in 2012 to 2014.

The Marine and Land Product Association, during an interview, provided their insights into the species of sharks in the fin trade through Singapore; interviews were not verified through actual trade records as these were not made available. Trade was stated to be dominated by Blue Shark *Prionace glauca*, which comprised as much as 70% of the market. The second most traded species was said to be mako *Isurus* spp., which comprised 10% to 15% of the market. Other species traded were reported to be various requiem sharks (*Carcharhinus* spp.), School Shark *Galeorhinus galeus*, Spotted Estuary Smooth-hound *Mustelus lenticulatus*, guitarfish, thresher sharks and dogfish sharks. Fins of chimaera elephant fish *Callorhynchus milii* were also sold as shark fins though they are not a shark species (M. Foo, Marine and Land Product Association, pers. comm. to P. Boon, April 2016).

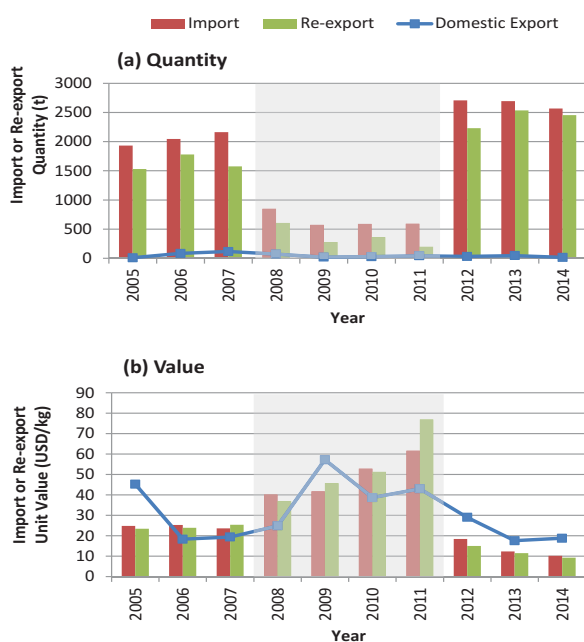
The reported dominance of the shark fin market in Singapore by Blue Sharks is consistent with

Figure 7. Top 10 destinations (a) and sources (b) of shark fin to and from Singapore respectively, with countries/territories listed in rank order.



findings from the Hong Kong market (Clarke *et al.*, 2006), which is the largest shark fin trader in the world and the top destination of shark fin exports from Singapore. Blue Sharks are listed as Near Threatened, while mako, thresher sharks and some species of dogfish sharks are listed as Vulnerable (IUCN, 2016). Blue Sharks are one of the most productive shark species, forming the majority of secondary shark catch in pelagic longline fisheries targeting tuna and swordfish, although the

Figure 8. Quantity (a) and unit value (b) of shark fins imported, re-exported and exported domestically through Singapore.



impact of the shark fin trade on this species is still unknown. The other shark species traded are listed as Near Threatened or least concern, both statuses being of lower extinction risk than Vulnerable. However, it should be noted that Chinese market categories for shark fins which apply in Singapore, are organized primarily by the quality of fin rays and secondarily by distinguishing features of dried fins (Clarke *et al.*, 2006). Further confirmatory studies are needed to verify matches between market categories and actual taxonomy.

Trade in CITES-listed sharks as recorded for the past 10 years in the CITES trade database revealed that fins of five species of sharks were reported to be traded by Singapore: Basking Shark, Porbeagle, Oceanic Whitetip Shark, Scalloped Hammerhead Shark and Great Hammerhead Shark. The Basking Shark fins were all imported from New Zealand, the Porbeagle fins from Spain and the Oceanic Whitetip and Scalloped Hammerhead Shark fins from Sri Lanka. All CITES-listed shark fin exports from Singapore were to Hong Kong and these included fins from Basking Shark, Porbeagle and Great Hammerhead Shark (Table 5).

Very little shark fin processing occurs in Singapore for export purposes; a telephone survey of seafood importers and processors in Singapore found through the Trade-Seafood Industry Directory (<http://www.trade-seafood.com/directory/>) and other sources online revealed that only one of the seven identified Singaporean companies carried out shark product (mostly fins) processing and this was only for domestic sale; most of the others that were contacted claimed that processing in Singapore was too expensive. Efforts to secure an interview and gather further information on this was not successful at the time of the report completion. Nonetheless shark fin wholesalers in Singapore carry out sorting and grading to value add to the products (M. Foo, Marine and Land Product Association, pers. comm. to P. Boon, April 2016).

Table 5. All CITES-listed shark fins traded by Singapore from 2005 to 2014. Where no unit is shown, the quantity number represents the total number of specimens.

Year	App	Species	Importer	Exporter	Origin	Quantity Reported by			
						Importer	Exporter	Term	Unit
2005	II	<i>Cetorhinus maximus</i>	Singapore	New Zealand		8		fins	
2006	II	<i>Cetorhinus maximus</i>	Singapore	New Zealand		39		fins	
2007	II	<i>Cetorhinus maximus</i>	Hong Kong	Singapore	New Zealand		39	fins	
2013	III	<i>Lamna nasus</i>	Singapore	Spain	Japan		586	fins	kg
2014	II	<i>Carcharhinus longimanus</i>	Singapore	Sri Lanka		451	451	fins	kg
2014	II	<i>Sphyrna lewini</i>	Singapore	Sri Lanka		160	160	fins	kg
2014	II	<i>Lamna nasus</i>	Hong Kong	Singapore			1000	fins	kg
2014	II	<i>Sphyrna mokarran</i>	Hong Kong	Singapore			872	fins	kg

The domestic consumption of shark fins in Singapore is estimated to be less than 10% of total imports (M. Foo, Marine and Land Product Association, pers. comm. to P. Boon, April 2016). Considering that this would be equivalent to 270 t of the 2704 t imported in 2012 to 2013, this estimate is only slightly less than an earlier mid-2000s estimate of 300–400 t per year (or 900–1200 t per year of unprocessed fins) (Clarke, 2005). In 2013, a representative of the shark fin trade industry from the Marine and Land Products Association claimed that between 2011 and 2012, domestic sales of shark fins to hotels and restaurants in Singapore fell by one-third and wholesale prices decreased by 30 to 50% (Tan and Yeo, 2013). He gave the example of a processed Blue Shark fin costing USD120/kg to USD160/kg while the unprocessed equivalent costs USD32/kg to USD48/kg. In the mid-2000s, the reported average retail prices for processed shark fins was USD218/kg to USD332/kg (Clarke, 2005). A request for updated wholesale prices for each shark fin market category was made to the Marine and Land Product Association in 2016, however no data were obtained before the publication of this report.

Trade in Shark Meat

As with shark fins, due to the difficulty of accurately estimating Singapore's trade in the four-year period from 2008 to 2011, this section restricts its focus to the period from 2005 to 2007, and also the years 2012 to 2014.

Analysis of national trade data showed that Singapore exported a total of 6116 t of shark meat, while imports recorded a total of 7213 t, over the six years assessed. This trade was recorded with a total of 51 countries/territories and other unspecified countries in Africa and Europe; exports headed to 22 countries/territories and other unspecified destinations in Africa and Europe while imports originated from 44 countries/territories and other unspecified locations in Africa. The top three destinations for shark meat from Singapore were South Korea, Brazil and Italy, which made up 62.6% of total exports; the top three sources of shark meat imports were Taiwan, South Korea and Mauritius, which made up 68.6% of total imports. Shark meat imports came from diverse sources, with 85.1% and 75.3% of the total volume of imports coming from countries/territories within the

Asia-Pacific region in 2005 to 2007 and 2012 to 2014 respectively (Figure 10, Annex III); 71.8% of the total volume of shark meat exported was headed for Asia-Pacific countries/territories in 2005 to 2007, which decreased to 32.6% in 2012 to 2014 (Figure 9, Annex III). Contrary to shark fins, domestic exports of locally processed shark meat made up 76.7% of the total export.

The majority of shark meat processing involved filleting (M. Foo, Marine and Land Product Association, pers. comm. to P. Boon, April 2016).

Figure 9. Trade flow maps of annual average shark meat export quantity in 2005 to 2007 (top) and 2012 to 2014 (bottom) from Singapore. OC = “Other Countries” (unspecified locations)

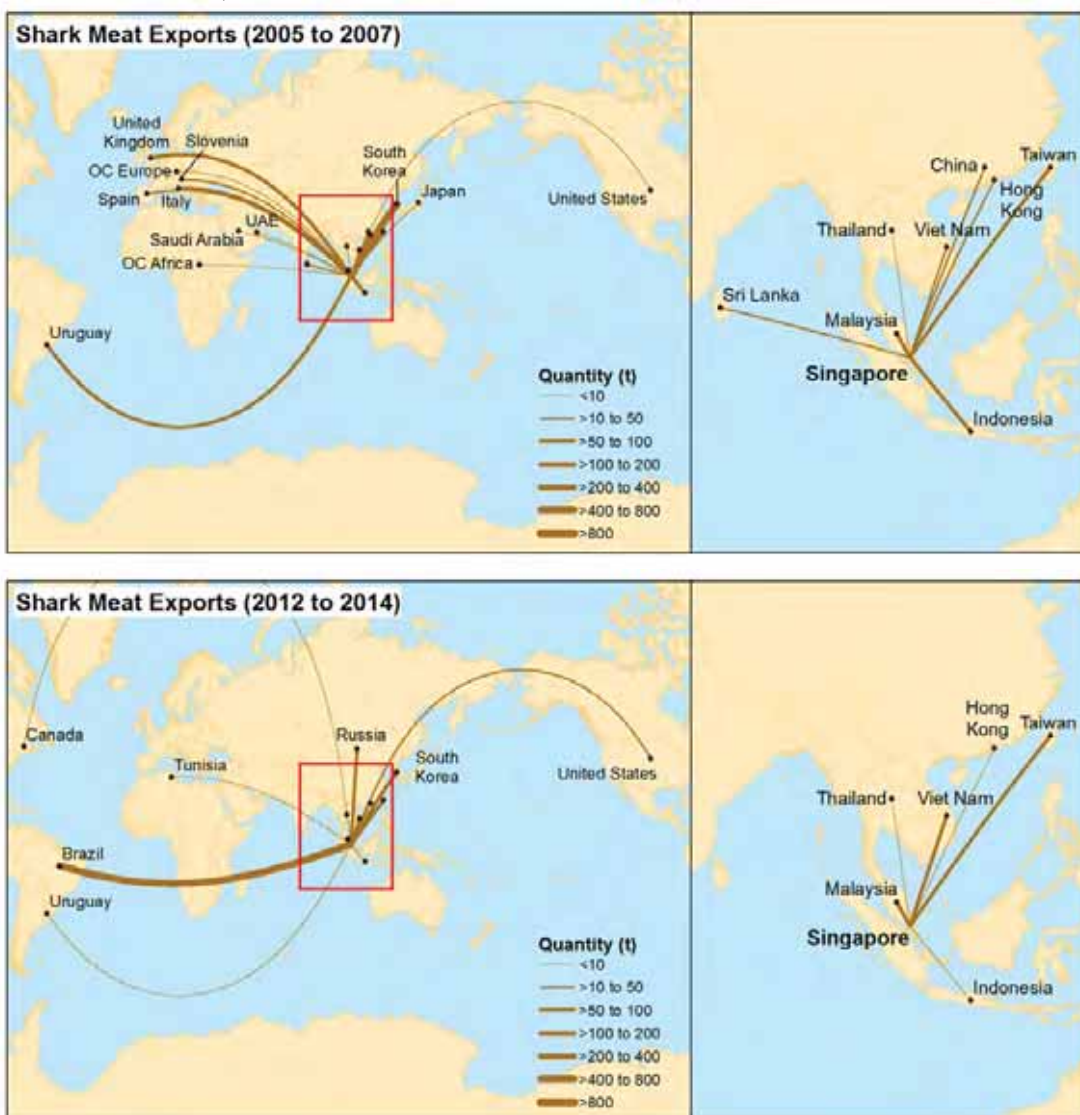
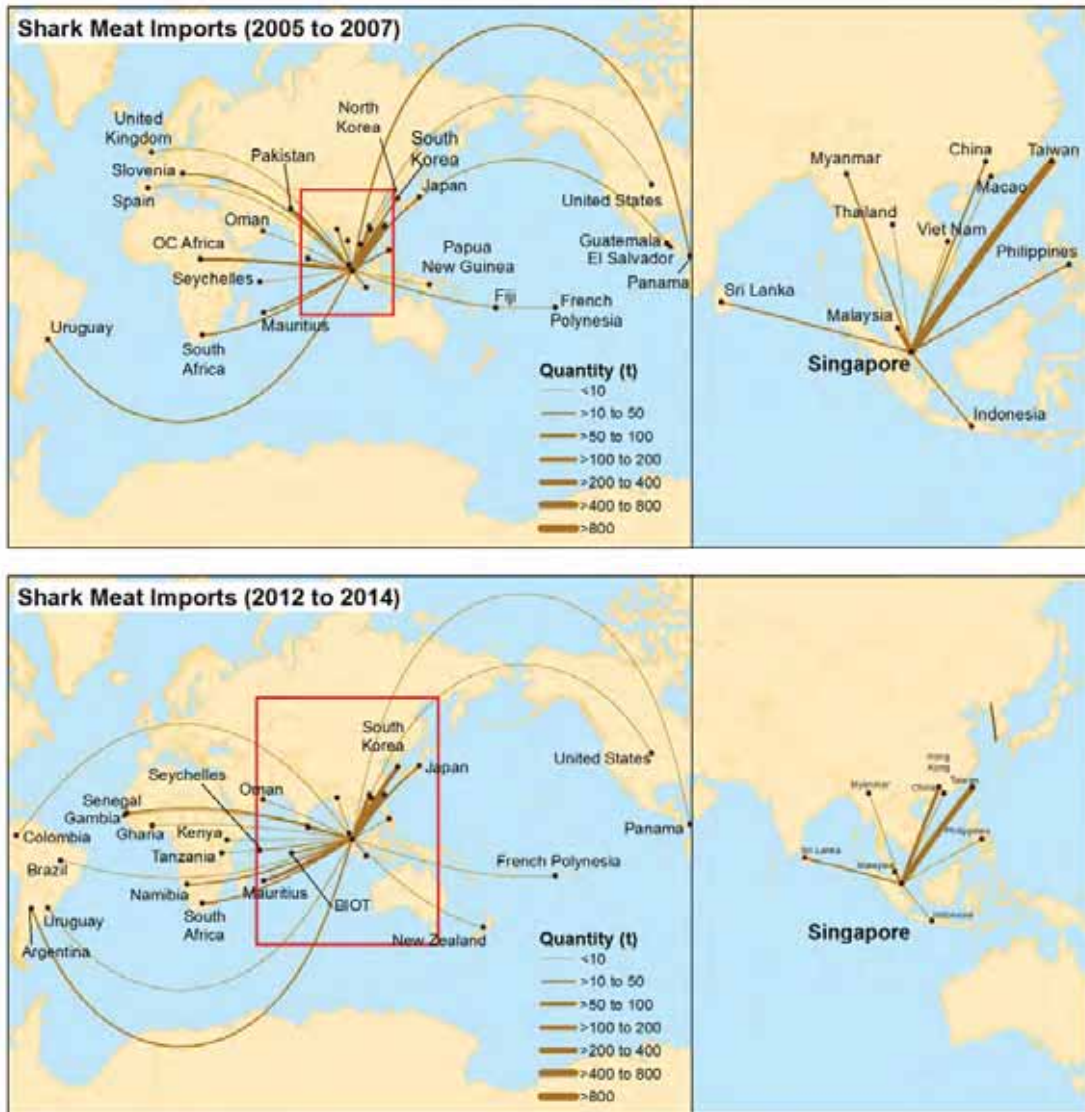


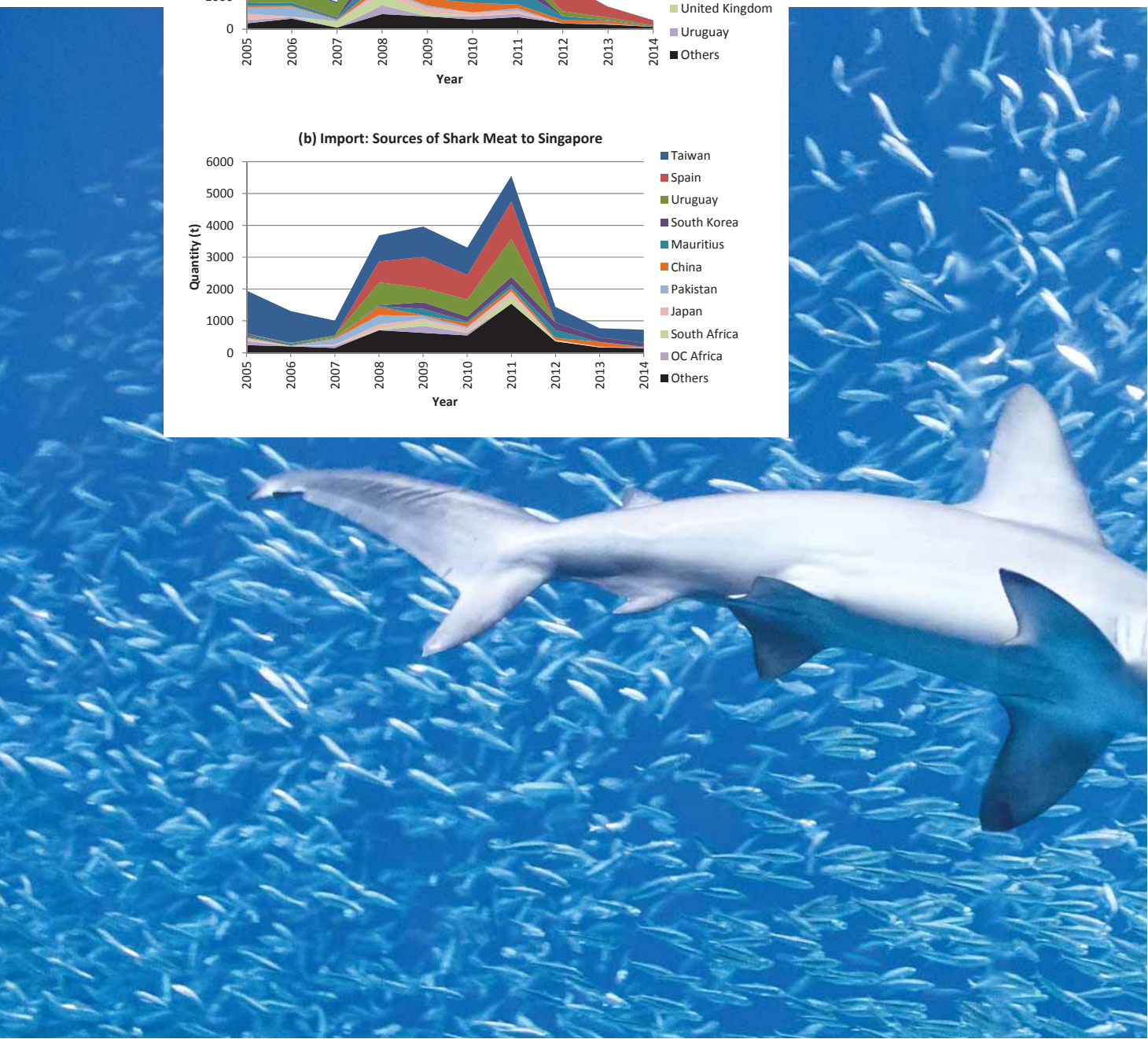
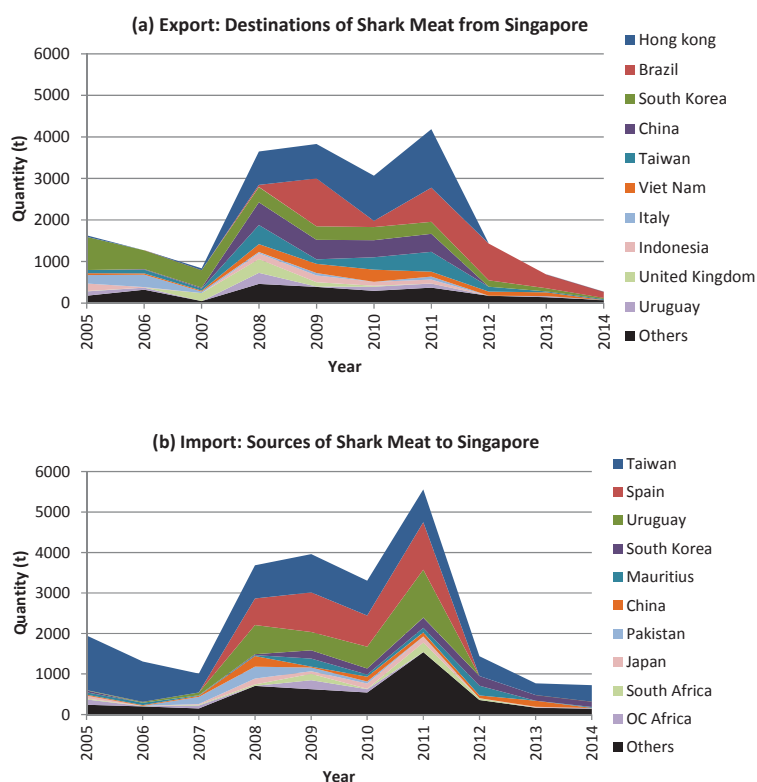
Figure 10. Trade flow maps of annual average shark meat import quantity from top 30 source countries/territories in 2005 to 2007 (top) and 2012 to 2014 (bottom) to Singapore. OC = "Other countries" (unspecified locations), BIOT = British Indian Ocean Territory



When comparing the two time periods, average annual exports and imports both decreased by 36.0% and 31.3% respectively (Figure 11, Figure 12a). The total number of trading partners also decreased, exporting to a maximum of 14 countries/territories in 2005 but to only five countries/territories in 2014; imports came from a maximum of 24 countries/territories and unspecified locations from 1 region in 2006 to 14 locations in 2014. The top three destinations for exports in 2005 to 2007 were South Korea, Italy and Malaysia which took in 67.0% of all shark meat exports from Singapore, at an average of 556 t, 180 t and 96 t of shark meat per year respectively; in 2012 to 2014, Brazil, South Korea and Viet Nam took in 76.0% of all shark meat exports from Singapore, at an average of 453 t, 88 t and 64 t per year respectively (Figure 11a, Annex III). The top three sources of imports to Singapore in 2005 to 2007 were Taiwan, OC Africa and Malaysia, which were the

source of 75.2% of Singapore's shark meat imports at 936 t (65.7% of total), 69 t, 66 t respectively; in 2012 to 2013, Taiwan remained the top source, but with a big decrease in shark meat export quantity to Singapore at 395 t (40.4% of total). The other two top sources were South Korea and Mauritius at 168 t and 90 t per year respectively (Figure 11b, Annex III). Together, these top three sources supplied 66.7% of Singapore's total shark meat imports.

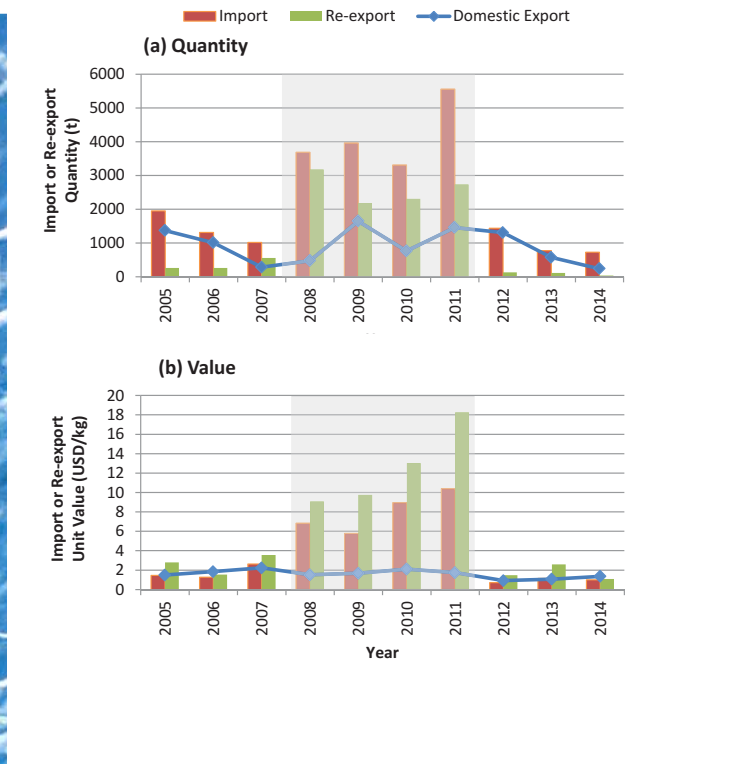
Figure 11. Top 10 destinations (a) and sources (b) of shark meat to and from Singapore respectively, with countries/territories listed in rank order.



The price of fresh or chilled shark meat imports (HS 03028100) steadily increased from a low of USD0.51/kg in 2006 to USD0.82/kg in 2014. There were no other clear trends in price of individual shark meat commodities during the period studied (Annex IV). The unit values calculated from aggregate prices of shark meat commodities on the other hand showed that domestic export prices decreased 39.9% from an average of USD1.9/kg in 2005 to 2007 to USD1.1/kg in 2012 to 2014, while prices for imports decreased 46.0% from an average of USD1.8/kg in 2005 to 2007 to USD1.0/kg in 2012 to 2014 (Figure 12b).

An effort was made to inquire about species of shark meat traded through Singapore through a local industry player. However, no information was provided before the publication of this report. There was no CITES-listed shark meat trade recorded on the CITES trade database.

Figure 12. Quantity (a) and unit value (b) of shark meat imported, re-exported and exported domestically through Singapore.

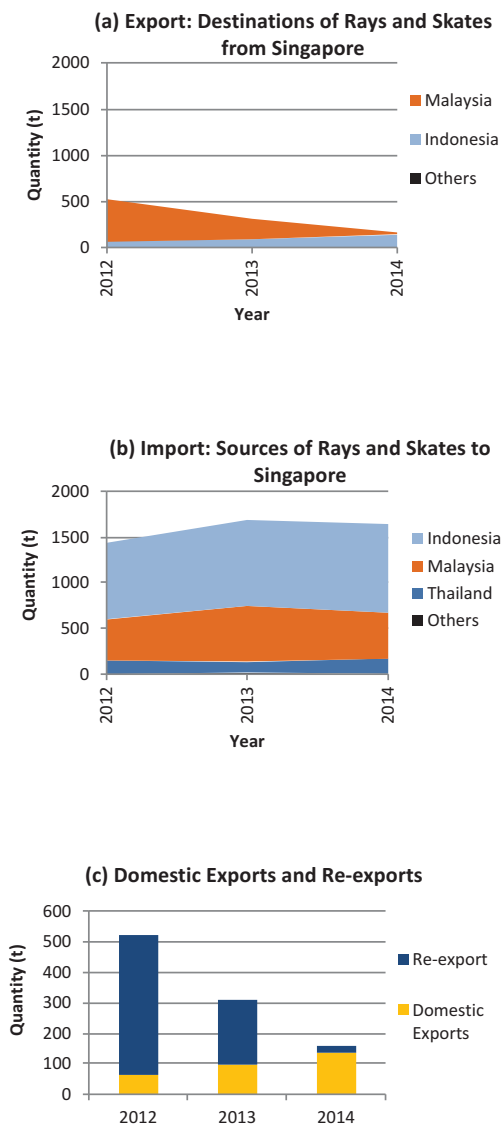


Scalloped hammerhead shark

Trade in Rays and Skates

Commodity codes for rays and skates only came into effect in 2012 and there are no trade figures before then (Figure 13). Singapore traded ray and skate products with 21 countries/territories, importing from 17 countries/territories and exporting to six, with Malaysia and Indonesia being the two major trading partners for both import and export. Export volumes decreased by 70.0% over the three years from 523 t in 2012 to 156 t in 2014 (Figure 13a), though domestic exports

Figure 13. Destinations (a) and sources (b) of rays and skates to and from Singapore respectively, with countries/territories listed in rank order and the proportion of domestic export and re-export of rays and skates from Singapore (c)



increased slightly from 61 t in 2012 to 136 t in 2014 (Figure 13c). The number of export destinations increased from three to five over these three years assessed, though export volumes to these new trading partners are small (<0.2 t per year); import volumes were much higher at 1430 t in 2012 to 1650 t in 2014 (Figure 13b) and the number of source countries/territories decreased from 15 to 11 over three years. The price of frozen rays and skates (HS 03038200) re-exported decreased slightly from USD2.83/kg in 2012 to USD2.34/kg in 2014. There were no other clear trends in price of ray and skate commodities during the period studied (Annex IV).

There was no trade in CITES-listed rays and skates recorded on the CITES trade database. However, it should be noted that of the 107 threatened ray and skate species, only 11 are listed in the CITES appendices.

There were no trade data specific to mobulid ray gill plates due to a lack of a HS Code specific to this commodity, which did not allow for any further research into this trade. Further comprehensive investigations into the domestic market availability for mobulid ray gill plates is required to determine the true levels of trade involving Singapore, while awaiting HS Codes to be established.

The Singaporean Marine and Land Product Association claims that Singapore plays a very small to negligible role in international mobulid ray gill plate trade (M. Foo, Marine and Land Product Association, pers. comm. to P. Boon, April 2016). The Association similarly states that the domestic market for mobulid ray gill plates is likely to be very small and most imports are likely to be re-exported to Guangzhou in China (M. Foo, Marine and Land Product Association, pers. comm. to P. Boon, April 2016). No trade data were made available to determine actual trade volumes.

Trade in Other Products

Over the past 10 years, the Great White Shark *Carcharodon carcharias* is the only species traded in Singapore for products other than its meat or fins. Product types recorded in trade included teeth, bones and skulls. In 2011 and 2012 the products were reported to be for educational purposes and circus or travelling exhibition purposes respectively. Note that it is possible that the three bones and three skulls reported by the importer, USA, and the exporter, Singapore, respectively may be the same traded product but termed differently by the two reporting countries.

Table 6. All other CITES-listed shark products traded by Singapore from 2005 to 2014. Where no unit is shown, the quantity number represents the total number of specimens.

Year	App	Species	Importer	Exporter	Origin	Quantity Reported by			
						Importer	Exporter	Term	Unit
2011	II	<i>Carcharodon carcharias</i>	USA	Singapore	Australia	3		Bones	
2011	II	<i>Carcharodon carcharias</i>	USA	Singapore	Australia	520	520	Teeth	
2011	II	<i>Carcharodon carcharias</i>	USA	Singapore	Australia		3	Skulls	
2012	II	<i>Carcharodon carcharias</i>	Singapore	Australia			3	Bones	
2012	II	<i>Carcharodon carcharias</i>	Singapore	Australia			520	Teeth	



CONCLUSIONS AND RECOMMENDATIONS

Globally, many shark and ray species are currently traded at levels that far exceed what can be sustainably sourced (Grautigam *et al.*, 2015). Moreover, the current lack of genuinely sustainable shark and ray fisheries, or adequate traceability systems, means that demand for shark and ray products is inevitably being met from unsustainable or entirely unknown sources (Grautigam *et al.*, 2015). Collection and reporting of accurate trade information by key exporters and importers such as Singapore is essential in making trade more transparent and traceable, which is expected to increase the share of sustainably sourced shark and ray products. Only then can responsible consumer choices be effective in reducing directed fisheries in sharks and rays (Grautigam *et al.*, 2015).

Singapore is the second-largest importer and exporter of shark fins in value terms after Hong Kong based on trade data reported to the FAO from 2005 to 2007 and 2012 to 2014. Taking into account the gaps in available data resulting from the reclassification of shark fins from 2008 to 2012, it appears that trade in shark fins through Singapore has been increasing. This is contradictory to the slight decrease in global shark fin trade from 2000 to 2012 (Dent and Clarke, 2015). It should be noted however that current trade statistics held and provided by the various organizations are not harmonious and therefore do not necessarily accurately reflect the quantity of actual shark material being traded. As such, apparent trends over time may be misleading. This is mainly due to the lack of distinction between frozen and dried shark fins, the former of which can weigh as much as four times as much as dried fins (Clarke, 2004) due to additional water content. With current aggregate commodity codes, it is not possible to adjust for weight by water content from reported quantities of shark fin. Prepared and preserved fins may also contain ingredients other than shark fins such as soup broth, which is currently not identified explicitly in trade records.

The decrease in unit values of shark fins in both imports and exports through Singapore should thus also be interpreted with caution. Although this decrease could be indicative of a lower demand for the commodity, it is not clear whether a low unit value points to a lower value of the shark fin material, which could be a result of its size or species, or whether it is because of a relatively higher proportion of water content and/or other non-fin components. The only certainty from current trade statistics is the number of trading partners, which have been decreasing for both imports and exports. There are however, new sources, most notably Namibia, the second largest source of shark fins to Singapore in 2012 to 2014, with no trade to Singapore recorded in 2005 to 2007. The same goes for British Indian Ocean Territory, though imported volumes are much lower than Namibia.

Singapore's trading partners in ray and skate meat are limited to neighbouring countries Malaysia and Indonesia. It is likely that the majority of imports are for domestic consumption as import volumes are much higher than export volumes, with a maximum of 1650 t in 2014 for imports and 523 t in 2012 for exports respectively. Domestic export volumes are small but are an indication of an existing processing market. Given that South Korea has consistently been in the top three export destinations of shark meat from Singapore and it is known to be a major global importer of rays and skates (Dent and Clarke, 2015), the high volumes of "shark meat" reported as exported to South Korea yet the paucity of exports of rays and skates recorded to South Korea may be due to mislabelling of ray and skate meat as shark meat. A check on ITC's Trade Map database did not reveal any imports recorded by South Korea of frozen rays and skates from Singapore.

Gaps and Deficiencies

Domestic Utilization

One of the gaps is the inability to calculate trends in domestic consumption. In Singapore, where there is no shark capture production, the main difficulty lies in a lack of data on processing yields. This is especially so for shark meat, as 76.7% of the total shark meat export is domestic export, i.e. locally processed. As products are exported in a form that is more highly processed than the form in which the fish was landed, domestic consumption is not as simple as subtracting imports from exports. Moreover, Singapore's commodity codes aggregate product forms, which makes it impossible to calculate domestic consumption even if processing yields were available. Although processing yields are not an issue for shark fins, of which Singapore is almost entirely a true trader, i.e. re-exports mostly do not go through processing, the lack of commodity codes that distinguishes between processed and non-processed products makes it difficult to account for double counting of imports which transit through a third country (i.e. re-imports will be counted as imports twice). This is true for all shark products without distinct commodity codes.

An effort was made to inquire about trends in domestic consumption of shark fins over the past ten years through the Marine and Land Product Association, particularly regarding wholesale prices of shark fins in Singapore and the domestic sales of shark fins to hotels and restaurants in Singapore. However, they had no official statistics on domestic consumption trends. There thus seems to be a lack of a reliable indicator of domestic consumption. A recent consumer survey conducted in 2015 found that over half of shark fin consumers in Singapore decreased their consumption in the past 12 months and 41% expect to decrease it further the following year (Anon., 2016). Only 18% of respondents ate shark or ray meat in the past 12 months and out of those, 78% consumed shark fin soup, 39% had ray meat and 18% had shark meat (Anon., 2016).

For rays and skates, products are only recorded as aggregate forms: 1) fresh or chilled and 2) frozen, with no commodity code specific to mobulid ray gill plate during the time of the assessment. Whilst the Marine and Land Product Association estimates the domestic mobulid ray gill plate market to be very small to negligible, data on product specific commodity code would be needed to identify and verify trends in domestic consumption of gill plates.

Access to Trade Data

At the time of the assessment, certain trade data, such as those of CA product codes which have more product and species specificity than HS code trade data, trade routes and enforcement actions such as seizures, were recorded but not made available for this study. The older editions of product codes prior to 2012 were also not made available to TRAFFIC. The relevant authorities are urged to make these data publically available for analysis and subsequent identification of improvements that can be made to current trade monitoring methods.

Updates from AVA since January 2017

In January 2016, outside the assessment period, AVA reported to TRAFFIC that product specific-codes as well as HS Codes for all 30 CITES-listed species have been introduced in December 2016. Codes for species-specific product codes under the categories of dried, frozen, chilled, canned and processed were established. This is further referred to in the recommendations section. AVA also reported to TRAFFIC that it introduced a shark surveillance program in October 2014 to monitor the import, re-export and transshipment of fins for CITES Appendix II listed sharks. This was done to detect any possible non-compliance for species that were listed on CITES in 2013. Through this, it has conducted random DNA sampling of shark fin shipments to verify that shipments and their declaration correspond. Each shipment of shark fins is required to be declared via the Customs TradeNet system and accompanied by additional CITES permits (for CITES-listed species). To



engage the industry, AVA organises meetings with the traders and also issues circulars to the seafood traders and declaring agents to inform them of the new CITES listing of sharks and rays and to comply with CITES requirements. To enhance public awareness about CITES sharks and compliance by the industry, AVA circulated an advisory notice on CITES sharks and rays at the fishery ports. AVA officers conduct checks based on TradeNet declarations and tip-offs and inspect the fishes put up on sale at the fishery ports. Adhoc monitoring of sharks in trade is also conducted.

RECOMMENDATIONS

Globally, many shark and ray species are currently traded at levels that far exceed what can be sustainably sourced. In addition, the current lack of genuinely sustainable shark and ray fisheries systems, or adequate traceable systems with appropriate trade data recording, means that demand for shark and ray products is inevitably being met from either unsustainable or entirely unknown sources – this is the case with Singapore. Under-reporting is a primary concern. Although Singapore submits annual reports to the CITES Secretariat, it is necessary for the government to be able to report trade information at a much greater resolution given the fact that it is among the world's top three traders with much of the global trade going through Singapore. Therefore, a fundamental and overarching recommendation from this study points to the need for the Singapore government to go beyond minimum reporting requirements given the scale of the global trade involving the country, and the need for more transparency and accountability. These are explained further below.

Information in this report highlights the need for Singapore to immediately scrutinise current practises including its HS codes for product types and species. For example, the HS Codes



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Basking shark

corresponding to shark commodity categories that are reported to FAO do not completely match with the Singapore Trade Classification, Customs and Excise Duties (STCCED) codes for shark products. Collection and reporting of accurate trade information by key exporters and importers such as Singapore therefore is essential in making trade more transparent and traceable. Only then can responsible consumer choices be effective in reducing directed fisheries in sharks and rays. However, the current incomprehensive reporting system lends itself to suspicions regarding the country's trade from unsustainable and untraceable sources. The elucidation of re-export volumes is particularly important to monitor domestic consumption, which is currently not possible using current customs statistics. Distinct commodity codes have been used in Hong Kong for example, the world's prominent shark trader, which allows for a more accurate and consistent indication of the scale of the trade.

The geographic position of the country as a leading trade entrepôt also requires robust trade controls and interventions to ensure responsible trade in shark and ray products globally. The international momentum and accountability requirements from key trading countries provides the much needed justification for Singapore to put in place, immediately, a recording and reporting mechanism to regulate its shark and ray trade, specifically in an effort to proactively minimise the risk or any speculations that Singapore is contributing to the global shark crisis.

1) Establish at least four product-specific codes

At the time of the assessment, product-specific codes were not separated into at least four categories: unprocessed dried, processed dried, unprocessed frozen and processed frozen. In order to monitor levels of shark trade, there needs to be distinct commodity codes for shark fin and meat products: unprocessed dried, processed dried, unprocessed frozen and processed frozen. These codes allow adjustments for double-counting, where for example, fins are first imported as a raw product to Singapore and re-exported to another country for processing which may be then re-imported to

Singapore for sale. With the predicted emerging market for mobuild gill rakers, there was also a similar need to set up a distinct commodity codes for this product in order to better monitor its trade. Since this analysis was completed, the Agri-Food and Veterinary Authority of Singapore (AVA), the national CITES management authority, has reported to TRAFFIC that product-specific codes have been established, including for gill rakers.

2) Establish recording systems for CITES Appendix I and II listed species

At the time of the assessment, Singapore only had product trade codes for five of the 30 CITES Appendix I and II listed species and therefore, establishing product trade codes for the remaining species was a priority; recording systems should have species-specific codes that cover all CITES Appendix I and II species and species categories. AVA has since reported to TRAFFIC that codes for rays were established since December 2016; details which are currently unknown at present.

As these species have been subjected to a CITES oversight and regulation process, such information is critical to ensure accurate and transparent monitoring of all CITES-listed species, and that trade is conducted in a legal and sustainable manner. This is in addition to the necessary CITES permits from AVA for the import and export of CITES-listed species. Future monitoring and analysis of such information will enable a better understanding on the scale of the trade.

3) Revisit product codes established by the World Customs Organization (WCO)

Modification of the commodity coding system for shark products set by WCO is necessary in order for meaningful trade monitoring to continue. The aforementioned product-specific commodity codes should be considered by the WCO, without which under-reporting will continue by the world's largest shark and ray trading countries/territories, which will impede regulatory systems. Agri-Food and Veterinary Authority of Singapore (AVA), as the national CITES management authority, should provide in-country support for these commodity coding changes at the WCO level and also at the ASEAN level.

4) Collaboration with Stakeholders for improved traceability

Singapore Customs, AVA, the Marine and Land Products Association, traders, retailers and researchers, are urged to co-operate to analyse all available data sources and collaboratively develop management decisions and traceability systems for the shark and ray trade industry, which does not currently seem to be present. In some cases, there appears to be inconsistent reporting of trade data. As a start, availability of detailed trade data based on product specific codes, including for those reported to have been recently established, as well as seizure data would enable a more comprehensive understanding of Singapore's trade dynamics. Traders, distributors and retailers interested in offering certified-sustainable chondrichthyan products should also be actively engaged, perhaps through the Marine and Land Products Association, to participate in constructing trade monitoring systems that support traceability and effective management

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APPENDIX

ANNEX I

**Table I-1. Conditions of Trade Required under the different CITES Appendices
(Sourced from Clarke, 2004)**

Appendix	Permit Conditions	Export Permit required?	Re-export certificate required?	Import permit required?	Non-detriment finding required?
I	Not for commercial trade; trade not detrimental to the species; trade is legal; avoids cruel or injurious shipping of live specimens	Yes (granted if import permit already in hand)	Yes (granted only if in accordance with CITES and there is a valid import permit)	Yes	Yes
II	Trade not detrimental to the species; trade is legal; avoids cruel or injurious shipping of live specimens	Yes	Yes (granted only if in accordance with CITES)	No (unless required under national law)	Yes
III (if trade originates with listing party)	Trade is legal and avoids cruel or injurious shipping of live specimens	Yes	Not applicable	No (unless required under national law)	No
III (if trade does not originate with listing party)	Trade is legal and avoids cruel or injurious shipping of live specimens	No (certificate of origin only)	No (certificate of origin only)	No (unless required under national law)	No

ANNEX II

Table II-1. World Exports of Shark Fins, tonnes, 2005-2013 (FishstatJ, all shark fin types summed, includes re-exports)

Exporter	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average		Rank	
										2005-2007	2012-2013	2005-2007	2012-2013
Thailand	44	18	13188	4742	5005	7141	7723	5455	3892	4417	4674	2	1
Singapore	1538	1863	1690	677	296	390	238	2260	2583	1697	2422	3	2
Hong Kong	7134	5963	5684	5308	4935	5060	3362	2427	2004	6260	2216	1	3
Malaysia	104	127	447	460	347	260	417	298	687	226	493	9	4
Trinidad and Tobago	7	23	10	106	186	129	364	538	421	13	480	18	5
Indonesia	1554	1073	801	1320	1437	2378	1607	514	367	1143	441	4	6
Taiwan	1279	1063	1016	916	974	1144	1067	542	249	1119	396	5	7
China	1400	569	552	394	382	314	489	339	350	840	345	6	8
UAE	562	428	496	515	460	501	479	306	302	495	304	7	9
Peru	155	178	245	134	155	202	206	134	146	193	140	10	10
Japan	168	181	197	163	164	164	131	116	103	182	110	13	11
India	104	145	96	95	107	98	135	168	51	115	110	15	12
Ecuador		1	12	124	131	184	226	123	76	4	100	19	13
Yemen	180	318	527	629	260	431	347	54	90	342	72	8	14
Panama	97	78	66	61	47	37	24	43	58	80	51	16	15
Brazil	157	118	131	113	85	49	59	39	31	135	35	14	16
Bangladesh	7	195	351	17	15	8	11	24	6	184	15	12	17
USA	65	34	36	37	77	42	38	11	12	45	12	17	18
Vietnam	228	169	157	693	347	98	223		8	185	4	11	19
Pakistan										0	0	20	20

Table II-1. World Exports of Shark Fins, USD1000, 2005-2013 (FishstatJ, all shark fin types summed, includes re-exports)

Exporter	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average		Rank	
										2005-2007	2012-2013	2005-2007	2012-2013
Hong Kong	127102	103840	97183	101181	80316	73198	88918	58942	31412	109375	45177	1	1
Singapore	36348	44693	44274	27382	15901	23088	20295	42199	37557	41772	39878	2	2
Thailand	1916	772	48424	26279	24795	32545	40245	27008	20868	17037	23938	3	3
China	21792	10682	12138	7501	8474	6971	12218	11731	15464	14871	13598	4	4
United Arab Emirates	14959	13649	14609	16228	13242	17912	14823	11842	7764	14406	9803	5	5
India	3663	5037	3879	7496	12504	8946	8310	13211	3086	4193	8149	11	6
Indonesia	8065	9174	7303	7047	10833	13563	13570	8654	4391	8181	6523	9	7
Peru	7256	6838	10648	7127	6945	10990	13648	6379	4153	8247	5266	8	8
Taiwan	9938	10313	8946	8551	8756	12078	13663	7826	2574	9732	5200	6	9
Japan	8140	9091	8735	8457	6824	8591	8759	5081	2434	8655	3758	7	10
Togo	1760	1847	2100	1900	2900	4100	3600	2900	1100	1902	2000	17	11
USA	3898	3171	2642	2059	3776	3357	2922	2851	788	3237	1820	13	12
Senegal	3508	2678	14					2100	1300	2067	1700	16	13
Guinea	2809	2002	1692	2665	2228	3290	4376	2300	1000	2168	1650	14	14
Costa Rica			69		282	251	628	257	2851	23	1554	18	15
Brazil	2292	1894	2313	2825	2338	1376	2109	1777	1294	2166	1536	15	16
Panama	3544	2600	4836	2615	3310	1457	1481	906	458	3660	682	12	17
Yemen	5156	7962	10926	15532	10736	13942	12428	369	322	8015	346	10	18
Oman								109	13	0	61	19	19
Pakistan										0	0	20	20

Table II-2. World Imports of Shark Fins, tonnes, 2005-2013 (FishstatJ, all shark fin types summed)

Importer	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average		Rank	
										2005-2007	2012-2013	2005-2007	2012-2013
Malaysia	860	1060	1220	1197	1331	3676	3489	3013	18048	1047	10531	4	1
Hong Kong	10348	9370	10209	9984	9395	9891	10322	8283	5408	9976	6846	1	2
Singapore	1933	2044	2163	848	557	591	595	2708	2695	2047	2702	3	3
Taiwan	434	709	572	796	988	1157	1262	635	979	572	807	5	4
Canada	112	110	94	118	184	107	104	275	243	105	259	9	5
Macao	120	106	119	123	132	119	116	120	103	115	112	8	6
Thailand	113	102	405	103	44	63	96	105	51	207	78	7	7
China	3353	2662	2545	2012	732	183	160	113	39	2853	76	2	8
Peru	1	8	2	28	54	77	71	30	94	4	62	14	9
USA	27	47	29	29	21	34	58	44	57	34	51	10	10
Indonesia	332	293	84	220	150	237	101	53	41	236	47	6	11
South Africa								8	54	0	31	20	12
Australia	9	7	11	7	7	6	16	27	23	9	25	13	13
UAE							26	16	16	0	16	19	14
South Korea	2	6	2	4	2	3	6	8	2	3	5	15	15
Myanmar			42	2	119	813	601			14	0	11	16
North Korea	1	2	25	1		69				9	0	12	17
Brazil	2									1	0	16	18
Brunei Darussalam			1			2				0	0	17	19
Timor-Leste					112	96	131			0	0	18	20

Table II-2. World Imports of Shark Fins, USD1000, 2005-2013 (FishstatJ, all shark fin types summed)

Importer	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average		Rank	
										2005-2007	2012-2013	2005-2007	2012-2013
Hong Kong	306968	253689	276690	288019	247087	196167	345469	219391	121136	279116	170264	1	1
Singapore	48102	52501	53570	38412	27576	36690	43863	61195	41580	51391	51388	2	2
Malaysia	2060	2721	2855	3418	3809	10369	10248	9833	17612	2545	13723	7	3
Taiwan	4667	4172	6268	8761	7400	10315	14273	7103	7974	5036	7539	5	4
Macao	3324	3728	5313	5920	6149	7124	7570	6998	6047	4122	6523	6	5
Canada	5261	5480	4994	6508	6217	6487	6351	3347	3541	5245	3444	4	6
Australia	1056	891	1182	1351	902	1128	915	1074	947	1043	1011	11	7
China	18467	13890	12052	10994	4490	968	1065	1434	339	14803	887	3	8
Peru	4	52	12	141	246	546	688	680	967	23	824	14	9
Thailand	1317	1141	1898	925	651	761	1021	1047	469	1452	758	8	10
USA	790	1497	1733	1808	1018	1240	1895	797	692	1340	745	10	11
Indonesia	2486	1274	366	1515	1120	970	1762	1029	349	1375	689	9	12
South Korea	109	157	82	167	119	223	602	570	391	116	481	13	13
South Africa								126	418	0	272	19	14
UAE		15					1209	330	113	5	222	16	15
North Korea	331	1222	1154	579	24	267	8		2	902	1	12	16
Myanmar			39	40	372	2173	1635	2		13	1	15	17
Djibouti	15									5	0	17	18
Brunei Darussalam			2			26				1	0	18	19
Timor-Leste					29	24	29			0	0	20	20

Table II-3a. World Exports of Shark Meat, tonnes, 2005-2013 (Fishstat), all shark, rays and skates meat types summed, includes re-exports)

Exporter	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average		Rank	
										2005-2007	2012-2013	2005-2007	2012-2013
Spain	14044	15022	17604	16590	17197	18427	21517	24643	17974	15557	21309	2	1
Taiwan	13762	17261	20655	21772	25946	27151	26392	20851	21308	17226	21080	1	2
Argentina	733	737	11370	13259	8427	9532	10065	10184	10699	4280	10442	5	3
Uruguay	1411	4102	7975	12048	17423	15629	11417	11919	8068	4496	9994	3	4
United States of America	2491	3059	3845	6934	2786	3396	4390	10215	8481	3132	9348	10	5
Japan	5339	4143	3612	4700	5399	5467	5073	5354	6028	4365	5691	4	6
Portugal	1697	2215	2179	1197	2096	3063	3560	4889	5680	2030	5285	15	7
New Zealand	3835	3942	4239	3182	3359	4872	3561	3590	3895	4005	3743	6	8
Indonesia	1209	1893	1657	1804	1425	1915	1367	1819	1991	1586	1905	16	9
France	1014	1043	1779	1251	1498	1436	1553	1895	1902	1279	1899	17	10
Namibia	1526	2314	2744	1803	2368	3333	3314	1575	1987	2195	1781	14	11
Costa Rica	5090	3587	2429	4301	1850	1583	1600	1870	1328	3702	1599	8	12
Chile	2951	2765	3670	2325	1810	1851	1734	1939	1236	3129	1588	11	13
Singapore	1622	1269	828	3648	3820	3066	4188	1957	944	1240	1451	18	14
United Kingdom	3759	1798	1234	783	844	678	780	955	881	2264	918	13	15
South Africa	1359	1126	894	1154	1822	1172	1039	796	804	1126	800	19	16
Canada	3197	3716	2676	2000	1505	947	471	782	804	3196	793	9	17
Norway	1095	837	716	807	685	664	371	328	348	883	338	20	18
Ireland	1554	4279	1676	1944	147	123	30	416	233	2503	325	12	19
Panama	5353	3433	2660	3523	5190	562	346	230	316	3815	273	7	20

Table II-3b. World Exports of Shark Meat, USD1000, 2005-2013 (Fishstat), all shark, rays and skates meat types summed, includes re-exports)

Exporter	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average		Rank	
										2005-2007	2012-2013	2005-2007	2012-2013
Spain	35842	64771	80019	76582	67764	88007	127162	84141	56228	60211	70185	1	1
China	970	1145	425	763	3159	4207	16943	22860	52537	847	37699	20	2
United States of America	6617	8258	12320	17311	10402	13016	16863	37556	34143	9065	35850	6	3
Taiwan	14970	18196	22330	24896	28848	37987	40947	29497	26558	18499	28028	2	4
Uruguay	1972	7150	16409	26706	34264	38395	32610	26708	21356	8510	24032	8	5
New Zealand	14449	14397	17388	15095	15997	21704	18932	20416	19732	15411	20074	3	6
Argentina	1731	1884	23807	33843	14663	21102	23039	20654	18859	9141	19757	5	7
Portugal	4713	5931	5660	4445	5854	12540	14670	11934	16759	5435	14347	12	8
France	5778	6475	9137	8506	9247	9846	10575	12924	11839	7130	12382	10	9
Japan	8213	7595	5231	6228	6614	8604	8502	10419	9876	7013	10148	11	10
Chile	7299	7688	10616	7284	5241	5870	6340	8208	5585	8534	6897	7	11
Netherlands	1429	1843	2969	2877	2590	2793	2897	3444	7540	2080	5492	19	12
Namibia	2950	2509	4370	2754	5540	7198	6928	2898	3813	3276	3356	16	13
United Kingdom	6242	5100	4779	2543	2316	2020	3599	3115	3118	5374	3117	13	14
Costa Rica	7150	4675	3887	6233	2348	1235	2747	3068	2203	5237	2636	14	15
Canada	12291	11741	10047	5981	7131	4555	2458	3066	1960	11360	2513	4	16
Singapore	2781	2291	2710	33308	27750	36934	63010	2875	1860	2594	2368	18	17
Denmark	4775	4328	3263	3414	2597	2402	1603	1630	1308	4122	1469	15	18
Norway	3082	2608	2615	2465	1868	2169	1309	910	1105	2768	1008	17	19
Panama	11545	6672	4898	7458	9625	681	644	385	545	7705	465	9	20

Table II-4a. World Imports of Shark Meat, tonnes, 2005-2013 (Fishstat), all shark meat types summed, including rays and skates)

Importer	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average		Rank	
										2005-2007	2012-2013	2005-2007	2012-2013
Brazil	10256	12245	11816	18439	22147	19769	21067	23046	20786	11439	21916	4	1
South Korea	23124	24468	24663	20436	21063	20479	19812	20614	21192	24085	20903	1	2
Spain	16220	14084	13768	10996	12047	11505	15477	14572	13373	14691	13973	2	3
Uruguay	1105	6076	13191	18331	21716	20642	13223	12849	9362	6791	11106	6	4
Italy	12757	13059	11881	10450	10206	9369	10043	9713	9451	12566	9582	3	5
France	3350	3603	3581	3243	3825	3504	3369	6674	6180	3511	6427	9	6
China	5391	4848	5575	6725	5666	4537	4335	4756	3572	5271	4164	7	7
Peru	955	1204	2579	2875	2910	4716	4298	4545	3667	1579	4106	12	8
Portugal	2402	3011	2358	1788	2668	1359	1940	2800	3771	2590	3286	10	9
Taiwan	501	363	1089	3528	3629	4659	2778	3288	3146	651	3217	20	10
Mexico	7986	7177	5838	5643	3546	3721	3222	3554	2552	7000	3053	5	11
Vietnam	66	92	2395	1111	900	2098	2170	2705	2921	851	2813	19	12
Costa Rica	1237	1748	1411	1663	3352	900	1866	3316	2306	1465	2811	13	13
Singapore	1941	1312	1002	3685	3943	3304	5556	2870	2460	1418	2665	14	14
Japan	1193	944	935	951	617	565	447	2179	1852	1024	2016	17	15
United Kingdom	1789	1490	1999	1634	2176	2511	2135	1526	1177	1759	1352	11	16
Greece	1261	1651	852	838	902	924	1024	812	887	1255	850	16	17
United States of America	1075	1524	1354	1094	431	165	175	209	480	1318	345	15	18
Denmark	1084	1025	581	605	536	552	302	363	294	897	329	18	19
Nigeria		12788	2922	3231			4	126	68	5237	97	8	20

Table II-4b. World Imports of Shark Meat, USD1000, 2005-2013 (Fishstat), all shark meat types summed, including rays and skates)

Importer	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average		Rank	
										2005-2007	2012-2013	2005-2007	2012-2013
South Korea	43539	50176	65159	61476	52238	57136	64917	71852	70970	52958	71411	1	1
Brazil	8880	14836	20556	34851	39861	44745	49267	40792	44923	14757	42858	5	2
Italy	35431	40535	38187	34155	34383	33174	39327	35290	39852	38051	37571	2	3
Spain	35039	30359	32030	27670	25770	30889	42712	30174	31493	32476	30834	3	4
France	12331	13244	12519	12007	13531	12755	13446	24817	24075	12698	24446	6	5
Japan	23981	18275	19652	19530	14206	12882	17254	21757	17124	20636	19441	4	6
Uruguay	698	4874	13045	19382	20967	24837	19853	12404	11238	6206	11821	10	7
China	10192	10931	12172	14985	12123	10098	11106	10802	8379	11098	9591	8	8
Portugal	6100	8162	5919	3128	4406	2605	4107	6195	9668	6727	7932	9	9
Mexico	13234	12148	10001	10486	6356	7467	5875	5954	5289	11794	5622	7	10
United Kingdom	5657	4627	5777	4715	6011	7231	6405	5247	4618	5354	4933	11	11
Belgium	3470	3068	2417	2719	3295	3878	2661	4221	4246	2985	4234	15	12
Australia	2553	1897	2969	2419	3039	3655	3673	3693	3844	2473	3769	17	13
Singapore	2831	1691	2781	28390	26399	34511	69431	3075	3325	2434	3200	18	14
Netherlands	994	1359	1980	1771	1546	1789	2108	2690	3301	1444	2996	20	15
Germany	4279	3097	1602	1197	1026	967	1017	2752	1731	2993	2242	14	16
Greece	1959	2696	1766	1709	1673	2074	2527	1356	2128	2140	1742	19	17
Denmark	3242	3154	1810	1750	1348	1512	1028	1174	932	2735	1053	16	18
United States of America	4256	3226	3067	3027	2143	1670	1735	651	812	3516	732	13	19
Nigeria		9478	2697	3724			12	150	117	4058	134	12	20

ANNEX III

Table III-1. Destinations of Singapore's Shark Fin exports ranked by trade quantity. Unspecified countries are highlighted; OC = other countries

EXPORT (2005 -2007)			EXPORT (2012 -2014)		
Rank	Country/ territory	Average/ yr (t)	Rank	Country/ territory	Average/ yr (t)
1	Hong kong	951.505	1	Hong kong	1044.390
2	Taiwan	186.271	2	China	411.593
3	China	144.559	3	Japan	306.342
4	Indonesia	139.372	4	Philippines	220.467
5	Malaysia	75.100	5	Taiwan	207.985
6	Japan	74.588	6	Malaysia	129.889
7	Vietnam	36.687	7	Indonesia	81.934
8	Brunei	26.324	8	Thailand	15.862
9	Sri Lanka	15.759	9	Vietnam	15.789
10	OC Africa	14.232	10	Korea, Republic of	1.614
11	Philippines	13.895	11	Australia	1.110
12	Thailand	10.834	12	Brunei	0.508
13	India	4.211	13	United Arab Emirates	0.084
14	Australia	1.550	14	Myanmar	0.029
15	Korea, Republic of	1.473	15	Egypt	0.017
16	Macao	0.213			
17	United States	0.035			
18	United Arab Emirates	0.034			
19	Myanmar	0.034			
20	Bahrain	0.013			
21	Spain	0.010			
22	Cyprus	0.007			
23	New Zealand	0.007			

Table III-3. Destinations of Singapore’s Shark Meat exports ranked by trade quantity. Unspecified countries are highlighted; OC = other countries

EXPORT (2005 -2007)			EXPORT (2012 -2014)		
Rank	Country/ territory	Average/ yr (t)	Rank	Country/ territory	Average/ yr (t)
1	South Korea	556.202	1	Brazil	452.587
2	Italy	180.220	2	South Korea	87.753
3	Malaysia	95.887	3	Vietnam	63.920
4	Taiwan	71.613	4	Russia	53.783
5	United Kingdom	67.057	5	Malaysia	52.949
6	Indonesia	63.377	6	Taiwan	52.622
7	Uruguay	50.460	7	United States	11.437
8	Vietnam	33.667	8	Tunisia	8.500
9	Sri Lanka	26.487	9	Uruguay	8.013
10	Hong kong	26.048	10	Canada	2.329
11	Spain	15.557	11	Thailand	1.853
12	Slovenia	14.883	12	Hong kong	0.011
13	China	11.867	13	Indonesia	0.001
14	United States	9.223			
15	OC Europe	6.473			
16	Thailand	4.597			
17	Saudi Arabia	4.187			
18	Japan	3.127			
19	OC Africa	2.017			
20	United Arab Emirates	0.033			

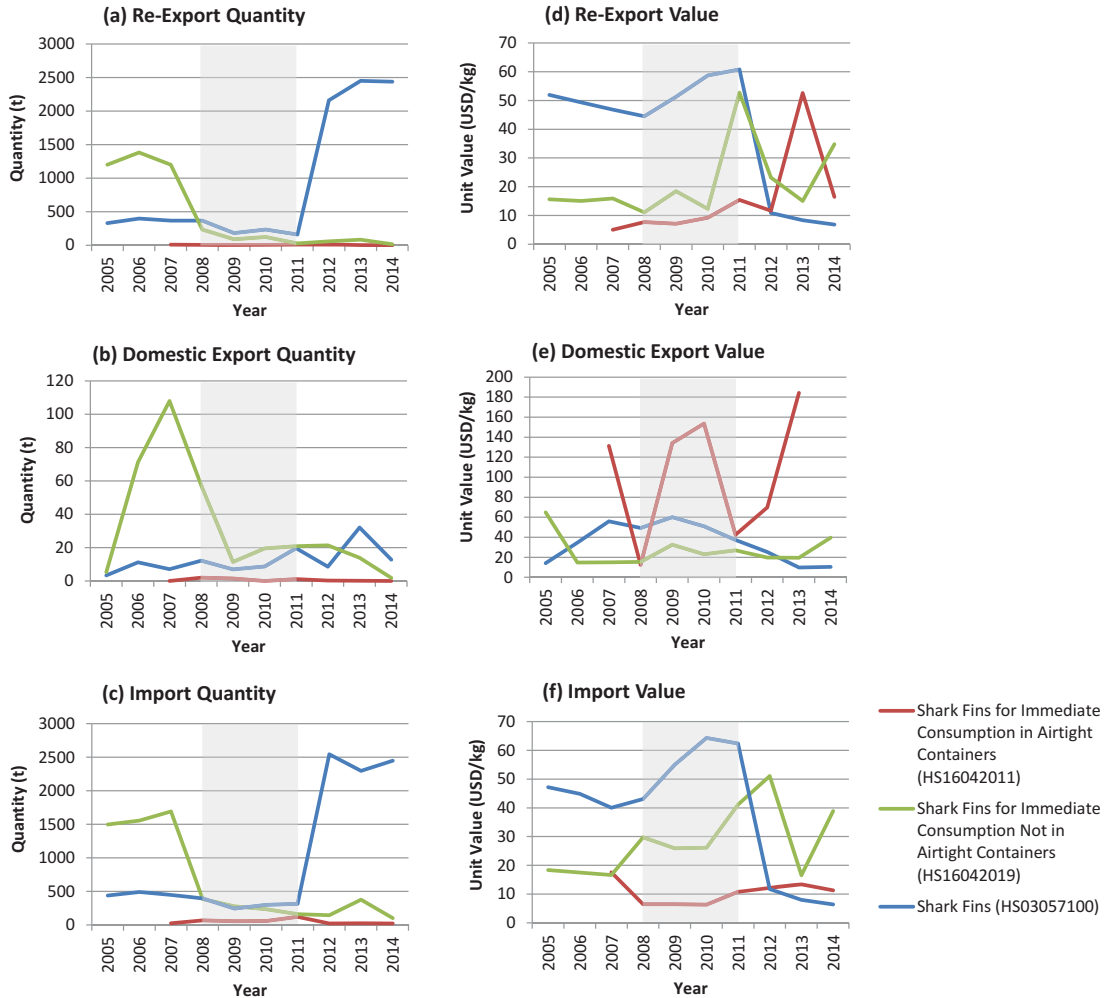
**Table III-4. Source of Singapore's Shark Meat imports ranked by trade quantity.
Unspecified countries are highlighted; OC = other countries**

IMPORT (2005 -2007)			IMPORT (2012 -2014)		
Rank	Country/ territory	Average/ yr (t)	Rank	Country/ territory	Average/ yr (t)
1	Taiwan	935.857	1	Taiwan	395.861
2	OC Africa	69.030	2	South Korea	167.931
3	Malaysia	66.085	3	Mauritius	89.771
4	Pakistan	58.908	4	China	72.482
5	Mauritius	42.518	5	Sri Lanka	39.098
6	Japan	33.372	6	Senegal	36.719
7	Uruguay	32.967	7	Malaysia	33.965
8	Myanmar	27.637	8	British indian ocean territory	22.713
9	China	22.939	9	Namibia	21.088
10	Panama	18.657	10	South Africa	16.357
11	Indonesia	18.063	11	Argentina	13.802
12	South Korea	16.950	12	Japan	11.769
13	Slovenia	16.663	13	Myanmar	9.836
14	Sri Lanka	16.100	14	United States	9.202
15	South Africa	14.840	15	Brazil	7.333
16	Philippines	11.820	16	Ghana	7.324
17	United States	4.047	17	Seychelles	5.052
18	Seychelles	3.400	18	Hong kong	3.639
19	Vietnam	3.380	19	Gambia	2.881
20	Oman	2.610	20	Panama	2.750
21	French Polynesia	2.353	21	Oman	2.729
22	Fiji	1.293	22	Indonesia	1.808
23	United Kingdom	1.273	23	French Polynesia	1.796
24	El Salvador	0.807	24	Philippines	1.435
25	North Korea	0.733	25	Kenya	1.010
26	Papua New Guinea	0.670	26	Uruguay	0.808
27	Spain	0.660	27	Colombia	0.170
28	Guatemala	0.617	28	Tanzania	0.124
29	Macao	0.238	29	New Zealand	0.042
30	Thailand	0.213			
31	New Zealand	0.083			
32	Brazil	0.020			
33	India	0.020			
34	France	0.003			
35	Germany	0.003			

ANNEX IV

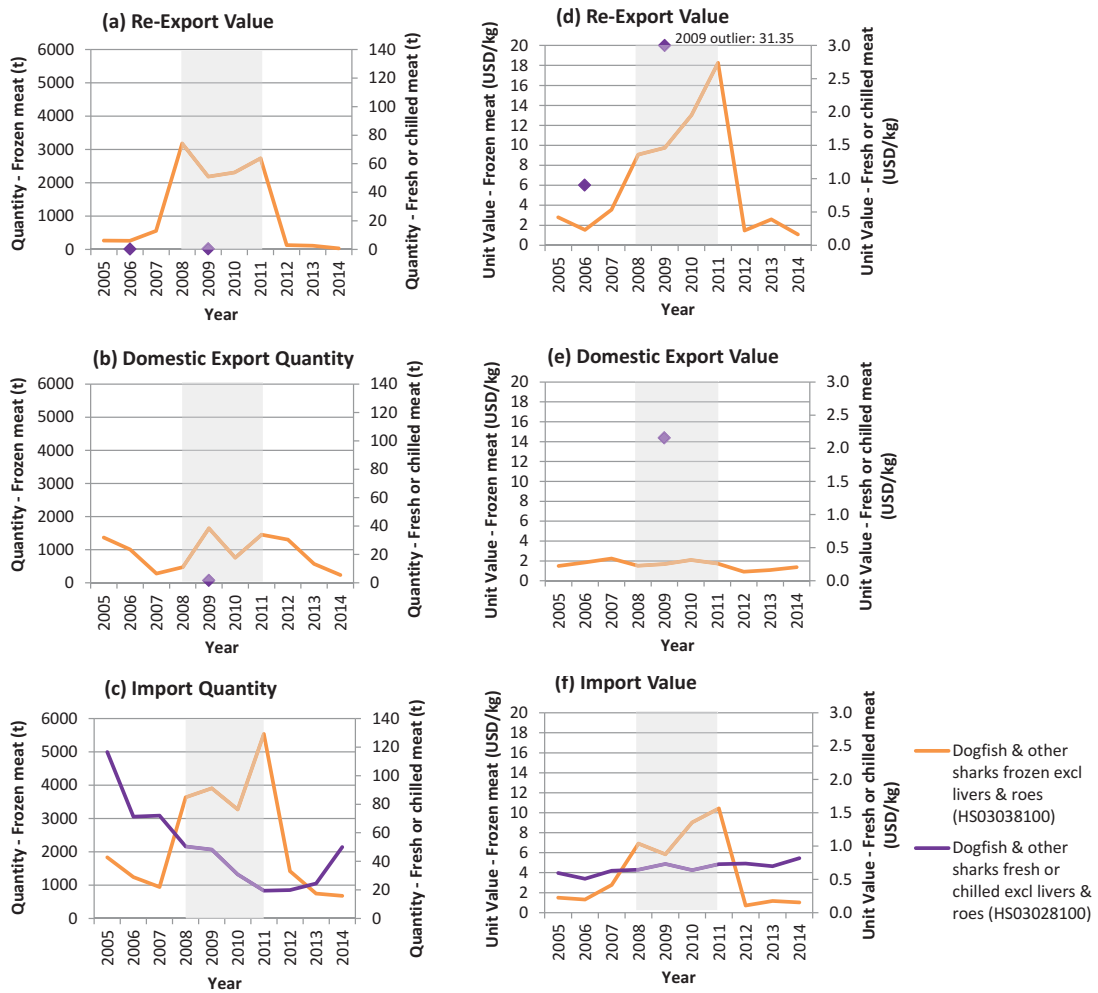
Shark Fins

Figure IV-1. Quantity and value per quantity of re-exports (a,d), domestic exports (b,e) and imports (c,f) of shark fin commodities. Values have been adjusted for inflation.



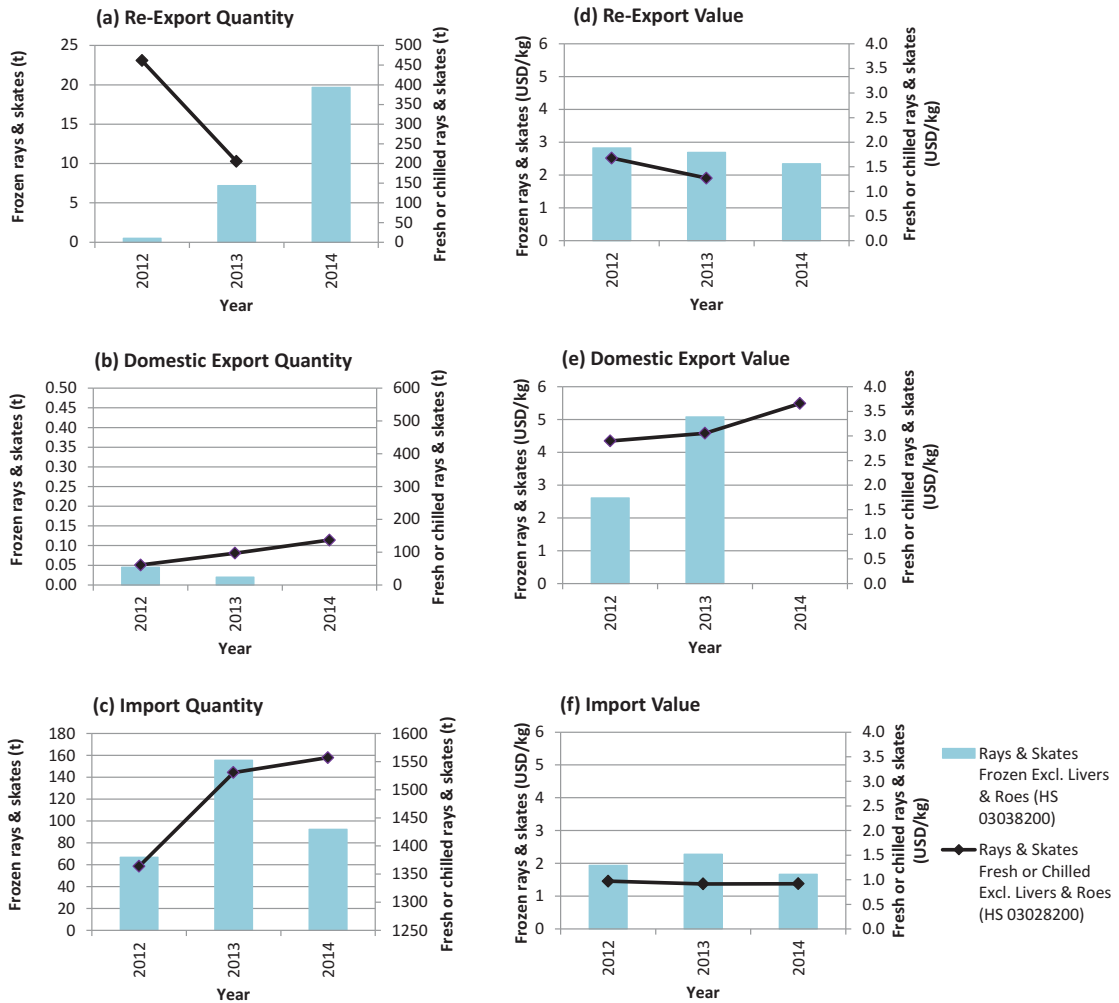
Shark Meat

Figure IV-2. Quantity and value per quantity of re-exports (a,d), domestic exports (b,e) and imports (c,f) of shark meat commodities. Values have been adjusted for inflation.



Rays and Skates

Figure IV-2. Quantity and value per quantity of re-exports (a,d), domestic exports (b,e) and imports (c,f) of shark meat commodities. Values have been adjusted for inflation.





100g #2
非洲魚翅
(2)

100g \$5

品名: 燕窩
規格: 特級
淨重: 20-30g
產地: 112000
淨重: 10g

100g \$75
100g \$75

100g #110
特大翅翅

鮮味魚翅
100g \$120.00

100g \$45

100g \$38

Shark fin found for sale in Singapore

TRAFFIC, the wildlife trade monitoring network, is the leading non-governmental organization working globally on trade in wild animals and plants in the context of both biodiversity conservation and sustainable development.

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