

**INTO THE DEEP:
IMPLEMENTING
CITES MEASURES FOR
COMMERCIALY-VALUABLE
SHARKS AND MANTA RAYS**

VICTORIA MUNDY-TAYLOR AND VICKI CROOK

A TRAFFIC REPORT

Published by TRAFFIC.

Report prepared by TRAFFIC for the European
Commission under Contract 070307/2010/574210/SER/E2

© European Commission.
All rights reserved.

All material appearing in this publication is copyrighted
and may be reproduced with permission. Any reproduction
in full or in part of this publication must credit the
European Commission as the copyright owner.

The views of the authors expressed in this publication do
not necessarily reflect those of the European Commission,
TRAFFIC, WWF or IUCN.

The designation of geographical entities in this
publication, and the presentation of the material, do not
imply the expression of any opinion whatsoever on the
part of the European Commission, TRAFFIC or its
supporting organizations concerning the legal status of any
country, territory, or area, or its authorities, or concerning
the delimitation of its frontiers or boundaries.

The TRAFFIC symbol copyright and Registered
Trademark ownership is held by WWF. TRAFFIC is a
strategic alliance of WWF and IUCN.

Suggested citation: Mundy-Taylor V. and Crook V. (2013). *Into the
deep: Implementing CITES measures for commercially-valuable sharks
and manta rays*. Report prepared for the European Commission.

ISBN 978-1-85850-357-8

Front cover photograph: Giant Mantas *Manta birostris*, Raja Ampat,
West Papua, Indonesia

© Andrea Marshall

**INTO THE DEEP:
IMPLEMENTING CITES MEASURES
FOR COMMERCIALY-VALUABLE
SHARKS AND MANTA RAYS**

VICTORIA MUNDY-TAYLOR AND VICKI CROOK



Scalloped hammerhead shark (*Sphyrna lewini*), Fiji.

Table of Contents

List of Figures and Tables	i
Acknowledgements	ii
Acronyms and Abbreviations	ii
INTRODUCTION	1
METHODS	2
PART I	
Key Exporters, Re-exporters and Consumers of the Shark and Ray Species Listed in the CITES Appendices at CoP16	3
1. MAIN COUNTRIES AND TERRITORIES INVOLVED IN SHARK CATCH AND TRADE	3
2. KEY FISHERIES AND MARKETS - OVERVIEWS BY SPECIES	7
PART II	
International, Regional and Domestic Policies, Regulations and Measures Relevant to CITES Implementation	21
1. INTERNATIONAL POLICIES, REGULATIONS AND MEASURES	21
2. REGIONAL POLICIES, REGULATIONS AND MEASURES	22
3. DOMESTIC MEASURES	24
PART III	
Implementation of the CITES CoP16 Shark and Ray Listings: Challenges, Available Resources and Capacity Building Initiatives	27
1. NON-DETRIMENT FINDINGS (NDFs)	29
2. COMPLIANCE AND ENFORCEMENT	37
3. LEGAL ACQUISITION FINDINGS	46
4. OTHER ISSUES	47
PART IV	
Overview of Key Gaps in Capacity and Priorities for Future Work	49
REFERENCES	51
APPENDICES	56

List of Figures and Tables

Figure 1	Top 20 shark catchers, 2002-2011	4
Figure 2	Oceanic Whitetip shark catchers, 2002-2011	8
Figure 3	Main Porbeagle shark catchers, 2002-2011	11
Figure 4	Main Hammerhead shark catchers, 2002-2011	14
Figure 5	Top 20 ray catchers, 2002-2011	17
Table 1	Top 20 shark exporters and importers, 2000-2009	6
Table 2	Oceanic Whitetip fisheries	9
Table 3	Porbeagle fisheries	10
Table 4	Hammerhead fisheries	15
Table 5	Manta fisheries	18
Table 6	Overview of binding shark measures adopted by Regional Fisheries Management Organisations (RFMOs)	22
Table 7	Examples of domestic shark measures	25
Table 8	Examples of workshops on Proposals for listing of sharks and manta ray species in the CITES Appendices	28
Table 9	Scientific data requirements for stock assessments	30
Table 10	Application of introduction from the sea (IFS) provisions to commercially-valuable sharks and manta rays	34
Table 11	Potential for distinguishing fins/gill rakers in trade based on morphological characteristics	39
Table 12	Examples of guides for the identification of fins and gill rakers in trade	40
Table 13	Market categories used by Hong Kong shark fin traders	41

Acknowledgements

This project has been realised within the framework of the service contract 070307/2010/574210/SER/E2 with the European Commission. The authors would like to thank the CITES authorities and other experts that provided information for this report and TRAFFIC colleagues Glenn Sant, Richard Thomas and Stephanie von Meibom for their helpful comments on the draft report. The authors also wish to acknowledge the technical support provided by TRAFFIC colleague Willow Outhwaite in the preparation of this report.

Acronyms and Abbreviations

AC	Animals Committee (CITES)
ACIAR	Australian Centre for International Agricultural Research
AFCD	Agriculture, Fisheries and Conservation Department (Hong Kong)
ANCORS	Australian National Centre for Ocean Resources and Security
APEC	Asia-Pacific Economic Cooperation
APFIC	Asia-Pacific Fishery Commission
ASEAN-WEN	Association of Southeast Asian Nations Wildlife Enforcement Network
BOBLME	Bay of Bengal Large Marine Ecosystem
BOBP	Bay of Bengal Programme
BOFT	Bureau of Foreign Trade (Taiwan)
CAIS	Central American Integration System
CBD	Convention on Biological Diversity
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCC	Standard Classification of Commodities of the Republic of China
CCRF	Code of Conduct for Responsible Fisheries
CCS	Catch Certification Scheme
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CDS	Catch Documentation Scheme
CEEAC/COREP	Regional Fisheries Committee for the Gulf of Guinea
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
CN	Combined Nomenclature

COFI	Committee on Fisheries (FAO)
CONABIO	Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (Mexico)
CONAP	Consejo Nacional de Areas Protegidas (Guatemala)
CoP	Conference of the Parties
COPEMED	Coordination to Support Fisheries Management in the Western and Central Mediterranean (FAO)
CPC	Contracting Parties and Cooperating Non-contracting Parties
CPPS	South Pacific Permanent Commission
CPUE	Catch per unit effort
CRAM	Fundación para la Conservación y Recuperación de Animales Marinos
DINARA	Dirección Nacional de Recursos Acuáticos (Uruguay)
DIPESCA	Dirección de Normatividad de la Pesca y Acuicultura (Guatemala)
DSTF	Danube Sturgeon Task Force
EEZ	Exclusive Economic Zone
EC	European Commission
EPA	Environment Protection Agency (Yemen)
ERA	Ecological Risk Assessment
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FCWC/CPCO	Fishery Committee for the West Central Gulf of Guinea
FIBA	International Foundation of “Banc d’Arguin”
GCC	Gulf Cooperation Council
GFCM	General Fisheries Commission for the Mediterranean
GTEAM	Grupo de Trabajo de Tiburones y Especies Altamente Migratorias (Working Group on Sharks and Highly Migratory Species)
HSI	Humane Society International
HS	Harmonised System
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
IFAW	International Fund for Animal Welfare

IFS	Introduction from the sea
IGO	Intergovernmental organisation
INCOPESCA	Instituto Costarricense de Pesca y Acuicultura
IOTC	Indian Ocean Tuna Commission
IPOA	International Plan of Action
IRD	Institut de Recherche pour le Développement
ISMAR	Insituto di Scienze Marine (Italy)
ISPRA	Istituto Superiore per la Protezione e la Ricerca Ambientale (Italy)
IUCN	International Union for Conservation of Nature
IUU	Illegal, unreported and unregulated
LAC	Latin America and the Caribbean
MACO	Marine and Coastal Programme
MARN	Ministerio de Medio Ambiente y Recursos Naturales (El Salvador)
MCS	Monitoring, control and surveillance
MEIC	Ministerio de Economía, Industria y Comercio (Costa Rica)
MNHN	Muséum National d'Histoire Naturelle (Paris)
MoU	Memorandum of Understanding
MSC	Marine Stewardship Council
NAFO	Northwest Atlantic Fisheries Organization
NEAFC	North-East Atlantic Fisheries Commission
NGO	Non-governmental organisation
NDF	Non-detriment findings
NMFS	National Marine Fisheries Service (US)
NPOA	National Plan of Action
NOAA	National Oceanic and Atmospheric Administration (US)
OSPESCA	Organizacion del Sector Pesquero y Acuicola del Istmo Centroamericano (Central America Fisheries and Aquaculture Organization)
PCR	Polymerase Chain Reaction
PRCM	Partenariat Régional Côtier et Marin
PSMA	Port State Measures Agreement
RFMO	Regional Fisheries Management Organisation

RPOA	Regional Plan of Action
SADC	Southern African Development Community
SAG	Secretaria de Agricultura y Ganaderia (Honduras)
SANBI	South African National Biodiversity Institute
SCRS	Standing Committee on Research and Statistics
SEAFDEC	Southeast Asian Fisheries Development Center
SEAFO	South East Atlantic Fisheries Organisation
SEFSC	Southeast Fisheries Science Center (US)
SMRC	Society for Marine Research and Conservation
SoMAS	School of Marine and Atmospheric Sciences, Stony Brook University
SPC	Secretariat of the Pacific Community
SRFC	Sub Regional Fisheries Commission
SRPOA	Sub-Regional Plan of Action
SSN	Species Survival Network
TAC	Total allowable catch
TDS	Trade documentation scheme
UAE	United Arab Emirates
UN	United Nations
UNEP	United Nations Environment Programme
UN FSA	UN Fish Stocks Agreement
UNCLOS	UN Convention on the Law of the Sea
US	United States
US FWS	United States Fish and Wildlife Service
WCO	World Customs Organization
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western Central Pacific Ocean
WCS	Wildlife Conservation Society
WIO	Western Indian Ocean
WPEB	Working Party on Ecosystems and Bycatch (IOTC)

INTRODUCTION

Over the past twenty years, the conservation and management of sharks has been the subject of much attention and discussion among Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). During this period, a significant amount of research and information has been generated on this issue within CITES processes, with Parties also having adopted a number of recommendations for action in the form of CITES Resolutions and Decisions, and proposals for listing of various shark species (Basking Shark *Cetorhinus maximus*, the Whale Shark *Rhincodon typus*, the Great White Shark *Carcharodon carcharias* and Sawfish Pristidae spp.) in the CITES Appendices. A summary of CITES processes related to shark conservation and management, from 1994 to present, is provided in **Appendix A**.

At the 16th meeting of the Conference of the Parties (CoP16) held in Bangkok, Thailand, in March 2013, four new proposals to list a number of commercially important marine species in Appendix II of CITES were adopted as follows:

- Oceanic Whitetip shark *Carcharhinus longimanus*
- Porbeagle *Lamna nasus*
- Scalloped Hammerhead shark *Sphyrna lewini*, Great Hammerhead shark *Sphyrna mokarran*, and Smooth Hammerhead shark *Sphyrna zygaena* (hereafter referred to collectively as “Hammerheads”)¹
- Manta rays *Manta* spp.

The entry into effect of the above listings has been delayed by 18 months to 14 September 2014, to enable Parties to resolve related technical and administrative issues. At CoP16, the European Union (EU) announced that it was providing funding through the CITES Secretariat to support capacity building for the implementation of the CITES listings of commercially-valuable marine species, with a focus on developing Parties. In order to ensure the effective allocation of these funds, the European Commission requested that TRAFFIC carry out a rapid assessment of capacity building priorities and needs.

Consequently, the aim of this Report was to compile and collate readily available information on: (i) the main Parties likely to be affected by the listings; (ii) international, regional and domestic regulations and measures that may be mutually supportive of, and complementary to, the listings; (iii) the main challenges expected in relation to implementation of the listings; and (iv) any existing or planned capacity building initiatives and tools available to support the listings, in addition to potential gaps and needs.

The Report is composed of the following four main Parts:

- I. Key exporters, re-exporters and consumers of the shark and ray species listed in the CITES Appendices at CoP16**
- II. International, regional and domestic policies, regulations and measures relevant to CITES implementation**
- III. Implementation of the CITES CoP16 shark and ray listings: challenges, available resources and capacity building initiatives**
- IV. Overview of key gaps in capacity and priorities for future work**

Additional/supporting information is provided in **Appendices A to P**.

¹ It is noted that there are seven currently recognised species of hammerhead shark in the genus *Sphyrna*, however only three species were proposed for listing in Appendix II at CoP16: the Scalloped Hammerhead, under *Resolution Conf. (Rev. CoP15) Annex 2a Criterion A*, and the Great Hammerhead and Smooth Hammerhead owing to look alike issues relating to difficulties in distinguishing between fins of the three species in trade.

METHODS

For the purposes of this report, TRAFFIC analysed the most recently available catch and trade data from Food and Agriculture Organization of the United Nations (FAO), collated information found in published sources, and contacted CITES authorities, non-governmental organizations (NGOs) and other experts for additional information.

Details of the FAO catch and trade data used in this Report are provided in the introductory sections of **Part I**. Published sources of information reviewed for this Report include: the CITES CoP16 listing proposals; IUCN-TRAFFIC Analyses; FAO Expert Advisory Panel Reports; reports of Regional Fisheries Management Organisations (RFMOs); CITES and Convention on Migratory Species (CMS) documents; identification guides; academic articles; and other reports and materials prepared by NGOs. Feedback from authorities and experts was requested via two different types of questionnaire, copies of which are included in **Appendix B**. Fifty different organisations and/or experts with knowledge covering over 30 countries and territories provided feedback via these questionnaires, email or telephone. Unless otherwise indicated, all references described as *in litt.* or pers. comm. in this Report were provided to TRAFFIC via this consultation process. Details of the authorities and experts that provided input to TRAFFIC's consultation in time for their information to be included in this Report are provided in **Appendix C**.

This Report focuses on those regions for which funding for capacity building is being considered, namely **Africa, Latin America and the Caribbean, the Middle East, South Asia, Southeast Asia, and Oceania** (excluding Australia and New Zealand).

PART I

Key Exporters, Re-exporters and Consumers of the Shark and Ray Species Listed in the CITES Appendices at CoP16

1. MAIN COUNTRIES AND TERRITORIES INVOLVED IN SHARK CATCH AND TRADE

A reasonable understanding of the main range, flag and port States for Oceanic Whitetip, Porbeagle, Hammerheads and Mantas can be obtained from the information and data in the Supporting Statements of the CITES CoP16 proposals (hereafter referred to as the CITES CoP16 Proposals) and other reports on shark catch and trade. Species-specific information derived from these sources, in addition to recent FAO capture production (catch) data reported to the species, genus and/or family level and information obtained from experts and authorities are presented in **Section 2** of this Part.

It is important to note, however, that the interpretation of catch and trade data (on which the majority of these resources rely) suffers from a number of problems caused by poor, under and mis-reporting and the limited availability of species-specific data (Lack and Sant, 2011). Consequently, the actual importance of a number of main players in the catch and trade of the shark and ray species listed in the CITES Appendices at CoP16 is still relatively unknown. This is especially relevant for trade, as there are currently no universal species-specific Customs codes in use for sharks or rays, and only a few countries or territories report trade in specific shark species. It was therefore considered important to supplement the species-specific overviews with a summary of the overall top shark catchers² and countries/territories trading in shark products, based on the most recent ten year catch and trade datasets available from FAO (2002-2011 for catch and 2000-2009 for trade). This brief analysis focuses on those regions for which funding for capacity building is being considered, namely **Africa, Latin America and the Caribbean, the Middle East, South Asia, Southeast Asia, and Oceania** (excluding Australia and New Zealand).

a. Catch

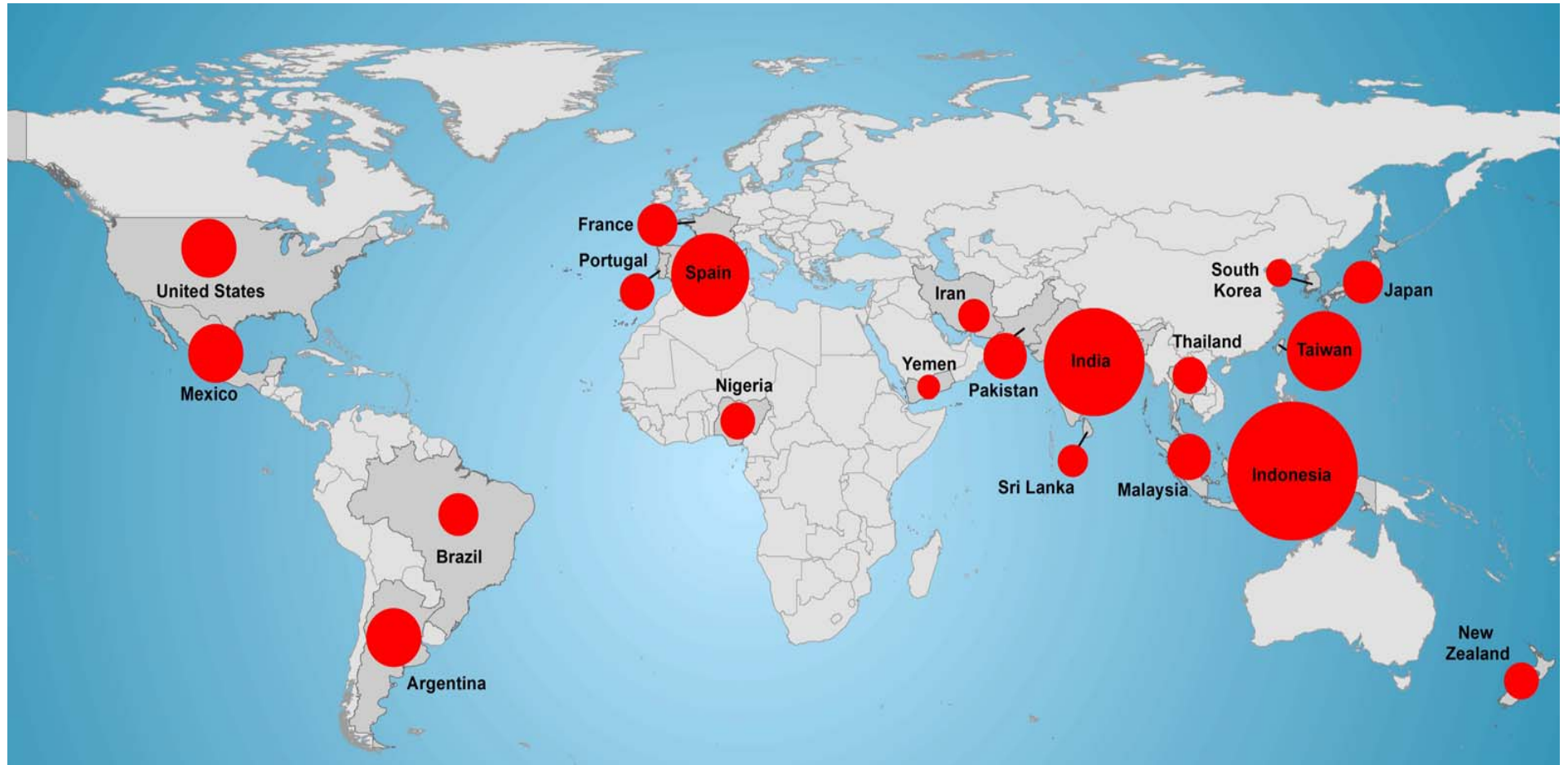
FAO (Fischer *et al.*, 2012) describes the top 26 shark catchers (those reporting at least 1% of global shark catches during decade 2000-2009) and these have not changed significantly for the most recent ten year period for which catch data were available (2002-2011). The top 20 shark catchers between 2002 and 2011, responsible for nearly 80% of reported global catch in these species, are presented in **Figure 1** below.

In summary:

- **Indonesia and India** alone were responsible for over 20% of global shark catches between 2002 and 2011.
- **Argentina, Mexico, Malaysia, Pakistan, Brazil, Thailand, Nigeria, Iran, Sri Lanka and Yemen** together were responsible for over 25%.

² The term “shark catchers” refers to countries, territories and other political entities that report catch in sharks, skates, rays and chimaeras (Class Chondrichthyes) to the FAO.

Figure 1: Top 20 shark catchers, 2002-2011 (total capture, tonnes, of all sharks, skates, rays and chimaeras included in FAO Fishstat)



b. Trade

Very few countries/territories report shark or ray species-specific trade data (see **Section 2(c)** of **Part III** on trade data reporting (Customs codes) for further details). Most meat and fin trade in Porbeagle, Oceanic Whitetip and Hammerheads 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. 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. The trade analysis presented here therefore focuses only on commodities reported to FAO that include reference to sharks, but in some cases these may also include ray products where these were grouped together by reporting countries/territories – these broader shark and ray products are included in category (c) (other).

The top 20 shark trading countries/territories as reported to FAO between 2000 and 2009 are presented in **Appendix D** under the three main shark commodity groupings described above. **Table 1** below summarises the most important exporters and importers, focusing on the main regions of potential interest for capacity building. Some observations on the trade data presented in **Appendix D** and **Table 1** include the following:

- **Several countries and/or territories that do not appear in the top 20 shark catchers, appear in the top 20 for shark product exports** (highlighted in italics in **Table 1**), namely:
 - *Africa* – **Namibia** and **South Africa** for meat and **Senegal** and **Guinea** for fins.
 - *Latin America and the Caribbean* – **Panama** and **Uruguay** stand out as the third and fourth most important meat exporters (both also in the top 20 for fins), while **Chile**, **Costa Rica**, **Ecuador**, **Peru** and **Suriname** are also important exporters of various shark products.
 - *Middle East* – the **United Arab Emirates** (UAE) is reportedly the 6th largest exporter of shark fins, with **Oman** also reporting exports of frozen fins.
 - *South Asia* – **Bangladesh** and the **Maldives** export important quantities of fins and, in the case of the **Maldives**, other products.
 - *Southeast Asia* – **Singapore** was the fourth most important exporter of shark fins between 2000 and 2009. In addition, although **Thailand** is in the top 20 shark catchers (14th) it was notably the top global exporter of shark fins, exporting nearly 99% of its fin total over the 2000-2009 period in the last three years, in the form of prepared or preserved fins.
- **The presence of a number of trade or processing hubs for shark products** (based on import/re-export data, comparable exports and imports, and/or high export figures in proportion to known catches) (indicated by an asterisk (*) in **Table 1**), namely:
 - In *Africa*, **South Africa** for **meat** – reporting the import and export of 9 000 tonnes.
 - In *Latin America and the Caribbean*:
 - **Panama** for **meat** – not being in the top 20 for catch, but being the third largest meat exporter worldwide (over 45 000 tonnes); and
 - **Uruguay** for **meat** – reporting imports of over 60 000 tonnes and exports of nearly 45 000 tonnes, with a consistent increase in exports over the ten year period (over 80% occurring in the last three years).
 - In the *Middle East*, **UAE** for **fins** – reporting the export of nearly 5 000 tonnes of fins, but not known to be a top shark catcher.
 - In *Southeast Asia*, **Singapore** for **meat** and **fins** – reporting imports and exports in the region of 20 000 tonnes of meat and 10 000 tonnes of fins.

In addition to those countries/territories included in **Table 1, Hong Kong Special Administrative Region of the People's Republic of China** (hereafter referred to as Hong Kong) is an important trade/processing hub for shark fins, importing over 100 000 tonnes, and re-exporting 70 000 tonnes during the period 2000-2009.

Table 1: Top 20 shark exporters and importers grouped according to region of potential interest for capacity building and by commodity category, 2000-2009 (see Appendix D for further details)

EXPORTERS			IMPORTERS		
Meat	Fins	Other	Meat	Fins	Other
Africa					
<i>Namibia</i> (15) <i>South Africa</i> (17)*	<i>Senegal</i> (15) <i>Guinea</i> (19)		Nigeria (9) South Africa (20)*	South Africa (15)	
Latin America and the Caribbean					
<i>Panama</i> (3)* <i>Uruguay</i> (4)* <i>Costa Rica</i> (5) Mexico (19)	<i>Panama</i> (11) Brazil (12) <i>Ecuador</i> (13) <i>Costa Rica</i> (16) <i>Uruguay</i> (18) Argentina (20) <i>Suriname</i> (fr)	<i>Chile</i> (2) Argentina (7) <i>Costa Rica</i> (9) <i>Uruguay</i> (11) <i>Peru</i> (13)	Brazil (3) Mexico (4) Uruguay (5)* Costa Rica (14) Peru (16)	Peru (13)	Chile (11) Costa Rica (19)
Middle East					
	<i>UAE</i> (6)* Yemen (10) <i>Oman</i> (fr)			Kuwait (20)	
South Asia					
	<i>Bangladesh</i> (14) Pakistan (17) India (fr) <i>Maldives</i> (fr)	<i>Maldives</i> (8) India (16)			
Southeast Asia					
<i>Singapore</i> (11)* Indonesia (18)	Thailand (1) Indonesia (3) <i>Singapore</i> (4)* Malaysia (7)	Indonesia (12)	Singapore (10)*	Singapore (3)* Malaysia (4) Indonesia (5) Thailand (7) Myanmar (11) Timor-Leste (12) Brunei Darussalam (18) Lao (19)	

Notes:

- (-) - position in top 20 as per 2000-2009 FAO trade data.
- (fr) - frozen fins reported with meat (see Notes to Tables 1 and 2, and to Tables 3 and 4, of Appendix D)
- Countries/territories in italics are those which do not feature in the top 20 shark catchers, but which feature in the top 20 for shark product exports - see accompanying text on page 5 of this Report.
- An asterisk (*) indicates where countries/territories appear to serve as trade or processing hubs for particular shark products – see accompanying text on page 5 of this Report.

The top 20 exporters and importers for the three categories of shark commodities include countries and/or territories responsible for ~ 90% or more of global trade over the 2000-2009 period. Any other exporters and importers of shark products falling outside of the top 20 are listed at the end of **Appendix D**. Of note are a number of countries/territories in Africa, Asia, Latin America and Oceania that fall outside of the top 20 for shark fin exports, but which exported over 100 tonnes of this commodity between 2000 and 2009, namely South Africa (204 tonnes), the Philippines (212 tonnes), Chile (188 tonnes), Colombia (172 tonnes), Bolivar Republic of Venezuela (145 tonnes), the Marshall Islands (131 tonnes), Togo (129 tonnes), the Maldives (128 tonnes) and the Republic of Congo (126 tonnes). Finally,

in addition to Hong Kong, only a few countries/territories specifically report “re-exports” (Mauritius - 188 tonnes, Fiji - 25 tonnes and Saudi Arabia - 25 tonnes, all of meat or other products) and it can be assumed that for most countries/territories re-exports are included in exports.

2. KEY FISHERIES AND MARKETS - OVERVIEWS BY SPECIES

An overview of distribution and exploitation (key fisheries and markets) for each of the shark and ray species listed in the CITES Appendices at CoP16 is provided in the sections below. The FAO catch data referred to in this discussion are provided in **Appendix E**.

a. Oceanic Whitetip

Distribution

Oceanic Whitetip *Carcharhinus longimanus* is distributed worldwide in tropical and subtropical open ocean surface (epipelagic) waters between 42°N and 35°S (IUCN and TRAFFIC, 2012) (see **Figure 2**).

Fisheries

Details of known Oceanic Whitetip **fisheries** are provided in **Table 2**. Oceanic Whitetip is taken in many parts of its range, primarily as **bycatch** in oceanic **longline** fisheries targeting large pelagic species (tunas, swordfishes and others) (FAO, 2013b). Levels of Oceanic Whitetip catch in directed fisheries are likely to be minor compared with bycatch in tuna fisheries (FAO, 2013b).

The main catchers of Oceanic Whitetip based on FAO catch data are shown in **Figure 2**. Given that the majority of countries/territories do not report Oceanic Whitetip catches to FAO to species level (CITES CoP16 Proposal), **Figure 2** presents only a partial picture of global Oceanic Whitetip catches. According to FAO catch data, key catchers of Oceanic Whitetip include **Sri Lanka, China, Brazil, Taiwan, Fiji** and **Tanzania** (**Figure 2**). Other countries/territories that are known to take Oceanic Whitetip as bycatch in their fisheries include **France, Japan, Spain, Uruguay** and **the US** (**Table 2**).

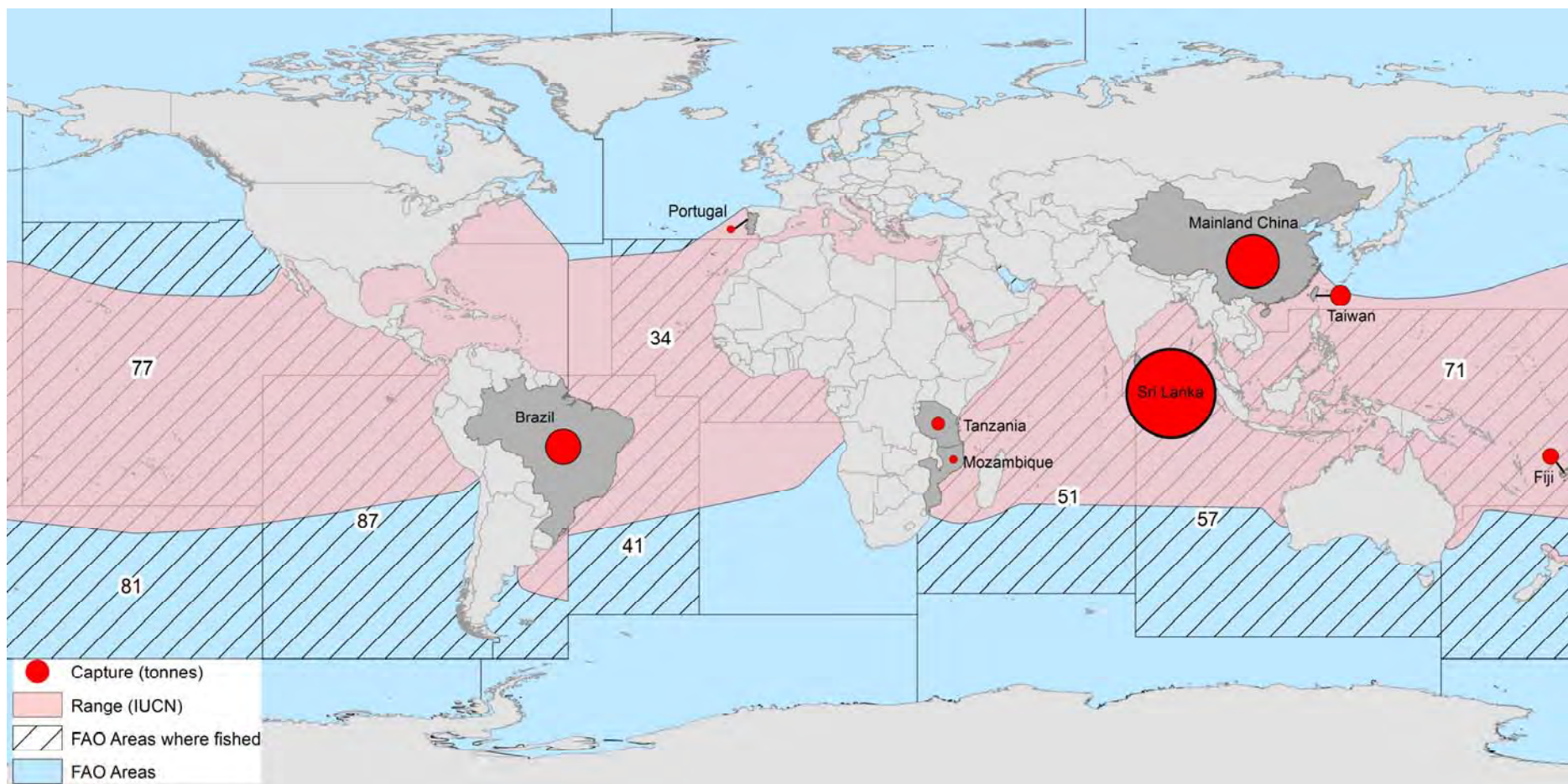
The FAO fishing areas associated with the highest Oceanic Whitetip catch for the period 2002-2011 are set out in **Table 2** of **Appendix E**. According to FAO catch data, **Sri Lanka** was responsible for nearly all of the reported Oceanic Whitetip catch for the Eastern Indian Ocean (4 274 tonnes)³, with **Brazil** the main catcher of this species in the Southwest Atlantic (972 tonnes). **Mainland China** was responsible for at least half of reported Oceanic Whitetip catches in the Western Central Pacific (979 tonnes), the Eastern Central Pacific (325 tonnes) and the Western Indian Ocean (132 tonnes) (**Table 3** of **Appendix E**).

Markets

Oceanic Whitetip is a preferred species in many **fin** markets, including in **Hong Kong** (Vannuccini, 1999). Demand from the international fin market is considered to be the primary force driving retention of bycatch of this species (IUCN and TRAFFIC, 2012). There is also evidence to suggest that Oceanic Whitetip **meat** has sufficient value to warrant retention (S. Clarke, *in litt.*, to IUCN/TRAFFIC, 2012, cited in IUCN and TRAFFIC, 2012). It has been reported that Oceanic Whitetip meat is eaten in fresh and smoked forms in **Mexico** and **the US**; and in fresh, dried and salted forms in the **Seychelles** and **Sri Lanka** (CITES CoP16 Proposal). The livers are sometimes also harvested for oil, and the skin used as leather (CITES CoP16 Proposal).

³ However, see note to Figure 2.

Figure 2: ‘Oceanic Whitetip shark’ catchers, 2002-2011 (total capture, tonnes, FAO FishStat)



Note: Sri Lanka's directed high seas shark fishery changed to tuna from 2004 (G. Sant, TRAFFIC, pers. comm., 2013). Shark catch reported by Sri Lanka declined following this change, with the majority of catch for 2002-2011 reported for the first few years of this period.

Table 2: Details of known Oceanic Whitetip fisheries

Region	Details of fishery	Source of information
Atlantic Ocean	<ul style="list-style-type: none"> • Bycatch in tuna and swordfish longline fisheries • Brazil, Mexico, Spain, St. Lucia and the US have reported catches to ICCAT. Data reported to ICCAT considered likely to under-represent Atlantic Ocean catches. • Comprise a greater proportion of bycatch in tropical than temperate waters. <p>Examples of bycatch:</p> <ul style="list-style-type: none"> • <u>South and Central Atlantic:</u> <ul style="list-style-type: none"> ○ Brazilian longline fisheries ○ Uruguayan longline fishery • <u>Eastern Atlantic:</u> <ul style="list-style-type: none"> ○ French and Spanish tuna purse-seine fisheries in Eastern tropical Atlantic. • <u>Northwest Atlantic:</u> <ul style="list-style-type: none"> ○ US-flagged longline vessels. • <u>Western Atlantic:</u> <ul style="list-style-type: none"> ○ Oceanic longline industrial fisheries in the Colombian Caribbean. 	CITES CoP16 Proposal; Clarke (2008); FAO (2013b); Hazin <i>et al.</i> (2008).
Pacific	<ul style="list-style-type: none"> • Bycatch in tuna longline and purse seine fisheries: <ul style="list-style-type: none"> ○ US and Japanese longline fishing fleets in the Western and Central Pacific ocean. ○ North and South Pacific. • Evidence that taken in small-scale targeted fisheries, e.g. <ul style="list-style-type: none"> ○ Papua New Guinea ○ Pacific coast of Central America ○ Likely in other areas of the Western Central Pacific. 	Bonfil and Abdallah (2004); CITES CoP16 Proposal; Clarke (2011); FAO (2013b); Rice and Harley (2012).
Indian Ocean	<ul style="list-style-type: none"> • Bycatch in tuna (and swordfish) longline and purse seine fisheries: <ul style="list-style-type: none"> ○ Tuna fishery in the Maldives. ○ French and Spanish tuna purse seine fleets in the Western Indian Ocean. ○ Swordfish longline fishery in the South-western Indian Ocean. ○ Japanese longline fishery targeting tuna. • Evidence that taken in small-scale targeted fisheries, e.g. <ul style="list-style-type: none"> ○ Gulf of Aden ○ Maldives (taken in commercial shark longline fishery targeting reef and pelagic sharks) 	Anderson <i>et al.</i> (2011); Bonfil and Abdallah (2004); FAO (2013b); Rice and Harley (2012).

Abbreviations: ICCAT - International Commission for the Conservation of Atlantic Tunas.

b. Porbeagle

Distribution

Porbeagle *Lamna nasus* is found in a circumglobal band of ~30-60°S in the Southern Hemisphere and mostly between 30-70°N in the North Atlantic Ocean and Mediterranean (IUCN and TRAFFIC, 2012) (see **Figure 3**).

Fisheries

Details of known Porbeagle **fisheries** are provided in **Table 3**. Porbeagle is taken in both **targeted fisheries** and as **bycatch**, particularly in pelagic **longline** fisheries for tuna and swordfish, but also in gill nets, driftnets, trawls and handlines.

The main catchers of Porbeagle based on FAO catch data are shown in **Figure 3**. According to these data and other sources, key catchers include **Japan, New Zealand, Republic of Korea, Spain, Taiwan**

and **Uruguay** (Table 3). It is noted that Japan did not report any catches of Porbeagle to FAO for the period 2002-2011.

Table 3: Details of known Porbeagle fisheries

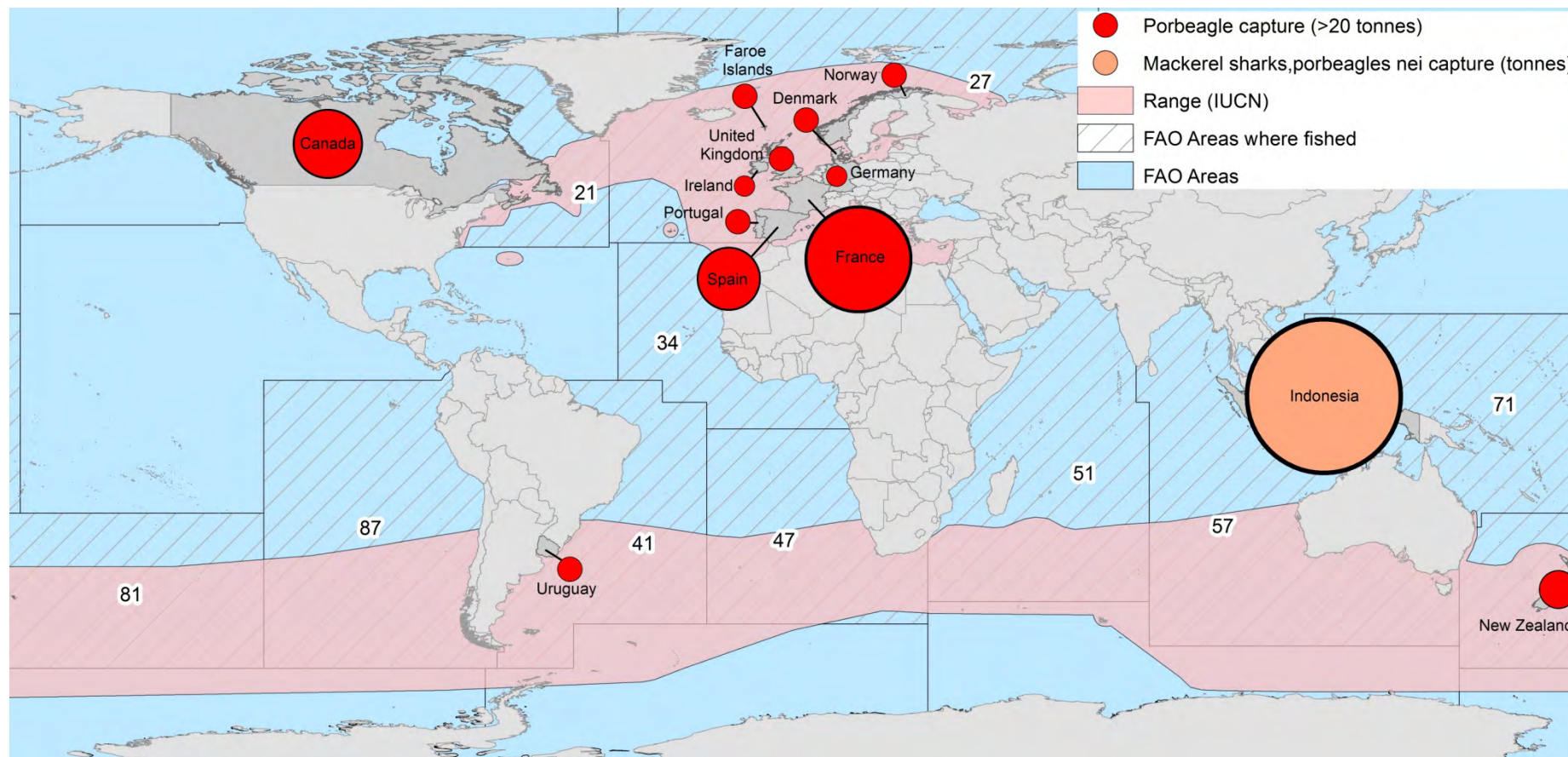
Region	Details of fishery	Source of information
Northeast Atlantic	<ul style="list-style-type: none"> Until recently, caught by many EU Member States (Spain – as bycatch in swordfish and tuna longline fisheries; France – in longline targeted fishery). Total allowable catch (TAC) for Porbeagle was reduced to zero for EU waters and EU fleets in 2010. From 2012, prohibited for EU Member State to land or to fish Porbeagle anywhere in the world. The main legal fisheries are now from Norway and the Faroe Islands. Generally seasonal, opportunistic rather than targeted fisheries. 	FAO (2013b); TRAFFIC (2012).
Northwest Atlantic	<ul style="list-style-type: none"> US and Canadian fisheries are under strict quota management. Since 2006, reported annual landings less than 200 tonnes. 	CITES CoP16 Proposal
North Atlantic	<ul style="list-style-type: none"> Caught on the high seas at high latitudes. Bycatch in tuna longline fisheries targeting bluefin tuna. Especially Taiwan, Republic of Korea, Japan. Unreported catch is considered an issue for Porbeagle taken as bycatch by the Japanese longline fishery operating in high sea areas of the North Atlantic. 	Campana and Gibson (2008); CITES CoP16 Proposal; Nakano and Homma (1996).
Southern Hemisphere*	<ul style="list-style-type: none"> Mainly taken as bycatch in longline fisheries for tuna and swordfish. Including by Japan, New Zealand, Republic of Korea, Spain, Taiwan and Uruguay. <p>Examples of bycatch of Porbeagle:</p> <ul style="list-style-type: none"> Argentine trawl fisheries off southern Patagonian shelf. Chilean artisanal and industrial longline swordfish fishery. Japanese longline fishery targeting southern bluefin tuna and bigeye tuna (South Atlantic). Porbeagle catch largely unreported but potentially significant. Tuna longliners, and pelagic and bottom trawling in New Zealand. Porbeagle catch in Uruguayan tuna and swordfish longline fishery in the Southwest Atlantic considered significant. Demersal longline and trawling for Patagonian toothfish and mackerel icedfish in the Southern Indian Ocean. 	CITES CoP16 Proposal; FAO (2013b); Matsunaga (2010); Semba and Yokawa (2012); Waessle (2007).

*Note: *Stock boundaries in the Southern Hemisphere are unclear.*

The FAO fishing areas associated with the highest Porbeagle catch for the period 2002-2011 are set out in **Table 5 of Appendix E**. However, as noted in **Table 3** above, many of the Porbeagle fisheries in the **Northern Hemisphere** (in the Northwest and Northeast Atlantic) are no longer active. In the **Southern Hemisphere**, significant catches of Porbeagle were reported for the following FAO areas: (i) Eastern Indian Ocean; (ii) Western Central Pacific; (iii) Southwest Pacific; (iv) Southeast Pacific; and (v) Southwest Atlantic (FishStat) (**Table 5, Appendix E**). However, it is unclear what proportion of the catch totals reported for the Eastern Indian Ocean and Western Central Pacific are captures of Porbeagle: Indonesia, which reported 100% of these catches, reports Porbeagle catches under the general category of *Mackerel sharks, porbeagles nei*⁴ rather than *Porbeagle*.

⁴Categories with the term “nei” include species “not elsewhere included”, i.e. they are not included in any more specific codes.

Figure 3: Main ‘Porbeagle’ catchers, 2002-2011 (total capture, tonnes, FAO Fishstat). *All countries reporting catches of ‘Mackerel sharks, porbeagles nei’ are also included.*



Notes:

- Map only presents data for those countries reporting more than 20 tonnes of Porbeagle catch to FAO (total) for the period 2002-2011.
- Many of the fisheries in the Northern Hemisphere are no longer active, due to the implementation of various management measures in the North Atlantic. The total allowable catch (TAC) for Porbeagle was reduced to zero for EU waters and EU fleets in 2010 (Table 3).
- Indonesia is the only country which reports Porbeagle catches under the general category Mackerel sharks, porbeagles nei rather than Porbeagle.

Markets

Porbeagle is harvested primarily for its high-value **meat**. **Europe** is the main market for Porbeagle meat, which is traded in fresh and frozen form. According to EU trade data, between 2010 and 2012 the main suppliers to the EU were **South Africa, Japan, Morocco, Norway and Faroe Islands** (Eurostat, 2013). As South Africa has no targeted fishery for Porbeagle, and has never reported landings of Porbeagle to FAO, the high quantities exported by South Africa to the EU are likely to be derived from foreign vessels fishing in the South Atlantic and landing in South African ports (CITES CoP16 Proposal).

In addition, the EU has reported **trading** Porbeagle products with the following countries/territories between 2010 and 2012: **Afghanistan, Andorra, Ceuta and Melilla, China, Gibraltar, New Zealand, Senegal, Suriname, Switzerland and Turkey** (Eurostat, 2013).

Porbeagle **fins** are generally less valued than fins of other species due to their low needle count (IUCN and TRAFFIC, 2012). Porbeagle is not one of the common species in the Hong Kong dried fin market, possibly as most fins in the market derive from areas other than those where Porbeagle is most abundant (Northeast and Northwest Atlantic) (Clarke *et al.*, 2006). However, Porbeagle fins are still exported from **New Zealand to Hong Kong** and also from **Norway to Asian markets** as by-products of meat processing. Porbeagle has, in the past, been reported as a preferred species for fins in **Indonesia** (Vannuccini, 1999); however this may not hold true today (S. Clarke, *in litt.* to IUCN/TRAFFIC, 2012, cited in IUCN and TRAFFIC, 2012).

c. Hammerheads

Distribution

The Scalloped Hammerhead *Sphyrna lewini* is a circumglobal shark species found in coastal warm temperate and tropical seas between 46°N and 36°S to depths of 1000m (CITES CoP16 Proposal). The species is primarily found on continental shelves and in adjacent deep water but rarely found in open ocean areas (FAO, 2013b). The Great Hammerhead *Sphyrna mokarran* is also a circumglobal species, occurring between 46°N and 36°S to depths of 300m. The Smooth Hammerhead *Sphyrna zygaena* has a wider range, being a circumglobal coastal-pelagic and semi-oceanic species that occurs in temperate and tropical seas between 59°N and 55°S (CITES CoP16 Proposal). The distributions of these three species are depicted in **Figure 4**.

Fisheries

Owing to their wide distributions and coastal-dwelling nature, Hammerheads are exploited along continental shelves and adjacent oceanic areas in a vast number of countries, in both tropical and warm temperate seas. Given the potentially very high number of countries/territories involved in catching Hammerheads, selected examples of fisheries known to catch Hammerheads (focusing in particular on the three species of Hammerhead listed in the CITES Appendices at CoP16 – Scalloped Hammerhead, Great Hammerhead and Smooth Hammerhead) are detailed in **Table 4**.

The three Hammerhead species are taken in **targeted fisheries** and as **bycatch** in fisheries for pelagic and demersal species (FAO, 2013b). Their coastal distribution suggests they are more vulnerable to fisheries on the continental shelf rather than the open ocean (FAO, 2013b) and they are reportedly relatively less vulnerable to high seas pelagic longline fisheries than other pelagic sharks (Cortes *et al.*, 2009, cited in FAO, 2013b). Fisheries known to capture Hammerheads include small and large fisheries using **gillnets** and **pelagic** or **bottom longlines** (CITES CoP16 Proposal). Capture of **juvenile**

Hammerheads in inshore fisheries is documented in many parts of their range (CITES CoP16 Proposal; Hayes *et al.*, 2009, cited in FAO, 2013b).

The main **Hammerhead** (all species) catchers based on FAO catch data are shown in **Figure 4**. According to these data, key Hammerhead catchers include **Indonesia, Senegal, Republic of Congo, Sri Lanka, Mexico, Liberia, Spain, Ecuador** and **Benin**, all of which reported total captures of over 500 tonnes for the period 2002-2011.

As only seven countries report catches of **Scalloped Hammerhead** to the species level, FAO catch data for the species do not provide an accurate representation of worldwide Scalloped Hammerhead catches (Miller *et al.*, 2013). Based on catch data specifically reported as Scalloped Hammerhead to FAO for the period 2002-2011, **Brazil** was the leading catcher (1 719 tonnes), followed by **Spain** (950 tonnes). Notably, **Mauritania**, which only began to report catches of Scalloped Hammerhead to FAO in 2010, reported a total of 257 tonnes in 2010, the highest reported catch of any country/territory since 2005 (Miller *et al.*, 2013).

The FAO fishing areas associated with the highest Hammerhead catch for the period 2002-2011 are set out in **Table 8** of **Appendix E**. To note that:

- **Indonesia** was responsible for 100% of reported Hammerhead catches in the **Western Central Pacific** (8 931 tonnes) and two thirds of total catch reported for the **Eastern Indian Ocean** (5 154 tonnes) during this period.
- Together, **Senegal** and the **Republic of Congo** were responsible for over 80% of Hammerhead catch in the **Eastern Central Atlantic** during this period (10 017 tonnes and 5 495 tonnes, respectively).

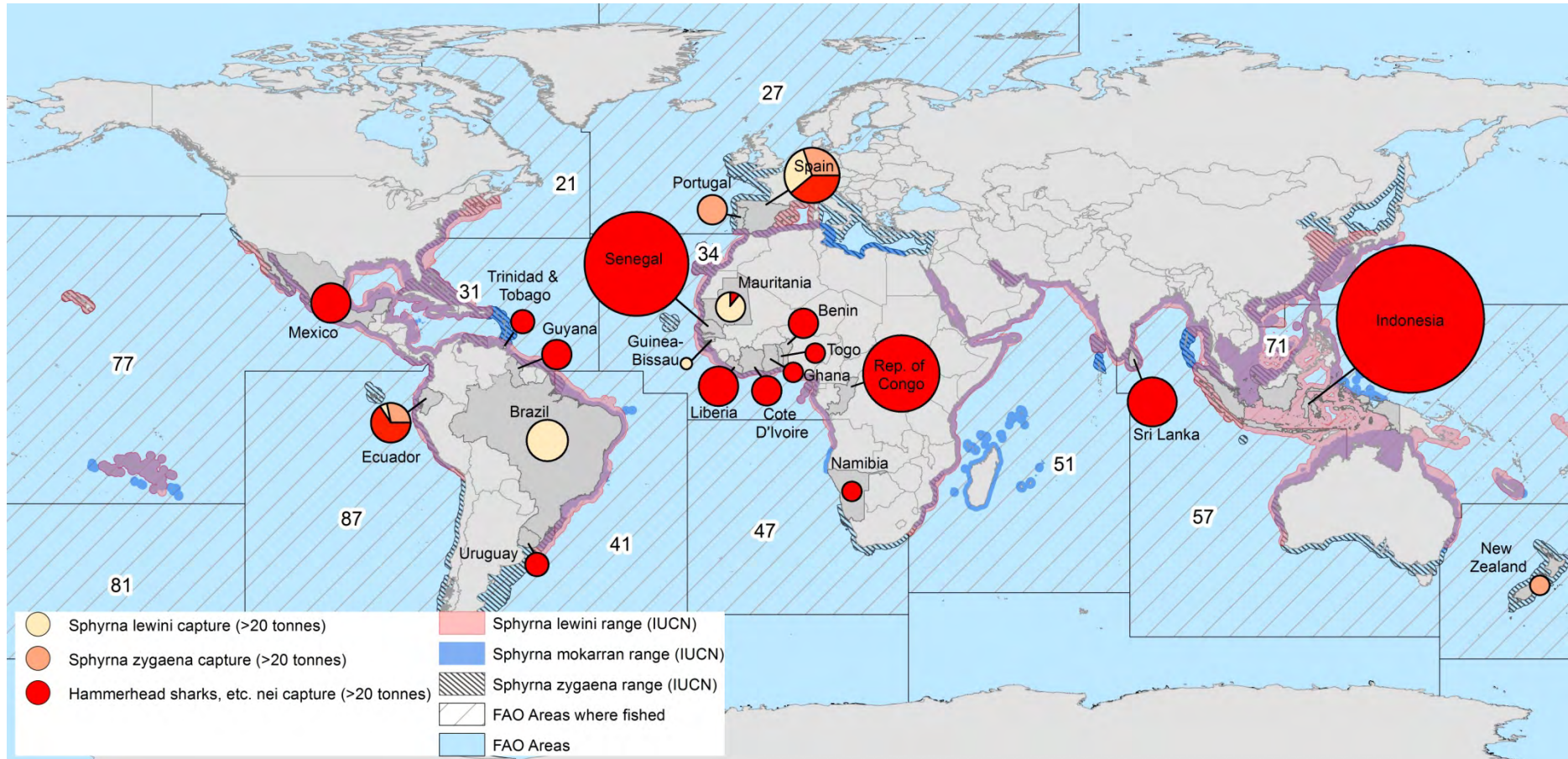
Regarding **Scalloped Hammerhead** catches reported specifically to FAO, **Spain** and **Mauritania's** reported catches were found to have occurred mainly in the **Eastern Central Atlantic**. The entirety of **Brazil's** reported Scalloped Hammerhead catch for the period 2002-2011 was taken in the Southwest Atlantic (**Table 12, Appendix E**).

Markets

Fins of the three Hammerhead species listed in the CITES Appendices at CoP16, and particularly those of the Scalloped Hammerhead, are highly valued in international trade because of their large size and high fin ray count (IUCN and TRAFFIC, 2012). Fins of Scalloped Hammerhead and Smooth Hammerhead together made up 4.4% of fins traded in the Hong Kong market between November 2002 and February 2004 (Clarke *et al.*, 2006). Scalloped Hammerhead was one of the most commonly encountered species in fin market surveys carried out in **mainland China** and **Hong Kong** in recent years (V. Lam, University of Hong Kong, *in litt.*, 2013). Regarding the origin of fins in trade, genetic tests indicated that 21% of a sample of Scalloped Hammerhead fins in the Hong Kong market was derived from the Western Atlantic populations (Chapman *et al.*, 2009).

Hammerhead **meat** is also traded internationally; however it is unlikely that the amount is significant when compared to the volume of fins in trade (CITES CoP16 Proposal). Hammerhead meat is reportedly consumed in **Mexico** and in many other parts of **Latin America** (Sosa-Nishizaki, *in litt.*, to IUCN/TRAFFIC, 2012, cited in IUCN and TRAFFIC, 2012), and also in **Europe, Japan** and elsewhere (CITES CoP16 Proposal).

Figure 4: Main ‘*Hammerhead sharks, etc. nei*’ catchers, 2002-2011 (total capture, tonnes, FAO Fishstat). *All countries reporting catches of ‘Scalloped hammerhead’ and ‘Smooth hammerhead’ are also included.*



Note: Sri Lanka's directed high seas shark fishery changed to tuna from 2004 (G. Sant, TRAFFIC, pers. comm., 2013). Shark catch reported by Sri Lanka declined following this change, with the majority of catch for 2002-2011 reported for the first few years of this period.

Table 4: Details of selected reported Hammerhead fisheries, focusing on Scalloped Hammerhead, Great Hammerhead and Smooth Hammerhead

Country, territory or region	Details of fishery	Source of information
Africa		
East Africa	<ul style="list-style-type: none"> Generally lack of data for Hammerhead catches in the Indian Ocean. Anecdotal evidence for Hammerheads caught along East African coastline, including Mozambique (with juveniles featuring in catches). Scalloped Hammerhead reportedly one of the main shark species caught by foreign longliners licensed to fish in Mozambican waters in 2010. 	H. Darrin, <i>Eyes on the Horizon, in litt.</i> (2013); M. Burgener <i>in litt.</i> (2013); CITES CoP16 Proposal; IOTC (2011).
Madagascar	<ul style="list-style-type: none"> Hammerheads (Sphyrnidae) account for approximately 20-40% of shark catch in the artisanal fisheries in northern and south-western Madagascar, with Scalloped Hammerhead the most commonly captured species. Primarily targeted using gillnets. 	Blue Ventures (unpublished data); F. Humber, Blue Ventures, <i>in litt.</i> (2013); McVean <i>et al.</i> (2006); Robinson and Sauer (2013).
West Africa	<ul style="list-style-type: none"> Targeted artisanal and bycatch in pelagic fisheries. Hammerheads (including Scalloped Hammerhead and Great Hammerhead) are taken in fisheries in the SRFC zone. Scalloped Hammerhead is reported in the CITES CoP16 Proposal as frequently caught along the West African coast, being heavily targeted by driftnets and fixed gillnets from Mauritania to Sierra Leone. 	CITES CoP16 Proposal; Diop and Dossa (2011); Zeerberg <i>et al.</i> (2006).
Latin America and the Caribbean		
Brazil	<ul style="list-style-type: none"> Targeted (bottom gillnet, surface longline) Hammerhead fishery abandoned after 2008 as species had become rare. Scalloped Hammerhead, Great Hammerhead and Smooth Hammerhead taken as bycatch in <i>inter alia</i> in fisheries using longlines and bottom gillnets. 	CITES CoP16 Proposal
Colombia	<ul style="list-style-type: none"> Catch data for Scalloped Hammerhead in industrial and artisanal fisheries in the Colombian Caribbean. Caught in bottom longlines, artisanal longlines and gill nets, shrimp trawling nets and oceanic longlines. 	Caldas <i>et al.</i> (2009); CITES CoP16 Proposal.
Costa Rica	<ul style="list-style-type: none"> Taken by small longliners targeting sharks on continental slopes. Majority of catch immature Scalloped Hammerheads (<1m long) Fishing pressure directed at juveniles reported to have increased off western Costa Rica. 	CITES AC 22 Inf. 3; CITES CoP16 Proposal.
Mexico	<ul style="list-style-type: none"> Scalloped Hammerhead reportedly taken in artisanal longline fishery along the Pacific coast. 	CITES CoP16 Proposal
Panama	<ul style="list-style-type: none"> Targeted artisanal fishing for Hammerheads has been documented in coastal nursery areas. Artisanal gillnet fishery catches dominated by neonate and juvenile Scalloped Hammerheads. 	Arriatti (2011)
Middle East		
Oman, UAE, Yemen	<ul style="list-style-type: none"> Hammerheads reported as caught in the Gulf and Red Sea area, being landed in <i>inter alia</i> UAE. According to the CITES CoP16 Proposal, Scalloped Hammerhead is one of five dominant species in catches of Oman. 	R. Sonntag, IFAW, pers. comm. (2013); CITES CoP16 Proposal.

Country, territory or region	Details of fishery	Source of information
South Asia		
India	<ul style="list-style-type: none"> • Generally a lack of data for Hammerhead catches in the Indian Ocean. However, it is reported that Hammerheads are targeted in artisanal gillnet fisheries and caught in floating longlines and hook and lines. • Hammerheads reportedly make up a significant proportion of west coast catches. However, declines of Great Hammerhead and Smooth Hammerhead landed at Cochin Fisheries Harbour have been reported. • Scalloped Hammerhead is reportedly the most harvested juvenile shark along Indian coasts during pre-and post-monsoon periods. 	K. K. Binesh, SMRC, <i>in litt.</i> (2013); CITES CoP16 Proposal.
Southeast Asia		
Indonesia	<ul style="list-style-type: none"> • Taken in targeted longline fisheries for sharks (e.g. Tanjung Luar, off East Lombok). Proportion of Scalloped Hammerhead in shark catch recorded at Tanjung Luar artisanal shark fishery decreased from 15 to 2% from 2001 to 2011. • Also taken as bycatch in tuna gillnet and trawl fisheries in offshore areas. 	ACIAR (2011) cited in FAO (2013b); White <i>et al.</i> (2006).

Abbreviations: AC – Animals Committee; ACIAR - Australian Centre for International Agricultural Research; IFAW - International Fund for Animal Welfare; IOTC – Indian Ocean Tuna Commission; SMRC - Society for Marine Research and Conservation; SRFC – Sub Regional Fisheries Commission (Cape Verde, Gambia, Guinea, Guinea-Bissau, Mauritania, Senegal, Sierra Leone); UAE – United Arab Emirates.

d. Mantas

Distribution

Manta species are circumglobal in range. *Manta birostris* is more widely distributed, inhabiting tropical, subtropical and temperate waters and undergoing significant seasonal migrations (>1000 km). *Manta alfredi* is more resident to coastal waters, inhabiting tropical and subtropical waters with shorter seasonal migrations (Couturier *et al.*, 2012). The distributions of these species are depicted in **Figure 5**.

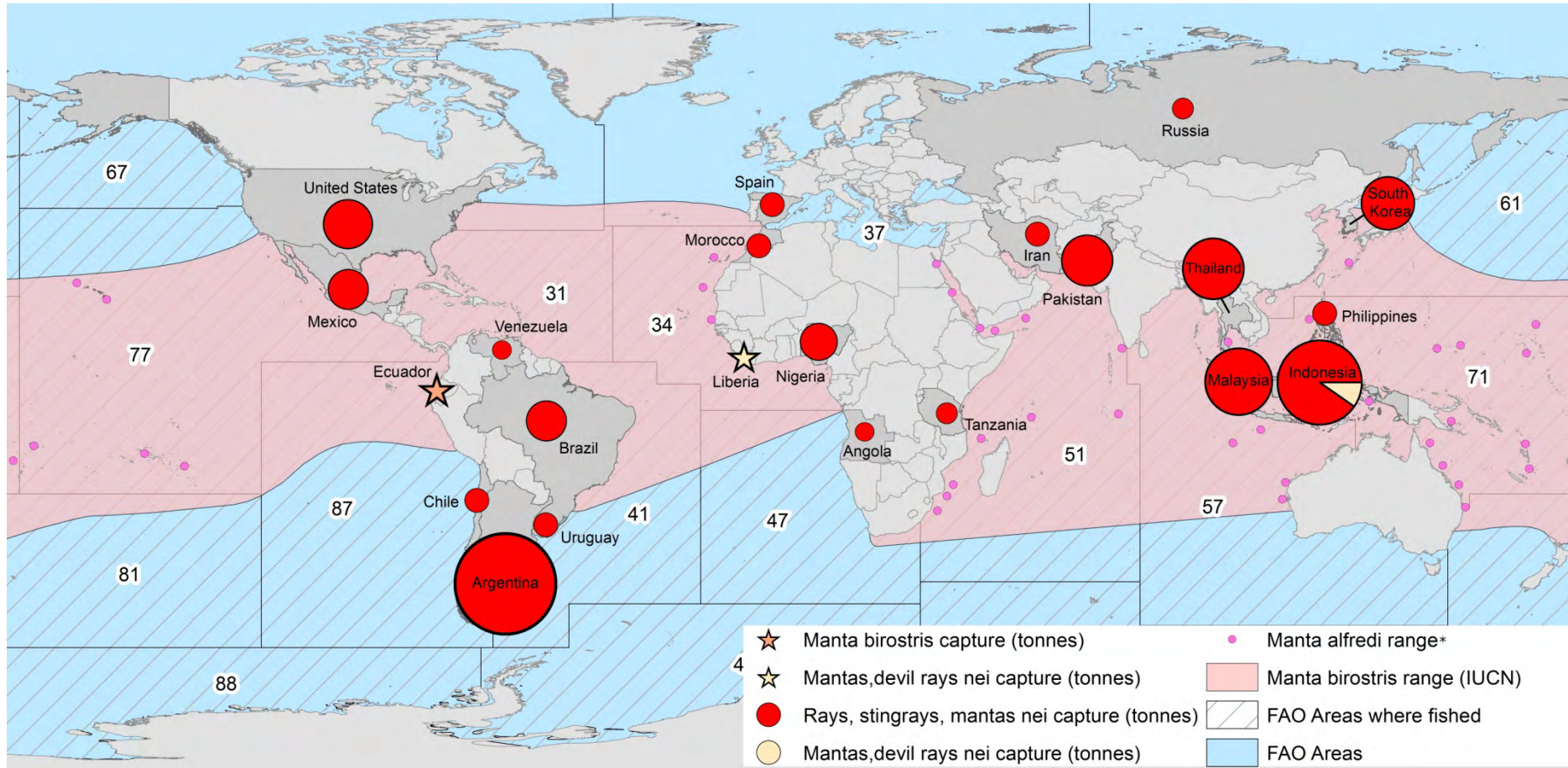
Fisheries

Mantas are taken in **targeted** fisheries throughout their range and as **bycatch** in coastal and offshore fisheries (Heinrichs *et al.*, 2011; Courturier *et al.*, 2012). They are targeted by small-scale and multispecies fisheries using several types of gear, including **harpoons**, **gillnets** and **trawl nets** (CITES CoP16 Proposal; Heinrichs *et al.*, 2011; Mohanraj *et al.*, 2009; Rayos *et al.*, 2012). Mantas are taken as bycatch in gillnet, longline and purse seine fisheries, including those targeting tuna in tropical waters; however catches are poorly documented (CITES CoP16 Proposal; White *et al.*, 2006; Camhi *et al.*, 2009).

An overview of the top 20 '**Rays, stingrays, mantas nei**' catchers according to FAO data for the period 2002-2011 is provided in **Figure 5**. However, as Manta catches comprise an unknown proportion of these totals, **Figure 5** is unlikely to accurately represent global patterns of catches of Manta species. Three countries also reported catches under more detailed descriptions: '**Mantas, devil rays nei**' and '**Giant Manta**', which are also depicted in **Figure 5**. These were:

- **Indonesia** – reported '**Mantas, devil rays nei**' catches of 17 878 tonnes, the majority of which was taken in the Western Central Pacific (15 243 tonnes), with the remaining quantity taken in the Eastern Indian Ocean.

Figure 5: Top 20 ‘Rays, stingrays, mantas nei’ catchers, 2002-2011 (total capture, tonnes, FAO Fishstat). *All countries reporting catches of ‘Giant manta’ (M. birostris) and ‘Mantas, devil rays nei’ are also included.*



Notes:

- *Marshall et al. (2009).
- Countries reporting only ‘Giant manta’ and ‘Mantas, devil rays nei’ have been symbolised with a star rather than a circle, as the magnitude of catch is relatively insignificant compared to catches reported under the category ‘Rays, stingrays, mantas nei’

- **Liberia** – reported ‘**Mantas, devil rays nei**’ catches of 1 470 tonnes, the entirety of which was taken in the Eastern Central Atlantic.
- **Ecuador** - reported ‘**Giant Manta**’ catches of 15 tonnes, taken in the Southeast Pacific.

Selected known/important fisheries for Mantas, based on experts and other reports, are detailed in **Table 5**. **Indonesia, Sri Lanka and India** have the largest documented fisheries, accounting for around 90% of recorded *M. birostris* mortality, with annual landings of over 3 000 animals (Heinrichs *et al.*, 2011). Targeted fisheries have also been reported in **Peru, Mexico, China, Mozambique** and **Ghana** (Heinrichs *et al.*, 2011), with the **Philippines** potentially also important for Manta catches (M. O’Malley, Shark Savers, *in litt.*, 2013) (**Table 5**). Anecdotal evidence suggests that more fisheries likely exist in isolated coastal regions throughout the Atlantic and Pacific, with potentially large fisheries for *M. birostris* in Africa for which little or no landings data are available (Heinrichs *et al.*, 2011).

Indonesia and **mainland China** are considered likely to be the main catchers of **Mantas** in waters beyond national jurisdiction (O’Malley, Shark Savers, *in litt.*, 2013).

Table 5: Details of selected known/important Manta fisheries

Country	Details of fishery	Estimated catch (no./year)	Gill raker trade	Source of information
Africa				
Ghana	<ul style="list-style-type: none"> • Targeted seasonal harvest of Mantas. • Year round large mesh drift gillnet fishery targets Mantas (and other species). 	-	Not yet reported	Essuman (2010) and Reeves <i>et al.</i> (2003) cited in Heinrichs <i>et al.</i> (2011); Heinrichs <i>et al.</i> (2011).
Mozambique	<ul style="list-style-type: none"> • Targeted fishery for <i>M. alfredi</i>. • Also taken as bycatch (entanglement in gillnets). 	35	Not yet reported	H. Darrin, <i>in litt.</i> (2013); Heinrichs <i>et al.</i> (2011); Marshall <i>et al.</i> (2011) cited in Heinrichs <i>et al.</i> (2011); M. O’Malley, Shark Savers, <i>in litt.</i> (2013).
Madagascar, Mauritania, Somalia, Tanzania	<ul style="list-style-type: none"> • Targeted fisheries reported but data lacking. 	-	Not yet reported	Heinrichs <i>et al.</i> (2011)
Asia				
Mainland China	<ul style="list-style-type: none"> • Targeted fisheries. • Reports of Mantas caught in the South China Sea and on the high seas. • Annual landings of approximately 200 Mantas per year reported by one processing plant in Zhehijiang Province. Manta landings from other ports in China not known. 	100	Yes	Heinrichs <i>et al.</i> (2011); Hilton (2011) cited in Heinrichs <i>et al.</i> (2011); M. O’Malley, Shark Savers, <i>in litt.</i> (2013).
India	<ul style="list-style-type: none"> • Targeted fisheries. • Numerous published references document significant Manta landings from the Indian coastal trawl, gillnet and longline fisheries but full extent of mobulid landings unknown. • Both Manta species reported as seasonally landed along India’s east and west coasts. Targeted harpoon fisheries reportedly land large numbers of <i>M.</i> 	690	Yes	Heinrichs <i>et al.</i> (2011); K. K. Bineesh <i>in litt.</i> (2013); M. O’Malley, Shark Savers, <i>in litt.</i> (2013); Rajc <i>et al.</i> (2007).

Country	Details of fishery	Estimated catch (no./year)	Gill raker trade	Source of information
	<i>birostris</i> but this is not represented in fisheries data.			
Indonesia	<ul style="list-style-type: none"> • Targeted Manta fisheries confirmed in Lombok, Lamakera, Lamalera and in other villages in Alor and possibly elsewhere. • Additional ports observed to land <i>M. birostris</i> regularly but may not be represented in fisheries data. 	1 320	Yes	Heinrichs <i>et al.</i> (2011); M. O'Malley, Shark Savers, <i>in litt.</i> (2013); Setiasih (2011) cited in Heinrichs <i>et al.</i> (2011); White <i>et al.</i> (2006).
Malaysia	<ul style="list-style-type: none"> • Gill raker trade recorded from Malaysian Borneo. 	-	Yes	D. Fernando, Manta Trust, <i>in litt.</i> (2013).
Philippines	<ul style="list-style-type: none"> • Manta fisheries reported but extent of fisheries and exports are not known. 	3	Possibly but extent not known	M. O'Malley, Shark Savers, <i>in litt.</i> (2013).
Sri Lanka	<ul style="list-style-type: none"> • Targeted fisheries. • Majority (at least 87%) of <i>M. birostris</i> recorded were juveniles and sub-adults, indicating heavy targeting of a potential Manta 'nursery' ground close to shore in southern Sri Lanka. 	1 055	Yes	Fernando and Stevens (2011); Heinrichs <i>et al.</i> (2011); M. O'Malley, Shark Savers, <i>in litt.</i> (2013).
Thailand	<ul style="list-style-type: none"> • Manta fisheries reported but extent of fisheries and exports are not known. • Targeting of Mantas reported in protected marine park areas. 	-	Not yet reported	Pers. comm. cited in Heinrichs <i>et al.</i> (2011); M. O'Malley, Shark Savers, <i>in litt.</i> (2013).
Latin America and the Caribbean				
Costa Rica	<ul style="list-style-type: none"> • Manta fisheries reported but extent of fisheries and exports are not known. • Net fishery in northern Costa Rica reported to be landing large numbers of rays, including an unknown number of Mantas. 	-	Not yet reported	M. O'Malley, Shark Savers, <i>in litt.</i> (2013).
Mexico	<ul style="list-style-type: none"> • Manta fisheries reported but extent of fisheries and exports are not known • Recent illegal Manta landings observed in the Pacific and Gulf of Mexico • Bycatch of Mantas may be significant due to high volume of commercial fisheries using drift gillnets and longlines. 	-	Not yet reported	Heinrichs <i>et al.</i> (2011); M. O'Malley, Shark Savers, <i>in litt.</i> (2013).
Peru	<ul style="list-style-type: none"> • Mantas caught opportunistically by fishermen primarily targeting other species. • Mobulid rays protected under Ecuadorian law but targeted when migrate south to Peru. 	150	Not yet reported	Planeta Oceano, unpublished data; M. O'Malley, Shark Savers, <i>in litt.</i> (2013).

Notes: Table adapted from Heinrichs *et al.* (2011), with additional sources included. See Heinrichs *et al.* (2011) for explanation of assumptions and calculations used to estimate total landings. As noted in Heinrichs *et al.* (2011), bycatch figures are notoriously underreported or incorrectly classified, and therefore estimated catch numbers are expected to be substantially higher. Much of the bycatch from high seas fisheries is likely to be discarded and may not go into the gill raker trade. Most fishery figures listed are extrapolated estimated catches.

Markets

Mantas are targeted and retained as valuable bycatch to supply the international **gill raker** trade. Based on a market survey conducted in the main centres for the Asian dried seafood trade (**Singapore, Hong Kong, Macao Special Administrative Region of the People’s Republic of China** (hereafter referred to as Macao), **Taiwan** and **Guangzhou** in mainland China), Hilton (2011) (cited in Heinrichs *et al.*, 2011) estimated that an average of 61 000 kg of gill rakers are traded annually, with an estimated 30% coming from *M. birostris*. **Singapore** and **Hong Kong** have been identified as involved in intermediate stages of the gill raker trade (O’Malley, Shark Savers, *in litt.*, 2013). However, the gill raker trade is reportedly increasingly centred on **Guangzhou**, with more catchers exporting directly to mainland China (O’Malley, Shark Savers, *in litt.*, 2013).

Cartilage and **skins** of Manta species are also traded internationally (CITES CoP16 Proposal).

PART II

International, Regional and Domestic Policies, Regulations and Measures Relevant to CITES Implementation

1. INTERNATIONAL POLICIES, REGULATIONS AND MEASURES

Appendix F provides details of key international policies, regulations and measures that may be relevant to the implementation of the CITES CoP16 shark and ray listings. The following are of particular relevance to the conservation of migratory shark species and regional cooperation in this regard:

- the United Nations Convention on the Law of the Sea (UNCLOS) and the UN Fish Stocks Agreement⁵ (UN FSA), which together establish binding obligations for coastal and flag States to cooperate in the conservation and management of straddling and highly migratory fish stocks, with cooperation in relation to high seas stocks to take place through sub-regional and regional fisheries management organisations (RFMOs);
- the FAO Compliance Agreement⁶ (completed within the framework of the FAO Code of Conduct on Responsible Fisheries⁷ (CCRF)), which obliges flag States to take necessary measures to ensure vessels flying their flag comply with applicable international conservation and management measures for living marine resources of the high seas; and
- the Convention on Migratory Species (CMS), which promotes concerted action among range States for the strict protection of migratory species threatened with extinction (listed in Appendix I to CMS) and encourages international cooperation (e.g. in the form of conclusion of global or regional Agreements) in respect of other specified species (those in Appendix II). For migratory species listed in Appendix I to CMS, Parties that are range States are obliged to prohibit the taking of animals belonging to such species (Article III(5)). The links between work on migratory sharks and rays carried out under CITES and within the framework of the CMS are described in **Appendix F**.

In addition to the FAO Compliance Agreement, a number of other agreements and instruments have evolved within the framework of the voluntary FAO CCRF which can provide support for implementation of the CITES CoP16 shark and ray listings. The 2009 FAO Port State Measures Agreement⁸, for example, represents an important step forward in the global fight against illegal, unreported and unregulated (IUU) fishing, a problem that threatens to undermine the effectiveness of the CITES CoP16 shark and ray listings, while also compromising the accuracy of scientific data available to inform, in particular, the formulation of NDFs (discussed further in **Part III, Section 4**). Likewise, the non-binding FAO International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks) encourages countries to implement measures to conserve and manage their shark stocks, with FAO guidelines on responsible fisheries providing useful information to assist in this regard (e.g. to inform the development of National Plans of Action – NPOA-Sharks). The establishment of an effective fisheries management regime, and particularly one that includes scientific assessment and a data collection scheme, is considered a highly desirable prerequisite for the successful implementation of trade regulations (FAO, 2012) (see **Part III, Section 1** for further discussion).

⁵ 1995 UN Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Stocks.

⁶ 1993 FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas.

⁷ FAO Conference Resolution 4/95, “The Code of Conduct for Responsible Fisheries”, is available at: www.fao.org/docrep/x5585E/x5585e05.htm#v.%20major%20trends%20and%20policies%20in%20food%20and%20agriculture.

⁸ 2009 FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing.

2. REGIONAL POLICIES, REGULATIONS AND MEASURES

a. RFMOs

As noted above, RFMOs are a central mechanism for regional cooperation in relation to the conservation and management of straddling and highly migratory fish stocks, and stocks on the high seas. A number of RFMOs have adopted **generic measures** for the conservation and management of sharks including: (i) prohibiting the targeting of sharks; (ii) prohibiting shark finning (the removal of fins and disposal of carcasses at sea); (iii) requiring compliance with specified fin-to-body weight ratios for sharks on board vessels; (iv) requiring full utilisation of shark catches (retention of all parts, except head, guts and skins); (v) requiring members to establish and implement a NPOA-sharks; and (vi) encouraging the live release of shark bycatch, where possible. An overview of shark measures implemented by RFMOs relevant to the present Report is provided in **Table 6** below, with further details provided in **Appendix G**.

Table 6: Overview of binding shark measures adopted by RFMOs

RFMOs	Fin measures	Discard/bycatch measures	Catch measures (TACs)	Reporting requirements	Gear measures	Shark-related research	NPOAs requested
CCAMLR*		✓					
CCSBT**							
GFCM	✓			✓	✓	✓	
IATTC	✓	✓		✓	✓	✓	✓
ICCAT	✓	✓		✓	✓	✓	✓
IOTC	✓	✓		✓		✓	
NAFO	✓	✓	✓	✓	✓	✓	
NEAFC	✓	✓		✓			
SEAFO	✓	✓		✓	✓	✓	
WCPFC	✓	✓		✓			✓

Sources: FAO (2012), Pew (2012) and Humane Society International (2013)

Abbreviations: CCAMLR - Commission for the Conservation of Antarctic Marine Living Resources; CCSBT - Commission for the Conservation of Southern Bluefin Tuna; GFCM - General Fisheries Commission for the Mediterranean; IATTC - Inter-American Tropical Tuna Commission; ICCAT - International Commission for the Conservation of Atlantic Tunas; IOTC - Indian Ocean Tuna Commission; NAFO - Northwest Atlantic Fisheries Organisation; NEAFC - North-East Atlantic Fisheries Commission; NPOA - National Plan of Action; SEAFO - South East Atlantic Fisheries Organisation; TAC - Total allowable catch; WCPFC - Western and Central Pacific Fisheries Commission

Notes: *CCAMLR prohibits all shark fisheries except for research purposes. **CCSBT does not yet have any binding shark regulations in place.

Some RFMOs have also adopted **measures specific** to the conservation of the shark and ray species listed in the CITES Appendices at CoP16, namely:

- The Inter-American Tropical Tuna Commission (IATTC), the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Indian Ocean Tuna Commission (IOTC) and the Western and Central Pacific Fisheries Commission (WCPFC) in relation to **Oceanic Whitetip**;
- ICCAT and the North-East Atlantic Fisheries Commission (NEAFC) in relation to **Porbeagle**; and
- ICCAT in relation to **Hammerheads** (noting that the most recent meetings of IOTC (6-10 May, Mauritius) and IATTC (10-14 June, Mexico) decided against the adoption of specific measures to grant additional protection to Hammerheads).

Details of these measures are also provided in **Appendix G**. In relation to **Mantas**, the tuna RFMOs have not, to date, adopted any bycatch mitigation measures specifically for these species; therefore the

incidental take of Mantas, especially *M. birostris*, in tuna fisheries under the mandate of these RFMOs is currently uncontrolled (FAO, 2013b).

In addition to the above, RFMOs may mandate or encourage the reporting of catch data for shark species, as well as encouraging their Members (and, possibly also their cooperating non-Members), to conduct research into *inter alia* improving gear selectivity to reduce shark bycatch and identifying potential nursery habitats. Several RFMOs have also carried out stock assessments for shark species and/or Ecological Risk Assessments to determine impacts on non-target species of fisheries under their mandate. Details of these data collection and research activities of RFMOs are also provided in **Appendix G**. To note that the General Fisheries Commission for the Mediterranean (GFCM), IATTC, ICCAT, IOTC, the Northwest Atlantic Fisheries Organisation (NAFO), NEAFC, the South East Atlantic Fisheries Organisation (SEAFO), and WCPFC all require the reporting of shark catch data, although in some cases reporting requirements may be limited to certain species (see **Appendix G** for further details).

With regard to the implementation of the shark conservation measures and reporting requirements set out in **Appendix G** (as opposed to their mere adoption), the following observations were noted by Lack and Sant (2011):

- Many RFMO shark conservation and management measures are ambiguous (e.g. whether the carcass weight of the fin-to-carcass ratio relates to whole or dressed weight) and provide loopholes that can be exploited.
- The level and comprehensiveness of publicly available information provided by RFMOs on the implementation of, and compliance with, these measures is variable. It therefore remains unclear whether domestic regulations or laws have been adopted to implement these measures.
- There is little to no accountability in RFMOs for non-compliance with these measures, including a lack of sanctions for non-compliance.
- Reporting of shark catch remains voluntary in some RFMOs and, in such cases, a number of the most important shark fishing countries/territories do not provide recommended data. Certain key shark fishing countries/territories may also fail to provide shark catch data in accordance with mandatory reporting requirements.

In support of the final point, the 2012 meeting of the IOTC Working Party on Ecosystems and Bycatch (WPEB) noted that bycatch data remain largely unreported by Contracting Parties and Cooperating Non-contracting Parties (together, CPCs), in spite of mandatory reporting requirements (IOTC, 2012).

These issues aside, RFMO measures are expected to complement and provide a mechanism for regional cooperation in relation to the CITES CoP16 shark and ray listings, in light of the fact that stocks will, in most cases, straddle multiple Exclusive Economic Zones (EEZs) and potentially also areas of the high seas. Scientific data collected through RFMOs can inform the development of Non-detriment findings (NDFs) by national CITES authorities, while for shared stocks RFMOs may play a central role in carrying out such assessments (see **Part III, Section 1** below). Other information collected by RFMOs may likewise inform legal acquisition findings, for example vessels identified as engaged in IUU fishing (G. Sant, TRAFFIC, *in litt.*, 2013) (discussed further in **Part III, Section 3** below).

Recognising that RFMO and CITES regulations are complementary and mutually supportive, CITES CoP16 adopted a decision directing the CITES Secretariat to collaborate with the FAO Secretariat in the development of a **single, regularly updated source summarising current RFMO measures for shark conservation and management**, with information on species, fisheries, Members and Contracting Parties, and the geographical areas covered and excluded (Decision 16.128).

b. Other examples of regional collaboration, including Regional Plans of Action

In addition to the RFMO measures discussed above, the following examples of regional collaboration, including Regional Plans of Action (RPOA), in relation to the conservation of shark species may also contain relevant provisions/actions for the implementation of the CITES CoP16 shark and ray listings:

- United Nations Environment Programme (UNEP)/International Union for Conservation of Nature (IUCN) Action Plan for the Conservation of Chondrichthyes in the Mediterranean Sea (2003).
- South Pacific Permanent Commission (CPPS) Regional Action Plan for the Conservation and Management of Sharks Rays and Chimeras in the South-East Pacific (2010).
- Pacific Island Regional Plan of Action (2009) (collaborative effort by the Pacific Islands Forum Fisheries Agency, Secretariat of the Pacific Regional Environmental Programme, Secretariat of the Pacific Community and WCPFC).
- Sub Regional Fisheries Commission (SRFC) Sub-Regional Plan of Action on the Conservation and Sustainable Management of Shark Populations (SRPOA-Sharks)⁹ (2011).
- Shark finning ban adopted by the Central American Integration System (CAIS)¹⁰ (2012) and the Central American Fisheries and Aquaculture Organization (OSPESCA) Regional Plan of Action on shark conservation (Plan de Acción Regional para la Ordenación y Conservación de los Tiburones en Centroamérica - PAR-TIBURON) (2011).
- Regional support for the development and implementation of NPOA-Sharks under the auspices of the Bay of Bengal Large Marine Ecosystem Project (BOBLME)¹¹ and a RPOA-Sharks in partnership with the Bay of Bengal Programme (BOBP-IGO) and Southeast Asian Fisheries Development Center (SEAFDC)¹².

3. DOMESTIC MEASURES

Table 7 provides examples of domestic shark measures in some of the key shark catching and trading countries and territories identified in **Part I** of this Report. The table also includes certain countries/territories identified as of particular significance for the international trade in the shark and ray species listed in the CITES Appendices at CoP16.

In terms of the potential for domestic measures to support the implementation of the CITES CoP16 shark and ray listings, the following may be noted in relation to the information set out in **Table 7**:

- **Finning measures** – requirements for sharks to be landed with their fins naturally attached can assist enforcement officers in species identification at landing sites, thereby addressing one of the key challenges of implementing the CITES CoP16 shark listings (see **Part III, Section 2** of this Report). So-called “fins-attached” regulations have been adopted by several key shark catching countries/territories across **Latin America and the Caribbean** and also in the **Middle East** (see **Table 7**¹³), however appear to be particularly lacking in: (i) **Africa** (with the exception of Guinea, Nigeria and South Africa); (ii) **South Asia** (with the exception of Sri Lanka); and (iii) **Southeast Asia**.

⁹ SRFC Member Countries: Cape Verde, Gambia, Guinea, Guinea-Bissau, Mauritania, Senegal, Sierra Leone.

¹⁰ CAIS Member States: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama.

¹¹ BOBLME Project participating countries: Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka.

¹² See Report of the Fourth BOBLME Project Steering Committee Meeting, 20-21 March 2013, Chennai, India (<http://www.boblme.org/documentRepository/BOBLME-2013-Project-01.pdf>).

¹³ The European Union has also recently adopted a requirement for all sharks be landed with their fins naturally attached to their bodies: Regulation (EU) No. 605/2013 of the European Parliament and of the Council of 12 June 2013 amending Council Regulation (EC) No. 1185/2003 on the removal of fins of sharks on board vessels (OJ L 181 of 29.06.2013)

- **RFMO membership** – as discussed in **Section 2(a)** above, RFMOs represent a potentially important mechanism for facilitating regional cooperation in relation to the CITES CoP16 shark and ray listings. However, certain key shark catchers and traders are not formally cooperating with relevant RFMOs that have the mandate to regulate for the catch and trade of sharks. The implementation of any RFMO measures for the shark and ray species listed in the CITES Appendices at CoP16 may therefore require some form of advice from the CITES Animals Committee and Standing Committee to CITES Parties to comply and cooperate with RFMO measures.
- **Ratification of the Port State Measures Agreement (PSMA)** – only a very limited number of key shark catching and trading States have to date ratified the PSMA aimed at preventing, deterring and eliminating IUU fishing: see **Part III, Section 4** of this Report for further discussion of IUU fishing in the context of implementation of the CITES CoP16 shark and ray listings.
- **Development of NPOA-Sharks** – there is currently a lack of progress toward the development of effective NPOAs on shark conservation and management by key shark catching countries/territories (or Shark Assessment Reports as prescribed by the IPOA), particularly in the following regions: (i) **Africa**, with the main exception of countries in the SRFC zone, which have received support to develop their NPOAs within the framework of the SRPOA-Sharks: see **Section 2(b)** above and Diop and Dossa (2011); (ii) **the Middle East**; and (iii) **South Asia**, although some support is being provided to countries participating in the BOBLME project to develop their NPOAs (see **Section 2(b)** above). The FAO’s 2012 review of implementation of the IPOA-Sharks noted that approximately half of fishing nations reporting catches of **Hammerheads** to FAO had not yet adopted a NPOA-Sharks (Fischer *et al.*, 2012), while several key **Manta** catching countries/territories are also yet to implement NPOAs.

Finally, it is noted that at CoP16, a Decision was adopted requiring the Secretariat to issue a Notification requesting Parties to summarise their **domestic laws and regulations** that prohibit the landing or trade of shark species and products, and provide copies of or links to these instruments, in order for the Secretariat to make this information available on the CITES website (Decision 16.128).

Table 7: Examples of domestic shark measures in key countries involved in shark catching and trade, including those countries identified as involved in the catch and trade of the shark and ray species listed in the CITES Appendices at CoP16 (see Part I of this Report)

Country	Finning measures ¹	Fishing ban ²	Trade measures ³	Member of RFMO ⁴	PSMA ⁵	NPOA-Sharks
Africa						
Congo, Republic of		●	●	○	○	
Ghana				●	(signed)	
Guinea	●	○		●	○	●
Madagascar				●	○	
Mauritania	○	○		●	○	●
Mauritius				●	○	(in prep.)
Mozambique				○	●	
Namibia				●	○	
Nigeria	●			●	○	○
Senegal	(in prep.)	○		●	○	●
South Africa	●	○		●	○	(in prep.)
Latin America and the Caribbean						
Argentina	●	○		●	(NPOA IUU)	●
Brazil	●			●	(signed)	(draft)
Chile	●			●	●	●

Country	Finning measures ¹	Fishing ban ²	Trade measures ³	Member of RFMO ⁴	PSMA ⁵	NPOA-Sharks
Colombia	●	○		●	○	
Costa Rica	●	○		●	○	
Ecuador	●	○	○	●	○	●
Mexico	●	○		●	(NPOA MCS)	●
Panama	●			●	○	●
Peru	○			●	(signed)	(draft)
Uruguay				●	(signed)	●
Venezuela, Boliv. Rep. of	●	○		●	○	●
Middle East						
Kuwait		●	●	○	○	
Iran (Islamic Republic of)	○	○		●	○	●
Oman	●			●	○	
Saudi Arabia		○		○	○	
United Arab Emirates	●	○		○	○	
Yemen	●			○	○	○
Oceania						
Fiji		(pending)	(pending)	●	○	
Marshall Islands		●	●	●	○	
South Asia						
India	○	○		●	(NPOA MCS)	(in prep.)
Maldives		●	●	●	○	
Pakistan				●	○	
Sri Lanka	●			●	●	(in prep.)
Southeast Asia						
Brunei Darussalam		●	●	○	○	
Indonesia	○	○	○	●	(signed)	●
Malaysia	○	○	○	●	○	●
Myanmar		●	●	○	●	
Philippines				●	○	●
Singapore						
Thailand	○			●	(NPOA IUU)	(draft)
Timor-Leste				○	○	

● - Adopted; ○ - Not adopted; ○ - Partially adopted (see notes below)

Sources: FAO (2012), Pew (2012), Humane Society International (HSI) (2013), FAO (2013) status of the PSMA, available at: http://www.fao.org/fileadmin/user_upload/legal/docs/2_037s-e.pdf (accessed 27 June 2013)

Abbreviations: NPOA IUU – National Plan of Action (NPOA) on Illegal, Unreported and Unregulated Fishing; NPOA MCS – NPOA on Monitoring, Control and Surveillance; PSMA – Port State Measures Agreement; RFMO – Regional Fisheries Management Organisation.

Notes:

¹Finning measures include requirements to land sharks with fins naturally attached, and requirements to apply specified fin-to-weight ratios (e.g. 5%).

²A closed circle depicts those countries/territories with a complete ban on shark fishing in territorial waters. A semi-closed circle indicates a partial ban on shark fishing (e.g. specific closed or protected areas, closed fishing seasons, bans on fishing certain species, or a ban on targeted fishing only).

³A closed circle indicates where a complete ban on trade in shark products is in place. A semi-closed circle indicates where partial trade bans are in place, e.g. limited to certain areas or species only.

⁴RFMO membership only relates to those RFMOs that have adopted shark management measures (see **Section 2(a)** of **Part II** for further information).

⁵A closed circle indicates where countries/territories have ratified or acceded to the PSMA. An open circle indicates that a country/territory has not signed the PSMA.

⁶Gaps in the table indicate where no information on shark management measures was available based on the sources consulted (see above).

PART III

Implementation of the CITES CoP16 Shark and Ray Listings: Challenges, Available Resources and Capacity Building Initiatives

OUTLINE OF PART III

1. Non-detriment findings (NDFs)
2. Compliance and enforcement
3. Legal acquisition findings
4. Other issues

This Part provides an overview of the main challenges that are expected to arise in relation to the implementation of the CITES CoP16 shark and ray listings,¹⁴ with a particular focus on developing countries. For the purposes of this section, the main challenges identified (based on information from CITES authorities, experts and relevant literature) are grouped into three broad categories, namely those associated with: (i) the development of NDFs (**Section 1**); (ii) ensuring effective compliance with, and enforcement of, CITES provisions (**Section 2**); and (iii) the making of legal acquisition findings (**Section 3**). In developing countries, these challenges may arise from a lack of technical (scientific, enforcement), institutional (legal frameworks, overarching structures) or administrative (human resources, IT systems) capacity necessary to implement the CITES CoP16 shark and ray listings, or a combination of these factors.

Implementation matters not falling within the above-mentioned three categories are discussed briefly in **Section 4** entitled “Other issues”. These include institutional challenges arising from the distribution of relevant expertise for the implementation of marine species listings across disparate national authorities (CITES/wildlife and fisheries agencies), and the need for coordination and collaboration between these entities and clear allocation of responsibilities. This section also provides a brief overview of how illegal, unreported and unregulated (IUU) fishing might undermine the effective implementation and enforcement of the CITES CoP16 shark and ray listings, both cutting across, and impacting upon, the various issues associated with NDFs, legal acquisition findings and compliance/enforcement. However, given the significant challenges posed by IUU fishing in many regions of the world, and the multitude of initiatives currently underway/planned to address this problem, a comprehensive assessment of IUU fishing in relation to CITES implementation was beyond the scope of this Report.

While considerable work remains to be done to address the shortcomings in developing country capacity to implement the CITES CoP16 shark and ray listings, a number of capacity building initiatives are already underway or being planned by the NGO community, national governments and sub-regional/regional organisations. Selected examples of such initiatives are provided in **Sections 1-4** below on challenges, as well as in **Appendix H** to this Report. The **Appendices** referred to in the following sections also contain details of selected tools and other resources that can assist countries in the implementation of the CITES CoP16 shark and ray listings, and which may also be used by organisations/authorities as part of their planned or current capacity building initiatives.

¹⁴ It is noted that a number of CITES Parties have entered specific reservations for some or all of the CITES CoP16 shark and ray listings, namely: Denmark on behalf of Greenland (Porbeagle), Guyana (all five shark species and the Manta rays), Japan (all five shark species), Iceland (Porbeagle) and Yemen (Hammerheads).

It is important to note that this Report was compiled with the intention of providing an overview of current/planned capacity building initiatives and tools relevant to the implementation of the CITES CoP16 shark and ray listings, and not to provide an exhaustive list. The aim of the following sections is to highlight some of the efforts and resources that have come to our attention during our research that could serve as a starting point for both further discussions with stakeholders and for more detailed assessments of the capacity needs of particular countries/regions. Furthermore, it is envisaged that this Report, and the Appendices in particular, could serve as a “living” resource for CITES implementation purposes, with the tools and initiatives detailed herein supplemented over time as new information becomes available.

Finally, a number of workshops were carried out prior to CITES CoP16, with *inter alia* the objective of informing developing country positions on the Proposals for listing of shark and ray species in the CITES Appendices submitted for consideration at the CITES meeting in Bangkok in March 2013 (see **Table 8**). These workshops played an important role in raising awareness amongst participants of the issues surrounding the shark and ray listings, including matters concerning implementation. In the case of the workshops that took place in Senegal and Mozambique, a significant number of resources were produced and distributed to workshop participants (e.g. identification tools and reports), which will be available to assist authorities in the implementation of these listings.

Table 8: Examples of workshops held prior to CITES CoP16 regarding the Proposals for listing of sharks and manta ray species in the CITES Appendices

Workshop	Participants	Objectives	Organiser(s)
CITES Workshop, Colombo, Sri Lanka, 22-23 January 2013	South Asian CITES delegates from across the South Asian region (Sri Lanka, the Maldives, India, Bangladesh, Bhutan, Nepal and Indonesia)	<ul style="list-style-type: none"> Provision of information on the shark and manta ray proposals. Delegates briefed on identification of shark fins and mobulid gill plates. See: http://www.mantatrust.org/cites-workshop-colombo-22nd-23rd-january-2013/	Manta Trust (Sri Lanka Manta Project) in collaboration with South Asian CITES authorities
Shark Conservation in the Western Indian Ocean – Implications of CITES for Fisheries Management, Maputo, Mozambique, 6-7 December 2012	51 people from nine countries. Countries represented included Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles and South Africa.	<ul style="list-style-type: none"> Review shark status in the Western Indian Ocean region. Review national and international contexts for shark conservation and management. Review CoP16 shark and ray proposals. Identify areas and next steps for cooperation. Informed a decision of the Parties to the Nairobi Convention adopted at CoP7 in December 2012 on the conservation of sharks: http://www.unep.org/NairobiConvention/docs/COP7/UNEP_DEP_I_EAF_CP_7_5_en_COP7_decisions_20_12_12.pdf	Co-convened by the WCS on behalf of the CITES 7 Coalition, the Nairobi Convention and Government of Mozambique
Shark Conservation in Arabia Workshop, Dubai, UAE, 8-11 October 2012	Attended by more than seventy delegates representing the governments and scientific community from the GCC	<ul style="list-style-type: none"> Review shark research, fisheries and conservation measures and national legislation for each country. Discuss shark management and 	Organised by IFAW in partnership with Sharkquest Arabia and the UAE

Workshop	Participants	Objectives	Organiser(s)
	countries, Egypt, Sudan, Yemen, Djibouti and Germany. IGO and NGO representatives and academics also in attendance.	conservation in Arabian Sea and Gulf Region and suggest shark fishery management plans.	Ministry of Environment and Water
CITES CoP16 Preparatory Workshop on Conservation of Sharks in West Africa and the Role of CITES, Dakar, Senegal, 20-21 February 2012	37 government, IGO and NGO representatives. West African countries represented: Cape Verde, Ghana, Guinea, Guinea-Bissau, Mauritania, Senegal, Sierra Leone, Benin, Cote d'Ivoire, Gabon, Gambia, Liberia, Niger and Nigeria. The EU and US were also represented. In most cases, countries represented by two agencies (Fisheries and Wildlife/CITES)	<ul style="list-style-type: none"> Review shark conservation and management issues in the region. Review shark management priorities. Consider CITES shark listing proposals and implications for fisheries management. <p>See Dakar Declaration adopted at the meeting: https://cmsdata.iucn.org/download/s/dakar_declaration_csrp_cites_meeting_on_sharks_02_2013.pdf</p>	Convened by the SRFC in partnership with WCS, on behalf of the CITES 7 Coalition, IUCN MACO (Dakar), PRCM (Mauritania) and Wetlands International-Africa

Abbreviations: IFAW – International Fund for Animal Welfare; GCC – Gulf Cooperation Council (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates); MACO – Marine and Coastal Programme; PRCM – Partenariat Régional Côtier et Marin; SRFC – Sub Regional Fisheries Commission; UAE – United Arab Emirates; WCS – Wildlife Conservation Society

1. NON-DETRIMENT FINDINGS

According to Article IV of CITES, Parties shall allow the export of any specimen of a species included in Appendix II only if the Scientific Authority (SA) of the State of export has advised that the export will not be detrimental to the survival of that species. Under this Article, Parties are also required, through their SAs, to ensure that exports of specimens of an Appendix II-listed species are monitored and, where necessary, limited in order to maintain that species throughout its range, at a level consistent with its role in the ecosystem in which it occurs and well above the level at which it might become eligible for inclusion in Appendix I. Where specimens of an Appendix II-listed species are subject to CITES provisions on introduction from the sea (IFS), the issuance of an IFS certificate must also be based on a finding of non-detriment made by the SA of the state of introduction (Article IV(6)).

While the making of so-called “non-detriment findings” is a central element of CITES regulation of trade in Appendix-II listed species, there is no agreed method on how NDFs should be made, only that they should be based on the scientific review of all available information on the population status, distribution, population trend, harvest and other biological and ecological factors, as appropriate, and trade information relating to the species concerned (Mosig *et al.*, 2013; CITES Resolution Conf. 10.3). Thus the development of an NDF requires appropriate scientific capacity, biological information on the species, and a framework for demonstrating that exports are based on sustainable harvest (FAO, 2013b).

According to the CITES Animals Committee, the key consideration for an NDF for listed shark species should be total mortality (e.g. intentional, unintentional and natural) and the extent to which trade may influence that mortality (AC 22 Doc. 17.2, para. 12(a)). However, the ability to develop an NDF for shark species may be compromised by factors such as a lack of adequate scientific data to perform robust stock assessments for shark species to form the basis of an NDF, as well as complexities associated with shared or straddling stocks and species for which (often unquantified) levels of bycatch represent a significant source of mortality.

The following sections provide an overview of some of the key challenges associated with the development of NDFs for the CITES CoP16 shark and ray listings, namely:

- a. **Lack of data to perform stock assessments for shark species**
- b. **Lack of guidance on NDFs for sharks**
- c. **Shared stocks and introduction from the sea**
- d. **Management deficiencies**
- e. **Species caught as bycatch**

a. Lack of data to perform stock assessments for shark species

In order to develop NDFs for the shark and ray species listed in the CITES Appendices at CoP16, Parties will need to conduct assessments of wild shark populations, independent of fisheries where possible, to ensure that the numbers being removed are sustainable (Vincent *et al.*, 2013). The scientific data requirements for stock assessments are set out in **Table 9**. While information from fishery independent sources (i.e. scientific surveys) is the preferred basis for robust stock assessments, assessments can also be based on simple landing data (i.e. species-specific catch - number of fish and/or weight) and information on effort (e.g. number of days fished or number of hooks used) (FAO, 2012) where fishery independent data are not available. However, as noted by FAO (2012), even these data are not always available to scientists, particularly in countries with limited resources.

Table 9: Scientific data requirements for stock assessments

Scientific data requirements	Details
Temporal and spatial distribution of fish stocks	<ul style="list-style-type: none"> • Observer programmes, reporting requirements (e.g. prescribed information to be included in vessel's logbook) or other monitoring programmes. • Need specialist knowledge (e.g. species identification).
Catch information	<ul style="list-style-type: none"> • Numbers, weight, size, sex, disposition (e.g. whether fish alive/dead when hauled on board or released/discard). • Necessary for robust evaluation of stock status and realistic estimate of fishing mortality. • Scientific observers on board vessels – to ensure non-targeted species are accounted for.
Basic biological information	<ul style="list-style-type: none"> • Data on age, growth, migration, segregation, diet, reproduction (e.g. gestation period, periodicity, fecundity)
Relative abundance of sharks	<ul style="list-style-type: none"> • Determined from estimates of catch rates from fisheries or surveys. • Where scientific surveys are not present, standardization of data from fisheries to correct for factors unrelated to abundance are often applied.
Trade information	<ul style="list-style-type: none"> • Including information obtained from catch documentation systems implemented by some RFMOs, by species, including processed weight and country of origin and/or general catch location (often by FAO area).

Source: FAO (2012)

In many developing countries, poor fisheries management, inappropriate or non-existent monitoring, and IUU fishing, results in poor data available on fishery mortality (catches, landings and discards), abundance indices, domestic market consumption and international trade (both imports and exports) (García Núñez, 2008). A lack of data on shark catch and fishing effort has been reported, for example, in respect of the Bay of Bengal Large Marine Ecosystem (BOBLME) region (see **Text Box 1**), while in Mozambique, monitoring is considered likely to include less than 5% of actual catches (H. Darrin, Eyes on the Horizon,

in litt., 2013). As in the case of other CITES-listed species, exporting countries are likely to lack the resources to conduct field based research and to establish long-term monitoring programmes for the listed shark and ray species they harvest and export (Mosig *et al.*, 2013). Thus, capacity building needs to focus on establishing frameworks for additional data collection, including the provision of trained personnel for the identification of species caught and recording of fishing operations and catches, as well as the collection of post-landing data to monitor trade in aquatic products (FAO, 2012).

Appendix I provides details of various initiatives to improve catch monitoring that could provide information to inform shark fisheries management measures and potentially the formulation of NDFs in relation to the CITES CoP16 shark and ray listings. **Text Box 2** contains details of a European Commission project to identify and address scientific data gaps for major elasmobranch species which may also yield relevant information for NDF formulation. **Appendix J** provides an overview of the current status of scientific data for the shark and ray species listed in the CITES Appendices at CoP16, including data gaps/deficiencies and the availability of stock assessments on which to base NDFs. Data collection and research activities of relevant RFMOs that could provide the scientific information necessary for the development of NDFs for the shark and ray species listed in the CITES Appendices at CoP16 are set out in **Appendix G**.

Text Box 1: Deficiencies in available data on shark catch and fishing effort – the case of the Bay of Bengal Large Marine Ecosystem (BOBLME) region

At a meeting in 2010, the BOBLME Sharks Working Group identified a **lack of basic shark fishery catch and effort data** as an issue across its member countries (Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand). The following were particularly noted:

- Lack of data and trained staff
- Absence of systematic monitoring and control of shark resources
- Lack of cooperation between stakeholders and government officials
- Absence of a baseline assessment on the status of shark populations (Fischer *et al.*, 2012).

In **Indonesia**, most shark fisheries are artisanal and catch data are still not well recorded, especially away from larger urban areas. Catch data are rarely recorded to the species level, occasionally being recorded in more specific groups such as hammerheads at particular landing sites. Studies on sharks in Indonesia are also lacking, especially on population and stock status, covering a limited proportion of Indonesia's vast territory (Fahmi, Indonesian Institute of Sciences, *in litt.*, 2013).

It is reported that **Bangladesh, India and Sri Lanka** all lack species-level catch data for the shark and ray species listed in the CITES Appendices at CoP16 (K. K. Binesh, Society for Marine Research and Conservation (SMRC), *in litt.*, 2013). In **Sri Lanka**, there is a lack of monitoring of shark and ray landings: even where landings are recorded, mobulid rays are reportedly never distinguished from other rays (D. Fernando, Manta Trust, *in litt.*, 2013).

Text Box 2: Provision of scientific advice for the purpose of the EU Plan of Action (POA) on Sharks – Studies for the European Commission (31 May 2013)

The objective of this project is to obtain scientific advice for the purpose of implementing the EU POA on sharks as regards the facilitation of monitoring fisheries and shark stock assessment on a species-specific level in the high seas. The study is focused on major elasmobranch species caught by both artisanal and industrial large pelagic fisheries on the High Seas of the Atlantic, Indian and Pacific areas, which are currently monitored and potentially managed by respective Tuna RFMOs.

Specifically, the study first aims to collate and estimate historical fisheries data especially on species composition of catches, fishing effort and size frequencies, in order to identify gaps in the current availability of fishery statistics as well as in current knowledge of the biology and ecology of sharks that should be filled in order to support the scientific advice provided to RFMOs on sustainable management of elasmobranch fisheries. Secondly, the project aims to review and prioritise the gaps identified to develop a research programme to fill those gaps in support of the formulation of scientific advice for management of sharks. The data and knowledge gaps identified through Phase I will allow focusing and prioritising the future research. Following Phase I it will be clear as to what data is available for providing management advice for shark species, and where gaps in the data render this task difficult. In a second step, recommendations for data collection improvements as well as research needs and activities will be described (European Commission, *in litt.*, 2013).

Report available at: http://ec.europa.eu/fisheries/documentation/studies/sharks/index_en.htm.

b. Lack of guidance on NDF development for sharks

Parties have expressed concern at the lack of specific guidelines for making NDFs, both for marine species in general and, specifically, for sharks (CITES CoP14, Prop. 17). García Núñez (2008) noted that NDFs have seldom been made for shark species despite the listing of two species of shark (Basking, Whale) in CITES Appendix II since 2003 and another species (Great White) since 2005. A key issue for the CITES CoP16 shark and ray listings will be how to approach the formulation of NDFs in data-poor situations, given the lack of monitoring and paucity of scientific information characterising many of these fisheries, particularly in developing countries (see under **Point a** above).

A selection of available sources of information that can assist SAs in carrying out NDFs for shark and ray species are described in **Appendix K**. These include CITES Resolution Conf. 16.7, which sets out various concepts and non-binding guiding principles that SAs are recommended to take into account when carrying out NDFs, including consideration of the volume of legal and illegal trade relative to the vulnerability of the species and the implementation of adaptive management, including monitoring. This Resolution also recommends that NDFs be based on resource assessment methodologies (including consideration of, for example, species biology and life-history characteristics, population structure, status and trends, and threats), while setting out the sources of information that may be considered when making a NDF.

In addition to the resources described in **Appendix K**, several national and regional experts directories and user friendly guides for developing NDFs have been produced to support Scientific Authorities in their decision-making, for example an electronic guide directed at Central American and Caribbean SAs

developed by TRAFFIC¹⁵ (Mosig *et al.*, 2013). Workshops gathering experts or focused on capacity building on conducting NDFs have also taken place in Canada, China, Dominican Republic, Indonesia, Kuwait, Mexico, Nepal, Nicaragua, Peru, and Viet Nam (García Núñez, 2008; Mosig *et al.*, 2013). Previous listings of aquatic species in the CITES Appendices also provide examples of how international collaboration and information sharing can assist in NDF formulation: the listing of sturgeon species, for example, led Black Sea and Lower Danube range and fishing States to develop an Action Plan and Regional Strategy to share data and develop stock assessments, quotas and NDFs (DSTF, 2003, cited in Vincent *et al.*, 2013).

Furthermore, the “CITES Review of Significant Trade” procedure has resulted in a wealth of relevant information that can guide Parties in the making of NDFs. This process is based on CITES Resolution Conf. 12.8 (Rev. CoP13) and was designed to identify species that may be subject to unsustainable levels of international trade, and to identify problems and solutions concerning the making of NDFs for these species. The Review has been undertaken for various aquatic species listed in Appendix II of CITES including sturgeons, giant clams (*Tridacnidae* spp.) and Queen Conch *Strombus gigas*, highlighting difficulties such as illegal fishing and trade, lack of appropriate management and monitoring regimes and incorrect use of units in permitting. It has helped to address implementation and enforcement issues; fostered regional cooperation and management (Evaluation of the Review of Significant Trade: Case Studies AC26/PC20 Doc. 7 Annex 5); and resulted in longer term impacts such as the establishment of fisheries data collection and population monitoring programmes (e.g. see presentation to the Queen Conch Working Group Meeting, Panama, 23-24 October 2012 at: [http://www.strombusgigas.com/Meeting%20Panama/Queen%20Conch%20Meeting%20\(23%20October\)/CITES%20&%20NOAA/Strombus%20gigas%20Panama%20.ppt](http://www.strombusgigas.com/Meeting%20Panama/Queen%20Conch%20Meeting%20(23%20October)/CITES%20&%20NOAA/Strombus%20gigas%20Panama%20.ppt)).

An International Expert Workshop on CITES Non-Detriment Findings held in Cancun, Mexico, in 2008 produced some particularly useful guidance for the formulation of marine fish NDFs, with case studies for various marine fish and invertebrate species (Napolean Fish *Cheilinus undulates* and seahorses *Hippocampus* spp.) submitted by attendees to inform discussions (see **Appendix K**). Following the CITES Appendix II listings of shark and ray species agreed at CoP16, the need for a follow-up workshop focusing specifically on the development of NDFs for shark species has been recognised, and discussions on how to take that forward are currently underway (G. Sant, TRAFFIC, *in litt.*, 2013).

c. Shared stocks and introduction from the sea

The effective implementation of the CITES CoP16 shark and ray listings will require the development of NDFs for specimens harvested from widely shared stocks, with introduction from the sea also an issue for some of these species (**Table 10**). The term introduction from the sea (IFS) covers the application of CITES trade provisions to specimens of CITES-listed species which were taken in the marine environment not under the jurisdiction of any State (CITES Article I(e)), with the term having been clarified over the years through various CITES Decisions and revisions to the CITES Resolution on IFS, most recently at CITES CoP16 (Resolution Conf. 14.6 (Rev. CoP16)).

The issues raised by straddling stocks/highly migratory species in relation to NDFs have been documented previously (e.g. Willock, 2004; Lack, 2006; CITES, 2008) and include:

- The lack of a requirement under CITES for Parties to share information on how an NDF has been determined. This has been identified as a potential issue in the context of NDF discussions within

¹⁵ Mosig, P. and Reuter, A. (2011). *Guía para la elaboración de Dictámenes de Extracción No Perjudicial (DENP) en el marco de la CITES, basada en los resultados del Taller Internacional de Expertos en la materia celebrado en Cancún, México, 2008*. TRAFFIC North America.

relevant RFMOs, where a high level of transparency, co-operation between members and information exchange would be expected (CITES, 2008).

- The need for Parties harvesting the same stock to agree on common criteria for NDFs and for the authorities in the States concerned to develop complementary or joint management arrangements that cover the entire stock, in support of such findings (Lack, 2006).
- The determination of NDFs for species harvested on the high seas. While the recently amended CITES resolution on IFS (Resolution Conf. 14.6 (Rev. CoP16)) sets out the responsibility of flag States for the formulation of NDFs for specimens caught on the high seas, the issue of how such NDFs are to be made remains to be addressed. In some cases, it would be appropriate/advisable for the relevant flag State's SA to consult other national SAs or possibly international scientific authorities that were involved in the assessment and management of the stock (FAO, 2013b), as envisaged by Article IV(7) of CITES. However, this option may not always be available, for example where stocks do not fall under the mandate of an RFMO and/or are not currently subject to any regulatory framework for their conservation and management (Willock, 2004). *Manta birostris*, for example, although listed in Appendix I to CMS (see **Part II, Section 1 above** and **Appendix F**), is not currently subject to the management of any RFMOs and it is expected that it will be particularly challenging for countries and/or territories that harvest *M. birostris* on the high seas to carry out NDFs for such specimens (O'Malley, Shark Savers, *in litt.*, 2013).
- For specimens taken on the high seas, there may be a lack of clarity regarding both the population from which the catch was derived, as well as the status of that population (Lack, 2006).
- How to approach the formulation of NDFs where catches are taken partly from waters under national jurisdiction and partly on the high seas on the same fishing trip (FAO, 2004, cited in FAO, 2013b). Transshipment of catches and onboard processing are also expected to give rise to significant practical difficulties in terms of the issuance of IFS certificates/permits for export (FAO, 2013b).

The period up to September 2014 when the CITES CoP16 shark and ray listings come into effect represents an important opportunity for jurisdictions sharing responsibility for stocks to address some of the issues outlined above. Priorities for range and fishing States include: (i) determining agreed criteria for NDFs; (ii) possibly creating joint stock assessments; and (iii) ensuring that management measures are complementary (Lack, 2006). Coordination with existing RFMOs can assist in the formulation of NDFs for specimens taken from shared stocks/harvested on the high seas, in cases where such organisations have established a mandate over shark fisheries (Willock, 2004; FAO, 2013b). RFMOs will invariably have at their disposal the most comprehensive information available on which to base an NDF (Willock, 2004): in addition to requiring Members to report data on shark catches and fishing effort, RFMOs often undertake scientific research and assessment of the status of stocks under their mandate (see **Appendix G** on RFMO measures, reporting and research initiatives).

Table 10: Application of introduction from the sea (IFS) provisions to the shark and ray species listed in the CITES Appendices at CoP16

Species	Location of harvest and application of IFS provisions
Oceanic Whitetip	IFS expected to occur often, at least in fisheries regulated by Regional Fisheries Management Organisations (RFMOs) that allow the landing of the species.
Porbeagle	<u>Southern Hemisphere</u> – taken as bycatch in longline fisheries of Japan, the Republic of Korea and Taiwan operating on the high seas (major portion of catch). IFS provisions will apply. <u>Northern Hemisphere</u> – most harvested within Exclusive Economic Zones (EEZs). IFS provisions will generally not apply.
Hammerheads	Most harvests from waters within state EEZs for which IFS would not apply.
<i>Manta</i> spp.	<i>M. birostris</i> is known to occur in marine environments not under the jurisdiction of any state. IFS expected to occur, at least in fisheries regulated by tuna RFMOs.

Source: FAO (2013b)

Regarding specimens taken on the high seas, at CoP16 the Parties directed the CITES Secretariat to develop capacity building tools and materials for use by Parties (e.g. a module in the CITES Virtual College) related to the implementation of CITES IFS provisions for such specimens (Decision 16.52). NOAA has also produced a fact sheet on the IFS Resolution agreed at CoP16, containing a helpful overview of the new provisions and actions to be taken by CITES authorities under alternative scenarios. The fact sheet is available in Arabic, French, Portuguese and Spanish and may be downloaded from the NOAA website at http://www.nmfs.noaa.gov/ia/agreements/global_agreements/cites_page/cites.html.

d. Management deficiencies

The CITES Animals Committee has advised that NDFs can be declared for species that are the subject of a management plan, as long as the proposed export is consistent with the sustainable management provisions of that plan (CITES AC 22 Doc. 17.2 –para. 12(d)). It has, however, been noted that:

- Owing to a lack of necessary financial, human, institutional and technical capacity, shark fisheries in developing countries are often poorly managed, with management entirely absent in some cases (Lack, 2006; Lack and Sant, 2011). NPOA-Sharks often fail to specify particular actions or schedules for action, or to reflect adequately the principles of the IPOA-Sharks (Lack and Sant, 2011). Implementation of NPOAs has also been slow, for example, in Indonesia, where an NPOA-Sharks has been in place since 2010 (Fahmi, Indonesian Institute of Sciences, *in litt.*, 2013). In 2005, an FAO Expert Consultation concluded that the majority of countries had not made progress in implementing effective measures for the management and conservation of their elasmobranch resources (FAO, 2006), a finding re-iterated by FAO in its 2012 review of the implementation of the IPOA-Sharks (Fischer *et al.*, 2012).
- NDFs need to ensure that management arrangements adequately take into account all mortalities (whether through landings or discards) and, where management arrangements regulate for the recording of discards, that these regulations are complied with (i.e. catch is taken legally) (Lack, 2006).
- The ability to implement effective management measures may be limited by a lack (or complete absence) of scientific information to inform sustainable catch levels. In other cases, management arrangements may not be in accordance with the scientific advice available (Lack, 2006).
- Management may only apply to part of a stock, or differential management arrangements may apply to various parts of the same stock (Lack, 2006).
- As a result of poor enforcement, compliance with management measures may be insufficient to adequately underpin a NDF (Lack, 2006).

As noted by FAO (2012), the establishment of an effective fisheries management regime may be considered a highly desirable prerequisite for the successful implementation of trade regulations. An overview of relevant regional and domestic measures relevant to shark conservation and management is provided in **Part II**; however there are significant gaps in terms of the coverage, implementation and enforcement of such measures. Details of resources that may assist managers in the design and implementation of effective measures for shark fisheries conservation and management are set out in **Appendix L**.

e. Species caught as bycatch

As detailed in **Part I**, the shark and ray species listed in the CITES Appendices at CoP16 are taken as bycatch in a variety of fisheries targeting species such as tuna and swordfish. In particular:

- **Oceanic Whitetip** sharks are caught as bycatch by tuna and swordfish longliners, and in tuna purse seine fisheries;

- **Porbeagle** sharks are taken as bycatch by tuna and swordfish longliners, in trawl fisheries (mid-water and bottom), and in demersal longline and trawling fisheries for Patagonian Toothfish;
- **Hammerhead** sharks are taken as bycatch in *inter alia* tuna gillnet and trawl fisheries, however are considered less vulnerable to high seas pelagic longline fisheries than other pelagic sharks;
- **Manta** rays are taken as bycatch in tropical tuna purse seine, longline and gillnet fisheries, however such catches are poorly documented and the relative importance of incidental compared with direct catch is unknown.

The importance of these species in bycatch raises a number of concerns/issues relevant to their listing in Appendix II of CITES, namely:

- The extent to which a CITES listing can contribute to improving the conservation status of a species for which incidental catch in non-selective fishing gear represents a significant cause of mortality. This is especially relevant in the case of Oceanic Whitetip sharks and Porbeagle, for which very few directed fisheries remain.
- The problem of unreported bycatch, which is known to be significant in some regions and caused by a range of factors including ineffective or non-existent reporting, or deliberate misreporting of catches (FAO, 2010). Monitoring efforts generally focus on fishing effort and landings of targeted species, with information on quantities discarded at sea rarely collected/available (Cosandey-Godin and Morgan, 2011). Incomplete scientific information on total removals weakens the reliability of fisheries assessments (FAO, 2010), limiting the potential for robust NDFs to be made for these stocks. In the absence of this information it is important that catch and mortality limits are set at precautionary levels (G. Sant, TRAFFIC, pers. comm., 2013).
- The concern that establishing quotas for allowable exports (one approach to making NDFs) will not diminish catch, but merely lead to greater discards without reducing pressure on wild populations (Vincent *et al.*, 2013). Export quotas would need to be part of an integrated package of management initiatives if they are to relieve pressure on species taken as bycatch (Vincent *et al.*, 2013).

Measures aimed at managing shark bycatch and reducing discards are therefore highly relevant to ensuring the effective implementation of the CITES CoP16 shark and ray listings. Details of selected key resources containing information on the mitigation of shark bycatch and reduction of post-release mortality are provided in **Appendix M**, including the International Guidelines on Bycatch Management and Reduction of Discards endorsed by the FAO Committee on Fisheries (COFI) in 2011.

2. COMPLIANCE AND ENFORCEMENT

The establishment of comprehensive compliance regimes is paramount to securing the effective implementation of the CITES CoP16 shark and ray listings (FAO, 2012). Officials must be provided with the capacity to enforce the listings, including the tools, training and other resources necessary to enable them to identify and verify specimens throughout the supply chain. Ensuring that a listed species can be readily identified and traced (from the point of harvest, through various processing stages, to the point of consumption), reduces the likelihood of illegally harvested product being laundered into trade (e.g. under other species names), or products from the listed species entering trade without the necessary CITES documentation having been obtained (Willock, 2004). Trade monitoring is also integral to any compliance regime, providing invaluable information on the form in which specimens of listed species are traded, methods of shipment and trade routes, which can guide authorities in their enforcement activities, for example, in the development of risk assessments.

As things currently stand, efforts to ensure compliance with the CITES CoP16 shark and ray listings will be hampered by a number of difficulties related *inter alia* to the monitoring and traceability of specimens in trade. These issues include:

- **inadequate species-specific catch data** caused by a lack of: (i) monitoring (e.g. of specimens taken as bycatch or caught in artisanal fisheries with multiple landing sites (OSPESCA, *in litt.*, 2013), as is often the case for Hammerheads and Mantas); (ii) species-specific reporting/recording of catch data (e.g. due to a lack of recorders trained in species identification); and/or (iii) imprecise reporting of fisheries data to FAO (e.g. species reported in generic categories such as “sharks” or “rays”). For example, confusion of *Manta* spp. with rays in the genus *Mobula* (both in the family Mobulidae) may result in mis-reporting (FAO, 2013b), particularly as fisheries for *Mobula* spp. generally occur in the same locations as for *Manta* spp., in most cases with large numbers of *Mobula* spp. landed (Fernando and Stevens (2011); White *et al.* (2006) cited in FAO, 2013b).
- **inadequate species-specific trade data** due to a lack of species-specific Customs codes for trade data reporting (i.e. all shark species reported in generic categories) (FAO, 2009a).
- **data discrepancies**, for example, Customs codes for recording international trade on sharks, products and derivatives differing among countries making it difficult to trace products by species and provenance across international supply chains (García Núñez, 2008). Also, a lack of compatibility of taxonomic resolution across supply chains, e.g. catch and trade data reported at different taxonomic levels, limits capacity for verification of catch and trade information (FAO, 2009a).
- **limited capacity to identify or trace the listed species and parts or products in trade** due *inter alia* to a lack of available or appropriate identification guides or training for officers in identification, difficulties in identifying processed shark products (e.g. fins and meat with and without skin, raw, salted, boiled and dried, ready-to-cook products) and/or a lack of tagging or traceability mechanisms in place for these products. Difficulties expected in relation to the identification of parts/products of the shark and ray species listed in the CITES Appendices at CoP16 are set out in **Table 11**.
- **methods of shipments of fins and associated issues**, for example fins shipped in large volumes, as mixed shipments (e.g. listed and non-listed species, or products of various geographical origin) and without individual species having been labelled.
- a lack of effective **inspection protocols** (and relevant training), as well as knowledge of **shipment methods** for risk assessments.
- **overlapping enforcement jurisdictions**, for example for shared, straddling, highly migratory and high seas stocks exploited by many different fishing fleets. Also, within countries, a lack of clarity of

enforcement responsibilities between, e.g. agencies responsible for inspecting fisheries products and agencies with authority to enforce CITES.

A number of tools, resources and approaches are available to address the issues outlined above. An overview of these resources is provided in the following sections under four broad categories:

- a. **Visual (morphological) identification tools**
- b. **Genetic (molecular) tests**
- c. **Trade data reporting (Customs codes)**
- d. **Supply chain and product traceability initiatives**

More detailed information on the tools and resources discussed in the following sections are provided in **Appendices N to P**. Information on current or planned capacity building initiatives focusing on compliance and enforcement issues is provided in **Appendix H**.

a. **Visual (morphological) identification tools**

Appendix N provides details of over 50 manuals, guides and factsheets that are available for identifying the shark and ray species listed in the CITES Appendices at CoP16. These resources are listed by region/coverage and in chronological order.

Identification of whole (or near whole specimens)

The majority of the guides in **Appendix N** are aimed at facilitating the **identification of whole (or near whole) specimens**, for fisheries officers and observers, and those engaged in fishing. Many include keys to family and species levels, species accounts with drawings or photos of lateral and sometimes ventral views, and descriptions highlighting the species' main diagnostic features and comparisons with other species. Most tools are available to use or download from the web for free. Guides and manuals are available in a number of languages, including Arabic, English, Cantonese, French, Indonesian, Japanese, Mandarin and Spanish.

FAO has produced a large number of guides, which are available free of charge via FAO Fish Finder <http://www.fao.org/fishery/fishfinder/en>. These include: (i) catalogues of shark species; (ii) field guides to shark and ray species in specific regions; and (iii) more general regional and country-specific fisheries guides, some of which are currently in the process of being updated. A CD ROM bringing together all shark, ray and chimaera-specific FAO publications and sections from regional guides up to and including 2007 is available for purchase. FAO is planning on creating improved online resources for sharks, including identification software, which will be presented at the CITES shark training workshop to be held in Brazil (M. E. Sanchez, SSN, pers. comm., 2013) (see **Table 3** of **Appendix H** for workshop details).

Identification of parts and products

Table 11 contains information on the potential for distinguishing fins/gill rakers of the shark and ray species listed in the CITES Appendices at CoP16 based on morphological characteristics, including some of the main challenges that are expected in relation to identification.

Fewer guides are available which focus specifically on the identification of these parts and products and, as most have been produced in recent years, they are yet to be fully tested. A number of potential limitations identified by users include: (i) the tendency to focus on dorsal fins and fins that are

unprocessed/with skin attached; (ii) the lack of clear comparisons with other similar (non-CITES listed) species; and (iii) a lack of reference/source information, e.g. for certain of the images (E. Cooper, TRAFFIC, *in litt.*, 2013; S. Clarke, *in litt.* to IUCN/TRAFFIC, 2012, cited in IUCN and TRAFFIC, 2012). Examples of guides that cover or specifically focus on fins and gill rakers in trade relevant to the CITES CoP16 listings are detailed in **Table 12**. These are also included in **Appendix N** (marked with an *).

Table 11: Potential for distinguishing fins/gill rakers of shark and ray species listed in the CITES Appendices at CoP16 based on morphological characteristics

Characteristics of products in trade	Potential for distinguishing fins/gill-rakers based on morphology	Identification difficulties expected
Oceanic Whitetip		
Primarily traded as fins (destined for Hong Kong fin market)	<ul style="list-style-type: none"> CITES CoP16 Proposal indicates that Oceanic Whitetip fins are one of the most distinctive products in the Asian shark fin trade (morphology and colour facilitates identification - rounded, white tip) (FAO, 2013b). Traders in Hong Kong fin market classify Oceanic Whitetip fins to a single product category (“Liu Qui”) with a high degree of accuracy (100% on a sample of 23 fins) (Clarke <i>et al.</i>, 2006). 	<ul style="list-style-type: none"> Identifying non-fin commodities and distinguishing fins in mixed shipments (China, cited in Summary Record of CoP16, Comm. 1). Identification guide lacking to assist in visually distinguishing Oceanic Whitetip fins from fins of other species in the Order Carcharhiniformes that have white-tips (S. Clarke, <i>in litt.</i> to IUCN/TRAFFIC, 2012, cited in IUCN and TRAFFIC, 2012).
Porbeagle		
Primarily traded as meat, but also fins	<ul style="list-style-type: none"> Porbeagle dorsal fins with skin attached have characteristic white rear edge (CITES CoP 16 Proposal, cited in FAO, 2013b). 	<ul style="list-style-type: none"> Expected that non-experts would have difficulties distinguishing the meat of Porbeagle from that of other similar lamnoid sharks in trade (e.g. shortfin mako) (FAO, 2007, cited in FAO, 2013b). Non-experts also expected to have difficulties identifying Porbeagle fins in trade (Clarke <i>et al.</i>, 2006).
Hammerheads		
Primarily traded as fins (volume of meat and other products in trade unknown but likely to be insignificant compared to volume of fins in trade)	<ul style="list-style-type: none"> Fins of hammerhead sharks have a similar morphology (thin, falcate, dorsal fin height higher than base) that facilitates identification by traders. Traders in Hong Kong fin market can generally identify fins in trade to species or to small species groups, e.g. Scalloped and Smooth Hammerhead fins classified to a single product category with 95% accuracy (Clarke <i>et al.</i>, 2006). 	<ul style="list-style-type: none"> Research suggests that non-experts would have difficulties visually identifying fins in trade to species level (Clarke <i>et al.</i>, 2006). Possibility of confusion between fins of listed <i>Sphyrna</i> species and those of other <i>Sphyrna</i> or <i>Eusphyrna</i> species (S. Clarke, <i>in litt.</i> to IUCN/TRAFFIC, 2012, cited in IUCN and TRAFFIC, 2012). Reliable visual identification of dried fins may present particular difficulties (FAO, 2013b). Identification of meat, oil, cartilage and lower lobe of caudal fin could also present a problem for Customs officers.
Manta spp.		
Primarily in trade as gill rakers	<ul style="list-style-type: none"> Trade names “fish gills” or “peng yu sai” used to refer to gill rakers from all Mobulid rays (<i>Manta</i> spp. and <i>Mobula</i> spp.) (Heinrichs <i>et al.</i>, 2011). However, market surveys suggest that size of dried gill rakers allows gill rakers of <i>M. birostris</i> to be distinguished from 	<ul style="list-style-type: none"> Often confused with rays of the genus <i>Mobula</i> (also in the family Mobulidae) (FAO, 2013b). Fisheries for <i>Mobulas</i> spp. generally occur in the same locations as for <i>Manta</i> spp., in most cases with large numbers of <i>Mobula</i> spp. landed. (Fernando and

Characteristics of products in trade	Potential for distinguishing fins/gill-rakers based on morphology	Identification difficulties expected
	<p>those of other Mobulid rays (generally largest gill rakers in trade) (Heinrichs <i>et al.</i>, 2011).</p> <ul style="list-style-type: none"> Distinguishing between gill rakers from <i>Manta</i> and <i>Mobula</i> species should be possible with an identification guide (FAO, 2013b). 	<p>Stevens (2011); White <i>et al.</i> (2006) cited in FAO, 2013b).</p> <ul style="list-style-type: none"> <i>Mobula</i> rays also targeted for international trade of their gill rakers. <i>Mobula</i> and <i>Manta</i> gill rakers are known to be traded together in mixed shipments and trade names “fish gills” or “peng yu sai” used to refer to gill rakers from both (Heinrichs <i>et al.</i>, 2011).

Table 12: Examples of guides for the identification of fins and gill rakers in trade

Parts	Description	Languages*
Shark fins	Visual identification of fins from common elasmobranchs in the Northwest Atlantic Ocean (NOAA, NMFS, SEFSC; 2013)	English
Shark fins	Identifying shark fins: Oceanic Whitetip, Porbeagle and the three listed Hammerhead species. Specifically compiled to support CITES listings (SoMAS, Pew; 2012)	Arabic, Chinese, English, French, Japanese, Spanish
Shark fins	Sharks – identification of fins. Focuses on 46 most endangered species in 2007 IUCN Red list and composed of two parts: 1) biology, ecology and systematics of sharks, including morphology and anatomy of fins; 2) identification of fins (6 types of tail fins, 4 dorsal and 3 pectoral), via dichotomous key (MNHM, WWF, TRAFFIC, Shark Alliance; 2010).	French**
Shark fins	Identification sharks caught by Tuna Longline using morphological characters of their fins. Includes key to species by shark fin characteristics and describes shape and colour of dorsal, caudal and pectoral fins, with images (Fisheries Agency of Japan, Global Guardian Trust; 1999)	English
Manta gill rakers	Field Identification Guide of the Prebranchial Appendages (Gill Plates) of Mobulid Rays for Law Enforcement and Trade Monitoring Applications (Manta Trust; 2013)	English

Abbreviations: NOAA – National Oceanic and Atmospheric Administration; NMFS – National Marine Fisheries Service; SEFSC – Southeast Fisheries Science Center; SoMAS – School of Marine and Atmospheric Sciences, Stony Brook University; MNHM - Muséum National d'Histoire Naturelle.

Note:*It is possible that some of these guides may be available in other languages than stated here but these were not easily accessed via standard internet searches. **Translation of this guide into English is under consideration.

In addition to the resources detailed in **Table 12**, the following initiatives are noted as potentially relevant to the identification of parts and products of the shark and ray species listed in the CITES Appendices at CoP16:

- Regional collaboration between Australia and other CITES Parties resulted in the production of identification sheets for the products of Great White Shark, Whale Shark and Basking Shark in six languages. These could serve as a useful precedent for the production of similar resources for the species listed in the CITES Appendices at CoP16. The CITES Animals Committee has specifically encouraged Parties to contribute to and make use of such initiatives, including the translation and publication of identification manuals for shark parts and products into their own languages (AC22 Doc. 17.2, Recommendation 17).
- A database of fin morphology for all fin types at every stage of processing is currently being compiled as part of genetic research (J. Giles, University of Queensland, *in litt.*, 2013). Shark fin samples have been collected from multiple sources and points along the supply chain, encompassing a wide variety of fin conditions, which could be of potential use in identification training.

Finally, it is important to note that shark fin traders, for example in the Hong Kong market, are able to distinguish between the fins of different species, including those of shark species listed in the CITES Appendices at CoP16. Genetic testing has confirmed a high degree of concordance between Hong Kong market categories for fins (**Table 13**) and actual species composition for the recently listed shark species (see **Table 11**). Clarke *et al.* (2006) further demonstrated that fin traders in the Hong Kong market were able to identify hammerhead fins from other shark fins, sorting *S. lewini* and *S. zygaena* fins together and *S. mokarran* fins separately from other shark fins. This knowledge, and particularly the fin morphological features upon which traders base their market categorisations, could inform future work to improve capacity to identify shark fins at other stages in the supply chain. It has also been suggested that mandatory labelling of fins by their Chinese trade names early in the supply chain could be one approach to improving monitoring of shark fins in trade (Chapman and Abercrombie, 2010). Huang (1994) and Yeung *et al.* (2000) describe these market categories and the identification of shark fins to product and/or species levels.

Table 13: Market categories used by Hong Kong shark fin traders for the categorisation of fins of the shark species listed in the CITES Appendices at CoP16

Species	Market categories
Oceanic Whitetip	Liu Qiu
Porbeagle	Hei Sha
Great Hammerhead	Gu Pian
Scalloped Hammerhead	Bai Chun / Chun Chi*
Smooth Hammerhead	Gui Chun/ Chun Chi*

*Note: * Chun Chi is used for both species, whereas the other trade names are species specific*

b. Genetic (molecular) tests

Morphological identification of shark and ray products in trade becomes increasingly difficult once products are modified and processed. Molecular identification is an important additional tool for monitoring and enforcement, although time and cost implications associated with molecular tests means that they are generally not considered part of routine screening processes (Lack, 2006). However, with considerable recent progress in the field of shark genetic research, there is the potential for genetic testing to become an increasingly important tool for shark fishery and trade enforcement, in particular to verify or refute the visual identification of fins in trade (Chapman and Abercrombie, 2010).

Shark parts, including fins and meat, can be identified using a number of genetic techniques, most commonly through **DNA barcoding** and **species-diagnostic Polymerase Chain Reaction (PCR)**. A general overview of these techniques and their availability for the shark species listed in the CITES Appendices at CoP16, as described by Chapman and Abercrombie (2010), is provided below. **Appendix O** contains a list of specific references on this topic.

Methodologies

- DNA-barcodes for all of the shark species listed in the CITES Appendices at CoP16 are available in searchable internet databases (e.g. GenBank: www.ncbi.nlm.nih.gov), enabling their identification using DNA barcoding methods.
- Species-diagnostic PCR assays have also been developed, or are under development, for these species and their populations: in the case of Porbeagle, for example, the differentiation of products derived from southern and northern hemisphere stocks is possible (Testerman *et al.*, 2007).

- The geographic origin of some of the recently CITES-listed shark species, including Scalloped Hammerhead, can now be assessed using publicly available DNA sequences (Chapman *et al.*, 2009).

Availability

- Genetic testing of shark body parts is now being developed and conducted around the world, including in Europe, East Asia, North America, South America and Oceania.
- The methods require only a basic laboratory set-up and are relatively inexpensive (materials cost from as little as USD5 to 10 per sample).
- Species-diagnostic PCR is easier and more cost-effective than DNA barcoding with virtually all molecular laboratories in the world being equipped for this relatively simple technique.
- Identification of about 50 shark samples can be completed in a single workday by one technician using species-diagnostic PCR.
- According to the 2012 FAO Expert Panel Report, a rapid and increasingly inexpensive DNA identification method has been developed by the EU recently for Oceanic Whitetip sharks (however, no further information is provided) (FAO, 2013b).
- Institutions such as the United States Fish and Wildlife Service (US FWS) Wildlife Forensic Laboratory in Oregon, USA, reportedly hold very good DNA reference collections for shark fins (including for the species listed at CITES CoP16) and would be able to process identification requests from enforcement officers, if needed (E. Cooper, TRAFFIC, *in litt.*, 2013).

Future work

- Practical difficulties associated with the use of genetic testing in shark fin trade enforcement include the detection of regulated fins in large volume, mixed shipments. Extraction of DNA from processed samples also presents problems: extracting and sequencing DNA from skinned fins is not always possible, with current success rates at approximately 75% (J. Giles, University of Queensland, *in litt.*, 2013).
- Research aiming to address these issues is currently in progress/planned (e.g. the development of specific mitochondrial DNA (mtDNA) markers – J. Giles, University of Queensland, *in litt.*, 2013). In addition, a recent study by Caballero *et al.* (2012) documents successful application of multiple PCR genetic methods to identify Scalloped Hammerhead shark parts from a large sample of unidentified sharks landed in Pacific ports in Colombia.
- Protocols to facilitate sub-sampling of large shark fin import consignments by enforcement officers will be tested for the US (dependent on funding), with plans to use this as a model for other countries and regions (J. Giles, University of Queensland, *in litt.*, 2013).
- Efforts are already underway to increase the capacity of developing countries to utilise genetic tests in wildlife trade enforcement. For example, the Association of Southeast Asian Nations Wildlife Enforcement Network (ASEAN-WEN) Wildlife Forensics Project, a three-year project (2009-12) led by TRACE Wildlife Forensic Network and run in partnership with TRAFFIC, delivered training to laboratory scientists in DNA techniques, as well as to enforcement officers in sample collection and storage (<http://www.asean-wfn.org/>). Such initiatives could provide a precedent for future capacity building for the genetic testing of shark fins (and other products) in trade, focusing on issues such as sample collection, storage and identification.

c. Trade data reporting (Customs codes)

The use of more specific Customs codes for trade data reporting would allow specimens of CITES-listed shark and ray species to be more easily traced along supply chains, particularly if these are consistently

applied between exporting and importing countries. The following is a summary of the current state of play with regard to Customs codes for shark and ray products.

The Harmonized Commodity Description and Coding System (HS) is an internationally standardized system of names and numbers for classifying traded products developed and maintained by the World Customs Organization (WCO). To ensure harmonization, contracting parties to the HS Convention must employ all 4- and 6-digit (HS6) provisions, but are free to adopt additional subcategories and notes. As of May 2013 there were 207 countries, territories and Customs or economic unions applying the Harmonized System. The Harmonised System is revised every five to six years (WCO, 2013).

The Harmonised System was most recently updated in 2012 (WCO, 2013) and there are currently:

- **Three HS6 commodity codes specific to shark products (non-species specific)** which are found in Chapter 3 on Fish and crustaceans, molluscs and other aquatic invertebrates: 030281 (fresh or chilled shark meat), 030381 (frozen shark meat) and 030571 (shark fins).
- **Two HS6 commodity codes specific to ray products (non-species specific)**, also in Chapter 3), namely 030282 and 030382 (fresh or chilled and frozen meat of rays and skates). These would exclude *Manta* meat however as they are specific to the Rajidae family.
- **A number of more general product codes** in chapters 3, 5, 15, 16, 21, 23, 35, 41, 42 and 64 (for example to include fillets, liver oil and skins) under which shark and ray products can also be reported.

Some countries and/or territories have adopted more specific Customs codes for sharks and rays, based on this HS6 system. For example:

- the **EU** reports trade under a Combined Nomenclature (CN) system, adding two additional digits to the HS6 codes to create CN8 codes. These codes are updated on a yearly basis, and in 2010 the EU brought in species-specific codes for fresh/chilled, frozen and frozen fillets of Porbeagle (European Commission, 2013). The EU also brought in size-specific codes relevant to CITES listed species in 2012 - the live *Anguilla* commodity (HS6: 030192) was divided into three size categories to facilitate the understanding of the different eel life stages in trade.
- **Taiwan** uses the Standard Classification of Commodities of the Republic of China (CCC) which is composed of 10-11 digit codes. In addition to a number of more detailed shark product codes predominantly covering different fin products, Taiwan has nine species-specific codes for Whale Shark products (BOFT, 2013).

Examples of more detailed national and territorial codes applicable to the shark and ray species listed in the CITES Appendices at CoP16 are included in **Appendix P**. CITES Parties, and the Animals Committee in particular, have been discussing and working on the need for more universal product and species-specific trade codes for shark for over ten years. Of particular concern has been the lack of codes to distinguish between dried, wet, processed, and unprocessed fins of different shark species (AC25). FAO has recently submitted a proposal to WCO for the inclusion of a large number of new shark product codes in the HS system from 2017 onwards (details provided in Appendix E of FAO (2013b)). Although this update, if adopted, would include more shark-specific product codes (and some species-specific), it would still be important for Management Authorities to collaborate with their national Customs authorities to expand their current classification system to allow for the collection of detailed data on shark trade, in particular to the species level, as per CITES Resolution 12.6 (Rev. CoP16).

d. Supply chain and product traceability initiatives

The tools, resources and approaches discussed in the above sections can all contribute to improving the traceability of shark products in trade. DNA testing, for example, can allow fisheries products to be traced to their geographic origin, as demonstrated by the European project FishPopTrace for cod, herring, hake and sole, with potential applications in detecting IUU fishing and fraud in the fish supply chain (Ogden, 2013, unpublished). As noted above, geographic origin identification has already been demonstrated for some of the shark species listed in the CITES Appendices at CoP16 (Scalloped Hammerhead sharks - Chapman *et al*, 2009).

A number of approaches have been implemented for other types of fish and fisheries products that could assist in the verification of shark and ray products along the supply chain. These include:

- **Eco-labelling schemes** (e.g. the Marine Stewardship Council (MSC) eco-label - <http://www.msc.org/>), which entitle a fishery product to bear a distinctive logo or statement certifying that the fish was harvested in compliance with conservation and sustainability standards (FAO, 2009b). As guidance, the FAO has produced Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries, available at: <http://www.fao.org/fishery/topic/13293/en>. Eco-labels may be supported by chain of custody measures (see below) to verify that the product bearing the eco-label originates from the certified fishery concerned (FAO, 2009).
- **Chain of custody measures**, aimed at ensuring verification of a product at each point in the supply chain. According to FAO (2009), such measures should cover both the tracking/traceability of a product along the processing, distribution and marketing chain, as well as the proper tracking of documentation. The Brazil CITES implementation workshop (see **Table 3** of **Appendix H** for details) is expected to cover the establishment of a chain of custody for shark products from catch to export, which can be used to make legality findings for exports of CITES-listed shark products and assist in the issuance of NDFs (see **Section 3** below). RFMOs that are expected to attend the workshop have developed their own guidance on chain of custody (e.g. ICCAT for dolphin-safe tuna), which could form the basis for further developments (M. E. Sanchez, SSN, *in litt.*, 2013).
- **Documentation schemes**. These may apply only to products that enter international trade (trade documentation scheme – TDS) or to all catch and trade (catch documentation scheme – CDS) and are aimed at assisting in validating catch data and/or minimising opportunities for product taken by IUU fishing to reach markets (Lack, 2008). The potential for catch and trade documentation schemes to assist in CITES work on shark trade has been recognised by the Animals Committee (AC24, WG5, Doc.1). Documentation schemes have been introduced *inter alia* at the RFMO level by CCAMLR for toothfish species (*Dissostichus* spp.) and by ICCAT for Atlantic Bluefin Tuna *Thunnus thynnus* (Lack, 2008), while the EU's IUU Regulation¹⁶ requires that fish coming into the EU is accompanied by a valid catch certificate as proof of legal harvesting (Catch Certification Scheme (CCS)). In relation to sharks, the Kobe II Workshop on MCS¹⁷ held in 2010 recommended that tuna RFMOs establish or expand the use of CDS to sharks not covered by an existing CDS and to which conservation and management measures apply. This recommendation was reaffirmed by the third

¹⁶ Council Regulation (EC) No 1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing, amending Regulations (EEC) No 2847/93, (EC) No 1936/2001 and (EC) No 601/2004 and repealing Regulations (EC) No 1093/94 and (EC) No 1447/1999.

¹⁷ Kobe II, the International Workshop on Improvement, Harmonization and Compatibility of Monitoring, Control and Surveillance Measures, Including Monitoring Catches from Catching Vessels to Markets, Barcelona, June 2010.

joint meeting of the tuna RFMOs (Kobe III, July 2011). The Kobe III meeting also recommended that RFMOs, developed States and NGOs accelerate efforts to provide capacity building assistance to implement CDS (Kobe III, 2011).

- **Technological initiatives** aimed at increasing traceability of fish products in trade include: (i) assigning unique numbers or identifiers to an individual fish to allow it to be traced back to the fisherman that landed it (e.g. using digital technology such as smart phones: Thisfish - <http://thisfish.info/>); and (ii) establishing publicly-accessible databases for tracking product distribution in the seafood industry (Boyle, 2013, unpublished). In this regard, TRAFFIC is planning a collaborative project to design and test a shark product labelling and tracking system (SharkTrack), first examining whether there is the potential to apply any existing fisheries product labelling and tracking systems to the shark trade.

Finally, it is noted that an understanding of national, regional and global shark and ray trade dynamics and supply chains provides an important basis for the development of traceability mechanisms. Research has been carried out, or is underway, to characterise the shark/ray fisheries in a number of countries, for example:

- In **Madagascar**, Blue Ventures (a British NGO) is currently carrying out a market analysis of the Malagasy shark fishery, including the distribution chain for shark fins, under the Indian Ocean Commission's SmartFish Programme (expected to be published in 2013 – F. Humber, pers. comm., 2013).
- In **Sri Lanka**, the Manta Trust has completed a study of the Manta and Mobula ray fishery, including market surveys and interviews with fishermen and dealers of gill rakers (Fernando and Stevens, 2011).
- Studies of the shark fishing industry completed with the framework of the Sub-Regional Plan of Action for the Conservation and Management of Sharks (SRPOA-Sharks) for the Sub Regional Fisheries Commission (SRFC) zone (**Cape Verde, Gambia, Guinea, Guinea-Bissau, Mauritania, Senegal, Sierra Leone**) have yielded extensive information on how sharks are caught, processed and sold by relatively specialised economic agents within the region (see Diop and Dossa (2011) for a preliminary analysis of the results of these studies).

3. LEGAL ACQUISITION FINDINGS

According to CITES Article IV(2)(b), a permit allowing export of any specimen of a species included in Appendix II may only be issued once a **legal acquisition finding** has been made by the Management Authority of the State of export, meaning that the authority must be “*satisfied that the specimen was not obtained in contravention of the laws of that State for the protection of fauna and flora*”.

As in the case of NDFs, many countries are expected to lack the capacity to make legal acquisition findings in the context of the CITES CoP16 shark and ray listings. In the case of Manta exports, for example, key catchers including Indonesia, Sri Lanka, India, mainland China, Peru, Mozambique, the Philippines, Thailand, Costa Rica and Mexico may all lack the capacity to verify legal origin (O’Malley, Shark Savers, *in litt.*, 2013). Particular issues that will need to be taken into account and/or addressed include:

- how to make legal acquisition findings for specimens caught beyond national jurisdiction. In this regard, the CITES Standing Committee could consider carrying out a review of the difficulties associated with applying a test for legal acquisition to specimens caught beyond national jurisdiction, examining the degree to which Parties have adequately implemented CITES Resolution Conf. 14.6 (Rev. CoP16) on IFS and reporting on the results of any such review to the CoP;
- whether adequate monitoring, control and surveillance (MCS) systems are in place to enable a legal acquisition finding to be made, for example, where fisheries have been banned in specific protected areas and monitoring capacity is insufficient to verify the location of harvest (FAO, 2013b); and
- the role of RFMOs in legal acquisition findings, for example, through the provision of information on *inter alia* vessels identified as engaged in IUU fishing.

The establishment of MCS systems, including measures to ensure the traceability of specimens (such as those described in **Section 2(d)** above), will be crucial to support authorities in making legal acquisition findings. As noted above, the Brazil CITES implementation workshop is expected to cover the establishment of a chain of custody for shark products from catch to export, which can be used to make legal acquisition findings for exports of CITES-listed shark products.

It is also noted that the information on domestic shark measures received from CITES Parties in response to the Notification to be issued by the CITES Secretariat following Decision 16.128 will provide an additional resource to support authorities in making findings of legal acquisition (see **Part II, Section 3** above). This information is to be made available on the CITES website.

4. OTHER ISSUES

a. Institutional issues

The inclusion of commercially-exploited aquatic species in the CITES Appendices will require many Parties to establish new administrative and possibly also legal arrangements to deal with issues specific to CITES regulation of such species. Most CITES Management and Scientific Authorities will lack the fisheries-specific knowledge to implement the CITES CoP16 shark and ray listings, necessitating some degree of involvement of fisheries agencies (or relevant departments undertaking responsibility for fisheries management) in implementation, particularly in the development of NDFs (see **Section 1** above). Where Parties have chosen to designate their fisheries agencies to serve as CITES Management and Scientific Authorities for marine fish species, this raises the issue of agencies that are new to CITES being involved in permitting and regulation (Vincent *et al.*, 2013). Effective implementation of the CITES CoP16 shark and ray listings will depend on clear allocation of responsibilities for various CITES matters (e.g. endorsement of permits, NDFs) in addition to collaboration between the authorities involved.

b. Illegal, unreported and unregulated (IUU) fishing

There is clear evidence to suggest that IUU (and particularly illegal) fishing for sharks is occurring globally, driven to a large degree by the high value of fins to meat in international trade (Lack and Sant, 2008). Although the quantities of sharks taken by IUU fishing and impacts on different shark species are difficult to determine, possible shark fishing “hot spots” have been identified off Central/South America and in the Western and Central Pacific Ocean, with Hammerheads among the most frequently cited species taken in illegal fishing activities (Lack and Sant, 2008). IUU fishing has several implications for the implementation of the CITES CoP16 shark and ray listings, including:

- compromising the accuracy of data available to undertake stock assessments to inform the development of NDFs; and
- where management measures are put in place to implement the CITES CoP16 shark and ray listings (e.g. catch quotas as a means of undertaking NDFs), undermining the effectiveness of those measures (García Núñez, 2008).

IUU fishing has already been identified as a major challenge to the implementation of CITES marine species listings in relation to the Humphead Wrasse (*Cheilinus undulatus*), with management measures having been proposed to address this issue (see Report of 2010 Bali workshop on Humphead Wrasse and CITES implementation: http://cmsdata.iucn.org/downloads/hhw_bali_workshop_report.pdf). Work on the linkages between international trade in shark fins and meat, and IUU fishing, has also been carried out within CITES processes, with relevant work on shark fisheries monitoring also undertaken by FAO, for example:

- **CITES** - at AC24 (Geneva, March 2009), the Animals Committee discussed documents submitted by Australia and prepared by TRAFFIC (AC24 Doc. 14.3 and AC24 Inf. 2). These documents concluded, *inter alia*, that the key impediment to better understanding and quantification of the catch of and trade in sharks and the relationship with IUU fishing was a lack of species-specific data on shark catch (landings and discards) and trade, and the difficulty of reconciling available catch, production, and trade data. The Committee agreed that IUU fishing was an important issue and that improved data and tracking of products was required, thereby reinforcing conclusions already reached concerning commodity codes and the implementation of the IPOA-Sharks (see CoP16 Doc. 61 (Rev. 1) at para. 21). Commodity codes used for reporting trade in shark products, and FAO’s proposed

amendments to the Harmonised System, are discussed further in **Section 2(c)** above, with initiatives to improve traceability of products discussed in **Section 2(d)**.

- **FAO** – in November 2008, FAO convened a workshop on the *Status, limitations and opportunities for improving the monitoring of shark fisheries*, which considered global and country specific information on shark fisheries and trade to identify limitations and strategies for improving their monitoring. The workshop recommended actions to promote the implementation of National Plans of Action for Sharks and to address specific problems affecting catch and trade monitoring, including lack of specificity in data, underestimated catch volumes, and limitations in the Customs codes used in trade monitoring (report available at: <http://www.fao.org/docrep/012/i1121e/i1121e.pdf>).

While a detailed discussion of measures and current initiatives to address IUU fishing is beyond the scope of this Report, examples of relevance to sharks include:

- The **2009 FAO Port State Measures Agreement (PSMA)** which aims to prevent illegally caught fish entering international markets through ports (see **Part II, Section 1** above for further details). The FAO review of the implementation of the IPOA-Sharks noted that the majority of the 26 major shark fishing nations had taken steps to combat IUU fishing by either signing the PSMA (43 percent – including Brazil, Indonesia, Peru and Sri Lanka (ratified)) or by adopting a National Plan of Action (**NPOA-IUU**) or similar plan (23 percent – including Argentina, Mexico, Thailand and India (MCS plan)) (Fischer *et al.*, 2012). FAO has also initiated a series of global workshops to develop capacity in relation to the PSMA, the first being held from 23-27 April 2012 in Bangkok, Thailand, in collaboration with the Asia-Pacific Fishery Commission (APFIC) (report available at: <http://www.fao.org/docrep/015/i2774e/i2774e00.pdf>).
- The **Regional Plan of Action (RPOA) to Promote Responsible Fishing Practices (including Combating IUU Fishing) in the Region** (<http://www.afma.gov.au/wp-content/uploads/2010/06/RPOA-IUU.pdf>), a joint initiative between most ASEAN states (Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore, Thailand and Viet Nam), Australia, Timor Leste and Papua New Guinea to strengthen the overall level of fisheries management in the region. Priorities include the development of information, monitoring, compliance and surveillance systems. Shark IUU fishing is also to be addressed under the RPOA.
- A programme to address IUU fishing **through regional cooperation under the Southern African Development Community (SADC) Protocol on Fisheries** initiated by the coastal States of the SADC (Angola, Madagascar, Mauritius, Mozambique, Namibia, Seychelles, South Africa and Tanzania). The programme aims *inter alia* to improve knowledge of IUU fishing/drivers; explore technical and institutional options to address IUU fishing; disseminate information of IUU fishing issues, impacts and solutions; provide support for the development of NPOAs on IUU; and facilitate regional policy coherence to support action (see: http://www.illegal-fishing.info/sub_approach.php?subApproach_id=269).

PART IV

Overview of Key Gaps in Capacity and Priorities for Future Work

This final short section provides an overview of CITES implementation issues that have been consistently emphasised by national (CITES, fisheries) authorities and/or regional fisheries bodies as priority areas for capacity building (whether in correspondence with TRAFFIC or elsewhere).

The examples provided below have been reported as lacking in particular countries/territories or regions, however it is expected that such gaps will be relevant to many other national/regional contexts where there is catching of, and international trade in, the shark and ray species listed in the CITES Appendices at CoP16. This Part therefore does not attempt to identify all countries/territories where capacity building is required. Instead, information in **Part I** on the main countries/territories known to be involved in catching and trading these species (and sharks more generally), in combination with the information on domestic measures provided in **Part II**, may serve as an initial point of reference for determining capacity building priorities for the implementation of the CoP16 CITES shark and ray listings.

In a number of regions, there is already effective coordination between countries on shark fisheries and CITES issues through various organisations (e.g. SRFC in West Africa, OSPESCA in Central America), providing existing mechanisms through which a number of the below capacity building activities may be implemented. However, while coordination at the regional level can ensure consistency and policy coherence between countries, certain capacity building activities will be better undertaken at the national level, to ensure greatest participation and to allow for strategies to be specifically adapted to national contexts, where appropriate (H. Diop, SRFC, pers. comm., 2013).

It is also noted that, in addition to the priority needs set out below, a number of other challenges will also need to be addressed for effective implementation of the CITES CoP16 shark and ray listings, including **developing guidance/protocols for the making of non-detriment findings** (NDFs) for these species and **establishing chain of custody measures to facilitate enforcement and verification of legality**. These issues are more comprehensively discussed in **Part III** of this Report.

The priority needs for capacity building in relation to the CoP16 CITES shark and ray listings, as identified by national (CITES, fisheries) authorities and regional fisheries bodies, are as follows:

- **Training on basic CITES requirements for these listings**, including training on documentary requirements and permitting processes, as well as on changes to domestic regulatory frameworks and administrative/institutional structures that may be required for CITES implementation (e.g. in the West African region - H. Diop, SRFC, pers. comm., 2013; Yemen – CITES MA, *in litt.*, 2013).
- **Establishing monitoring programmes to evaluate shark and ray populations and providing support for further research** where catch and population status information for these shark and ray species, necessary for the formulation of NDFs, is currently lacking (e.g. in BOBLME countries¹⁸ - BOBLME, 2010; and in Latin America - Brazil CITES MA, *in litt.*, 2013; Guatemala CITES MA/SA, *in litt.*, 2013; H. Benitez Diaz, Mexico CITES MA, *in litt.*, 2013). Support is required for the establishment of programmes to monitor catches and landings; to allow for the continuation of existing data collection programmes (H. Diop, SRFC, pers. comm., 2013); and for the operational costs of ongoing research (Mozambique, CITES MA, *in litt.*, 2013). Priorities include providing training to data collectors in species identification to facilitate accurate monitoring of landings

¹⁸ Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand.

(OSPESCA, *in litt.*, 2013), as well as training authorities in stock assessment methodologies (Mozambique, CITES MA, *in litt.*, 2013).

- **Improving available information on trade dynamics for these shark and ray species** (DIPESCA, *in litt.*, 2013; UAE, CITES MA, *in litt.*, 2013), through monitoring of landings (see point above), the establishment of (regional) databases with information on exports and imports of shark products (OSPESCA, *in litt.*, 2013), and the analysis of supply and distribution chains. Efforts to improve trade monitoring would be facilitated by the introduction of species-specific Customs codes.
- **Improving identification tools and training in their use**, both for identification of whole sharks/unprocessed fins at landing sites and parts/products in trade (e.g. Southeast Asia - A. Ali, SEAFDEC, *in litt.*, 2013; Central America - M. Perez, OSPESCA, *in litt.*, 2013; Mozambique - CITES MA, *in litt.*, 2013; UAE – CITES MA *in litt.*, 2013; and Yemen - CITES MA, *in litt.*, 2013). Comprehensive identification guides or methods are required that, for example: (i) include comparisons of fins and gill rakers of CITES-listed species with those of other similar species; (ii) assist enforcement officials in identifying fins in processed form without skins (A. Wong, Hong Kong CITES MA, *in litt.*, 2013); and (iii) are in user-friendly form, e.g. adapted for use on hand-held devices (Mozambique CITES MA, *in litt.*, 2013).
- **Training in inspection protocols and improving information on methods of shipment** (A. Wong, Hong Kong CITES MA, *in litt.*, 2013), in order to guide officials in, for example, the sampling of large volume/mixed shipments for further DNA testing, and to provide information for the development of risk assessments.
- **Awareness-raising and communication of CITES controls and relevant laws/management measures**, particularly amongst artisanal fishing communities and the fishing/shark product industry (I. Zanella, Costa Rica CITES SA, *in litt.*, 2013; M. Ixquiac, DIPESCA, *in litt.*, 2013; UAE CITES MA, *in litt.*, 2013).

REFERENCES

- Anderson, R.C., Adam, M.S. and Saleem, M.R. (2011). *Shark longline fishery in the northern Maldives*. IOTC-2011-WPEB07-27 Rev_1. pp. 1–24.
- Arriati, R. (2011). *Impacto de la pesquería artesanal en la disminución de las poblaciones de tiburones en el Pacífico Oriental de Panamá*. Doc. ARAP, OSPESCA, CI y Fundación Natura.
- BOFT (2013). *Classification of Commodities and Regulations*. Bureau of Foreign Trade, Taiwan. Accessed June 2013. <https://fbfh.trade.gov.tw/rich/text/indexfhE.asp>.
- Bonfil, R. and Abdallah, M. (2004). *Field identification guide to the sharks and rays of the Red Sea and Gulf of Aden*. FAO Species Identification Guide for Fisheries Purposes. Rome, FAO. 71 pp.
- Boyle, M. (unpublished). *Fish to Plate: Traceability in the seafood industry*. Presentation to the 8th International Forum on Illegal, Unreported and Unregulated Fishing, 11-12 February, Chatham House, London.
- Caballero, S., Cardenosa, D., Soler, G. and Hyde, J. (2012). Application of multiplex PCR approaches for shark molecular identification: feasibility and applications for fisheries management and conservation in the Eastern Tropical Pacific. *Molecular Ecology Resources* 12:233-237.
- Caldas, J.P., Díaz-Trujillo, E.M., García, C.B. and Duarte, L.O. (2009). Revisión Histórica de la Pesca de Tiburones y Rayas en el Mar Caribe Continental de Colombia. In: Puentes V.A., Navia, F., Mejía- Falla, P.A., Caldas, J.P., Diazgranados, M.C. and Zapata, L.A. (Eds). *Avances en el Conocimiento de Tiburones, Rayas y Quimeras de Colombia*. Fundación SQUALUS, Ministerios de Ambiente, Vivienda y Desarrollo Territorial, Instituto Colombiano Agropecuario, Colciencias, Conservación Internacional, WWF, 245 p.
- Camhi, M.D., Valenti, S.V., Fordham, S.V., Fowler, S.L. and Gibson, C. (2009). *The Conservation Status of Pelagic Sharks and Rays*: Report of the IUCN Shark Specialist Group Pelagic Shark Red List Workshop. IUCN Species Survival Commission Shark Specialist Group. Newbury, UK.
- Campana, S. and Gibson, A.J.F. (2008). *Catch and stock status of Porbeagle shark (Lamna nasus) in the Northwest Atlantic to 2007*. NAFO Doc. 08/36.
- CCSBT ERSWG (2012). *Report of the Ninth Meeting of the Ecologically Related Species Working Group*. 27-30 March 2012, Tokyo, Japan.
http://www.ccsbt.org/userfiles/file/docs_english/meetings/meeting_reports/ccsbt_19/report_of_ERSWG9.pdf
- Chapman, D.D. and Abercrombie, D. (2010). Genetic Identification of Shark Body Parts in Trade: Rapid, Reliable, Inexpensive. A Summary of New Scientific Analysis. *Ocean Science Factsheet*. Pew Environment Group. Washington DC. Available at:
http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Fact_Sheets/Protecting_ocean_life/Pew%20OSS%20Genetic%20ID%20sharks%20final.pdf?n=7918
- Chapman, D.D., Pinhal, D. and Shivji, M.S. (2009). Tracking the fin trade: genetic stock identification in western Atlantic scalloped hammerhead sharks *Sphyrna lewini*. *Endangered Species Research* 9: 221–228.
- CITES (2008). Final Report of the Fish Working Group. *Results of the International Expert Workshop on CITES Non-Detriment Findings, 17-22 December 2008, Mexico*. Available at:
http://www.conabio.gob.mx/institucion/cooperacion_internacional/TallerNDF/Links-Documentos/WG-CS/WG8-Fishes/WG8-FR.pdf

- Clarke, S.C. (2008). Use of shark fin trade data to estimate historic total shark removals in the Atlantic Ocean. *Aquatic Living Resources* 21(4): 373-381.
- Clarke, S.C. (2011). *A Status Snapshot of Key Shark Species in the Western and Central Pacific and Potential Mitigation Options*. SC7-EB-WP-04. Secretariat of the Pacific Community, Nouméa, New Caledonia.
- Clarke, S.C., Magnussen, J.E., Abercrombie, D.L., Mcallister, M.K. and Shivji, M.S. (2006). Identification of shark species composition and proportion in the Hong Kong shark fin market based on molecular genetics and trade records. *Conservation Biology* 20: 201– 211.
- Cosandey-Godin, A. and Morgan, A. (2011). *Fisheries Bycatch of Sharks: Options for Mitigation*. Ocean Science Division. Pew Environment Group, Washington DC.
- Couturier, L.I.E., Marshall, A.D., Jaine, F.R.A., Kashiwagi, T., Pierce, S.J., Townsend, K.A., Weeks, S.J., Bennet, M.B. and Richardson, A.J. (2012). Biology, ecology and conservation of the Mobulidae. *Journal of Fish Biology* 80: 1075–1119.
- Diop, M. and Dossa, J. (2011). *Trente années d'exploitation de Requins en Afrique de l'Ouest*. Carlet et Condé-sur- Noireau.
- European Commission. (2013). *Combined Nomenclature*. Accessed June 2013.
http://ec.europa.eu/taxation_customs/customs/customs_duties/tariff_aspects/combined_nomenclature/
- EUROSTAT (2013). Porbeagle Shark trade dataset. *EU27 trade since 1988 by CN8*. Downloaded June 2013.
- FAO. (2006). *Report of the FAO Expert Consultation on the Implementation of the FAO International Plan of Action for the Conservation and Management of Sharks*. Rome, 6–8 December 2005. FAO Fisheries Report. No. 795. Rome, FAO. 2006. 24p
- FAO. (2009a). *Report of the Technical Workshop on the Status, Limitations and Opportunities for Improving the Monitoring of Shark Fisheries and Trade*. Rome, 3–6 November 2008. FAO Fisheries and Aquaculture Report. No. 897. Rome, FAO. 2009. 152p.
- FAO. (2009b). *Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries*. Rome, FAO.
- FAO. (2010). *Report of the Expert Consultation on International Guidelines for Bycatch Management and Reduction of Discards*. Rome, 30 November–3 December 2009. FAO Fisheries and Aquaculture Report. No. 934. Rome, FAO. 2010. 28pp.
- FAO. (2011). *International Guidelines on Bycatch Management and Reduction of Discards*. Rome, FAO, 73 pp.
- FAO. (2012). *Report of the FAO/CITES Workshop to Review the Application and Effectiveness of International Regulatory Measures for the Conservation and Sustainable Use of Elasmobranchs*. Genazzano, Italy, 19–23 July 2010. FAO Fisheries and Aquaculture Report. No. 984. Rome, FAO.
- FAO. (2013a). Fishery Commodities and Trade and Global Capture Production Datasets. *FishStat*. Downloaded June 2013.

FAO. (2013b). *Report of the fourth FAO Expert Advisory Panel for the Assessment of Proposals to Amend Appendices I and II of CITES Concerning Commercially-exploited Aquatic Species, Rome, 3–8 December 2012*. FAO Fisheries and Aquaculture Report No. R1032. Rome, FAO. 161 pp.

Fernando, D. and Stevens, G. (2011). *A study of Sri Lanka's manta and mobula ray fishery*. The Manta Trust, 29 pp.

Fischer, J., Erikstein, K., D'Offay, B., Barone, M. and Guggisberg, S. (2012). *Review of the Implementation of the International Plan of Action for the Conservation and Management of Sharks*. FAO Fisheries and Aquaculture Circular No. 1076. Rome, FAO. 120 pp.

García Núñez, N.E. (2008). *Sharks: Conservation, Fishing and International Trade*. Bilingual edition. Dirección General para la Biodiversidad. Ministerio de Medio Ambiente, y Medio Rural y Marino, Madrid. 111 pp.

Hayes, C.G., Jiao, Y. & Cortes, E. (2009). Stock assessment of scalloped hammerheads in the western north Atlantic Ocean and Gulf of Mexico. *N. Am. J. Fish. Management*, 29: 1406–1417.

Hazin, F.H.V., Broadhurst, M.K., Amorim, A.F., Arfelli, C.A. and Domingo, A. (2008). Catches of pelagic sharks by subsurface longline fisheries in the South Atlantic Ocean during the last century: A review of available data with an emphasis on Uruguay and Brazil. Pp 213–229. In: *Sharks of the Open Ocean. Biology, Fisheries and Conservation*. Camhi, M.A., Piktich, E.K. and Babcock, E.A. (Eds). Blackwell Publishing, Oxford, UK.

Heinrichs, S., O'Malley, M., Medd, H., and Hilton, P. (2011). *Manta Ray of Hope: Global Threat to Manta and Mobula Rays*. Manta Ray of Hope Project.

Humber, F., Godley, B., Harris, A., Pedron S., Ramehery, V. and Broderick, A. (2008) *The artisanal shark fisheries in the Andavadoaka region of south west Madagascar: results from a year of catch monitoring*. Blue Ventures Research Report. Blue Ventures Conservation & Marine Turtle Research Group, Centre for Ecology & Conservation, University of Exeter.

Huang, Z.G. (1994). Zhongguo haiyang shengwu zhonglei xiefenbu (China marine organism categorization and ordering). China Ocean Press, Beijing (in Chinese).

Humane Society International (HSI). (2013). *National law, multi-lateral agreements, regional and global regulations on shark protection and shark finning*. Available at: http://www.hsi.org/assets/pdfs/shark_finning_regs_2013.pdf. Accessed 24 June 2013.

IOTC (2011). *Report of the Seventh Session of the IOTC Working Party on Ecosystems and Bycatch*. Lankanfinolhu, North Malé Atoll, Republic of Maldives, 24-27 October 2011. IOTC-2011- WPEB07-R[E]: 99 pp.

IOTC (2012). *Report of the Eighth Session of the IOTC Working Party on Ecosystems and Bycatch*. Cape Town, South Africa, 17–19 September, 2012. IOTC–2012–WPEB08–R[E]: 77 pp.

IUCN and TRAFFIC (2012). *IUCN/TRAFFIC Analyses of the Proposals to Amend the CITES Appendices*. Prepared by IUCN Global Species Programme and TRAFFIC for the Sixteenth Meeting of the Conference of the Parties to CITES. IUCN – International Union for Conservation of Nature, Gland, Switzerland.

KOBE III (2011) *Kobe III Recommendations*. Document K3-REC-A. Available at: http://www.tuna-org.org/Documents/TRFMO3/K3-REC_ENG.pdf

Lack, M. (2006). *Conservation of Spiny Dogfish Squalus acanthias: a role for CITES?* TRAFFIC International.

- Lack, M. (2008). *The Case for a Catch Documentation Scheme in the Western and Central Pacific*. WWF South Pacific Programme and TRAFFIC International.
- Lack, M. and Sant, G. (2008). *Illegal, unreported and unregulated shark catch: A review of current knowledge and action*. Department of the Environment, Water, Heritage and the Arts and TRAFFIC, Canberra.
- Lack, M. and Sant G. (2011). *The Future of Sharks: A Review of Action and Inaction*. TRAFFIC and the Pew Environment Group.
- Marshall, A.D., Compagno. L.J.V. & Bennett, M.B. (2009) Redescription of the genus *Manta* with resurrection of *Manta alfredi* (Krefft, 1868) (Chondrichthyes; Myliobatoidei; Mobulidae). *Zootaxa*, 2301, 1-28.
- Matsunaga, H. (2010). CPUE trend for porbeagle caught by Japanese tuna longline in the SBT fishery ground during 1992–2007. *Collect. Vol. Sci. Pap. ICCAT*, 65(6): 2088–2093.
- McVean, A.R., Walker, R.C.J. and Fanninga, E. (2006). The traditional shark fisheries of southwest Madagascar: A study in the Toliara region. *Fisheries Research* 82: 280-289.
- Miller, M.H., Carlson, J., Cooper, P., Kobayashi, D., Nammack, M., and J. Wilson. (2013). *Status review report: scalloped hammerhead shark* (*Sphyrna lewini*). Report to National Marine Fisheries Service, Office of Protected Resources. March 2013. 131 pp.
- Mohanraj, G., Rajapackiam, S., Moha, S., Batch, H. and Gomathy, S. (2009). Status of elasmobranchs fishery in Chennai, India. *Asian Fisheries Science*, 22: 607–615.
- Mosig, P., Reuter, A. and Oldfield, T. (2013). The CITES non-detriment finding process, in *CITES at 40: Perspectives, trade patterns and future prospects*. UNEP-WCMC, Cambridge, UK.
- Nakano, H. and Honma, M. (1996). Historical CPUE of pelagic sharks caught by the Japanese longline fishery in the Atlantic Ocean. *Sci. Pap. ICCAT, Vol. 46(4)*: 393-398.
- Ogden, R. (unpublished). *Fisheries Forensics: Technologies for detecting IUU fishing and fraud in the fish supply chain*. Presentation to the 8th International Forum on Illegal, Unreported and Unregulated Fishing, 11-12 February, Chatham House, London.
- Pew (2012). *Navigating Global Shark Conservation: Current Measures and Gaps*. Pew Environment Group. Available at: http://www.pewenvironment.org/uploadedFiles/PEG/Publications/Report/Navigating%20Global%20Shark%20Conservation_Current%20Measures%20and%20Gaps%207%206%2012.pdf
- Raje, S. G., Sivakami, S., Mohanraj, G., Manojkumar, P.P., Raju, A. and Joshi, K.K. (2007). *An atlas on the Elasmobranch fishery resources of India*. CMFRI Special Publication, 95. pp. 1-253.
- Rayos, J.C.C., Santos, M.D. and Barut, N.C. (2012). Devil ray resources in Bohol Sea, Philippines. *Fish for the People*, 10(1): 20–23.
- Rice, J. and Harley, S. (2012). *Stock assessment of oceanic whitetip sharks in the western and central Pacific Ocean*. Report for the 8th Regular Session of WCPFC Scientific Committee. WCPFC-SC8-2012/SA-WP-06.
- Robinson, L. and Sauer, W.H.H. (2013). A first description of the artisanal shark fishery in northern Madagascar: implications for management. *African Journal of Marine Science*, 35(1): 9–15

- Semba, Y. and Yokawa, K. (2012). Preliminary results of standardized CPUE for Porbeagle in the south Atlantic from Japanese longline logbook data between 1994 and 2010. *Collect. Vol. Sci. Pap. ICCAT*, 68(5): 1885–1892.
- Testerman, C., Richards, V., Francis, M., Pade, N., Jones, C., Noble, L. and Shivji, M. (2007). Global phylogeography of the porbeagle shark (*Lamna nasus*) reveals strong genetic separation of northern and southern hemisphere populations. *Abstract presented at the American Elasmobranch Society Annual Conference*, 2007.
- TRAFFIC. (2012). *CITES Appendix III listing of Porbeagle Shark (Lamna nasus) - Information Document*. Produced for the European Commission. Restricted circulation.
- TRAFFIC. (2013). *Recommendations on the Proposals to Amend the CITES Appendices at the 16th Meeting of the Conference of the Parties*. TRAFFIC, Cambridge, UK. Available at: <http://www.traffic.org/cop16-table/>.
- Vannuccini, S. (1999). *Shark utilization, marketing and trade*. FAO Fisheries Technical Paper No. 389. Rome, FAO.
- Vincent, A.C.J., Sadovy, Y.J., Fowler, S.L. and Lieberman, S. (2013). The role of CITES in the conservation of marine fishes subject to international trade. *Fish and Fisheries*. <http://www.fisheries.ubc.ca/node/3649>
- Waessle, J.A. (2007). *Análisis de las capturas de Squalus acanthias y Lamna nasus en las flotas congeladora y factoria (convencional y surimera) con observadores a bordo. Periodo 2003 – 2006*. Inf. De Asesoramiento y Tránsito INIDEP N05/07. 12 pp.
- WCO. (2013). *Nomenclature and classification of goods*. Accessed June 2013. <http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools.aspx>
- White, W.T., Last, P.R., Stevens, J.D., Yearsley, G.K., Fahmi and Dharmadi (2006). *Economically important sharks and rays of Indonesia*. Canberra, ACIAR Publishing. 329 pp.
- Willock, A. (2004). *Administrative and Monitoring Implications of listing and down-listing of commercially-exploited aquatic species, including the implications of Annex 4 of Resolution Conf. 9.24*. TRAFFIC International, Cambridge, UK.
- Yeung, W. S., C. C. Lam, and P. Y. Zhao. (2000). *The complete book of dried seafood and foodstuffs*. Wan Li Book Company Limited, Hong Kong (in Chinese).
- Zeeberg, J., Corten A. and de Graaf, E. (2006). Bycatch and release of pelagic megafauna in industrial trawler fisheries off Northwest Africa. *Fisheries Research*, 78: 186–195.

**APPENDIX A: Selection of recent CITES-related shark and ray discussions, Resolutions, Decisions and inter-sessional activities
– with a focus on implementation issues and capacity of CITES Parties**

Notes: Concerns over shark trade was first raised in the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) arena by the United States at the 9th Conference of the Parties (CoP9) in 1994. Led by Panama, Resolution 9.17 was adopted, requesting that the Food and Agriculture Organization of the United Nations (FAO) and other fisheries management organisations establish programmes to collect and assemble necessary biological and trade data on shark species and that all nations using and trading specimens of shark species cooperate with FAO and other international fisheries management organisations. A number of Decisions were then adopted at CoP10 in 1997 aimed at effective implementation of Resolution 9.17, including to improve systems to identify; record and report landings of sharks; reduce mortality of sharks in bycatch; initiate management of sharks fisheries at national levels and establish international and regional bodies to coordinate management of shark fisheries; and for FAO and the CITES Secretariat to undertake specific activities to improve the conservation and effective management of sharks. At CoP11 Resolution 9.17 was repealed, following adoption of the UN FAO International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks), and the CITES Animal Committee (AC) instructed to maintain liaison with FAO Committee on Fisheries (COFI) in order to monitor the implementation of the IPOA-Sharks and to report at CoP12 in 2002 on progress. *Cetorhinus maximus* (Basking Shark), *Rhincodon typus* (Whale Shark) and *Carcharodon carcharias* (Great White Shark) were all proposed for listing in Appendix II – these proposals were not adopted. The Basking Shark and Great White Shark were listed in Appendix III by the UK and Australia, respectively, in September 2000 and October 2001. Progress from CoP12 onwards is described in the table below.

<p>CoP12 (2002)</p>	<p>DISCUSSIONS, RESOLUTIONS and DECISIONS:</p> <p>Parties expressed concern that:</p> <ul style="list-style-type: none"> • Insufficient progress had been made in achieving shark management through implementation of IPOA-Sharks. • Development and implementation of National Plans of Action (NPOAs) had not been sufficient. • Continued significant trade in sharks and their products was not sustainable. <p>New Resolution 12.6 adopted urging an improvement in this situation:</p> <ul style="list-style-type: none"> • Report on progress by the Animals Committee at the next CoP. • Animals Committee to identify key species and examine these for possible listing under CITES, and if necessary to make species-specific recommendations on improving the conservation status of sharks and the regulation of international trade in these species • (COFI) and Regional Fisheries Management Organisations (RFMOs) to strengthen efforts to undertake research, training, data collection, data analysis and shark management plan development as necessary to implement the IPOA-Sharks. <p>Decision 12.7 – Memorandum of Understanding (MoU) to be established between CITES and FAO, to establish framework for co-operation between the two organisations, particularly on marine species. MoU between CITES and the Convention on Migratory Species (CMS) also concluded in 2002 (September).</p>	<p>PROPOSALS:</p> <p><i>Cetorhinus maximus</i> (Basking Shark, II); <i>Rhincodon typus</i> (Whale Shark, II) – <u>both adopted, came into force 13/02/2003</u></p>
<p>Inter-sessional activity incl. AC19 and AC20</p>	<p>Notifications 2003/051 and 2003/068 issued, the latter including a questionnaire on progress with implementation of IPOA-Sharks.</p> <p>Results reviewed by AC19 and AC20 (full report provided in CoP13 Doc 35) and large number of shark and ray related documents presented and discussed at AC20, including an outline of harmonized codes for shark products, and suggestions on how to supplement these to include all shark products: AC20 Inf. 2, AC20 Inf. 3 and AC20 Inf. 4.</p>	

<p>CoP13 (2004)</p>	<p>DISCUSSIONS, RESOLUTIONS and DECISIONS:</p> <p>Animals Committee provided a substantive report (CoP13 Doc 35) on the implementation of the UN FAO International Plan of Action for the Conservation and Management of Sharks (IPOA–Sharks):</p> <ul style="list-style-type: none"> • Twice as many Parties had reported progress towards implementation of the IPOA-Sharks than was the case 2 years previously, with particularly good progress by some African range States. • However, there was not much evidence of improved shark fisheries management. <p>FAO presented two reports on expert consultation of implementation and legal issues related to listing commercially-exploited aquatic species on CITES Appendices: CoP13 Inf. 34 and CoP13 Inf. 35</p> <p>Decision 13.43 adopted, in which Animals Committee was instructed to carry on its work and to:</p> <ul style="list-style-type: none"> • Review implementation issues related to sharks listed in the CITES Appendices with a view <i>inter alia</i> to sharing experiences that may have arisen and solutions that may have been found. • Identify specific cases where trade is having an adverse impact on sharks, in particular those key shark species threatened in this way. • Prepare a report on trade-related measures adopted and implemented by Parties that are aimed at improving the conservation status of sharks. <p>Parties to request FAO to:</p> <ul style="list-style-type: none"> • Convene a consultation to review progress with the implementation of the IPOA-Sharks. • Assess the effectiveness and efficiency of current conservation and management measures for sharks and identify any improvements needed. 	<p>PROPOSALS:</p> <p><i>Carcharodon carcharias</i> (Great White Shark, II) – <u>adopted, came into force 12/01/2005</u></p>
<p>Inter-sessional activity incl. AC21, AC22 and FAO</p>	<p>Animals Committee Shark Working Group reviewed information collected via a questionnaire on management and trade in sharks (Notification 2005/044), summarised main implementation issues and recommendations in AC22 17.2 and CoP14 Doc. 59.1 (Annex 1), covering: identification; commodity codes; non-detriment findings (NDFs); legal and institutional matters, relationships between agencies domestically and internationally; training and capacity; enforcement; personal effects; introduction from the sea; and reservations.</p> <p>FAO expert consultation on implementation of IPOA-Sharks held in December 2005. Noted several problems hampering implementation:</p> <ul style="list-style-type: none"> • lack of information on population biology and catch and effort data needed to inform management decisions • low political priority to shark fisheries resulting in a lack of effective policy and institutional practice • basic lack of funds and human resources to manage shark fisheries <p>Concluded voluntary basis of IPOA-Sharks did not provide necessary incentives to increase political attention to shark fisheries management.</p> <p>Technical Workshop on Conservation and Management of Sharks held in April 2006, report submitted to AC22 Inf.3, concluded the main issues were: lack of taxonomic guides to identify species; absence of scientific assessments; insufficient information on shark population biology, both targeted and bycatch species, stock status and fisheries (catch and fishing effort); and shortage of funds, human resources and institutional practices.</p>	

<p>CoP14 (2007)</p>	<p>DISCUSSIONS, RESOLUTIONS and DECISIONS:</p> <p>17 Decisions 14.101 to 14.117 based on AC recommendations were adopted - on implementation and effectiveness of shark listings, commodity codes for international trade, species-specific reviews and recommendations, capacity building, the IPOA-Sharks and Illegal Unreported and Unregulated (IUU) fishing.</p> <p>Decision 14.103 - Secretariat to obtain case studies on the development of NDFs for shark species from Parties' Scientific and Fisheries Authorities, and collate and summarize these for provision to international expert workshop on non-detriment findings to be held in Mexico.</p> <p>Decision 14.115 and 14.116 strongly encouraged Parties to identify opportunities to:</p> <ul style="list-style-type: none"> • Improve, in cooperation with FAO and relevant fisheries management bodies, monitoring and reporting of catch, bycatch, discards, market and international trade data, at species level • Establish systems to provide verification of catch information • Implement the IPOA-Sharks as a matter of priority • Through FAO and RFMOs develop and implement regional shark plans and associated measures to assist in species identification and monitoring (as called for in IPOA-Sharks, by mid-2009) to report at CoP15. 	<p>PROPOSALS: Pristidae spp. (Sawfishes, 9 species, I) and <i>Pristis microdon</i> (live animals for aquaria, II), <i>Lamna nasus</i> (Porbeagle, II); <i>Squalus acanthias</i> (Spiny dogfish, II) - <u>Sawfish listing proposal adopted, came into force 13/09/07, others failed.</u></p>
<p>Inter-sessional activity incl. AC23, AC24 and FAO</p>	<p>Information needed for several Decisions (14.104, 14.106, 14.108 and 14.115) requested via Notification 2007/033:</p> <ul style="list-style-type: none"> • Parties landing and exporting products from shark species of concern identified by the Animals Committee (Cop14 Doc 59.1 Annex 3) to report on fisheries, environmental and international trade management measures adopted, levels of landings and exports, and the status of these stocks and fisheries. • For shark fishing and trading entities (particularly major ones), encourages improved cooperation with FAO • Parties to provide details of commodity codes for fish products. <p>Information collated summarised/provided in: AC23 Doc 15.1, AC23 Doc 15.1 Add, AC23 Inf. 3, AC23 Inf. 4 and AC23 Inf. 7.</p> <p>Notification 2008/044 requested Parties to provide shark NDF case studies in support of the International Expert Workshop on CITES Non-Detriment Findings held in November 2008 in Cancun, Mexico. Final report of Working Group 8 on Fishes included sharks.</p> <p>Comprehensive report from Spain (AC24 Inf. 5) compiled existing information on conservation, management, methodologies, tools, data, expertise and other available resources which can be useful for enhancing Parties' capacities to undertake improved NDF for sharks. Also suggests some fundamental considerations when making NDF for shark species and proposes some general guiding principles.</p> <p>FAO technical workshop on "Status, limitation and opportunities for improving the monitoring of shark fisheries and trade" held in November 2008.</p>	

<p>CoP15 (2010)</p>	<p>DISCUSSIONS, RESOLUTIONS and DECISIONS:</p> <p>Ongoing Animals Committee work on commodity codes, shark species of concern, capacity building, monitoring and reporting and linkages between international trade in shark fins, meat and IUU fishing presented in CoP15 Doc. 53.</p> <p>Resolution 12.6 revised and updated:</p> <ul style="list-style-type: none"> • Expresses continued concern at unsustainable trade and insufficient progress with IPOA-Sharks • Urges and encourages enhanced efforts • Instructs Animals Committee to make species-specific recommendations, if necessary, on improving the conservation status of sharks and to examine information provided by range States on trade and other data and information and report on activities at next CoPs. 	<p>PROPOSALS:</p> <p><i>Sphyrna lewini</i>, <i>S. mokarran</i>, <i>S. zygaena</i>, <i>Carcharhinus plumbeus</i>, <i>C. obscurus</i> (Hammerhead/Sandbar/Dusky sharks, II); <i>Carcharhinus longimanus</i> (Oceanic Whitetip, II); <i>Lamna nasus</i> (Porbeagle, II); <i>Squalus acanthias</i> (Spiny Dogfish, II) – <u>all proposals failed.</u></p>
<p>Inter-sessional activity (incl. AC25 and AC26)</p>	<p>FAO/CITES workshop to review the application and effectiveness of international regulatory measures for the conservation and sustainable use of elasmobranchs, held in July 2010, in Genazzano, Italy.</p> <p>Notification 2010/027 and Notification 2011/049 requesting information on trade in shark specimens and NPOAs; domestic measures (e.g. laws or regulations) regulating fishing, retention or landing of shark or ray species in their waters; and domestic measures regulating import or export of shark parts and products. Feedback to 2011/049 presented in AC26 16.2 Annexes; Response from Pew AC26 Inf 1.</p> <p>AC25 requested CITES Secretariat to closely collaborate with FAO Secretariat to develop questionnaire directed to the 26 major shark fishery States and territories to be used in FAO’s first global review of the implementation of IPOA-Sharks. FAO Review of International Plan of Action for Conservation and Management of Sharks published in July 2012.</p> <p><i>Lamna nasus</i> and <i>Sphyrna lewini</i> were listed in Appendix III by the European Union (EU) and Costa Rica, respectively, in September 2012.</p>	
<p>CoP16 (2013)</p>	<p>DISCUSSIONS, RESOLUTIONS and DECISIONS:</p> <p>Resolution 12.6 revised and updated (to incl. text from Decision 15.85) and two new draft DECISIONS adopted:</p> <ul style="list-style-type: none"> • Parties to provide to the Secretariat a summary, copies and links of domestic laws and regulations that prohibit or regulate the landing of sharks or trade in shark specimens, to be posted on CITES website. • Secretariat to collaborate with FAO in development of single, regularly updated, source summarising current RFMO measures for shark conservation and management, with information on species, fisheries, Members and Contracting Parties, and geographical areas covered and excluded. • Encourages Parties to engage with CMS, as cooperation increasingly relevant with two shark and one ray on CMS Appendix I, and seven shark species or populations, and one ray on CMS Appendix II. 	<p>PROPOSALS:</p> <p><i>Sphyrna lewini</i>, <i>S. mokarran</i>, <i>S. zygaena</i> (Hammerheads, II); <i>Carcharhinus longimanus</i> (Oceanic Whitetip, II); <i>Lamna nasus</i> (Porbeagle, II); <i>Pristis microdon</i> (live animals for aquaria, I), <i>Manta</i> spp. (Mantas, II), <i>Potamotrygon motoro</i>, <i>P. schroederi</i>; <i>Paratrygon aiereba</i> (Freshwater stingrays, II) - <u>all Shark and Manta proposals adopted, come into force 14/09/2014.</u></p>
<p>Inter-sessional activity</p>	<p>Notification 2013/023 issued to request information on planned and ongoing capacity building activities on CITES-listed shark species</p> <p>EU allocated funds for capacity building for implementation of these listings – current report compiled and notification to request information on capacity building initiatives issued.</p>	

APPENDIX B: Consultation questionnaires

1) Copy of questionnaire sent to CITES authorities

Consultation by TRAFFIC

May/June 2013

Aim: to help identify capacity building priorities for implementation of the new CITES Appendix II marine listings agreed at CoP16

At CITES CoP16, proposals to list a number of commercially important marine species on Appendix II were accepted. The following listings will consequently come into force on 14th September 2014:

- Hammerhead sharks: Scalloped Hammerhead Shark *Sphyrna lewini*, Great Hammerhead Shark *Sphyrna mokarran* and Smooth Hammerhead Shark *Sphyrna zygaena*
- Manta rays: *Manta* spp.
- Oceanic Whitetip Shark *Carcharhinus longimanus*
- Porbeagle Shark *Lamna nasus*

The questions below are aimed at obtaining a better picture of the information and tools available to authorities to assist in the implementation of these new marine species listings and how authorities are planning to address any gaps already identified.

We would be very grateful if you could provide feedback on behalf of your scientific, management and enforcement authorities in relation to the main issues surrounding the implementation of those listings that are most relevant to your country and region.

Thank you for your time and feedback!

Scientific Authorities

- 1) What information/data do you have available to you for carrying out NDFs for the marine species newly listed on CITES Appendix II?
- 2) What information/data do you feel you are lacking to carry out an accurate NDF?
- 3) How do you intend to address any information/data gaps prior to the listing coming into force in September 2014?
- 4) Other than the information/data deficiencies noted above, what do you anticipate will be the key challenges for scientific authorities associated with the implementation of these Appendix II listings? How might these be addressed?
- 5) Are there any important lessons you have learnt from previous listings of commercially important aquatic species that you feel will help solve any issues with the new listings?

Management Authorities

- 1) What information do you have available to you for carrying out legality findings for the marine species newly listed on CITES Appendix II?
- 2) What information do you feel you are lacking to carry out a legality finding?

- 3) How do you intend to address any knowledge gaps prior to the listing coming into force in September 2014?
- 4) Other than the information/data deficiencies noted above, what do you anticipate will be the key challenges for management authorities associated with the implementation of these Appendix II listings? How might these be addressed?
- 5) Are there any important lessons you have learnt from previous listings of commercially important aquatic species that you feel will help solve any issues with the new listings?

Enforcement Authorities

- 1) What tools do you have available to you for ensuring adequate enforcement of trade in species newly listed on CITES Appendix II?
- 2) What tools do you feel you are lacking to be able to properly enforce these listings?
- 3) How do you intend to solve these issues prior to the listing coming into force in September 2014?
- 4) Other than any issues specifically mentioned above, what do you anticipate will be the key challenges for enforcement authorities associated with the implementation of these Appendix II listings from an enforcement perspective? How might these be addressed?
- 5) Are there any important lessons you have learnt from previous listings of commercially important aquatic species that you feel will help solve any issues with the new listings?

2) Copy of questionnaire sent to experts

Consultation by TRAFFIC

May/June 2013

Aim: to help identify capacity building priorities for implementation of the new CITES Appendix II marine listings agreed at CoP16

At CITES CoP16, proposals to list a number of commercially important marine species on Appendix II were accepted. The following listings will consequently come into force on 14th September 2014:

- Hammerhead sharks: Scalloped Hammerhead Shark *Sphyrna lewini*, Great Hammerhead Shark *Sphyrna mokarran* and Smooth Hammerhead Shark *Sphyrna zygaena*
- Manta rays: *Manta* spp.
- Oceanic Whitetip Shark *Carcharhinus longimanus*
- Porbeagle Shark *Lamna nasus*

The questions below are aimed at obtaining a better picture of the main countries and territories that are likely to be affected by these listings, whether they have the capacity to deal with new implementation issues that will arise as result of the listings and whether there are already any initiatives underway (or planned) to address any gaps in capacity.

As a result of information collated in support of the CoP16 proposals, in addition to other sources, we have a good overall understanding of the range, flag and port States of these species. However, due to the various limitations on catch and trade data (lack of reporting, mis-reporting, lack of species-specific reporting etc.) the actual importance of each of these players is still relatively unknown. With these

species being generally wide-ranging and fished by many different nations, we would greatly appreciate any expert knowledge or opinion you could share with us under the questions below in relation to identifying the main players for each of the species/genera outlined above.

Thank you for your time and feedback!

1) Range States

- (a) Which range States are the key players in terms of locations of fisheries for these species?
- (b) In light of the requirement for the range State to carry out an NDF and a legality finding prior to the grant of an export permit for specimens caught in national waters, in which of these range States do you consider capacity is particularly lacking to implement the new Appendix II listings?
- (c) Are you aware of any capacity building initiatives currently planned with respect to the implementation of the new Appendix II listings for these species, for example, targeting any of the range States mentioned in your response to (a) or (b) above?

2) Flag States

- (a) Which are the key countries engaged in fishing these species, particularly in waters beyond national jurisdiction?
- (b) In light of the requirement for the Flag State to carry out an NDF and a legality finding prior to the grant of an export permit for specimens caught in waters beyond national jurisdiction, in which of these Flag States do you consider capacity is particularly lacking to implement the new Appendix II listings?
- (c) Are you aware of any capacity building initiatives currently planned with respect to the implementation of the new Appendix II listings for these species, for example in any of the Flag States mentioned in your response to (a) or (b) above?

3) Port States and intermediate countries (e.g. of processing)

- (a) Which countries are the key players in terms of landings of these species and subsequent processing?
- (b) For which of the countries mentioned in your response to (a) above do you consider capacity is particularly lacking to implement the new Appendix II listings, e.g. in terms of tracking and controlling fish landings and trade, general enforcement capacity, identification skills, training, etc.?
- (c) Are you aware of any capacity building initiatives currently planned to address these deficiencies in capacity?

APPENDIX C: Authorities and experts providing input to TRAFFIC's consultation

CITES Authorities

Country/ Territory	Authority (contact person/organisation, where provided)
Australia	Management/Scientific/Enforcement Authority (Bronwen Jones, combined response)
Canada	Management/Scientific/Enforcement Authority (combined response, through TRAFFIC staff: Ernie Cooper)
Costa Rica	Scientific Authority (Ileana Zanella/*Mision Tiburon)
El Salvador	Scientific Authorities (Ernesto Barraza, Francisco Rivas, Nestor Herrera /MARN & LEA)
Guatemala	Management/Scientific Authority (CONAP)
Honduras	Management Authority (Julian Suazo/SAG)
Hong Kong	Management Authority (Alfred Wong/AFCD)
Mexico	Management Authority (Hesiquio Benitez Diaz/CONABIO)
Mozambique	Management/Scientific/Enforcement Authority (combined response, through TRAFFIC: Markus Burgener)
South Africa	Scientific Authority (Michele Pfab /SANBI)
Taiwan	Competent Management Authority (Bureau of Foreign Trade)
Yemen	Management/Scientific/Enforcement Authority (EPA, Ministry of Water and Environment, combined response)
United Arab Emirates	Management Authority (Ministry of Environment and Water)

Abbreviations: please see comprehensive list of abbreviations in the main Report.

Experts (including representatives from other national authorities, regional and sub-regional organisations, NGOs/IGOs and academic institutions)

Continent/ Region	Country/ Territory/ Specialism	Name/organisation
Africa	Madagascar	Frances Humber/Blue Ventures
	Mozambique, South Africa	Markus Burgener/TRAFFIC Hannah Darrin/Eyes on the Horizon Simon Pierce/*Marine Megafauna Foundation
	West Africa, Senegal	Mathieu Ducrocq/*IUCN Hamady Diop/*SRFC
Asia	Hong Kong	Vivian Lam/*University of Hong Kong
	India, Sri Lanka	K.K. Bineesh/* Society for Marine Research & Conservation Daniel Fernando/Manta Trust
	Indonesia	Fahmi/*Indonesian Institute of Sciences Peter Bassett/Aquatic Alliance
	Malaysia	Ahmad Bin Ali/*SEAFDEC
	Middle East, United Arab Emirates	Edwin Grandcourt/*EAD Ralf Sonntag/IFAW
	Taiwan	Dr. K.M. Liu/National Ocean University
Europe	Mediterranean, Italy	Marino Vacchi/ISPRA, ISMAR
Latin America	All	Sandra Andraka/WWF-LAC
	All, Mexico	Maria Elena Sanchez/SSN
	Central America	OSPESCA (Central America Fisheries and Aquaculture Organization, combined response by members)
	Brazil	Fabio Hazin/*Universidade Federal Rural de Pernambuco UFRPE

Continent/ Region	Country/ Territory/ Specialism	Name/organisation
		Monica Peres/Ministério do Meio Ambiente
	Costa Rica	Jose Miguel Carvajal/Instituto Costarricense de Pesca y Acuicultura
	Guatemala	Manuel Ixquiac/University of San Carlos; DIPESCA (Fisheries Authority)
	Nicaragua	Manuel Perez/OSPESCA Alejandro Cotto/FAO Nicaragua
	Venezuela	Freddy Arocha/*Universidad de Oriente
North America	Canada	Ernie Cooper/TRAFFIC
	United States	Laura Cimo/NOAA
Global	All	Amie Brautigam/WCS
	All	Colman O'Criodain/WWF
	All	Glenn Sant/TRAFFIC
	All	Mary Lack/Independent
	All	Sarah Fowler/*Independent
	All	Johanne Fischer/FAO
	Molecular identification	Jenny Giles/University of Queensland; Scientific Working Group for Wildlife Forensic Sciences (US)
	Manta range States	Mary O'Malley/Shark Savers (in consultation with Shawn Heinrichs/Bluesphere and Mark Erdman/Conservation International)

Abbreviations: please see comprehensive list of abbreviations in the main Report.

Note: *These experts were contacted in their capacity as members of the IUCN Shark Specialist Group

Appendix D: FAO trade data for sharks, 2000-2009

Tables 1 and 2: Top 20 fresh and frozen shark meat exporters and importers, total tonnes traded 2000-2009 (FAO Fishstat)

	Exporter	tonnes
1	Spain*	123 848
2	Taiwan	103 067
3	Panama	46 543
4	Uruguay	44 653
5	Costa Rica	43 252
6	United States of America	38 521
7	Japan	35 199
8	Canada	33 596
9	United Kingdom*	26 860
10	New Zealand	21 496
11	Singapore	19 155
12	Ireland*	17 785
13	Portugal*	14 675
14	France*	12 938
15	Namibia	11 268
16	Norway	9 479
17	South Africa	9 090
18	Indonesia	7 545
19	Mexico	7 190
20	Denmark*	6 829
21<	Rest of the World	75 393
	TOTAL	708 383

	Importer	tonnes
1	Spain*	144 697
2	Italy*	111 238
3	Brazil	98 668
4	Mexico	65 628
5	Uruguay	61 273
6	China	50 005
7	France*	35 286
8	Republic of Korea	31 913
9	Nigeria	22 474
10	Singapore	21 836
11	Portugal*	21 678
12	United Kingdom*	20 488
13	Taiwan	17 882
14	Costa Rica	15 641
15	United States of America	14 781
16	Peru	13 185
17	Greece*	12 442
18	Japan	10 674
19	Denmark*	10 188
20	South Africa	8 724
21<	Rest of the World	83 537
	TOTAL	872 238

Notes:

- These figures include commodities reported under fresh/chilled and frozen shark meat pre-2012 HS6 codes 030265 and 030375.
- Some countries/territories report more species- or product-specific data under these codes, such as Spiny Dogfish and frozen shark fin and are therefore included in the totals above.
- Member States of the European Union (EU) are marked with an asterisk (*). Together, EU Member States accounted for 223 537 (32%) and 377 991 (43%) tonnes of exports and imports, respectively.
- Of note are the following countries / territories that specifically reported exporting frozen shark fin to FAO and did not report any trade in non-frozen shark fins (in tables 3 and 4): India (1982 t), Oman (158 t), Maldives (90 t), St. Pierre and Miquelon (2 t) and Suriname (90 t).

Tables 3 and 4: Top 20 shark fin exporters and importers, total tonnes traded 2000-2009 (FAO Fishstat)

	Exporters	tonnes
1	Thailand	23 220
2	China	13 544
3	Indonesia	10 762
4	Singapore	9 737
5	Taiwan	6 378
6	United Arab Emirates	4 765
7	Malaysia	2 124
8	Japan	1 978
9	United States of America	1 941
10	Yemen	1 753
11	Panama	897
12	Brazil	869
13	Ecuador	790
14	Bangladesh	744
15	Senegal	525
16	Costa Rica	353
17	Pakistan	282
18	Uruguay	253
19	Guinea	221
20	Argentina	214
21<	Rest of the World	2 059
	TOTAL	83 409

	Importers	tonnes
1	Hong Kong	105 549
2	China	31 228
3	Singapore	12 337
4	Malaysia	6 896
5	Indonesia	1 582
6	Taiwan	1 205
7	Thailand	1 198
8	Macao	1 136
9	United States of America	334
10	Canada	328
11	Myanmar	163
12	Timor-Leste	112
13	Peru	94
14	Republic of Korea	54
15	South Africa	51
16	Australia	41
17	Democratic Rep. of Korea	32
18	Brunei Darussalam	21
19	Lao	12
20	Kuwait	9
21<	Rest of the World	8
	TOTAL	162 390

Notes:

- *These figures include shark fins reported under various commodity codes and reported specifically to FAO as shark fins, except frozen fins (see notes under Tables 1 and 2).*
- *They include dried/ salted; dried/ unsalted; salted and in brine but not dried or smoked; prepared or preserved.*
- *There is no data reported from EU Member States under these commodities.*

Tables 5 and 6: Top 20 exporters and importers of other shark products, total tonnes traded 2000-2009 (FAO Fishstat)

	Exporter	tonnes
1	Taiwan	29 482
2	Chile	21 215
3	Spain*	20 499
4	New Zealand	14 431
5	Japan	7 472
6	Portugal*	3 528
7	Argentina	2 641
8	Maldives	2 620
9	Costa Rica	2 071
10	Iceland	1 722
11	Uruguay	1 451
12	Indonesia	1 411
13	Peru	1 364
14	Netherlands*	785
15	Republic of Korea	680
16	India	605
17	Belgium*	561
18	Germany*	507
19	Norway	459
20	United Kingdom*	376
21<	Rest of the World	1 503
	TOTAL	115 383

	Importer	tonnes
1	Republic of Korea	83 785
2	Italy*	5 252
3	France*	4 167
4	Spain*	3 754
5	Greece*	2 483
6	Germany*	2 162
7	Taiwan	1 339
8	Netherlands*	1 103
9	Denmark*	748
10	Belgium*	625
11	Chile	594
12	Portugal*	491
13	Russian Federation	488
14	United Kingdom*	429
15	Croatia	353
16	Romania*	343
17	Bulgaria*	321
18	Norway	306
19	Costa Rica	280
20	Czech Republic*	226
21<	Rest of the World	1 210
	TOTAL	110 459

Notes:

- These figures include all other shark-specific commodities reported to FAO, not included in the meat and fins commodities summarised in Tables 1-4.
- Member States of the EU are marked with an asterisk (*). Together, EU Member States accounted for 26 819 (23%) and 377 991 (21%) tonnes of exports and imports, respectively.

List of other countries reporting shark trade under any of the categories, but falling outside the Top 20 exporters and importers:

Antigua and Barbuda, Albania, Algeria, Angola, Armenia, Austria, Bahrain, Barbados, Belarus, Bolivia (Plurinational State), Bosnia and Herzegovina, Cameroon, Cayman Islands, Colombia, Congo (Democratic Republic of), Congo (Republic of), Cook Islands, Côte d'Ivoire, Cuba, Cyprus, Djibouti, Dominican Republic, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Faroe Islands, Fiji, Finland, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, Jamaica, Jordan, Kenya, Kiribati, Latvia, Lesotho, Liberia, Libya, Lithuania, Luxembourg, Macedonia (FYROM), Madagascar, Marshall Islands, Mauritania, Mauritius, Micronesia (Federal States of), Moldova (Republic of), Montenegro, Morocco, Mozambique, Netherlands Antilles, Nicaragua, Niger, Oman, Palau, Papua New Guinea, Philippines, Poland, Qatar, Saint Helena, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Saudi Arabia, Serbia, Seychelles, Sierra Leone, Slovakia, Slovenia, Solomon Islands, Somalia, Sri Lanka, St. Pierre and Miquelon, Suriname, Swaziland, Sweden, Switzerland, Tanzania (United Republic of), Togo, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, Vanuatu, Venezuela (Bolivarian Republic of) and Viet Nam.

APPENDIX E: FAO catch data by species, 2002-2011

A. Oceanic Whitetip

Table 1: Oceanic Whitetip catchers, 2002-2011 (total in tonnes, FAO FishStat)

Country	Total capture (tonnes)
Sri Lanka	4 274
China	1 571
Brazil	972
Taiwan	303
Fiji	92
Tanzania	60
Portugal	13
Mozambique	6

Table 2: Oceanic Whitetip catch by FAO fishing area, 2002-2011 (total in tonnes, FAO FishStat)

FAO area	Total capture (tonnes)
Eastern Indian Ocean	4 393
Western Central Pacific	1 090
Southwest Atlantic	974
Eastern Central Pacific	609
Western Indian Ocean	200
Eastern Central Atlantic	9
Southeast Pacific	9
Southwest Pacific	7

Table 3: Location (FAO area) of Oceanic Whitetip fisheries by top 3 catchers, 2002-2011 (total in tonnes, FAO FishStat)

Country	FAO Area	Total Capture (tonnes)
Sri Lanka	Eastern Indian Ocean	4 274
China	Western Central Pacific	979
	Eastern Central Pacific	325
	Western Indian Ocean	132
	Eastern Indian Ocean	119
	Southeast Pacific	9
	Southwest Pacific	7
	Brazil	Southwest Atlantic

B. Porbeagle

Table 4: Porbeagle catchers, 2002-2011 (total in tonnes, FAO FishStat)

Country	Total Capture (tonnes)
Indonesia *	5 038
France	2 707
Canada	1 405
Spain	1 079
New Zealand	686
Uruguay	187
Norway	153
United Kingdom	145
Faroe Islands	137
Portugal	119
Denmark	103
Ireland	60
Germany	21
United States of America	19
Ukraine	17
Iceland	10
Channel Islands	9
Albania	7
Italy	6
Sweden	5
St. Pierre and Miquelon	4
Malta	2
Argentina	1
Australia	1

Note: Indonesia is the only country which gave figures for Mackerel sharks, porbeagles nei and not Porbeagle

Table 5: Porbeagle catch by FAO fishing area, 2002-2011 (total in tonnes, FAO FishStat)

FAO area	Total Capture (tonnes)
Northeast Atlantic	3 714
Eastern Indian Ocean	2 558
Western Central Pacific	2 480
Northwest Atlantic	1 436
Southwest Pacific	703
Eastern Central Atlantic	436
Southeast Pacific	282
Southwest Atlantic	205
Western Indian Ocean	51
Southeast Atlantic	25
Mediterranean and Black Sea	16
Western Central Atlantic	13
Antarctic Atlantic	1
Antarctic Indian Ocean	1

Note: These figures include catch data for Indonesia which is the only country which reports Porbeagle catches under the general category Mackerel sharks, porbeagles nei rather than Porbeagle

Table 6: Location (FAO area) of Porbeagle fisheries by top 3 catchers, 2002-2011 (total in tonnes, FAO FishStat)

Country	FAO area	Total capture (tonnes)
Indonesia	Eastern Indian Ocean	2 558
	Western Central Pacific	2 480
France	Northeast Atlantic	2 707
Canada	Northwest Atlantic	1 405
Spain	Eastern Central Atlantic	390
	Northeast Atlantic	311
	Southeast Pacific	282
	Western Indian Ocean	45
	Southeast Atlantic	25
	Western Central Atlantic	13
	Southwest Atlantic	12
	Mediterranean and Black Sea	1

Note: Indonesia has been included as it is the largest catcher of "Mackerel sharks, porbeagles nei"

C. Hammerheads

Table 7: “*Hammerhead sharks, etc. ner*” catchers, 2002-2011 (total in tonnes, FAO FishStat)

Country	Total capture (tonnes)
Indonesia	14 085
Senegal	10 017
Congo, Republic of	5 495
Sri Lanka	2 593
Mexico	1 591
Liberia	1 557
Spain	1 198
Ecuador	964
Benin	536
Côte d'Ivoire	410
Guyana	313
Uruguay	204
Namibia	166
Trinidad and Tobago	218
Ghana	105
Togo	58
Mauritania	37
Portugal	10
United States of America	0

Table 8: “*Hammerhead sharks, etc. ner*” catch by FAO fishing area, 2002-2011 (total in tonnes, FAO FishStat)

FAO area	Total capture (tonnes)
Eastern Central Atlantic	19 119
Western Central Pacific	8 931
Eastern Indian Ocean	7 793
Western Central Atlantic	1 175
Eastern Central Pacific	983
Southeast Pacific	966
Southwest Atlantic	213
Western Indian Ocean	211
Southeast Atlantic	166

Table 9: Location (FAO area) of “*Hammerhead sharks, etc. ner*” fisheries by top 3 catchers, 2002-2011 (total in tonnes, FAO FishStat)

Country	FAO area	Total catch (tonnes)
Indonesia	Western Central Pacific	8 931
	Eastern Indian Ocean	5 154
Senegal	Eastern Central Atlantic	10 017
Congo, Republic of	Eastern Central Atlantic	5 495

Table 10: “*Scalloped hammerhead*” catchers, 2002-2011 (total in tonnes, FAO FishStat)

Country	Total capture (tonnes)
Brazil	1 719
Spain	950
Mauritania	317
Ecuador	89
Guinea-Bissau	40
United Kingdom	16
Venezuela, Bolivarian Republic of	6

Table 11: “*Scalloped hammerhead*” catch by FAO fishing area, 2002-2011 (total in tonnes, FAO FishStat)

FAO area	Total capture (tonnes)
Eastern Central Atlantic	1 251
Southwest Atlantic	1 790
Southeast Pacific	89
Western Central Atlantic	6
Southeast Atlantic	1

Table 12: Location (FAO area) of “*Scalloped hammerhead*” fisheries by top 3 catchers, 2002-2011 (total in tonnes, FAO FishStat)

Country	FAO area	Total catch (tonnes)
Brazil	Atlantic, Southwest	1 719
Spain	Eastern Central Atlantic	880
	Southwest Atlantic	70
Mauritania	Eastern Central Atlantic	317

Table 13: “Smooth hammerhead” catchers, 2002-2011 (total in tonnes, FAO FishStat)

Country	Total capture (tonnes)
Spain	922
Ecuador	412
Portugal	308
New Zealand	100
United States of America	6

Table 14: “Smooth hammerhead” catch by FAO fishing area, 2002-2011 (total in tonnes, FAO FishStat)

FAO area	Total capture (tonnes)
Eastern Central Atlantic	880
Southeast Pacific	412
Southeast Atlantic	177
Southwest Pacific	100
Northeast Atlantic	94
Southwest Atlantic	79
Northwest Atlantic	6

Table 15: Location (FAO area) of “Smooth hammerhead” fisheries by top 3 catchers, 2002-2011 (total in tonnes, FAO FishStat)

Country	FAO area	Total catch (tonnes)
Spain	Eastern Central Atlantic	686
	Southeast Atlantic	160
	Southwest Atlantic	55
	Northeast Atlantic	21
Ecuador	Southeast Pacific	412
Portugal	Eastern Central Atlantic	194
	Northeast Atlantic	73
	Southwest Atlantic	24
	Southeast Atlantic	17

APPENDIX F: Overview of international policies, regulations and measures relevant to CITES implementation with respect to commercially-valuable marine species

Overview (scope, relevant provisions)	Status
<p><u>United Nations Convention on the Law of the Sea (UNCLOS)</u></p> <ul style="list-style-type: none"> Establishes coastal State sovereignty to conserve and manage living resources in their Exclusive Economic Zones (EEZs). Coastal States must take and implement conservation measures to avoid overexploitation, allow restoration of species if needed, take account of associated or dependent species and consider incidental bycatch. Freedom of fishing by flag States in the high seas is restricted by treaty obligations, taking into consideration the interests of coastal States and the obligation for flag States to cooperate in the conservation and management of marine species. Regional co-operation is required in relation to the management of straddling stocks and highly migratory species in the EEZs and in the high seas. Highly migratory species listed in Annex I of UNCLOS includes all CITES-listed oceanic sharks: <i>Cetorhinus maximus</i>, <i>Rhincodon typus</i>, Sphyrnidae (Hammerhead sharks), Lamnidae (Porbeagle) and <i>Carcharhinidae</i> (Oceanic Whitetip). 	<p>BINDING</p> <p>Adopted: 1982 Entry into Force: 1994 Ratifications/signatories: 165</p>
<p><u>UN Fish Stocks Agreement (relating to the conservation and management of straddling fish stocks and highly migratory fish stocks, UNFSA)</u></p> <ul style="list-style-type: none"> Obliges states to co-operate through RFMOs (regional fishery management organisations or arrangements) to conserve and manage stocks of migratory sharks in the high seas. Implements Article 64 of UNCLOS on highly migratory species and requires coastal States and fishing States to co-operate and agree measures to ensure conservation of qualifying shark species (listed in Annex I of UNCLOS) or stocks that straddle coastal waters and the high seas. Obliges Contracting Parties to minimise catch of non-target species such as sharks and impacts on associated or dependent (particularly endangered) species. Calls for Parties to monitor fishing levels and stocks, provide accurate reporting of and minimise bycatch and discards, and gather reliable, comprehensive scientific data as the basis for management decisions. Fishing states must take measures to ensure the conservation of any sharks occurring only on the high seas. 	<p>BINDING</p> <p>Adopted: 1995 Entry into Force: 2001 Ratifications/signatories: 80</p>
<p><u>Food and Agriculture Association of the United Nations (FAO) Compliance Agreement (to promote compliance with international conservation and management measures by fishing vessels on the high seas)</u></p> <ul style="list-style-type: none"> Flag States must take necessary measures to ensure vessels flying their flag are not engaging in any activity undermining the effectiveness of conservation and management measures. Applies to all high seas fishing (not just straddling fish stocks and highly migratory stocks). Obligation to establish record of fishing vessels and to make information available on request. Provides for systematic exchange of information regarding high seas fishing vessels to which agreement applies. 	<p>BINDING</p> <p>Adopted: 1993 Entry into Force: 2003 Parties: 39</p>
<p><u>FAO Agreement on Port State Measures (to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing, PSMA)</u></p> <ul style="list-style-type: none"> Main purpose is to prevent, deter and eliminate IUU fishing through the implementation of robust port State measures when foreign vessels 	<p>BINDING</p>

Overview (scope, relevant provisions)	Status
<p>are seeking entry to ports or while they are in port.</p> <ul style="list-style-type: none"> Stipulates minimum port State measures that will contribute to harmonized port State measures, enhanced regional and international cooperation and block the flow of IUU-caught fish into national and international markets, however countries are free to adopt even more stringent measures. FAO has initiated a global series of regional workshops to develop capacity in relation to port State measures, helping to prepare countries before ratifying the agreement. 	<p>Adopted: 2009 Entry into Force: 30 days after 25th ratification, acceptance, approval or accession</p>
<p><u>FAO Code of Conduct for Responsible Fisheries (CCRF)</u></p> <ul style="list-style-type: none"> Supplements the FAO Compliance Agreement and the UN Fish Stocks Agreement. Sets out principles and international standards of behaviour for responsible fishing and fishing activities. Several provisions of the code refer to the need to develop or use selective and environmentally safe fishing gear and to minimise waste, catch of non-target species (fish and non-fish) and impacts on associated species. 	<p>NON-BINDING</p> <p>Adopted: 1995</p>
<p><u>FAO International Plan of Action for Conservation and Management of Sharks (IPOA-Sharks)</u></p> <ul style="list-style-type: none"> Elaborated within the framework of CCRF. Covers all shark, skate, ray and chimera species and all types of catches (directed, bycatch, commercial, recreational, others). Applies to coastal States where sharks are caught in their waters and to flag States where vessels entitled to fly their flags catch sharks on the high seas. States are called on to participate in the management of shark stocks. States are encouraged to develop and implement National Plans of Action (NPOAs) for the conservation and management of shark stocks if vessels conduct directed fisheries for sharks or take sharks as bycatch. FAO has carried out a series of activities to support implementation, including publishing various Technical Guidelines for Responsible Fisheries, including on Responsible Fish Trade¹. 	<p>NON-BINDING</p> <p>The 2012 FAO review of implementation of the IPOA concluded that progress in implementation of NPOAs was lacking (Fischer <i>et al.</i>, 2012)</p>
<p>UN General Assembly Resolutions on sustainable fisheries</p> <p><u>2008 Resolution on sustainable fisheries</u></p> <ul style="list-style-type: none"> Called upon states to urgently adopt measures to implement IPOA-Sharks fully and to report regularly on shark catches. Further called upon states to improve implementation of and compliance with existing measures adopted by RFMOs, particularly those prohibiting shark finning. <p><u>2010 Resolution on sustainable fisheries</u></p> <ul style="list-style-type: none"> Called upon RFMOs to strength or establish precautionary, science-based conservation and management measures for sharks taken in fisheries within their convention areas. 	<p>NON-BINDING</p>
<p><u>The Convention on Migratory Species (CMS)</u></p> <ul style="list-style-type: none"> Aims to conserve species that cross national boundaries and/or are in areas beyond national jurisdiction. Promotes concerted action among range States for the strict protection of migratory species threatened with extinction that are listed in 	<p>BINDING</p> <p>Adopted: 1979 Entry into Force: 1983</p>

¹ FAO (2009) *Responsible fish trade. FAO Technical Guidelines for Responsible Fisheries. No. 11. Rome, FAO. 23 pp.*

Overview (scope, relevant provisions)	Status
<p>Appendix I (including <i>Carcharodon carcharias</i>, <i>Cetorhinus maximus</i> and <i>Manta birostris</i> populations) and obliges range States to prohibit the taking of animals belonging to such species (Article III(5)).</p> <ul style="list-style-type: none"> Range States are encouraged to enter into global or regional agreements for migratory species with unfavourable conservation status that need or would significantly benefit from international co-operation and are listed in Appendix II (including <i>Rhincodon typus</i>, <i>Lamna nasus</i>, <i>Squalus acanthias</i> (Northern Hemisphere populations), and <i>Carcharodon carcharias</i>, <i>Cetorhinus maximus</i> and <i>Manta birostris</i> populations not included in Appendix I). <p>CMS Memorandum of Understanding (MoU) and Conservation Plan on the Conservation of Migratory Sharks</p> <ul style="list-style-type: none"> Non-legally binding MoU agreed under CMS in 2010. Applies to species listed in Annex I of the MoU, including <i>Carcharodon carcharias</i>, <i>Cetorhinus maximus</i>, <i>Rhincodon typus</i> and <i>Lamna nasus</i>. Annex I is open for further listings which may include any <i>Chondrichthyes</i> migratory species, subspecies or populations. Signatories adopted conservation plan at their first meeting in September 2012 (Annex 3 to the MoU). Section 3 paragraph 8 of the MoU states that sharks should be managed to allow for sustainable harvest where appropriate, through conservation and management measures based on the best available scientific information. Paragraph 13j) of Section 4 of the MoU encourages relevant bodies to set targets based on the best available science for fish quotas, fishing effort and other restrictions to help achieve sustainable use. <p>Cooperation between CITES and CMS:</p> <ul style="list-style-type: none"> At AC25 (Geneva, July 2011), the Animals Committee requested that the CITES Secretariat consult and closely collaborate with the Secretariat of the CMS on shark issues pursuant to the MoU between the two Secretariats. CITES Secretariat participated in the First Meeting of the Signatories to the MOU on Sharks (Bonn, 24-27 September 2012), where the Conservation Plan was adopted. <p>CMS Resolutions relevant to CITES-listed sharks and rays: Resolution adopted at CoP10 UNEP/CMS/Res.10.14 - Bycatch of CMS-listed Species in Gillnet Fisheries:</p> <ul style="list-style-type: none"> Urges Parties to assess the risk of bycatch arising from their gillnet fisheries, as it relates to migratory species, including by using observer programmes and/or other methods, where appropriate, to implement best practice mitigation measures and to review regularly the effectiveness of their implementation of mitigation measures with a view to refining them if required. 	<p>Ratifications/signatories: 119</p> <p>NON-BINDING</p> <p>Signatories: 26</p> <p>NON-BINDING</p> <p>NON-BINDING</p>
<p>The Convention on Biological Diversity (CBD)</p> <ul style="list-style-type: none"> Sharks are a focus group of the CBD and several recommendations for their sustainable conservation and management have been adopted, in particular with regard to large pelagic sharks. 	<p>BINDING</p> <p>Adopted: 1992</p> <p>Entry into Force: 1993</p> <p>Ratifications/Signatories: 168 (193 Parties)</p>

APPENDIX G: Details of binding and non-binding measures for the conservation and/or management of sharks adopted by RFMOs

RFMOs	Details of shark conservation/management measures	Data collection and research activities	Examples of stock assessments and/or Ecological Risk Assessments (ERA) carried out
CCAMLR	<ul style="list-style-type: none"> • Targeting of sharks in the Convention Area prohibited for purposes other than scientific research¹ • Any bycatch of shark (especially juveniles and gravid females) to be released alive, as far as possible² • Measure to minimise incidental mortality of non-target species, including sharks³ 		Biomass survey of all fish species including the mackerel icefish, <i>Champsocephalus gunnari</i> (2010) ⁴ , Patagonian toothfish <i>Dissostichus eleginoides</i> (2008) ⁵
	<p>References: (1) Conservation Measure 32-18 (2006); (2) Conservation Measure 32-18 (2006); (3) Conservation Measure 26-01 (2008); (4) Stock assessment of mackerel icefish (<i>Champsocephalus gunnari</i>) in the vicinity of Kerguelen Islands (Division 58.5.1) after the 2010 POKER Biomass survey (http://www.ccamlr.org/en/wg-fsa-12/16-rev-1); (5) An integrated stock assessment for the Patagonian toothfish (<i>Dissostichus eleginoides</i>) for the Heard and McDonald islands using CASAL. http://archive.ccamlr.org/ccamlr_science/Vol-15-2008/01candy-constable.pdf.</p>		
CCSBT	<p>Encourages/recommends Members to:¹</p> <ul style="list-style-type: none"> • Implement the IPOA-Sharks • Comply with shark measures adopted by the IOTC, WCPFC and ICCAT in their Convention Areas 	<p>Encourages/recommends Members to:¹</p> <ul style="list-style-type: none"> • Collect and provide data on ecologically related species • Conduct an assessment of risks to ecologically related species posed by fishing for Southern Bluefin Tuna. 	Stock assessment for Southern Bluefin Tuna (<i>Thunnus maccoyii</i>)(2011) ²
	<p>References: (1) Recommendation to Mitigate the Impact on Ecologically Related Species of Fishing for Southern Bluefin Tuna (not binding on Contracting Parties); (2) Report of the Sixteenth Meeting of the Scientific Committee http://www.ccsbt.org/userfiles/file/docs_english/meetings/meeting_reports/ccsbt_18/report_of_SC16.pdf; (3) CCSBT ERSWG (2012). Report of the Ninth Meeting of the Ecologically Related Species Working Group, 27-30 March 2012, Tokyo, Japan. http://www.ccsbt.org/userfiles/file/docs_english/meetings/meeting_reports/ccsbt_19/report_of_ERSWG2.pdf</p>		
GFCM	<ul style="list-style-type: none"> • Shark catches to be fully utilised (all parts to be retained, except head, guts and skins) • Finning of sharks to be prohibited¹ • Live release of shark bycatch (especially juveniles) is encouraged² <p>Species-specific measures:</p> <ul style="list-style-type: none"> • Adopted ICCAT recommendation on Hammerheads³ 	<ul style="list-style-type: none"> • Where possible, research to be conducted towards improved gear selectivity and for the identification of shark-nursery areas² • Data on catches of sharks, including effort, gear, landings and discards, to be reported annually, to species level if possible. Numbers and species of highly migratory sharks to be recorded in logbooks⁴ 	Three year work-programme initiated in 2010 to improve knowledge and assess status of elasmobranchs in the Mediterranean Sea and Black Sea (including development of standardised protocol to collect basic data on species).
	<p>References: (1) Recommendation GFCM/36/2012/3 on fisheries management measures for conservation of sharks and rays in the GFCM area; (2) Recommendation GFCM/2005/3 (E) – adoption of ICCAT Recommendation 04-10; (3) Recommendation GFCM/35/2011/7 (C) – adoption of ICCAT Recommendation 10-08 on Hammerhead sharks (family Sphyrnidae) caught in association with fisheries management by ICCAT; (4) Recommendation GFCM/35/3011/1. GFCM Recommendations are binding on Contracting Parties.</p>		
IATTC	Members and cooperating non-Members (CPCs) required to: ¹	Members and cooperating non-Members (CPCs) required to: ¹	<ul style="list-style-type: none"> • IATTC resolved to provide preliminary advice on stock status of key shark species (2005)

RFMOs	Details of shark conservation/management measures	Data collection and research activities	Examples of stock assessments and/or Ecological Risk Assessments (ERA) carried out
	<ul style="list-style-type: none"> Establish and implement an NPOA Sharks Fully utilise shark catches (all parts to be retained, except head, guts and skins) Apply a 5 percent fin-to-body weight ratio for sharks on board vessels <p>CPCs <u>encouraged to</u>:¹</p> <ul style="list-style-type: none"> Release live sharks, especially juveniles, caught as bycatch and not used for food and/or subsistence <p>Species-specific measures:²</p> <ul style="list-style-type: none"> Oceanic Whitetips to be released alive, to the extent practicable. Targeting and retention prohibited. 	<ul style="list-style-type: none"> Where possible, undertake research to identify ways to make fishing gear more selective, identify nursery habitats, determine survival rates of released sharks and define areas/periods when species are most likely caught Submit annual reports on catches, effort by gear type, landing and trade of sharks by species, where possible. Annual reports to contain information on discards and releases of Oceanic Whitetips with indication of status (dead or alive).² <p>(Note: IATTC started collecting shark bycatch statistics in 1992⁶)</p>	<ul style="list-style-type: none"> Research plan proposed for comprehensive assessment of these stocks (2006) Stock assessments for tuna species (2012)³; Silky Shark (<i>Carcharhinus falciformis</i>) in progress⁴; Blue Shark (<i>Prionace glauca</i>) conducted by scientists of NMFS (2009)⁵
	<p>References: (1) IATTC. Resolution on the Conservation of Sharks Caught in Association with Fisheries in the Eastern Pacific Ocean. Resolution C-05-03 (2005); (2) IATTC. Resolution on the Conservation of Oceanic Whitetip Sharks Caught in Association with Fisheries in the Antigua Convention Area. Resolution C-11-10 (2011); (3) Stock Assessment Report 13 http://www.iattc.org/StockAssessmentReports/StockAssessmentReport13ENG.htm; (4) Workshop on stock assessment of silky sharks in the Eastern Pacific Ocean https://iattc.org/Meetings/Meetings2013/FebShark/PDFs/Shark-meeting-Feb-2013-AnnouncementENG.pdf; (5) North Pacific Blue Shark Stock Assessment http://www.pifsc.noaa.gov/tech/NOAA_Tech_Memo_PIFSC_17.pdf. (6) Kobe II Bycatch Workshop Background Paper: http://www.tuna-ora.org/documents/Aus/Kobe_II_Bycatch_Workshop_Paper_Sharks_FINAL_ENG_rev.pdf IATTC. Resolutions are binding on Contracting Parties.</p>		
ICCAT	<p>Each CPC <u>required to</u>:</p> <ul style="list-style-type: none"> Fully implement an NPOA Sharks¹ Apply a 5% fin-to-body weight ratio for sharks on board vessels² Fully utilise shark catches (all parts to be retained, except head, guts and skins)² <p>CPCs <u>encouraged to</u>:</p> <ul style="list-style-type: none"> Release shark bycatch (especially juveniles) alive. <p>Species-specific measures:</p> <ul style="list-style-type: none"> Catch and trade of Oceanic Whitetips³ and Hammerheads⁴ (except <i>Sphyrna tiburo</i>) prohibited. (Note: developing coastal states exempted from the prohibition to allow domestic consumption of 	<p>Each CPC <u>required to</u>:</p> <ul style="list-style-type: none"> Report annually catch and effort data for sharks. Discards and releases (dead or alive) of Oceanic Whiteips³ and Hammerheads⁴ (except <i>Sphyrna tiburo</i>) must be reported. <p>CPCs <u>encouraged to</u>:</p> <ul style="list-style-type: none"> Conduct research towards improved gear selectivity and for the identification of shark-nursery areas. Where possible, implement research on Hammerheads in the Convention area in order to identify potential nursery areas⁴. 	<ul style="list-style-type: none"> Stock assessment for Shortfin Mako <i>Isurus paucus</i> (2012)⁶, Blue Shark (2008)⁷. Collaborated with ICES on a joint Porbeagle stock assessment (2009)⁸. ERA conducted on eleven species of pelagic elasmobranchs (10 sharks and 1 ray) including Oceanic Whitetip, Porbeagle, Scalloped Hammerhead and Smooth Hammerhead⁹.

RFMOs	Details of shark conservation/management measures	Data collection and research activities	Examples of stock assessments and/or Ecological Risk Assessments (ERA) carried out
	<p>Hammerheads, assuming they do not enter international trade and catches do not increase)</p> <ul style="list-style-type: none"> Fishing mortality of Porbeagle should be reduced, until sustainable levels of harvest can be determined. In 2008 ICCAT adopted a non-binding resolution suggesting a joint meeting of adjacent RFMOs (ICCAT, ICES, NAFO, and NEAFC) to examine the possibility of adopting compatible management measures for Atlantic Porbeagles⁵. 	<p>(Note: ICCAT started collecting shark bycatch statistics in 1995⁵)</p>	
<p>References: (1) Resolution 03-10 on shark fishery (2003); (2) ICCAT. Recommendation 04-10 Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT (2004); (3) ICCAT. Recommendation 10-07 on the Conservation of Oceanic Whitetip Sharks caught in Association with fisheries in the ICCAT Convention Area (2010); (4) ICCAT. Recommendation 10-08 on Hammerhead Sharks (family Sphyrnidae) Caught in Association with Fisheries Managed by ICCAT (2010). (5) Kobe II Bycatch Workshop Background Paper http://www.tuna-ora.org/documents/Aus/Kobe_II_Bycatch_Workshop_Paper_Sharks_FINAL_ENG_rev.pdf; (6) Recommendation 10-06 on Atlantic Shortfin Mako Sharks Caught in Association with ICCAT Fisheries; (7) Report of the 2008 shark stock assessments meeting: http://www.iccat.es/Documents/SCRS/DetRep/DET-SHK.pdf; (8) Report of the 2009 porbeagle stock assessments meeting: http://www.iccat.int/Documents/Meetings/Docs/2009_POR_ASSESS_ENG.pdf; (9) Ecological risk assessment of pelagic sharks caught in Atlantic pelagic longline fisheries: http://www.iccat.int/Documents/Meetings/Docs/SCRS/SCRS-08-138_Cortes_et_al.pdf; Recommendations are mandatory for CPCs; resolutions are strongly encouraged.</p>			
IOTC	<p>CPCs <u>required to</u>:¹</p> <ul style="list-style-type: none"> Fully utilise shark catches (all parts to be retained, except head, guts and skins) Apply a 5% fin-to-body weight ratio for sharks on board vessels up to the first point of landing <p>CPCs <u>encouraged to</u>:¹</p> <ul style="list-style-type: none"> Release live sharks (especially juveniles and gravid females) caught as bycatch and not used for food and/or subsistence, to the extent possible <p>Species-specific measures:</p> <ul style="list-style-type: none"> Oceanic Whitetips not to be retained and to be released unharmed, to the extent practicable. CPCs to encourage their fishers to record incidental catches and live releases and report to IOTC. CPCs to implement research on Oceanic Whitetips in order to identify potential nursery areas. Based on this research, CPCs shall consider other measures, as appropriate². 	<p>CPCs <u>required to</u>:¹</p> <ul style="list-style-type: none"> Report shark catches annually, in accordance with IOTC data reporting procedures, including available historical data. To species level, if possible. <p>CPCs <u>encouraged to</u>:¹</p> <ul style="list-style-type: none"> Conduct research towards improved gear selectivity and for the identification of shark-nursery areas. Seek scientific advice on stock status of key shark species and propose a research plan and timeline for a comprehensive assessment of these stocks. 	<ul style="list-style-type: none"> Stock assessments for Yellowfin tuna (2012)³, Indian Ocean skipjack tuna (2012)⁴, Indian Ocean bigeye tuna (2010)⁵ An ERA was conducted on 17 shark species captured and impacted in pelagic longline fisheries in the Indian Ocean including Oceanic Whitetip, Porbeagle, Scalloped Hammerhead, Smooth Hammerhead and Great Hammerhead⁶
<p>References: (1) Resolution 05/05 Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by IOTC; (2) On the conservation of oceanic whitetip sharks (<i>Carcharhinus</i></p>			

RFMOs	Details of shark conservation/management measures	Data collection and research activities	Examples of stock assessments and/or Ecological Risk Assessments (ERA) carried out
	<p><i>longimanus</i>) caught in association with IOTC managed fisheries http://www.iotc.org/files/proceedings/2013/s/IOTC-2013-S17-PropF%20[E].pdf (Resolution passed at meeting of the IOTC, 6-10 May, Mauritius); (3) Stock assessment of yellowfin tuna in the Indian Ocean using MULTIFAN-CL: http://www.iotc.org/files/proceedings/2012/wptt/IOTC-2012-WPTT14-38%20Rev_1.pdf; (4) Indian Ocean Skipjack Tuna Stock Assessment 1950-2011 (Stock Synthesis) http://www.iotc.org/files/proceedings/2012/wptt/IOTC-2012-WPTT14-29%20Rev_1.pdf; (5) Exploration of Indian Ocean Bigeye Tuna Stock Assessment Sensitivities 1952-2008 using Stock Synthesis (Updated to include 2009): http://www.iotc.org/files/proceedings/2010/wptt/IOTC-2010-WPTT-04.pdf; (6) Preliminary Ecological Risk Assessment (ERA) for shark species caught in fisheries managed by the IOTC: http://www.iotc.org/files/proceedings/2012/wpeb/IOTC-2012-WPEB08-31%20Rev_2.pdf. Resolutions are binding on Contracting Parties.</p>		
NAFO	<ul style="list-style-type: none"> Shark catches to be fully utilised (all parts to be retained, except head, guts and skins) 5 percent fin-to-body weight ratio to be applied for sharks on board vessels, up to first point of landing Live release of shark bycatch (especially juveniles) encouraged.¹ 	<p>Contracting Parties required to:¹</p> <ul style="list-style-type: none"> Where possible, conduct research towards improved gear selectivity and for the identification of shark-nursery areas. Report data on catches of sharks, including discards, to species level if possible, including available historical data. 	<p>Stock assessments carried out for shrimp (<i>Pandalus borealis</i>) with ICES (2012)²; cod (2011)³.</p>
	<p>References: (1) Conservation and Enforcement Measures (2012) NAFO/FC Doc. 12/1 – Article 12 – Conservation and Management of Sharks; (2) Shrimp (<i>Pandalus borealis</i>) in the Barents Sea – Stock assessment 2012 http://archive.nafo.int/open/sc/2012/scr12-049.pdf; (3) Assessment of the Cod Stock in NAFO Division 3M http://www.repositorio.ieo.es/e-iao/bitstream/10508/630/1/scr11-038.pdf.</p>		
NEAFC	<ul style="list-style-type: none"> 5% fin-to-body weight ratio to be applied for sharks on board vessels, up to first point of landing¹ <p>Species-specific measures:</p> <ul style="list-style-type: none"> Porbeagle² - directed fisheries prohibited (2012-2014); live release of bycatch required; data, including on discards, to be submitted to ICES. 	<ul style="list-style-type: none"> Specific reporting requirements for 17 deep-sea shark species, spurdog and Porbeagle 	
	<p>References: (1) Report of the 25th Annual Meeting of the North-East Atlantic Fisheries Commission, 13-17 November 2006; (2) NEAFC. Porbeagle. Recommendation 06: 2012.</p>		
SEAFO	<ul style="list-style-type: none"> Shark catches to be fully utilised (all parts to be retained, except head, guts and skins) 5% fin-to-body weight ratio to be applied for sharks on board vessels, up to first point of landing Live release of shark bycatch (especially juveniles) encouraged.¹ 	<p>Contracting Parties required to:</p> <ul style="list-style-type: none"> Where possible, conduct research towards improved gear selectivity and for the identification of shark-nursery areas Report data annually on catches of sharks, to species level if possible.¹ 	
	<p>References: (1) Conservation Measure 04/06 on the Conservation of Sharks Caught in Association with Fisheries Managed by SEAFO http://www.seafo.org/ConservationMeasures/2006%20conservation%20measures/conservation%20measure%2004_06.pdf (binding).</p>		
WCPFC	<ul style="list-style-type: none"> Shark catches to be fully utilised (all parts to be 	<p>Commission Members, Cooperating Non-members and Participating Territories</p>	<ul style="list-style-type: none"> Stock assessments carried out for Shortfin Mako

RFMOs	Details of shark conservation/management measures	Data collection and research activities	Examples of stock assessments and/or Ecological Risk Assessments (ERA) carried out
	<p>retained, except head, guts and skins)</p> <ul style="list-style-type: none"> 5% fin-to-body weight ratio to be applied for sharks on board vessels, up to first point of landing Live release of shark bycatch (especially juveniles) encouraged.¹ <p>Commission Members, Cooperating Non-members and Participating Territories (CCMs) <u>required to:</u>¹</p> <ul style="list-style-type: none"> Establish and implement a NPOA-Sharks, to include measures to minimise waste and discards from shark catches and encourage live release of shark bycatch. <p>Species-specific measures:</p> <ul style="list-style-type: none"> Oceanic Whitetip² - from 2013, fishery and landing prohibited. Discards to be recorded as dead or alive. 	<p>(CCMs) <u>required to:</u>¹</p> <ul style="list-style-type: none"> Report data annually on catches of key species of shark, including fishing effort by gear type, noting sharks that are retained and discarded. Annual reporting requirement specifically includes: Oceanic Whitetips, Porbeagles and Hammerheads (Scalloped, Great and Smooth). <p>CCMs <u>encouraged to:</u></p> <ul style="list-style-type: none"> Support research for avoidance of unwanted shark captures <p>(Note: special data collection and research measures for adopted Oceanic Whitetip in 2012²)</p>	<p>(<i>Isurus oxyrinchus</i>) (2009)³, Blue Shark (2009)⁴, Oceanic Whitetip (2012)⁵, Silky Sharks (2012)⁶.</p> <ul style="list-style-type: none"> Work on ERA for species caught in the WCPO tuna fishery continuing, covering <i>inter alia</i> Oceanic Whitetip, Porbeagle, Hammerheads (Scalloped, Smooth and Great) and Mantas⁷.
<p>References: (1) WCPFC. Conservation and Management Measure for Sharks, CMM 2010-07 (binding); (2) Conservation and Management Measure for Oceanic Whitetip Shark, CMM 2011-04 (binding); (3) Stock assessment of the shortfin mako shark (<i>Isurus oxyrinchus</i>) in the Northwest Pacific Ocean using per recruit and virtual population analyses http://www.sciencedirect.com/science/article/pii/S0165783609000940; (4) Kobe II Bycatch Workshop Background Paper http://www.tuna.org.org/documents/Aus/Kobe_II_Bycatch_Workshop_Paper_Sharks_FINAL_ENG_rev.pdf; (5) Rice, J., and Harley, S. J. 2012b. Stock assessment of oceanic whitetip sharks in the Western and Central Pacific Ocean. WCPFC-SC8-SA-WP-06: http://www.wcpfc.int/doc/SA-WP-06/Stock-Assessment-Oceanic-Whitetip-Sharks-Western-and-Central-Pacific-Ocean; (6) Rice, J., and Harley, S. J. 2012. Stock assessment of silky sharks in the Western and Central Pacific Ocean. WCPFC-SC8-SA-WP-07: http://www.wcpfc.int/doc/SA-WP-07/Stock-Assessment-Silky-Sharks-Western-and-Central-Pacific-Ocean; (7) Kirby et al. Ecological Risk Assessment for species caught in the WCPO tuna fishery: updated Productivity-Susceptibility Analysis. Secretariat of the Pacific Community, Noumea, New Caledonia: http://www.wcpfc.int/doc/eb-wp-1/ecological-risk-assessment-species-caught-wcpo-tuna-fishery-updated-productivity-suscept.</p>			

Sources: FAO Regional Fisheries Body Factsheets, accessed June 2013: <http://www.fao.org/fishery/rfb/search/en>; Pew (2012); Fischer *et al.* (2012).

Abbreviations: CCAMLR - Commission for the Conservation of Antarctic Marine Living Resources; CCSBT - Commission for the Conservation of Southern Bluefin Tuna; GFCM - General Fisheries Commission for the Mediterranean; IATTC - Inter-American Tropical Tuna Commission; ICCAT - International Commission for the Conservation of Atlantic Tunas; ICES - International Council for the Exploration of the Sea; IOTC - Indian Ocean Tuna Commission; IPOA - International Plan of Action; NAFO - Northwest Atlantic Fisheries Organisation; NEAFC - North-East Atlantic Fisheries Commission; NMFS - National Marine Fisheries Service; NPOA - National Plan of Action; SEAFO – South East Atlantic Fisheries Organisation; WCPFC - Western and Central Pacific Fisheries Commission.

APPENDIX H: Details of selected current or planned initiatives to build capacity for the implementation of the CITES CoP16 shark and ray listings in developing countries

*Details of current or planned initiatives to build capacity for the implementation of the CITES CoP16 shark and ray listings in developing countries are set out below. Information on these initiatives was received from experts, CITES authorities and other stakeholders, or obtained through publicly available sources. Initiatives to improve the quality and availability of data on shark catches and fishing effort to inform scientific assessments are not included in this Appendix – rather examples of such initiatives are included in **Appendix I** to this Report. In addition, this research did not focus on more general initiatives to build developing country capacity for improved shark conservation and management; however details of such initiatives are included below where they were specifically reported to TRAFFIC as part of the consultation process for this Report.*

Table 1: Examples of current/planned capacity building initiatives for the Africa region

Country/ Region	Organisation	Details
Regional initiatives		
West and Central Africa	Wildlife Conservation Society (WCS)	<p>WCS is having preliminary discussions with the Sub Regional Fisheries Commission (SRFC) and IUCN in Dakar, Senegal, regarding possibilities for collaboration to continue implementing the Regional Plan of Action (RPOA-Sharks) and, ideally, adapt their model (including incorporating CITES and trade control regimes) to the two other fisheries sub-regions of the Atlantic coast and their respective commissions: (i) Regional Fishery Committee for the West Central Gulf of Guinea (FCWC/CPCO, based in Tema, Ghana); and (ii) Regional Fisheries Committee for the Gulf of Guinea (CEEAC/COREP, based in Libreville, Gabon), which together encompass 13 countries beyond the seven countries of the SRFC zone.</p> <p>WCS also intends to work with partners to provide technical assistance to the SRFC countries to implement the CITES shark listings (responding to needs expressed by CITES Management Authorities at the SRFC CITES-Requins Workshop held in Dakar in February 2013 - see Table 8 in main Report)</p>
East Africa and the Western Indian Ocean (including Kenya, Madagascar, Mozambique and Seychelles)	WCS	<p>WCS is currently reviewing resources required to assist CITES implementation for sharks in accordance with the results of the Western Indian Ocean (WIO) Sharks and CITES Workshop (Maputo, December 2012). Will be working with governments and NGO counterparts in the WIO to secure funding for and undertake:</p> <ul style="list-style-type: none"> (i) a review of legal and institutional arrangements for CITES and shark fishery management and conservation (ii) an assessment of shark fisheries and trade, management and conservation issues (iii) national needs assessments for implementing CITES and trade controls for sharks and rays (iv) development of National Plans of Action (NPOAs-Sharks) in the context of a WIO RPOA-Sharks.
Country initiatives		
Gabon	WCS	Provision of technical advice to Government of Gabon on regulations for controlling shark and ray fisheries. Will continue this collaboration to ensure necessary infrastructure in place to implement the CITES shark listings.
Congo	WCS	WCS envisages engaging with Congolese authorities on a needs assessment for implementation of the CITES shark listings and broader shark fisheries management and conservation.

Country/ Region	Organisation	Details
Madagascar	WCS	WCS envisages working with partners to: <ul style="list-style-type: none"> (i) undertake a needs assessment for shark fisheries management and trade controls; and (ii) assist with addressing priority needs, including policy and legislative reform, capacity building and non-detriment findings.
Mozambique	Marine Megafauna Foundation/ Eyes on the Horizon	Working with government to help develop management strategies for recently CITES-listed shark and ray species in Mozambican waters and enforce the CITES CoP16 listings (http://www.eoth.org/what-does-cites-mean-for-mozambique/). Following CITES CoP16, Marine Megafauna Foundation together with Eyes on the Horizon delivered a community presentation about what CITES will mean for Mozambique.
	TRAFFIC	TRAFFIC is planning to carry out work on shark harvest and trade in Mozambique, including components on: <ul style="list-style-type: none"> (i) building knowledge of shark harvest and trade dynamics; (ii) assisting in the development of national policy, legislation and management plans; (iii) capacity building for compliance officials regulating trade in shark products.
South Africa	SANBI (CITES SA)	Will soon hold a non-detriment finding (NDF) workshop for marine (shark) experts, fisheries managers and enforcement officials.

Source: A. Brautigam, WCS, *in litt.* (2013); H. Darrin, Eyes on the Horizon, *in litt.* (2013); M. Burgener, *in litt.*, TRAFFIC (2013); M. Pfab, South Africa CITES SA, *in litt.* (2013).

Table 2: Examples of current/planned capacity building initiatives for the Asia region

Country/ Region	Organisation	Details
Regional initiatives		
APEC economies*	Asia-Pacific Economic Corporation (APEC)	The 14 th APEC Roundtable Meeting on the Involvement of the Business/Private Sector in the Sustainability of the Marine Environment, to be held on 14-16 October 2013 in Taipei will focus on Shark Resource Management, to address the regulation and capacity building for CITES CoP16 shark listings.
Country initiatives		
India	Society for Marine Research and Conservation (SMRC)	<ul style="list-style-type: none"> • Working on mass awareness of fishermen and traders about endangered, nationally protected or CITES-listed species. • Providing training to boat staff engaged in gill netting targeting of sharks to encourage safe release of endangered species. • Raising awareness to stop illegal fishing of juvenile shark fishing along Indian coast during pre- and post-monsoon period (Scalloped Hammerheads frequently caught).
Indonesia	Wildlife Conservation Society (WCS) (and others)	<p>WCS working with Conservation International, the Indonesia Ministry of Fisheries and other NGOs and experts to assist the Government of Indonesia in preparing the required scientific justification for Parliamentary proposals to introduce laws to restrict shark fishing (including the species listed at CITES CoP16).</p> <p>WCS currently seeking funding to:</p> <ul style="list-style-type: none"> (i) train local Fisheries Departments in shark conservation and management, and enforcement tools and methods;

		(ii) implement a compliance monitoring system; (iii) develop outreach and awareness campaigns among local governments, community institutions and communities; (iv) expand application of WCS's experiences, tools and information with regional government agencies and others in support of CITES non-detriment findings for Appendix II-listed marine species.
	Conservation International	Working with Indonesian government on new national law to grant partial protection to the shark and ray species listed in the CITES Appendices at CoP16 (Mantas, three Hammerhead species and Oceanic Whitetips).
Thailand	Freeland Foundation	In contact with the Thai government regarding implementation plans with respect for the CITES CoP16 shark and ray listings.

Source: A. Brautigam, WCS, *in litt.* (2013); K. K. Binesh, Society for Marine Research and Conservation (SMRC), *in litt.* (2013); K.M. Liu, National Ocean University, *in litt.* (2013); M. O'Malley, Shark Savers, *in litt.* (2013)

Notes: *APEC economies of Southeast Asia include: Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore, Thailand, Viet Nam.

Table 3: Examples of current/planned capacity building initiatives for the Latin America and Caribbean region

Country/ Region	Organisation	Details
Regional initiatives		
All countries	Brazilian government, US National Oceanic and Atmospheric Administration (NOAA) and Species Survival Network (SSN) (including Humane Society International, Defenders of Wildlife and Teleliz)	Regional Workshop on Sharks Listed in Appendix II of CITES – Preparing for Implementation (planned for Pernambuco, Brazil, 17-20 September). Aimed at all Latin American and Caribbean countries catching or trading in sharks and that are Parties to CITES (32 countries – excluding Bolivia, Paraguay, Bahamas and Honduras, 2 representatives per country). Participants will include staff from CITES MAs, and fisheries/enforcement officials with an interest in sustainable shark management. The objective of the workshop is to facilitate implementation of the CITES shark listings. Topics that will be discussed include: (i) improving the identification of sharks and shark products (with a focus on CITES-listed sharks) through training in the use of shark fin and shark identification manuals and other tools; (ii) mechanisms for improving the monitoring of shark fisheries and of shark products in trade; (iii) implementation of CITES shark listings in a manner that is complementary to existing conservation and management measures for sustainable shark fishing and trade, both regionally and globally; and (iv) how to establish chain of custody for shark products and which can be used to make legal acquisition findings for exports of CITES-listed sharks and assist in the issuance of non-detriment findings (NDFs). (Note: workshop will not cover NDFs.)
	SSN	Planning to develop virtual courses on NDFs with Mexico and then send experts to 10 main fishing countries for specific training.

Country/ Region	Organisation	Details
Central America	OSPESCA (Central America Fisheries and Aquaculture Organization)	<ul style="list-style-type: none"> Meeting of the Policy Group on Fisheries and Aquaculture (April 2013), discussed inclusion of sharks in CITES Appendix II. Attended by representative of Fisheries Authority of every member country of OSPESCA, Regional Coordinator of GTEAM (Working Group on Sharks and Highly Migratory Species) and CITES Management Authority of El Salvador and Honduras. Discussed possible technical and administrative recommendations for period up to September 2014. Fisheries and CITES authorities coordinating efforts to raise funds for capacity building. Identified need to carry out a regional analysis of institutional procedures related to shark management and establish urgent priorities. GTEAM has also been developing new processes for controlling the export and import of shark product. Developed a Landing Inspection Form and are currently looking for funding to get their use underway and to create a database. A workshop will likely be held with all CITES authorities and the GTEAM to develop an action plan for implementation of the shark and ray listings in the region.
	Wildlife Conservation Society (WCS)	<p>Project has been designed to conduct a CITES shark implementation workshop for Central America. Incorporates three mini-symposia on:</p> <ul style="list-style-type: none"> (i) standardised methods for non-detriment findings; (ii) harmonisation of management measures; (iii) international trade issues and controls at national and regional levels. <p>Sessions will be based on an array of analyses, syntheses and inputs from technical experts, relevant national and regional (OSPESCA) government agencies, and other key actors. WCS consider that the workshop design could be adapted for other regions.</p>
APEC economies*	Asia-Pacific Economic Corporation (APEC)	The 14 th APEC Roundtable Meeting on the Involvement of the Business/Private Sector in the Sustainability of the Marine Environment, to be held on 14-16 October 2013 in Taipei will focus on Shark Resource Management, to address the regulation and capacity building for CITES shark listings (K.M. Liu, National Ocean University, <i>in litt.</i> , 2013)
Country initiatives		
Belize	WCS	<p>Specific shark and ray activities include:</p> <ul style="list-style-type: none"> Advising Belize Fisheries Department on shark management and conservation needs. Reviewing priority needs for CITES implementation, including training in fin identification, non-detriment findings and other management and trade measures.
Costa Rica	CITES authorities	<p>Implementation plans for the CITES CoP16 listings include:</p> <ul style="list-style-type: none"> Training of staff from fisheries institutes, enforcement officers (e.g. those working for the coastguard) and environment ministries on identification and basic biology of elasmobranchs (especially CITES species – how to identify bodies and fins). Raising public awareness on new trade restrictions and fishing restrictions, focusing efforts on coastal communities.
El Salvador	CITES authorities	<p>Implementation plans for the CITES CoP16 listings include:</p> <ul style="list-style-type: none"> Training of personnel. Standardisation of additional information needed for CITES certificates. Meetings with artisanal fishermen, fishing companies and port authorities. Sharing of information with enforcement and monitoring authorities in all sectors involved in fisheries production, as well as with academics.

Country/ Region	Organisation	Details
		(Note: a lack of resources may limit capacity to implement work)

Source: A. Brautigam, WCS, *in litt.* (2013); F. Rivas, El Salvador CITES SA, *in litt.* (2013); I. Zanella, Costa Rica CITES SA, *in litt.* (2013); J.M. Miguel Carvajal, Instituto Costarricense de Pesca y Acuicultura, *in litt.* (2013); K.M. Liu, National Ocean University, *in litt.* (2013); M.E. Sanchez, SSN, *in litt.* (2013); OSPESCA, *in litt.* (2013) (combined response to TRAFFIC consultation questionnaire)

Notes: *APEC economies of Latin America and the Caribbean include: Chile, Mexico and Peru.

Table 4: Examples of current/planned capacity building initiatives for the Middle East region

Country/ Region	Organisation	Details
Regional initiatives		
Arab region (Oman, United Arab Emirates, Yemen, possibly also Egypt)	International Fund for Animal Welfare (IFAW)	Planning to develop a series of workshops to take place in late 2013/2014 on the implementation of CITES shark listings in the Arab region. Already received request from Yemen for a workshop. See: http://www.thenational.ae/news/uae-news/environment/shark-trade-curbed-to-save-species

Source: R. Sonntag, IFAW, pers. comm. (2013)

Table 5: Examples of current/planned capacity building initiatives for the Oceania region

Country/ Region	Organisation	Details
General	New Zealand government, TRAFFIC, Australian National Centre for Ocean Resources and Security (ANCORS)	A general workshop is planned (but not yet confirmed) to identify and begin to address some of the implementation issues associated with the CITES CoP16 shark and ray listings.

Source: G. Sant, TRAFFIC, *in litt.* (2013)

APPENDIX I: Examples of initiatives to collect data on shark catches and fishing effort to inform scientific assessments

Country/ region	Organisation	Details/data collected	Reference
Africa			
Madagascar	Blue Ventures	<ul style="list-style-type: none"> • Community monitoring of the traditional (non-motorised) shark fishery in the region around the village of Andavadoaka, southwest Madagascar, where Scalloped Hammerhead accounts for ~20-40% of shark catch. • Trained local village-based collectors employed to record biological and fisheries data since 2007. • Data collected for each shark catch landed, including shark morphometric data, fisher demographics and catch-specific information. Information on, e.g. species, verified from digital images of catches. • From mid-2013, trialling new methodology using mobile phones for real-time reporting of catch information to a database of landings. 	Humber <i>et al.</i> (2008); Blue Ventures, unpublished data; F. Humber, pers. comm. (2013)
Mozambique	Eyes on the Horizon	<ul style="list-style-type: none"> • Small-scale initiative aiming to address lack of catch data. • Voluntary reporting of catch details and photos, including via social networking, newspaper readers, lodges and dive centres along coast. 	H. Darrin, Eyes on the Horizon, <i>in litt.</i> (2013)
Northwest Africa (Cape Verde, The Gambia, Guinea, Guinea-Bissau, Mauritania, Senegal, Sierra Leone)	Sub Regional Fisheries Commission (SRFC)	<ul style="list-style-type: none"> • Various activities carried out within the framework of the Sub-Regional Plan of Action for the Conservation and Management of Sharks (SRPOA-Sharks) • 2004-2007 - focus on monitoring of shark populations • Monitoring of shark landings: surveys at landing areas carried out since 2005 (complete surveys or representative sampling of catch according to zone and country). Data collected by field surveyors trained in shark landing monitoring techniques. Biological and fishing effort information collected. Catch recorded to the species level. • Training: since 2004, annual training sessions organised for technicians and scientific observers, including on shark identification, biology and data collection of landings. Identification guide also created to facilitate rapid identification of principal shark species found at SRFC zone landing sites and West Africa more generally. • Regional databases: establishment of TrawlBase (experimental fishing trip) and StatBase (fishing statistics) within the Fisheries Information and Analysis System (FIAS), to provide information on species caught in the SRFC zone (shark and ray species caught, when catches occur, trends in landings and fishing effort). Includes historical data (past 50 years). • Country databases: containing information on catch from artisanal and industrial fishing for each SRFC country. Include data from research institutes and fisheries departments, since 2003, and information from FIAS databases prior to 2002. <p>NOTE: for Mauritania, data has been collected to the species level since 1998 by IMROP (Mauritanian Institute for Oceanographic and Fisheries Research) field surveyors working at the principal landing sites.</p>	Diop and Dossa (2011)
Americas			
Belize	Wildlife Conservation	<ul style="list-style-type: none"> • WCS working to assist Belize Fisheries Department to monitor shark and ray populations and shark fishery landings. Ongoing field monitoring at individual sites. 	A. Brautigam, WCS, <i>in litt.</i>

	Society (WCS)	<ul style="list-style-type: none"> Developed a protocol for monitoring artisanal shark and ray fisheries (including catch per unit effort – CPUE) and trade, currently being implemented in Belize and other countries (including Indonesia). Rapid national assessment also carried out, through field surveys, of sharks and rays in Belize. 	(2013)
Costa Rica	INCOPESCA	<ul style="list-style-type: none"> INCOPESCA (Institute of Fisheries Aquaculture, Costa Rica) inspects landings of shark from longline fishing vessels in authorised ports. Inspection form allows further sale and export to ensure traceability. Database of information created, recording landing details such as dates, vessel names, ports where landed, fishing location, species, no. of bodies and weights of bodies and fins, in addition to details on vessel registration and fishing licenses. 	AC23 Doc. 15.1
Central America	OSPESCA-GTEAM	<ul style="list-style-type: none"> From 2012, the GTEAM (Working Group on Highly Migratory Species) has been working on standardising the methods of collection of biological and catch information in OSPESCA (Central America Fisheries and Aquaculture Organization) countries, and has created a digital database for analysing this data. 	OSPESCA-GTEAM, <i>in litt.</i> (2013)
Eastern Pacific Ocean	WWF	<ul style="list-style-type: none"> Eastern Pacific Ocean bycatch observer programme. Information collected from direct onboard observation for longline fisheries (2004-2012). Information collected on a voluntary and confidential basis by fishermen and authorities. 	S. Andraka, WWF-LAC, <i>in litt.</i> (2013)
Asia			
Indonesia	Aquatic Alliance/Gili Eco Trust	<ul style="list-style-type: none"> Small scale NGO initiative to collect information on sharks and rays. Daily fisheries data collected at the Tanjung Luar fishery in East Lombok. Monitoring all sharks and rays over a certain size brought in for finning/gill raker removal. 	P. Bassett, Aquatic Alliance, <i>in litt.</i> (2013)
	WCS	<ul style="list-style-type: none"> Science-based shark and ray fisheries monitoring framework and tool created for the Aceh-Weh Seascape, which was developed and adopted by district and provincial governments as part of fisheries strategic plans. Training conducted in use of monitoring tool, which is now being used to collect shark and ray landing information for use by district and national governments to implement policies and regulations for shark and ray protection. Currently seeking funding to continue monitoring shark and ray landings at key landing sites in Aceh and Lombok. 	A. Brautigam, WCS, <i>in litt.</i> (2013)
	Government	<ul style="list-style-type: none"> Training in species and fin identification techniques being planned in future for fisheries officers, field observers and recorders to enhance quality of catch, landing and trading data in Indonesia 	Fahmi, Indonesian Institute of Sciences, <i>in litt.</i> (2013)
Malaysia	Department of Fisheries	<ul style="list-style-type: none"> Training on taxonomy and biology organised approximately every year for officers who are actively involved in data collection of sharks and rays at landing sites. 	A. Ali, SEAFDEC, <i>in litt.</i> (2013)
South and Southeast Asia	SEAFDEC and BOBLME	<ul style="list-style-type: none"> Five-day training workshops on taxonomy and biology of major shark and ray species held in the Southeast Asian Fisheries Development Center (SEAFDEC) and Bay of Bengal Large Marine Ecosystem (BOBLME) regions in 2012 and 2013. Training focused on identifying major shark and ray species landed at sites in the region, with the aim of improving recording of major shark and ray species (to species level) in annual statistics. 	A. Ali, SEAFDEC, <i>in litt.</i> (2013)

APPENDIX J: Examples of scientific data available for NDF development

- (i) Issues with the scientific data available for the shark and ray species listed in the CITES Appendices at CoP16
(ii) Status of stock and other assessments which can form the basis NDFs for these species

Species	Scientific data deficiencies and issues	Stock status information for NDFs*
Oceanic Whitetip	<ul style="list-style-type: none"> • Primarily taken as bycatch in tuna longline and purse seine fisheries - <u>problem of unreported catch</u> (FAO, 2013b) • Data reported to ICCAT considered likely to be inaccurate and to under-represent Atlantic Ocean catches (Clarke, 2008, cited in CITES CoP16 Proposal). 	<ul style="list-style-type: none"> • Stock status developed for Western Central Pacific (Rice and Harley, 2012) – can be used to assess population status and sustainable harvests in the region (FAO, 2013b). • Other less data-intensive methods would have to be applied in other parts of the species range (FAO, 2013b).
Porbeagle	<ul style="list-style-type: none"> • <u>Species-specific assessments</u> that could provide the basis for NDFs <u>lacking in the Southern Hemisphere</u> (e.g. Southeast Atlantic and Southwest Indian Ocean – CITES CoP16 Proposal), although there are plans for Japan, New Zealand and Australia to progress a stock assessment for Porbeagle shark under CCSBT (CCSBT ERSWG, 2012). • Suspected <u>high levels of unreported catches</u> from all tuna longline fleets operating in the Southwest Atlantic. Constrains accurate assessments of stock status. • <u>Unreported catch may also be an issue</u> in other areas (Campana and Gibson, 2008), e.g. in the high seas within the Northwest Atlantic stock area (SCRS, 2009 – cited in FAO, 2013b). Unreported bycatch is considered to be an issue for Japan’s high seas pelagic longline fishery (Campana and Gibson, 2008). 	<p>Northeast Atlantic:</p> <ul style="list-style-type: none"> • Scientific advice available to inform NDFs • First assessment of Porbeagle stock conducted by ICES/ICCAT in 2009. ICES recommended prohibition on target fishing for Porbeagle, limitation of bycatch and prohibition on landings (SCRS, 2009). Adopted by the EU in 2010 (ICES, 2011, cited in FAO, 2013b). • European Community Action Plan for the Conservation and Management of Sharks – could eventually provide management reference points needed to evaluate NDFs (FAO, 2013b) <p>Northwest Atlantic:</p> <ul style="list-style-type: none"> • Most recent assessment of Porbeagle stock conducted by SCRS (2009, cited in FAO, 2013b). Two assessment models used to estimate status (surplus production and age-structured). • FAO (2013b) – basis for NDFs should follow current re-building plans and TACs established by Canada and the US based on results from stock assessments. <p>Southwest Atlantic:</p> <ul style="list-style-type: none"> • CPUE data of Porbeagle caught as bycatch in the Uruguayan pelagic longline fleet. Time series used to assess status of Porbeagle stock using a surplus production model (SCRS, 2009, cited in FAO, 2013b) <p>Introduction from the sea:</p> <ul style="list-style-type: none"> • Existing RFMOs could be used to provide the basis for NDFs (FAO, 2007, 2010 – cited in FAO, 2013b).

Species	Scientific data deficiencies and issues	Stock status information for NDFs*
Hammerheads	<ul style="list-style-type: none"> • <u>Species-specific assessments</u> that could provide the basis for NDFs <u>lacking for most of range</u> (except for the northwest and northeast Atlantic) <ul style="list-style-type: none"> ○ e.g. Indian Ocean – lack of available data, no quantitative stock assessment, no fishery indicators for Scalloped Hammerhead. Stock status highly uncertain (IOTC, 2011). • Hammerhead sharks are <u>the most frequently cited species taken in IUU fishing</u> (Lack and Sant, 2008). Catch and landings data likely to be significantly incomplete. <ul style="list-style-type: none"> ○ e.g. Hammerhead sharks documented in IUU fishing activities including 120 longline vessels in the Western Indian Ocean, Brazil, northern Australia, the Galapagos, Colombia, Palau, and the Marshall Islands (not an exhaustive list) (CITES CoP16 Proposal). • Often taken in artisanal fisheries subject to limited or no catch monitoring. 	<ul style="list-style-type: none"> • Northwest Atlantic – population assessment of Scalloped Hammerhead using two forms of surplus production model. Most robust index of abundance available (Hayes <i>et al.</i>, 2009). • Potential for a combined NDF for several species could be considered (as for stony coral) (FAO, 2013b). <p>See also: NOAA Status Review Report - Scalloped Hammerhead Shark <i>Sphyrna lewini</i> (Miller <i>et al.</i>, 2013) (available at: http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/scallopedhammerheadshark.pdf)</p>
<i>Manta</i> spp.	<ul style="list-style-type: none"> • <u>Lack of management and monitoring</u> of manta ray catch, e.g. in India. Main exporters unlikely to have sufficient data to carry out a legitimate NDF (O'Malley, Shark Savers, <i>in litt.</i>, 2013). • <u>Lack of reliable catch data:</u> <ul style="list-style-type: none"> ○ Mobulid bycatch rarely recorded and, when recorded, not classified by species (e.g. possibly large fisheries in Africa for which little to no landings data available; catches in India may be significantly under reported) (Heinrichs <i>et al.</i>, 2011). ○ Impact of incidental fishing on Manta populations largely underestimated/unknown (FAO, 2013b). ○ No time series of effort or catch data available to evaluate possible changes in fishing pressure or CPUE (FAO, 2013b). ○ Bulk of catches reported to FAO in generic category “Rays, stingrays, mantas nei” (FAO, 2013b). ○ Often taken in artisanal fisheries subject to limited or no catch monitoring. • <u>Poor biological information</u> (e.g. on population sizes and trends) for all parts of range: <ul style="list-style-type: none"> ○ No estimates of total population abundance of either of the two species (FAO, 2013b). 	<p>Note: <i>Manta birostris</i> is considered a migratory species threatened with extinction under the Convention on Migratory Species (CMS) (see Appendix F above).</p>

Note: *The focus of this table is limited to stock assessments in the strict sense only.

Abbreviations: CCSBT - Commission for the Conservation of Southern Bluefin Tuna; CPUE – Catch per unit effort; ICCAT - International Commission for the Conservation of Atlantic Tunas; ICES - International Council for the Exploration of the Sea; IOTC - Indian Ocean Tuna Commission; NDF – non-detriment finding; NOAA - National Oceanic and Atmospheric Administration; SCRS - Standing Committee on Research and Statistics

APPENDIX K: Available guidance, information and tools to assist the development of non-detriment findings (NDFs) for shark species

Summary of available guidance and information	Reference/link to document
<p><i>Transparent exposure risk assessment framework for identifying commercially exploited aquatic species at greatest potential risk of over-exploitation for international trade (currently under development by TRAFFIC)</i></p> <ul style="list-style-type: none"> • This follows on from TRAFFIC's previous work to a) develop a method to identify high risk commercially-exploited aquatic organisms in trade and analyse the potential applications of Multilateral Environmental Agreements (MEAs) and b) assess the intrinsic vulnerability of commercially-exploited shark species, based on various life-history traits. • The tool will be tested by application to sharks, with the first case study assessments (to include Porbeagle, Scalloped Hammerhead and Oceanic Whitetip) to be made available towards the end of 2013. • The risk assessment methodology involves generating a score for two risk elements: (i) exposure (based on the scale of the fishery, as well as the value and other related factors); and (ii) management compliance risk (based on factors such as whether appropriate management controls are in place to constrain catch levels and whether there are compliance measures to address illegal, unreported and unregulated (IUU) fishing). 	<p>Not yet available, but previous risk methodology and shark vulnerability assessment work carried out by TRAFFIC are available here: http://jncc.defra.gov.uk/page-6120 and http://www.cites.org/common/com/ac/26/E26-09i.pdf</p>
<p><i>Australia's risk based approach to the information requirements for making non-detriment findings</i></p> <ul style="list-style-type: none"> • Australia has experience in applying a risk-based approach to making non-detriment findings for marine species • Takes into consideration that level of information required to inform a non-detriment finding varies depending on the biological vulnerability of the species, its global and national status, the risks posed to the species (cumulatively, including harvest pressure), and the degree of certainty associated with these factors. 	<p>Australian CITES Scientific Authority, <i>in litt.</i> (2013)</p>
<p><i>CITES Resolution Conf. 16.7 on Non-detriment findings</i></p> <ul style="list-style-type: none"> • Recommends general definitions and non-binding guiding principles based on the Mexico workshop outcomes • Recommends NDFs be based on resource assessment methodologies • Highlights sources of information that could be considered by Scientific Authorities when making NDFs. 	<p>http://www.cites.org/eng/res/16/16-07.php</p>
<p><i>Sharks: Conservation, fishing and international trade (Garcia Nunez, 2008)</i></p> <ul style="list-style-type: none"> • Compilation of existing information on conservation, management, methodologies, tools, data, expertise and other available resources that may be useful for enhancing Parties' capacities to undertake improved NDFs for sharks. • Suggests some fundamental considerations when making NDFs for shark species and proposes some general guiding principles. • At Annex III of the report, provides an adapted version of the IUCN NDF checklist (Rosser and Haywood, 2002), aimed at taking into account particular requirements relevant to making NDFs for shark exports. 	<p>Report made available at AC24 as document Inf. 5: http://www.cites.org/common/com/ac/24/EF24i-05.pdf</p>
<p><i>Lessons learnt for non-detriment findings from CITES Secretariat commissioned projects (Report produced for the CITES Secretariat, March 2009)</i></p> <ul style="list-style-type: none"> • Draws on the range of work carried out under CITES, particularly under the Review of Significant Trade² process, to try to clarify some of the most important issues involved in making non-detriment findings and to identify common threads, and differences between, the major groups in trade. 	<p>Report made available at AC25 as document Inf. 2: http://www.cites.org/common/com/ac/25/E25i-02.pdf</p>

² The Review of Significant Trade process aims to determine, for Appendix II species traded in significant amounts, whether the provisions of CITES Article IV (requirement for Scientific Authorities to make a non-detriment finding prior to the export of an Appendix II-listed species) are being adequately implemented in exporting countries or not, and, if not, to propose remedial actions to be taken (culminating if necessary in recommendations to importing Parties that they suspend imports in those species from relevant exporting countries) (AC25, Inf. 2).

Summary of available guidance and information	Reference/link to document
<p><i>International Expert Workshop on CITES Non-Detriment Findings (17-22 November 2008, Cancun, Mexico)</i> Fishes Working Group discussed essential information and practices to enable the NDF process, and the following in more detail:</p> <ul style="list-style-type: none"> • Essential information about the target species or related species (biological and species status, take/uses, other impacts, management/conservation, and monitoring) • Field methodologies and other sources of information to collate this information, types of approaches for data integration for NDF elaboration and approaches to assess data quantity and quality • Common problems, errors, challenges or difficulties found on the elaboration of NDF 	<p>The full report, as well as the NDF case studies submitted by attendees, are available online: http://www.conabio.gob.mx/institucion/cooperacion_internacional/Taller_NDF/wg8.html</p>
<p><i>Sharks, rays and chimaeras: the status of the chondrichthyan fishes</i></p> <ul style="list-style-type: none"> • Comprehensive status survey to inform conservation, management and research. 	<p>Fowler <i>et al.</i> (2005), available online at: http://www.iucnssg.org/tl_files/Assets/pdf/Reports/Shark%20Status%20Report%20-%20Section%201.pdf</p>
<p><i>Report of the Expert Consultation on Implementation Issues Associated with Listing Commercially-exploited Aquatic Species on CITES Appendices (FAO, 2004)</i></p> <ul style="list-style-type: none"> • Provides brief guidance on NDFs in a fisheries context under points 27-29 	<p>Report made available at CoP13 as document Inf. 34: http://www.cites.org/common/cop/13/inf/E13i-34.pdf</p>
<p><i>Checklist to assist in making non-detriment findings for Appendix II exports (2000)</i></p> <ul style="list-style-type: none"> • The Checklist helps identify the factors that need to be taken into account when making an NDF and assists Scientific Authorities in understanding the strengths and weaknesses of the information at their disposal 	<p>Made available at CoP11 (Gigiri, 2000) as Inf. 11.3; later published as Rosser and Haywood (2002): http://www.cites.org/eng/cop/11/inf/o/03.pdf</p>
<p><i>IUCN Red List Assessments for newly listed species</i></p> <ul style="list-style-type: none"> • Providing an overview of population, habitat and ecology, threat and conservation action information on a global scale. • Comprehensive assessments available for all newly listed species 	<p>Searchable here: http://www.iucnredlist.org/</p>
<p><i>Stock assessment approach for the Napoleon fish, Cheilinus undulates, in Indonesia. A tool for quota setting for data-poor fisheries under CITES Appendix II Non-Detriment Finding requirements (Sadovy et al., 2007)</i> Stock assessment approach as a tool for determining sustainable catch levels for the Napoleon fish (Humphead Wrasse) <i>Cheilinus undulates</i>.</p>	<p>FAO Fisheries Circular. No. 1023: http://www.fao.org/docrep/012/a1237e/a1237e00.htm</p>
<p><i>CITES Non-detriment Findings Guidance for Perennial Plants (TRAFFIC)</i> Step by step process being designed to support the making of evidence-based NDF, including comprehensive flow charts and worksheets.</p>	<p>In progress</p>
<p><i>International Workshop of Experts on Non-Detriment Findings on Bigleaf Mahogany (Swietenia macrophylla) (10-13 April 2007, Cancun, Mexico)</i> Aimed to define a feasible methodological approach that could be used to formulate an NDF for bigleaf mahogany <i>Swietenia macrophylla</i>.</p>	<p>Made available at CoP14 as Inf. 24: http://www.cites.org/eng/cop/14/inf/E14i-24.pdf</p>
<p><i>Regional Strategy for the Conservation and Sustainable Management of Sturgeon Populations of the N-W Black Sea and Lower Danube River in accordance with CITES (26 November 2003, Danube Sturgeon Task Force)</i></p> <ul style="list-style-type: none"> • Example of regional level collaboration with respect to the implementation of a CITES Appendix II listing of a commercially-exploited aquatic species • Data sharing and development of stock assessments, quotas and NDFs by range and fishing States. 	<p>Available at: http://www.dstf.eu/assets/Uploads/documents/NAP/Regional-Strategy-for-the-Conservation-and-Sustainable-Management-of-Sturgeon-Populations-CITES.pdf</p>

**APPENDIX L: Resources to assist fisheries managers in developing and implementing appropriate measures
for shark conservation and management**

Resource	Description and links (if available)
Fisheries management. 1. Conservation and management of sharks. FAO Technical Guidelines for Responsible Fisheries. No. 4, Suppl. 1 (FAO Marine Resources Service, 2000)	<ul style="list-style-type: none"> Originally produced to support FAO members in the implementation of the UN FAO International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks). Contains <i>inter alia</i> advice regarding the framework for the development and implementation of national, sub-regional and regional shark plans, and information to assist in preparation of shark assessment reports. <p>ftp://ftp.fao.org/docrep/fao/003/x8692e/x8692e00.pdf</p>
Manual of Techniques for the Management of Elasmobranch Fisheries (Musick and Bonfil, 2005)	<ul style="list-style-type: none"> Aimed at operational fisheries managers. Provides detailed information on methods to collect and analyse data necessary to assess stocks and prepare plans to sustainably manage elasmobranch fisheries.
A Fishery Manager's Guidebook (Cochrane and Garcia, 2009)	<ul style="list-style-type: none"> Originally produced as an FAO Fisheries Technical Paper in 2002. Guidebook covers the following topics: the primary dimensions or features of fisheries management; legal and institutional issues; the measures and tools available for managing fisheries; information to assist good decision-making; key aspects and aids for implementing fisheries management. Includes a dedicated chapter on small-scale fisheries, which highlights the unique features of these fisheries and the implications of those features for management. The needs and approaches to build capacity for improving management of small-scale fisheries are also discussed. <p>http://www.fao.org/docrep/015/i0053e/i0053e.pdf</p>
Report of the FAO/CITES Workshop to Review the Application and Effectiveness of International Regulatory Measures for the Conservation and Sustainable Use of Elasmobranchs (FAO, 2012)	<ul style="list-style-type: none"> This workshop (19-23 July 2010, Genazzano, Italy) was jointly convened by FAO and CITES and was attended by experts from different geographic areas and sectors, including scientific assessment, fisheries management, fishing industry, fish trade, monitoring and control, and government administration. The workshop report discusses the effectiveness of different types of fishery and trade regulations in terms of implementation and stock recovery as well as their impact on fisheries, livelihoods, food security, markets and trade, and government administrations. A tabular summary of the discussed effects of different measures on various sectors, together with descriptions in the narrative part of the report, are designed to assist resource managers in various regions and countries and under different fisheries development and shark management situations in their decision-making regarding their own most appropriate management regulations for the conservation and sustainable use of sharks that concern them. <p>http://www.cites.org/common/disc/coop/CITES-FAO-Genazzano-workshop-report2010.pdf</p>

<p>Transparent exposure risk assessment framework for identifying those commercially exploited aquatic species at greatest potential risk of over-exploitation for international trade (currently under development by TRAFFIC).</p>	<ul style="list-style-type: none"> • This follows on from TRAFFIC's previous work to a) on developing a method to identify high risk commercially-exploited aquatic organisms in trade and an analysis of the potential applications of Multilateral Environmental Agreements (http://jncc.defra.gov.uk/page-6120) and b) assessing the intrinsic vulnerability of commercially exploited shark species, based on various life-history traits (http://www.cites.org/common/com/ac/26/E26-09i.pdf). • The tool will be tested by application to sharks, with the first case study assessments (to include Porbeagle, Scalloped Hammerhead and Oceanic Whitetip) to be made available towards the end of 2013. • The risk assessment methodology involves generating a score for two risk elements: (i) exposure (based on the scale of the fishery, as well as the value and other related factors); and (ii) management compliance risk (based on factors such as whether appropriate management controls are in place to constrain catch levels and whether there are compliance measures to address IUU fishing). • Considerations related to the likelihood of management being effective can not only inform future management decisions in relation to the newly listed shark species, but are relevant factors to be taken into account when making NDFs for these species.
---	--

APPENDIX M: Selected resources on the mitigation of shark bycatch and post-release mortality, and reduction of discards

Resource	Description	Link to webpage (if available)
<p>International Guidelines on Bycatch Management and Reduction of Discards (FAO, 2011)</p>	<ul style="list-style-type: none"> Guidelines were developed through a participatory process involving fisheries experts, fishery managers from governments, the fishing industry, academia and non-government and intergovernmental organisations. Formally adopted by an FAO Technical Consultation held in Rome (6-10 December 2010). Intended to assist States and RFMO/As in the management of bycatch and reduction of discards in conformity with the FAO Code of Conduct for Responsible Fisheries. Provide guidance on management factors, from an appropriate regulatory framework to the components of a good data collection programme (e.g. establishing reliable monitoring and assessment techniques, implementing data collection procedures and protocols appropriate to the scale and type of fishery – such as observers, logbooks, vessel monitoring systems). The Guidelines were also reviewed in an Expert Consultation on Bycatch Management and Reduction of Discards, held from 30 November to 3 December 2009, Rome, Italy (FAO, 2010), the report from which contains additional discussion and recommendations on managing bycatch and discards. 	<p>Guidelines: http://www.fao.org/docrep/015/ba0022t/ba0022t00.pdf Technical Consultation: http://www.fao.org/docrep/013/i2024e/i2024e00.pdf</p> <p>Expert Consultation: http://www.fao.org/docrep/013/i1672e/i1672e00.pdf</p>
<p>Fisheries Bycatch of Sharks: Options for Mitigation (Cosandey-Godin and Morgan, 2011)</p>	<ul style="list-style-type: none"> Report by the Pew Environment Group. Provides a summary of current knowledge and understanding of shark bycatch and discusses available management options and technical measures aimed at reducing both the rate at which sharks encounter fishing gear and the associated damaging effects. Reviews recent research concerning technological bycatch mitigation options (changes to fishing gear and/or fishing practices). Notes that the majority of research has focused on pelagic longline fisheries, with more attention needed to the development of mitigation measures for bottom longline, gillnet, trawl and purse seine fisheries. 	<p>http://www.pewenvironment.org/news-room/reports/fisheries-bycatch-of-sharks-options-for-mitigation-85899365907</p>
<p>International workshop on Tuna RFMO management of issues relating to bycatch (Kobe II Workshop on Bycatch, Brisbane, Australia, June 23-25, 2010)</p>	<ul style="list-style-type: none"> Objectives of the workshop were: (i) reviewing available information on incidental catch of non-target species and juveniles of target species; (ii) providing advice to tuna RFMOs on best practices, methods, and techniques to assess and reduce the incidental mortality of non-target species, such as sharks, and juvenile target species; and (iii) developing and coordinating relevant research programs and observer programs. Background paper produced for the workshop provides an overview of information and resources for addressing bycatch, information on selected research and management tools, and an inventory of existing conservation measures related to sharks in place in each of the five tuna RFMOs. 	<p>Report and supporting materials available at: http://www.tuna-organization.org/RFMOsAus1.htm.</p> <p>Background paper: http://www.tuna-organization.org/Documents/Aus/Kobe_II_Bycatch_Workshop_Paper_Sharks_FINAL_ENG_rev.pdf</p>

Resource	Description	Link to webpage (if available)
<p>Chondrichthyan guide for fisheries managers: A practical guide for mitigating chondrichthyan bycatch (Patterson and Tudman, 2009)</p>	<ul style="list-style-type: none"> • Aims to provide fisheries managers with practical options to mitigate Threatened, Endangered or Protected chondrichthyan and high risk species bycatch. • The options provided in the Guide are the result of a meeting of the Chondrichthyan Technical Working Group that was convened by the Australian Fisheries Management Authority, specifically to provide scientifically-based advice to assist with the development of cost effective mitigation measures to reduce the risk to chondrichthyans from interactions with Commonwealth managed fisheries. • The options are intended to apply to a range of species, fisheries and gear types, and are not restricted to those specifically listed in the Guide. 	<p>http://fish.washington.edu/classes/fish513a/pdfs/23-UW%20Sharks/PattersonTudman2009.pdf</p>
<p>Shark Depredation and Unwanted Bycatch in Pelagic Longline Fisheries: Industry Practices and Attitudes, and Shark Avoidance Strategies (Gilman <i>et al.</i>, 2007)</p>	<p>Reviews information collected from longline industries ranging from small-scale artisanal fisheries to large-scale industrial distant water fleets, in order to:</p> <ol style="list-style-type: none"> (i) obtain a more complete understanding of shark-pelagic longline interactions, current fisher attitudes and practices employed in response to shark interactions; (ii) identify methods to avoid shark interactions; (iii) identify research priorities; and (iv) assess the effects of legislation that impact upon longline practices relating to the catching and processing of sharks. 	<p>http://www.prodelphinus.org/pdf/PDF%20Tiburones.pdf</p>

Appendix N: Identification manuals/tools for shark and ray species, focusing on those relevant to CITES CoP16 listings

Notes: Guides presented by broad oceanic region/coverage, and then in chronological order. Most guides are generally aimed at identification of whole or near-whole specimens. Guides that include or have a specific focus on identification of parts/derivatives in trade are marked with *. FAO has produced a large number of guides (all relevant ones included in table below) which can be found at FAO Fish Finder: <http://www.fao.org/fishery/fishfinder/en>. All FAO guides include standard measurements and terms and fully illustrated species accounts, incl. lateral views, useful illustrations, field marks and diagnostic features (details not repeated under individual guides below).

Title	Authors/ Organisation	Year	Availability (source and languages)	Notes (incl. guide type and target audience)
General/Global/Multiple Regions				
Tiburones de México, Centro América y el Caribe	Cantu, J. C. and Mendez, R. L. / HSI; Marviva; Defenders of Wildlife; Teyeliz; Pretoma	2013	http://www.defenders.org/sites/default/files/publications/shark-identification-guide-mexico-caribbean.pdf Spanish	Focus on creating clear and self-explanatory images to facilitate identification by fishermen with limited identification skills. Currently available as laminated leaflet, being reviewed by FAO, with plans to print on PVC once finalised (M.E Sanchez, SSN, pers. comm, 2013).
Shark Identification Guide (for sharks of Australia)	Queensland Government Dept of Agriculture, Fisheries and Forestry	2012	http://www.daff.qld.gov.au/28_11934.htm English	An online photo guide to Australian shark species including a glossary of terms and structural features of sharks. Species accounts include description and frequent misidentifications.
*Identifying shark fins: Oceanic whitetip, porbeagle and hammerheads	Abercrombie, D. and Chapman, D. / Pew; SoMAS	2012	http://www.sharkfinid.com/ Online identification: English Downloads: English, Spanish, French, Arabic, Japanese, Chinese	Specifically compiled to support CITES listings. Potential limitations include: a) focus on dorsal fins with skin still attached (with some images of pectoral fins); b) does not provide comparisons with other species; c) references lacking in some cases.
FAO Field Guides (non-shark specific)	Various	2012-1984	http://www.fao.org/fishery/org/fishfinder/3,2/en English, French, Spanish and/or Portuguese	Covering: a) Eastern and Southern Mediterranean; b) Kenya; c) Namibia; d) Morocco; e) Kuwait, Eastern Saudi Arabia, Bahrain, Qatar and United Arab Emirates; f) Cambodian Mekong; g) Somalia; h) Sri Lanka; i) Tanzania freshwater; j) Northern Coast of South America; k) Gulf of Guinea; l) Mozambique; m) Senegal and The Gambia; n) Angola; o) Pakistan; p) Tanzania; and q) Madagascar
*Guía de identificación de filetes de pescado y mariscos	MarViva, INCOPECA, MEIC	2012	http://www.meic.go.cr/images/stories/descargas/consulta/guia_practica/guapescadomarisco.pdf Spanish	Guide to identifying fish meat, including shark, for consumers, p58-59 "Tiburón".
Guía para la identificación de especies de tiburones, rayas y quimeras	Mejía-Falla, P. A., Navia, A. F. and Puentes, V. / Ministerio de Ambiente y Desarrollo Sostenible, SQUALUS	2011	http://www.academia.edu/2088429/Guia_para_la_identificacion_de_especies_de_tiburones_rayas_y_quimeras_de_Colombia Identification guide of sharks rays and chimaeras species from Colombia Spanish	Factsheets for species found in Colombian waters.

Title	Authors/ Organisation	Year	Availability (source and languages)	Notes (incl. guide type and target audience)
*Les requins – Identification des nageoires	Pascal Deynat / MNHM; WWF; TRAFFIC; Shark Alliance	2010	Can be purchased online in various formats: http://librairie.immateriel.fr/fr/ebook/9782759203826 French (<i>Note: translation of this guide into English is under consideration</i>)	<i>Focuses on 46 most endangered species in 2007 IUCN Red list. Two parts: 1) Biology, ecology and systematics of sharks, including morphology and anatomy of fins. 2) Identification of fins (6 types of tail fins, 4 dorsal and 3 pectoral), via dichotomous key.</i>
Guide des requins, des raies et des chimères des pêches françaises	Seret, B. / IRD Paris	2010	http://agriculture.gouv.fr/IMG/pdf/100421-guideraies_requins.pdf French	<i>Intended for use on board fishing boats and at fish markets, enabling fast and quick visual identification of most commonly caught species within French fisheries. Photos supplemented by information on easily observable distinguishing characteristics of the species (body shape and fins, color, appearance of the skin, the presence of spines). Author notes the guide's simplicity and that it could be expanded / improved upon pending user requests.</i>
*CITES Wiki Identification Manual and Australian Government CITES Appendix II listed species identification sheets	CITES Parties (Australia, India, the Philippines and UK)	From 2007	http://www.cites.org/eng/resources/wiki_id.shtm and http://www.environment.gov.au/biodiversity/wildlife-trade/cites/plants-animals.html English, French, Spanish, Cantonese, Indonesian and Mandarin.	<i>Identification sheets currently available for three CITES listed shark species - great white shark <i>Carcharodon carcharias</i> and whale shark <i>Rhincodon typus</i> and basking shark <i>Cetorhinus maximus</i>. More details and languages currently available on Australian website than in CITES Wiki ID Manual.</i>
Sharks, rays and chimaeras. Excerpts from FAO Species Identification publications as of 2007	Various / FAO	2007	Only available on CD-ROM: http://www.fao.org/icalog/search/dett.asp?aries_id=109038 English	<i>Includes Catalogue of sharks of the world, Field guide of sharks and rays of the Mediterranean and Black Seas, Field guide of sharks and rays of the Red Sea and Gulf of Aden, and excerpts of from several regional guides: Eastern Central Atlantic, Western Indian Ocean, Southern Ocean, Mediterranean and Black Seas, Eastern Central Pacific, Western Central Pacific and Western Central Atlantic.</i>
FAO CD-ROMS (non-shark specific)	Various / FAO	2006-2003	http://www.fao.org/fishery/org/fishfinder/3.4/en English	<i>a) Species Catalogues- FAO Fisheries Synopsis No. 125, Vols. 1 to 18; b) Eastern Central Atlantic Volumes I-VII; c) Eastern Indian Ocean & Western Central Pacific Volumes I-IV; d) Pacifico Centro-Oriental Volúmenes 1-3; e) Western Indian Ocean Volumes I-VI; f) Méditerranée et Mer Noire Volumes I & II</i>
A Field Guide to the Sharks of the World	Compagno, L.J.V., Dando, M. and Fowler, S.; Princetown	2005	Available for purchase: http://press.princeton.edu/titles/7931.html English	<i>Comprehensive field guide to all 440-plus shark species. Colour plates illustrate all species, with detailed accounts including diagnostic line drawings illustrating physical features from different angles and a guide for differentiating similar species.</i>
FAO Regional Guides (non-shark specific)	Various / FAO	2002-1974	http://www.fao.org/fishery/org/fishfinder/3.1/en English, French and/or Spanish	<i>Covering: a) Western Central Atlantic; b) Western Central Pacific; c) Pacifico Centro-Oriental; d) Méditerranée et Mer Noire Southern Ocean ; e) Western Indian Ocean; f) Eastern Central Atlantic (<i>currently being updated</i>); g) Eastern Indian Ocean and Western Central Pacific</i>

Title	Authors/ Organisation	Year	Availability (source and languages)	Notes (incl. guide type and target audience)
* The complete book of dried seafood and foodstuffs	Yeung, W.S., C.C. Lam, and P.Y. Zhao / Wan Li Book Company Limited	2000 / 2006	Not currently available online (TRAFFIC has a hard copy of the 2006 edition) Chinese	<i>Identifies shark fin to product and/or species level, based on Chinese market categories.</i>
Sharks of the world (Vol. 2 Bullhead, mackerel, and carpet sharks (Heterodontiformes, Lamniformes and Orectolobiformes)	Compagno, L.J.V. / FAO	2001	http://www.fao.org/docrep/009/x9293e/x9293e00.HTM English	<i>FAO Species catalogue for fisheries purposes. Annotated and illustrated catalogue of shark species known to date.</i>
Pelagic Species caught in Longline Fisheries	National Research Institute of Far Seas Fisheries, Japan	2002	Not currently available online (TRAFFIC has a scanned copy) Japanese	<i>Identification manual with dichotomous keys, species comparisons, drawings and photos for all relevant species.</i>
*Characterization of morphology of shark fin products. A guide of the identification of shark fin caught by the tuna longline fishery.	Nakano, H / Fisheries Agency of Japan; Global Guardian Trust	1999	Not currently available online (TRAFFIC has a scanned copy), but alternative (shorter) 2000 version available from the ICCAT website: http://www.iccat.int/Documents/CVSP/CV051_2000/no_6/CV051061785.pdf English	<i>Describes shape and colour of dorsal, caudal and pectoral fins, with images. Alternative source Nakano and Kitamura (2000) includes key to species by shark fin characteristics (Identification of eleven sharks caught by Tuna Longline using morphological characters of their fins. ICCAT Col. Vol. Sci. Pap. 51 (6)).</i>
Bycatch Species caught in the Southern Bluefin Tuna Fishing Grounds	National Research Institute of Far Seas Fisheries, Japan	1995	Not currently available online (TRAFFIC has scanned copy) Japanese	<i>Identification manual with dichotomous keys, species comparisons, drawings and photos for all relevant species.</i>
Sharks of the world. Part 1: Hexanchiformes to Lamniformes Part 2: Carcharhiniformes	Compagno, L.J.V. / FAO	1984	http://www.fao.org/docrep/009/ad122e/ad122e00.htm and http://www.fao.org/docrep/009/ad123e/ad123e00.HTM English	<i>FAO Species catalogue for fisheries purposes- annotated and illustrated catalogue of shark species known to date. Currently being updated by Ebert and Compagno (three volumes), anticipated completion, 2013</i>
Tiburones y Rayas - Guía de Identificación	CRAM, Caja Madrid	n/a	http://www.cram.org/files/pdf/guia-identificacion-rayas-tiburones.pdf Spanish	<i>Factsheets for species caught in Catalan Mediterranean fisheries.</i>
Marine Species Identification Portal – Rays, skates and sharks	Key to Nature	n/a	http://species-identification.org/index.php?groep=Rays%2C+skates+and+sharks&selectie=42&hoofdgroepen_pa d=%2C1%2C7%2C42 English	<i>Mostly descriptive, with “field marks” and “diagnostic features”.</i>
Key to Shark ID	Canadian Online Research Lab	n/a	http://www.marinebiodiversity.ca/shark/english/key.htm English http://www.marinebiodiversity.ca/shark/french/key/key1.htm French	<i>Online step by step key.</i>

Title	Authors/ Organisation	Year	Availability (source and languages)	Notes (incl. guide type and target audience)
Atlantic Region				
Sharks, Batoids and Chimaeras of the North Atlantic	Ebert, D.A. and Stehmann, M.F.W. / FAO	2013	http://www.fao.org/docrep/017/i3178e/i3178e.pdf English	FAO Species Catalogue for Fishery Purposes No. 7
Pocket Guides: North Atlantic Sharks, Batoids and Chimaeras Relevant to Fisheries Management	Stehmann, M.F.W. and D'Antoni, E. /FAO	2013	Available for purchase from various websites English	Two illustrated plastic coasted pocket guides: 1) sharks and 2) batoids and chimaeras. Include colour illustrations of species lateral views and anatomical details, main field markings, diagnostic features and distinctive characters of similar species. Also includes information on fisheries, regulations in force in 2012 and if the fins are marketed.
*Visual Identification of Fins from Common Elasmobranchs in the Northwest Atlantic Ocean.	Abercrombie, D.L., Chapman, D.D., Gulak, S.J.B., and Carlson, J.K. / NOAA, NMFS, SEFSC	2013	http://www.nmfs.noaa.gov/ia/species/sharks/fin_guide.pdf English	As Abercrombie and Chapman (2012), focuses on dorsal fins that still have skin attached, with some images of pectoral fins.
Tiburones de Sur América del Océano Atlántico	Cantu, J. C. and Mendez, R. L. / HSI; Marviva, Defenders of Wildlife, Teyeli, Pretoma	2013	http://www.defenders.org/sites/default/files/publications/shark-identification-guide-atlantic.pdf Spanish	Focus on creating clear and self-explanatory images to facilitate identification by fishermen with limited identification skills. Currently available as laminated leaflet, being reviewed by FAO, with plans to print on PVC once finalised (M.E Sanchez, SSN, pers. comm, 2013).
Managed shark species that can be legally retained by recreational anglers in the Atlantic Ocean, Caribbean Sea and Gulf of Mexico	Driggers, W.B. and Hoffmayer, E.R. / NOAA	2010	http://www.nmfs.noaa.gov/sfa/hms/sharks/2008/Rec_shark_ID_placard.pdf English	Two page factsheet highlighting main characteristics of 20 shark species, including all newly listed species
ICCAT Manual - Bycatch species of special importance - Porbeagle	J. Valeiras and E. Abad/ ICCAT	2009	http://www.iccat.int/Documents/SCRS/Manual/CH2/2_2_1_3_POR_ENG.pdf English http://www.iccat.int/Documents/SCRS/Manual/CH2/2_2_1_3_POR-fra.pdf French http://www.iccat.int/Documents/SCRS/Manual/CH2/2_2_1_3_POR_SPA.pdf Spanish	Nine page identification and factsheet for Porbeagle.
Identification guide of the main shark and ray species of the eastern tropical Atlantic	Berneard Seret, IRD/MNHN/IUCN/ FIBA	2006	http://www.iucnssg.org/tl_files/Assets/Regional%20files/West%20Africa/ID_East_Trop_Atlantic_ENGLISH.pdf English http://www.iucnssg.org/tl_files/Assets/Regional%20files/West%20Africa/ID_East_Trop_Atlantic_FRENCH.pdf French	For fishery observers, fishermen and biologists collecting catch and shark biology data in SRFC zone and in West Africa. Features main morphological characteristics of species, fishing equipment used to catch species, bathymetric distribution and habitat.

Title	Authors/ Organisation	Year	Availability (source and languages)	Notes (incl. guide type and target audience)
Sharks and rays of the Mediterranean and Black Sea – field identification guide	Serena, F. / FAO; GFCM; COPEMED	2005	http://www.fao.org/docrep/009/y5945e/y5945e00.htm English	<i>Species Identification Guides and Identification Cards for Fishery Purposes.</i>
Guide to Sharks, Tunas, and Billfishes of the U.S. Atlantic and Gulf of Mexico	Schulze-Haugen, M., Corey, T. and Kohler, N.E. / NOAA; Rhode Island Sea Grant	2004	Available for purchase: http://seagrant.gso.uri.edu/bookstore/index.html Example of image sheet: http://seagrant.gso.uri.edu/z_downloads/bookstore_sharkplacard1.pdf English	<i>Concise visual guide to 44 highly migratory species, with at-a-glance physical descriptions, diagnostic and field photographs, including side-by-side comparisons of many similar species.</i>
Guía de campo para la identificación de peces cartilaginosos en el Río de la Plata y su frente marítimo	Meneses, P. and L. Paesch	2003	<i>Frente Marítimo</i> , 19, 137-185 Spanish	<i>Covering species found in waters off Argentina and Uruguay.</i>
Field Guide to Requiem Sharks (Elasmobranchiomorphi: Carcharhinidae) of the Western North Atlantic	Grace, M. / US Department of Commerce	2001	http://spo.nwr.noaa.gov/tr153.pdf English	<i>Includes key to Carcharbinidae and individual species accounts with lateral view drawings and detailed text descriptions.</i>
Guide for the Identification of Atlantic Ocean Sharks	Domingo, A. Cortes, E., Forsellado, R. and Triggers, W. / FAO; DINARA; NOAA; ICCAT	n/a	http://www.iccat.int/Documents/SCRS/Guide_ID_Sharks_ENG-2.pdf English http://www.iccat.int/Documents/SCRS/Guide_ID_Sharks_FRA-1.pdf French http://www.iccat.int/Documents/SCRS/Guide_ID_Sharks_SPA-1.pdf Spanish	<i>Four page identification sheets for Carcharhinus spp., with lateral view photos and short descriptions of main characteristics.</i>
Shark Trust ID Guide	Shark Trust; Foundation Ensemble	n/a	http://www.divebooks.net/download/STsharkID.pdf and individual species sheets: http://www.sharktrust.org/en/shark_id_guides English	<i>Covers 35 species of shark encountered in British and Irish waters, and the 19 other species recorded elsewhere in the Northeast Atlantic. Drawings of lateral and ventral views, with principal identification characteristics, and comparisons with similar species.</i>
FWC Guide to the HMS Sharks of Florida	Florida Fish and Wildlife Conservation Commission	n/a	http://www.guidosfishing.com/shark%20identification%20chart.PDF English	<i>Very simple two page key.</i>
Indian Ocean Region				
Deep-water elasmobranchs of the Indian Ocean	Ebert, D. <i>et al.</i> / FAO	In prep	Will be available at FAO FishFinder: http://www.fao.org/fishery/fishfinder/en	<i>Species Catalogue for Fishery Purposes plus Pocket Guide.</i>
Shark and Ray Identification in Indian Ocean Pelagic Fisheries	IOTC/SPC	2012	http://www.iotc.org/files/SpeciesIDcards/IOTC_IDSharksCards_v18[E].pdf English (common names provide in Chinese, Japanese, French, Spanish)	<i>Identification cards aimed at improving catch data and statistics on sharks and rays that interact with tuna fisheries in the Indian Ocean. For fisheries observers, samplers, fishing masters and crew; fisheries training institutions and fishing communities.</i>

Title	Authors/ Organisation	Year	Availability (source and languages)	Notes (incl. guide type and target audience)
Economically important sharks and rays of Indonesia.	White, W.T., Last, P.R., Stevens, J.D., Yearsley, G.K., Fahmi and Dharmadi / ACIAR	2007	http://aciarc.gov.au/files/node/744/mn124_economically_important_sharks_and_rays_indo_1698_3.pdf English and Indonesian	<i>Bilingual guide including family key and species accounts highlighting key features, with lateral and ventral images.</i>
Sharks and rays of the Red Sea and Gulf of Aden – Field identification guide and identification sheets	Bonfil, R. and Abdallah, M. / FAO	2004 and 2007	http://www.fao.org/docrep/009/y5080e/y5080e00.HTM and http://www.fao.org/docrep/010/a1502e/a1502e00.htm English	<i>FAO Species Identification Guide for Fishery Purposes.</i>
Field identification guide to Western Australian Sharks and Shark-like Rays	McAuley, R., Newbound, D. and Ashworth, R. / Department of Fisheries, Perth, Western Australia	2002	http://www.fish.wa.gov.au/Documents/occasional_publications/fop001.pdf English	<i>Family and species level descriptions. Very simple/clear line drawings and descriptions emphasising main diagnostic features, with key identifying features that can be used quickly and reliably to distinguish particular species highlighted in red text.</i>
Pacific Region				
Tiburones de México y Centro América del Océano Pacífico	Cantu, J. C. and Mendez, R. L. / HSI; Marviva; Defenders of Wildlife; Teyeliz; Pretoma	2013	http://www.defenders.org/sites/default/files/publications/shark-identification-guide-mexico-central-america-pacific.pdf Spanish	<i>Focus on creating clear and self-explanatory images to facilitate identification by fishermen with limited identification skills. Currently available as laminated leaflet, being reviewed by FAO, with plans to print on PVC once finalised (M.E Sanchez, SSN, pers. comm, 2013).</i>
Tiburones de Sur America del Oceano Pacifico	Cantu, J. C. and Mendez, R. L. / HSI; Marviva; Defenders of Wildlife; Teyeliz; Pretoma	2013	http://www.defenders.org/sites/default/files/publications/shark-identification-guide-pacific.pdf Spanish	<i>Focus on creating clear and self-explanatory images to facilitate identification by fishermen with limited identification skills. Currently available as laminated leaflet, being reviewed by FAO, with plans to print on PVC once finalised (M.E Sanchez, SSN, pers. comm, 2013).</i>
Guía de campo para la identificación de los principales tiburones de Océano Pacifico Oriental	Martinez-Ortiz, J. / Asia Pacific Economic Co-operation; Ecuador	2010	http://tiburon.viceministerioap.gob.ec/tiburonecuador/guia-de-campo-para-la-identificacion-de-tiburones-en-el-oceano-pacifico-oriental-opo-233.html Spanish	<i>20 page colour guide of main sharks found in the Eastern Pacific, with photos, drawings and key diagnostic features.</i>
The Fish Database of Taiwan	Shao, K.T.	2009	http://fishdb.sinica.edu.tw/chi/fishoutline.php Chinese	<i>Online resource including all shark species from the region, including detailed morphological descriptions.</i>
Identifying sharks and rays: a guide for New South Wales commercial fishers	NSW Department of Primary Industries, Australia	2008	http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/264775/Identifying-sharks-and-rays.pdf English	<i>Contains simple, easy-to-use keys that highlight certain external distinguishing features and colouration for identification purposes.</i>

Title	Authors/ Organisation	Year	Availability (source and languages)	Notes (incl. guide type and target audience)
Field Guide to Sharks, Skates, and Ratfish of Alaska	Stevenson, D.E., Orr, J.W., Hoff, G.R., McEachran, J.D. / Alaska Sea Grant College Program	2007	Available for purchase: http://seagrant.uaf.edu/bookstore/pubs/SG-ID-57.html English	<i>Morphology descriptions based on museum specimens and distribution data from assessment surveys and observer collections. Keys for species and egg cases, with color photos and illustrations.</i>
Guía para la identificación de especies de tiburones y rayas comercializadas en el Pacífico colombiano	Navia, A. F., Mejía Falla, P.A. and Caicedo, J.A. / Fundación SQUALUS	2007	http://www.squalus.org/redconstrictios/pdf/Navia%20et%20al.2007.pdf Spanish	<i>Keys and species sheets, including brief descriptions of diagnostic, general and colour features, line drawings and general fisheries type with which the species are associated.</i>
Photographic identification guide for billfish, sharks, rays, tuna-like and non-tuna finfish taken in WCPO Pelagic Longline Fisheries (V1)	McAuliffe, J. A., Itano, D.G. and Arceneaux, S. / WCPFC	2007	http://www.wcpfc.int/doc/ft-ip-6/photographic-identification-guide-billfish-sharks-rays-tuna-and-non-tuna-finish-taken-w English	<i>Illustrated with photographs of specimens taken by observers on commercial vessels, being representative of what actual fishermen or observers might see during normal longline cruises in the central Pacific Ocean. With comparison photographs of similar species side by side.</i>
Mantas				
Field Guide to the Identification of Mobulid Rays (Mobulidae): Indo-West Pacific.	Stevens, G. / Manta Trust	2013	http://www.mantatrust.org/wp-content/uploads/2011/09/Field-Guide-to-the-Identification-of-Mobulid-Rays-Indo-West-Pacific.pdf English	<i>Focuses on seven mobulid species occurring in the Indo-West Pacific. Includes basic mobulid anatomy, sexual dimorphism, closely related species, keys and species accounts with distinctive features and photos.</i>
*Field Identification Guide of the Prebranchial Appendages (Gill Plates) of Mobulid Rays for Law Enforcement and Trade Monitoring Applications	Stevens, G. / Manta Trust	2013	http://www.mantatrust.org/wp-content/uploads/2011/09/Mobulid-Gill-Plate-Identification-Guide.pdf English	<i>Based on guide above – with descriptions and photos of gill plate distinguishing features and a key for differentiating Manta and Mobula ray gill plates in trade.</i>
*Photo Identification Guide: Gill Rakers of Manta and Mobula Rays	Stevens, G. / Manta Trust	2013	http://www.mantatrust.org/wp-content/uploads/2011/09/Guide-to-Manta-Mobula-Gill-Rakers.pdf English	<i>Includes images to compare fresh and dry gill rakers of Manta and Mobula species.</i>
Field Guide for the Identification of Manta and Mobula Rays	The Manta Network	2007	http://www.mantas.org/documents/Field_Guide_2007.pdf English	<i>Focuses on characteristics important for collecting field data on individual mantas and rays for research, for inclusion in the online Manta Global Database.</i>

Abbreviations: please see comprehensive list of abbreviations in the main Report.

APPENDIX O: Genetic studies on shark identification – selection of references related to shark and manta species listed in the CITES appendices at CoP16

- Abercrombie, D.L., Clarke, S.C. and Shivji, M.S. (2005). Global-scale genetic identification of hammerhead sharks: application to assessment of the international fin trade and law enforcement. *Conservation Genetics* 6:775–788.
- Caballero, S., Cardenosa, D., Soler, G. and Hyde, J. (2012). Application of multiplex PCR approaches for shark molecular identification: feasibility and applications for fisheries management and conservation in the Eastern Tropical Pacific. *Molecular Ecology Resources* 12:233-237.
- Chapman, D.D. and Abercrombie, D.L. (2010). Genetic Identification of Shark Body Parts in Trade: Rapid, Reliable, Inexpensive. A Summary of New Scientific Analysis. *Ocean Science Factsheet*. Pew Environment Group, March 2010.
- Chapman, D.D., Pinhal, D. and Shivji, M.S. (2009). Tracking the fin trade: genetic stock identification in western Atlantic scalloped hammerhead sharks *Sphyrna lewini*. *Endangered Species Research*: 9: 221–228.
- Clarke, S.C., Magnussen, J.E., Abercrombie, D.L., McAllister, M.K. and Shivji, M.S. (2006). Identification of shark species composition and proportion in the Hong Kong shark fin market based on molecular genetics and trade records. *Conservation Biology*. 20: 201-211.
- Clarke, S.C., McAllister, M.K., Milner-Gulland, E.J., Kirkwood, G.P., Michielsens, C.G.J, Agnew, D.J., Pikitch, E.K., Nakano, H. and Shivji, M.S. (2006). Global Estimates of Shark Catches using Trade Records from Commercial Markets. *Ecology Letters* 9: 1115-1126.
- Doukakis, P., Hanner, R., Shivji, M., Bartholomew, C., Chapman, D., Wong, E. and Amato, G. (2011). Applying genetic techniques to study remote shark fisheries in northeastern Madagascar. *Mitochondrial DNA*, 22(S1): 15-20.
- Dudgeon, C.L., Blower, D.C., Broderick, D., Giles, J.L., Holmes, B.J., Kashiwagi, T., Kruck, N.C., Morgan, J.A., Tillett, B.J. and Ovenden, J.R. (2012). A review of the application of molecular genetics for fisheries management and conservation of sharks and rays. *Journal of Fish Biology* 80(5):1789-1843.
- Giles, J. (in prep). Various publications based on PhD research, thesis title: Indo-West Pacific phylogeography of six shark and ray species and two species complexes, with research and forensic applications to the international shark fin trade.
- Hernandez, S., Haye, P. A. and Shivji, M. S. (2008). Characterization of the pelagic shark-fin trade in northcentral Chile by genetic identification and trader surveys, *Journal of Fish Biology* 73, 2293–2304.
- Hernández, S., Gallardo-Escárate C., Álvarez-Borrego, J., González, M.T. and Haye, P.A. (2010). A multidisciplinary approach to identify pelagic shark fins by molecular, morphometric and digital correlation data. *Hidrobiológica* 2010, 20 (1): 71-80.
- Holmes, B.H., Steinke, D. and Ward, R.D. (2009). Identification of shark and ray fins using DNA barcoding. *Fisheries Research* 95: 280-288
- Kashiwagi, T., Marshall, A.D., Bennett, M.B., and Ovenden, J.R. (2012). The genetic signature of recent speciation in manta rays (*Manta alfredi* and *M. birostris*). *Molecular Phylogenetics and Evolution*, 64(1): 212-218.
- Nance, H.A. (2010). The population genetics of the endangered scalloped hammerhead shark, *Sphyrna lewini*, across its eastern Pacific range. Dissertation. Clemson University. *Dissertation Abstracts International*: Vol. 71, no. 05, suppl. B, 122 p.

- Naylor, G.J.P., Ciara, J.N., Jensen, K., Rosana, K.A.M, and White, W.T. (2012). A DNA sequence-based approach to the identification of shark and ray species and its implications for global elasmobranch diversity and parasitology. *Bulletin of the American Museum of Natural History*, 367:1-262.
- Ovenden J., Giles J., Holmes B. and Ward R. (2007). Chapter 3. DNA Species Identification. In: Salini, J., Giles, J., Holmes, B., Marshall, L., Pillans, R., Ovenden, J., Ward, B., Stevens, J., Meekan, M. and Last, P. (2007). *Species Identification from Shark Fins- Phase 1* (AFMA R05/0538) Final Report March, 2007. Australian Fisheries Management Authority.
- Ovenden, J.R., Kashiwagi, T., Broderick, D., Giles, J. and Salini, J. (2009). The extent of population genetic subdivision differs among four co-distributed shark species in the Indo-Australian archipelago. *BMC Evolutionary Biology* 9 (40): 1-15.
- Ovenden, J.R., Morgan, J.A.T., Street, R., Tobin, A., Simpfendorfer, C., Macbeth, W. and Welch, D. (2011). Negligible evidence for regional genetic population structure for two shark species *Rhizoprionodon acutus* and *Sphyrna lewini* with contrasting biology. *Marine Biology* 158:1497-1509.
- Pade, N., Sarginson, J., Antsalo, M., Graham, S., Campana, S., Francis, M., Jones, C., Sims, D., and Noble, L. (2006). Spatial ecology and population structure of the porbeagle (*Lamna nasus*) in the Atlantic: an integrated approach to shark conservation. *Poster presented at 10th European Elasmobranch Association Science Conference*. 11–12 November 2006. Hamburg, Germany.
- Pinhal, D., Shivji, M.S., Vallinoto, M., Chapman, D.D., Gadig, O.B.F., and Martins, C. (2012). Cryptic hammerhead shark lineage occurrence in the western South Atlantic revealed by DNA analysis. *Mar Biol* 159:829–836.
- Poortvliet, M., Galvan-Magana, F., Bernardi, G., Croll, D.A., and Olsen, J.L. (2011). Isolation and characterization of twelve microsatellite loci for the Janapense Devilray (*Mobula japonica*). *Conservation Genetics Resource*. 3: 733-735.
- Quattro, J.M, Stoner, D.S., Driggers, W.B., Anderson, C.A., Priede, K.A., Hoppmann, E.C., Campbell, N.H., Duncan, K.M. and Grady, J.M. (2006) Genetic evidence of cryptic speciation within hammerhead sharks (Genus *Sphyrna*) *Marine Biology* 148 (5):1143-1155
- Rodrigues-Filho, L.F., Pinhal, D., Sodre, D. and Vallinoto, M. (2012). Shark DNA forensics: Applications and impacts on genetic diversity. Pp. 269-286 in (M. Caliskan ed.) [*Analysis of Genetic Variation in Animals*](#). InTech..
- Shivji, M.S. (2010). DNA forensic applications in shark management and conservation. In: *Sharks and their Relatives II: Biodiversity, Adaptive Physiology and Conservation*. Eds. Carrier, J.C., Heithaus, M.R. and Musick, J.A. Pp 593–610. CRC Press
- Shivji, M., Clarke, S., Pank, M., Natanson, L., Kohler, N., and Stanhope, M. (2002). Rapid molecular genetic identification of pelagic shark body-parts conservation and trade-monitoring. *Conservation Biology* 16(4): 1036–1047.
- Testerman, C., Richards, V., Francis, M., Pade, N., Jones, C., Noble, L. and Shivji, M. (2007). Global phylogeography of the porbeagle shark (*Lamna nasus*) reveals strong genetic separation of northern and southern hemisphere populations. *Abstract presented at the American Elasmobranch Society Annual Conference*, 2007.
- Wong, E.H., Shivji, M.S. and Hanner, R.H. (2009). Identifying sharks with DNA barcodes: assessing the utility of a nucleotide diagnostic approach. *Mol Ecol Resour* 9 (SUPPL S1), 243-256
- Ward, R.D., Holmes, B.H., White, W.T. and Last, P.R. (2007). DNA Barcoding Australian Chondrichthyans: Results and Potential Uses in Conservation. *Marine and Freshwater Research* 59(1) 57–71

APPENDIX P: Current valid Shark-specific Customs codes (as of 01/01/2012)

Global codes and examples of more detailed national/territorial codes applicable to shark and ray species listed in the CITES Appendices at CoP16

Customs code	Commodity
Harmonised system (HS6) – mandatory global use	
0302.81 (*0302.65)	Fresh or chilled sharks
0303.81 (*0302.75)	Frozen sharks
0305.71 (*0305.59)	Shark fins
Combined nomenclature (CN8) – European Union	
0302.81.30	Fresh or chilled porbeagle shark “ <i>Lamna nasus</i> ”
0302.81.90	Fresh or chilled dogfish and other sharks (excl. Dogfish “ <i>Squalus acanthias</i> and <i>Scyliorhinus</i> spp.” and Porbeagle Shark)
0303.81.30	Frozen porbeagle shark “ <i>Lamna nasus</i> ”
0303.81.90	Frozen dogfish and other sharks (excl. Dogfish “ <i>Squalus acanthias</i> and <i>Scyliorhinus</i> spp.” and Porbeagle Shark)
0304.89.55	Frozen fillets of porbeagle shark “ <i>Lamna nasus</i> ”
0304.89.59	Frozen fillets of dogfish and other sharks (excl. Dogfish “ <i>Squalus acanthias</i> and <i>Scyliorhinus</i> spp.” and Porbeagle Shark)
0305.71.10	Shark Fins, smoked
0305.71.90	Shark Fins, dried, salted or in brine (excl. smoked)
Harmonised system (HS6 +2) – Hong Kong	
0305.71.11	Shark fins, dried, whether or not salted but not smoked, with or without skin, with cartilage
0305.71.12	Shark fins, dried, whether or not salted but not smoked, with or without skin, without cartilage
0305.71.21	Shark fins, in brine or salted but not dried or smoked, with or without skin, with cartilage
0305.71.22	Shark fins, in brine or salted but not dried or smoked, with or without skin, without cartilage
0305.71.90	Shark fins, NESOI (not elsewhere specified or included)
1604.20.11	Shark fins, prepared or preserved, canned
1604.20.91	Shark fins, prepared or preserved, not canned
Harmonised system (HS6 +2) – Japan	
0304.59.220	Fresh or chilled fish fillets and other fish meat (whether or not minced) - Dogfish and other sharks
0304.99.920	Frozen fish fillets and other fish meat (whether or not minced) - Dogfish and other sharks
0305.71.010	Shark fins, smoked
0305.71.090	Shark fins, other
Harmonised system (HS6 +5, CCC) – Taiwan**	
0302.65.00.90-8	Fresh or chilled Dogfish and other sharks
0303.75.00.90-5	Frozen Dogfish and other sharks
0304.19.30.00-6	Fresh or chilled Shark fins, edible
0304.29.90.42-1	Frozen fillets or steaks of Dogfish and other sharks
0304.99.30.00-9	Frozen shark fins, edible
0305.59.20.00-8	Dried shark fins
0305.69.20.00-6	Salted or in brine shark fins
1604.20.20.11-7	Frozen prepared or preserved fins (incl. shark, skate and ray)
1604.20.20.12-6	Canned prepared or preserved fins (incl. shark, skate and ray)
1604.20.20.19-9	Other prepared or preserved fins (incl. shark, skate and ray)

Notes: Many more general fishery and other Customs codes could contain shark products, however they do not specify the inclusion of sharks (or Manta rays) and are not included in the table above. *Code prior to 2012, and used in FAO trade data analysis presented in this Report. ** Taiwanese codes are currently still based on the pre-2012 HS6 system, but it is likely they will be updated in line with the new 2012 HS6 system later in 2013 (J. Wu, TRAFFIC, in litt, 2013).

Abbreviations: CCC - Standard Classification of Commodities of the Republic of China

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

For further information contact:

Regional Director

TRAFFIC

219a Huntingdon Road

Cambridge CB3 0DL

UK

Telephone: (44) 1223 277427

Fax: (44) 1223 277237

Email: teur@traffic.org

