CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

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Twenty-seventh meeting of the Animals Committee
Veracruz (Mexico), 28 April – 3 May 2014

CITES NON-DETRIMENT FINDINGS GUIDANCE FOR SHARKS

1. The attached information document has been submitted by Germany[1].

2. In 2013 the German Scientific Authority (Fauna) commissioned a project Development of Non-detriment Findings for shark species listed in Appendix II of CITES: a review of existing management measures and the development of guidelines and practical recommendations.

3. The resulting report, "*CITES Non-Detriment Findings Guidance for Shark Species: a Framework to assist Authorities in making Non-detriment Findings (NDFs) for species listed in CITES Appendix II*", is attached.

4. The NDF procedures set out in the report will be tested on selected stocks of Porbeagle (*Lamna nasus*) and other listed shark species, and the results analysed during a small expert workshop that will be hosted by the German government in Berlin during August 2014.

5. The procedures and guidance notes will be revised following testing and discussions at the Berlin workshop. The aim is for the framework to be ready for practical implementation by the time that the Appendix II listings adopted by CoP16 in March 2013 come into force, in September 2014. The revised guidance report will be finally submitted to the CITES Secretariat to be placed on the CITES homepage section for sharks and mantas (http://www.cites.org/eng/prog/shark/index.php).

[1] *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat or the United Nations Environment Programme concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

CITES Non-detriment Findings Guidance for Shark Species

A Framework to assist Authorities in making Non-detriment Findings (NDFs) for species listed in CITES Appendix II

24 February 2014

Victoria Mundy-Taylor, Vicki Crook, Sarah Foster, Sarah Fowler, Glenn Sant and Jake Rice.

BfN Federal Agency for Nature Conservation

TRAFFIC the wildlife trade monitoring network

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GLOSSARY

Baited remote underwater video (BRUV). A non-extractive low-cost method to monitor changes in relative abundance and diversity, using bait to attract fish into the field of view of a remotely controlled camera.

Bycatch. The part of a catch taken incidentally in addition to the target species towards which fishing effort is directed. Includes secondary catch – the bycatch that is retained and utilised.

Catch Documentation Scheme. A trade-based recording and reporting measure, one of several monitoring, control and surveillance (MCS) tools developed by Regional Fisheries Management Organizations (RFMOs) to combat illegal, unreported and unregulated (IUU) fishing activities.

Catch per unit effort (CPUE). An indirect fishery-dependent measure of the abundance of a target species, in which changes in CPUE are inferred to reflect changes to the target species' true abundance. A decreasing CPUE indicates overexploitation, while a level CPUE indicates sustainable harvesting.

Chondrichthyan. Member of the Class Chondrichthyes, including the elasmobranchs (sharks and batoid fishes) and the holocephalans (chimaeras).

Circumglobal. Occurring around the world.

Circumtropical. Occurring around the tropical regions of the world.

Cohort. A group of fish born in the same year within a particular stock.

Elasmobranch. Member of the subclass Elasmobranchii: the sharks and batoid fishes (including sawfishes, skates and rays, characterised by 5–7 pairs of gill openings).

Exclusive Economic Zone (EEZ). A zone under national jurisdiction (up to 200-nautical miles wide) declared in line with the provisions of UNCLOS, within which the coastal State has the right to explore and exploit, and the responsibility to conserve and manage, living and non-living resources.

Demersal. Occurring or living near or on the bottom of the ocean (cf. pelagic).

Fishery-independent monitoring. A method to monitor stocks that is not dependent upon and therefore influenced by commercial fishing activity. Examples include scientific surveys using standard methodologies.

Generation. Measured as the average age of parents of newborn individuals within a population. Usually lower in an exploited stock.

High Seas. Areas outside of the jurisdiction of any State (also international waters, or trans-boundary waters). Fisheries on the high seas are managed by regional fisheries management bodies.

Highly migratory species. The agreed list of species listed in UNCLOS Annex I. These should be subject to cooperative management by the countries fishing the stocks.

Individual Transferable Quota (ITQ). A catch limit or quota (a part of the Total Allowable Catch) allocated to an individual fisher or vessel owner that can either be harvested or sold to others.

Illegal, unreported and unregulated (IUU). Illegal fishing takes place where vessels operate in violation of the fishing laws of a RFMO or a coastal State. Unreported fishing is unreported or misreported to relevant authorities, in contravention of applicable laws and regulations. Unregulated fishing generally refers to fishing by vessels without nationality, or flagged to a State not Party to the RFMO governing the species or fishing area. See FAO IPOA–IUU fishing. http://www.fao.org/docrep/003/y1224e/y1224e00.htm

International Plan of Action for the Conservation and Management of Sharks. A voluntary measure adopted to assist with the implementation of the FAO Code of Conduct for Responsible Fisheries. Encourages FAO Members that catch sharks to produce Shark Assessment Reports and adopt National Shark Plans, and RFMOs to develop regional management measures.

Introduction from the sea. See Text Box 1, page 3.

Longevity. The maximum expected age of individuals in the absence of fishing mortality.

Maximum sustainable yield (MSY). The largest theoretical average catch or yield that can continuously be taken from a fish stock under existing environmental conditions without causing it to become depleted (it assumes that removals and natural mortality are balanced by stable recruitment and growth).

Monitoring, control and surveillance (MCS). The mechanism for implementing agreed policies, plans or strategies for oceans and fisheries management; a key component of the fisheries management process.

National Plan of Action/National Shark Plan. See International Plan of Action for the Conservation and Management of Sharks.

Overfished. A stock is considered overfished when it is exploited beyond a limit (often expressed as a 'limit biological reference point') at which its abundance is considered too low to ensure safe reproduction.

Overfishing. A term used to refer to the level of fishing effort or fishing mortality upon a fish stock that would, if reduced, lead to an increase in the total catch. Overfishing may occur even if the stock is not overfished. Also termed over-exploitation.

Pelagic. Referring to organisms that live in the water column, not on the sea bottom.

Productivity. Relates to the birth, growth and mortality rates of a fish stock. Highly productive stocks are characterised by high birth, growth and mortality rates and can usually sustain higher exploitation rates and, if depleted, could recover more rapidly than comparatively less productive stocks.

Regional Fisheries Body (RFB). A group of States or organizations that are Parties to an international fishery arrangement and work together towards the conservation and management of fish stocks. Some RFBs only provide scientific advice. See also RFMO (below).

Regional Fisheries Management Organisation (RFMO). An RFB with a conservation and management remit.

Regional Plan of Action/Regional Shark Plan. See International Plan of Action for the Conservation and Management of Sharks.

Shark Assessment Report. See International Plan of Action for the Conservation and Management of Sharks.

Stock. A fish stock is a subpopulations of a particular fish species, often occupying a well-defined geographical range and regarded as an entity for management and assessment purposes, whose population dynamics are defined by its intrinsic parameters (extrinsic factors are considered to be insignificant).

Stock assessment. Scientific analyses that provide fisheries managers with the information needed to develop measures for the regulation of a fish stock.

Straddling stock. A fish stock which migrates between, or occurs in both a State's Exclusive Economic Zone (EEZ) and the high seas.

Total allowable catch (TAC). The total quantity of a species permitted to be caught in a certain area during a particular fishing season or year. The TAC is subdivided into quotas that may be assigned to each country participating in the fishery, and/or to each fleet, vessel or fisher.

Total length (TL). A standard morphometric measurement, from the tip of the snout or rostrum to the end of the upper lobe of the caudal fin.

Trade documentation scheme. See Catch Documentation Scheme.

Vessel Monitoring System. Satellite position fixing system used by environmental and fisheries regulatory organizations to monitor position, course and speed of commercial fishing vessels.

ACRONYMS AND ABBREVIATIONS

AC	Animals Committee (CITES)
BfN	Bundesamt für Naturschutz (German CITES Scientific Authority)
BRUV	Baited remote underwater video
CDS	Catch Documentation Scheme
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
CoP	Conference of the Parties
CPUE	Catch per unit effort
DEFRA	Department for Environment, Food and Rural Affairs
EEZ	Exclusive Economic Zone
EU	European Union
EU-TWIX	Trade in Wildlife Information eXchange
FAO	Food and Agriculture Organization of the United Nations
IFS	Introduction from the sea
IGO	Inter-governmental organisation
IPOA	International Plan of Action
IUCN	International Union for Conservation of Nature
IUU	Illegal, unreported and unregulated
MCS	Monitoring, control and surveillance
MSC	Marine Stewardship Council
MPA	Marine Protected Area
NGO	Non-governmental organisation
NDF	Non-detriment findings
NPOA	National Plan of Action/National Shark Plan
OSPAR	The Convention for the Protection of the Marine Environment of North-East Atlantic
RFB	Regional Fisheries Body
RFMO	Regional Fisheries Management Organisation
RPOA	Regional Plan of Action/Regional Shark Plan
SAR	Shark Assessment Report
TAC	Total allowable catch
TDS	Trade documentation scheme
UN	United Nations
UNCLOS	UN Convention on the Law of the Sea (1982)
US FWS	United States Fish and Wildlife Service
VMS	Vessel Monitoring System

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BACKGROUND

This Guidance was produced for the Bundesamt fur Naturschutz (German government) under the project "Development of Non-detriment Findings for shark species listed in Appendix II of CITES: a review of existing management measures and the development of guidelines and practical recommendations". A brief summary of work undertaken for this project will be presented to the 27th meeting of the CITES Animals Committee in 2014.

The NDF procedures set out in the report will be tested on selected stocks of Porbeagle (*Lamna nasus*) and other listed shark species, and the results analysed during a small expert workshop to be hosted by the German government in Berlin during August 2014. The procedures and guidance notes will be revised if necessary following discussions at this workshop.

The aim is for the Guidance to be finalised and ready for practical implementation by the time that the Appendix II listings adopted by the Sixteenth meeting of the Conference of the Parties (**CoP**) in March 2013 come into force in September 2014. The revised guidance report will be submitted to the CITES Secretariat to be placed on the CITES homepage section for sharks and mantas (http://www.cites.org/eng/prog/shark/index.php).

INTRODUCTION

What are CITES Non-detriment Findings?

Ensuring trade lies within sustainable limits is at the core of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (**CITES**). According to the Convention, Parties shall allow trade in specimens of species included in Appendix II only if the Scientific Authority of the State of export has advised that "such export will not be detrimental to the survival of that species" (**Article IV.2(a)**). Referred to as "**non-detriment findings**" (**NDFs**), they are a guarantee that exports of products from listed species covered by the NDF have not harmed wild populations[1] or ecosystems.

International trade of shark[2] products derived from species listed in Appendix II[3] is only permitted if a **CITES Export Permit**[4] has been issued by the Management Authority of the exporting State. An export permit cannot be issued until the **Management Authority** has proved that the specimens were **legally acquired**, and an **NDF** has been prepared by the **Scientific Authority**. Special provisions apply to Appendix II-listed species caught on the **high seas,** i.e. areas outside of the jurisdiction of any State (**Articles IV.6 & 7** and **Resolution Conf. 14.6 (Rev. CoP 16)**), see **Text Box 1** below.

The **development of an NDF should ideally take place before** any listed shark species that is destined to be exported or introduced from the sea **has been fished and landed**. This is particularly important because NDFs may come with conditions, such as improving management through restrictions on catch (e.g. an annual Total Allowable Catch (**TAC**) comprised of separate quotas for national fleets or individual vessels) or export quantities, or the requirement of monitoring and control systems to ensure compliance with such limits. Another condition may be the need for traceability from catch to consumer. Setting such conditions in advance of harvesting will help to discourage unsustainable mortality driven by trade demand.

Why is guidance for Non-detriment Findings needed?

Because the Scientific Authority of each CITES Party is responsible for making NDFs and determining how to do so, the Conference of the Parties (**CoP**) has not produced binding technical criteria for undertaking NDFs. Instead, considerable effort has been made by some CITES Parties, inter-governmental organisations (**IGOs**), non-governmental organisations (**NGOs**), the CITES Secretariat and the CoP to develop non-binding general and taxon-specific guidance for making NDFs.

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[1] Elsewhere in this Guidance, the term "stock" is generally used instead of "population".

[2] The term "shark" is used in this Guidance to refer to all sharks, skates, rays and chimaeras (*Class Chondrichthyes*).

[3] In 2014, the shark species listed in CITES Appendix II are: (i) Oceanic Whitetip Shark *Carcharhinus longimanus*; (ii) Porbeagle *Lamna nasus*; (iii) Scalloped Hammerhead Shark *Sphyrna lewini*; (iv) Great Hammerhead Shark *Sphyrna mokarran*; (v) Smooth Hammerhead Shark *Sphyrna zygaena*; (vi) Basking Shark *Cetorhinus maximus*; (vii) Whale Shark *Rhincodon typus;* (viii) Great White Shark *Carcharodon carcharias*, and (ix) the Manta rays *Manta birostris* and *Manta alfredi*. The CITES listings for taxa (i) to (v) and (ix) are due to enter into force on 14 September 2014. The Sawfish, Family Pristidae, are all listed in Appendix I, which prohibits commercial trade. Current shark species lists are available at http://www.cites.org/eng/prog/shark/index.php

[4] Or equivalent documentation, if one of the States involved is not a Party to CITES.

Key milestones have included:

- The publication (and supporting workshops) of the IUCN Species Survival Commission's ***Guidance for CITES Scientific Authorities: Checklist to assist in making non-detriment findings for Appendix II exports***[5] (Rosser and Haywood, 2002);
- The ***International expert workshop on CITES non-detriment findings*** (Cancun, Mexico, 17-22 November 2008[6]), which considered case studies on NDF development for seahorses (*Hippocampus* spp.), Humphead Wrasse (*Cheilinus undulatus*), sturgeons, *Arapaima* spp. and European Eel (*Anguilla anguilla*) in order to formulate general guidelines on making NDFs for fish species;
- The information document submitted by Spain to the 24th Meeting of the CITES Animals Committee (**AC**), ***Sharks: Conservation, fishing and international trade*** (AC24 Inf. 5)[7], which proposed general guidelines for assessing the effect that exploitation due to commercial international trade may have on shark stocks;
- ***Resolution Conf. 16.7 on Non-detriment Findings***[8], which provides general guidelines on making NDFs based on the outcomes of the 2008 workshop;
- ***CITES Non-detriment Findings guidance for perennial plants: a nine-step process to support CITES Scientific Authorities making science-based non-detriment findings (NDFs) for species listed in CITES Appendix II***, under preparation by TRAFFIC on behalf of WWF Germany, with financial support from the German Federal Agency for Nature Conservation (BfN);
- ***Making Non-detriment Findings for seahorses – a framework,*** developed by Project Seahorse under a project to build in-country capacity to undertake NDFs for *Hippocampus* spp. in Indonesia, Thailand and Viet Nam[9];
- Electronic guide on the making of Non-detriment Findings, directed at Central American and Caribbean American Scientific Authorities, developed by TRAFFIC[10];
- The CITES Virtual College module on making NDFs[11].

The content of this Guidance draws upon these resources, particularly the Fish Working Group report and case studies from the 2008 International Expert Workshop in Mexico, the framework for making NDFs for seahorses, and the NDF guidance for perennial plants. However, it has adapted this process to incorporate specific issues and information that may need to be taken into account when making NDFs for shark species.

Although this guidance may appear intimidatingly long and comprehensive, this is because it aims to cover every possible relevant point that might contribute to reaching an NDF. It is certainly not necessary to provide all the data listed at each step before making an NDF. Short-cuts may also be possible, under certain conditions.

[5] http://data.iucn.org/themes/ssc/our_work/wildlife_trade/citescop13/CITES/guidance.htm#guide
[6] http://www.conabio.gob.mx/institucion/cooperacion_internacional/TallerNDF/taller_ndf.html
[7] http://www.cites.org/common/com/ac/24/EF24i-05.pdf
[8] http://www.cites.org/eng/res/16/16-07.php Resolutions may be revised at each CoP, but the CITES website is updated accordingly.
[9] http://seahorse.fisheries.ubc.ca/ndf
[10] 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.
[11] https://cites.unia.es/

Text Box 1

Introduction from the sea (IFS)

When a CITES-listed species that was taken on the **high seas** (in an area not under the jurisdiction of any State) is landed, this is referred to as an "introduction from the sea" (**IFS**) and is included in CITES' definitions of "trade".

Under the framework agreed at CITES CoP16 (contained in **Resolution 14.6 (Rev. CoP16)**), where a vessel catches an Appendix II listed species on the high seas **and**:

- lands the specimen(s) in the **same State** to which the vessel is flagged, the Management Authority of the "**State of introduction**" (i.e. the State to which the vessel is flagged – the Flag State) must grant an **IFS certificate**, requiring an NDF to be prepared before the catch can be landed;
- lands the specimen(s) in a **different State** to the State to which the vessel is flagged, the transaction will be **treated as an export**. The Management Authority of the Flag State must issue an **export permit**, requiring an NDF and a legal acquisition finding.

A narrow exception to this requirement has been agreed in cases where **chartering arrangements** are in place between two CITES Parties. In such cases, where a vessel chartered by one State (State A) from the Flag State (State B), catches a species on the high seas and wishes to land the specimens in State A, the two States **can agree** that the **chartering State (State A) will issue an IFS certificate** for the specimens concerned (rather than State B having to issue an export permit).

According to Resolution Conf. 14.6 (Rev. CoP16), for this exception to apply, the chartering arrangements should be consistent with the framework for chartering of a relevant Regional Fisheries Body (**RFB**) and the CITES Secretariat should be informed in advance of the arrangement, enabling CITES Authorities/RFBs to find out from the Secretariat what agreement is in force.

Note that, although an NDF is required for the purposes of an IFS certificate, **a legal acquisition finding** in the strict sense is not necessary if the specimens are not going to be exported to another State (see below). Resolution Conf. 14.6 (Rev. CoP16) does, however, recommend that Parties, when issuing an IFS certificate, take into account whether or not the specimen was or will be acquired and landed:

(i) in a manner consistent with applicable measures under international law for the conservation and management of living marine resources, including those of any other treaty, convention or agreement with conservation and management measures for the marine species in question; and

(ii) through any illegal, unreported or unregulated (**IUU**) fishing activity.

In cases where the specimens are **subsequently to be exported**, a legal acquisition finding will also be required for the issuing of the export permit.

Article IV.7 specifies that IFS certificates may be granted "in respect of periods not exceeding one year for total numbers of specimens to be introduced in such periods". In other words, just as with specimens landed in national waters, an NDF may be based on a a total catch quota (agreed to be non-detrimental) for the year and issue individual permits to vessels until that quota has been met for the stock being fished (see also **Text Box 3** below).

See also: http://www.nmfs.noaa.gov/ia/agreements/global_agreements/cites_page/cites.pdf

The aim of this Guidance

This document sets out to provide **practical NDF guidelines under Article IV.2(a) (Export) and Article IV.6(a) (Introduction from the sea)** for CITES Authorities dealing with the export of products from Appendix II-listed shark species or their introduction from the sea. Although the guidance is prepared with Porbeagle *Lamna nasus* specifically in mind, it should be sufficiently generic to be suitable for application to all shark species listed in CITES Appendix II). [12]

The following pages cover the procedures needed for development of NDFs for international trade in CITES Appendix II-listed shark specimens caught in **a State's territorial waters and/or Exclusive Economic Zone (EEZ)** and for specimens caught on the **high seas** (see **Text Box 1**).

The Guidance takes into account the preparation of NDFs for **shark stocks that occur within the waters of more than one State and/or on the high seas**[13]. Under these scenarios, CITES allows an NDF to be developed and issued at a **regional level** with, for example, a Regional Fisheries Body (**RFB**) (such as an Regional Fisheries Management Organisation (**RFMO**)) acting as an international Scientific Authority for high seas stocks, as provided under **Article IV.7**. This facilitates collaboration between countries to ensure that all sources of mortality for the shark stock concerned are considered.

The Guidance recognises that CITES also encourages **consultation with the RFB**[14] that have jurisdiction over the fisheries that take the species concerned, whether as directed or secondary catch. **Scientific Authorities should check with the relevant RFB to see if a Regional NDF has been agreed** – where one has not, they should seek scientific advice from that RFB in developing a State-based NDF.

A number of **over-arching principles** that will facilitate the development of robust NDFs for shark species is provided in **Text Box 2** below.

Text Box 2

Over-arching principles that will enhance development of robust shark NDFs

1. Good communication between Fisheries Authorities and CITES Authorities within and between Parties, especially where Fisheries Authorities are designated as the Scientific Authority for making NDFs for sharks and/or other aquatic species.
2. International coordination, including through the bilateral and multilateral development of joint NDFs for shared (straddling, high seas and highly migratory) stocks.
3. Collaborative development of stock assessments and NDFs for high seas shark stocks through membership of Regional Fisheries Bodies.
4. Parties adopting standard approaches that allow NDFs to be equivalent and comparable, regardless of provenance, enhanced by peer review and sharing of NDF methodologies.

[12] **Annex 3** of this document contains management risk assessments for Porbeagle prepared by TRAFFIC under a DEFRA project to develop a rapid management-risk assessment method for fish species through its application to sharks (Lack *et al.*, 2014). These contain relevant information to assist authorities in their decision-making throughout the NDF process for these species.

[13] Also called straddling stocks and high seas stocks. See http://www.fao.org/fishery/topic/14769/en

[14] A few Regional Fisheries Bodies (**RFB**) are solely scientific advisory bodies (e.g. the International Council for the Exploration of the Seas (ICES)), but most are Regional Fisheries Management Organizations (**RFMO**) with both a fisheries conservation and management remit. The latter may obtain scientific advice from other RFBs, or from internal scientific committees and working groups.

How to Use this Guidance

This Guidance has been developed as a series of steps, illustrated by the flow-chart in **Figure 1**. More detail is provided in **Table 1**. The primary intent is to guide Scientific Authorities through the process of carrying out NDFs for shark species, considering the range of different scenarios that may be encountered, for example, species caught:

- in **target fisheries**;
- as **secondary catch**;
- from **stocks exploited by several States**; and/or
- in **data-poor situations**.

Steps 2–5, shown in colour in **Figure 1**, are directly related to the **role of Scientific Authorities** in preparing NDFs and receive particular attention in the following pages. Other related tasks (**Steps 1 and 6**) that are primarily the **responsibility of Management Authorities** are also described. This is because the data gathered and feedback provided at those stages will assist the work of the Scientific Authorities and aid the process by which existing NDFs are reviewed and new NDFs prepared. This approach also recognises that CITES Scientific and Management Authority roles may overlap considerably in some Parties.

Although this Guidance is intended to guide a Scientific Authority through the process of gathering and analysing data relevant to an NDF, ultimately it is necessary for the Scientific Authority to **weigh up the risks and evidence to make its final NDF decision**.

Table 1 provides an overview of the **structure of this Guidance**, as follows (from left to right):

- the **Steps** in the decision-making process, as illustrated in **Figure 1**;
- the **Sections** under each Step (also shown in **Figure 1**); and
- the main **Question**(s) to be answered under each Section (which are accompanied in the text by Guidance Notes, Useful Sources of Information and instructions on the Next Steps to be taken).

Sources of information

As a starting point, and in addition to the more detailed lists of Useful Sources under each Step of this Guidance, the following sources provide valuable information to assist in the NDF decision-making process. In particular, the first two websites below provide links to several key shark NDF resources:

- **CITES Shark portal**: http://www.cites.org/eng/prog/shark/index.php
- **United Nations (UN) Food and Agriculture Organization (FAO) shark portal**: http://www.fao.org/fishery/ipoa-sharks/en

Fisheries management information:

- National and Regional Plans of Action for Sharks (**NPOA** and **RPOA-Sharks**) and Shark Assessment Reports (**SAR**) developed within the framework of the UN FAO International Plan of Action for the Conservation and Management of Sharks (**IPOA–Sharks**) (http://www.fao.org/fishery/ipoa-sharks/en).
- National fisheries regulations, including prohibited species lists, size limits, gear restrictions, seasonal closures, and details of TACs and quotas (these can be obtained from the national fisheries management authority).

- Resolutions, Conservation and Management Measures and Recommendations of relevant RFBs, including prohibited species, prohibited areas, and technical measures such as fishing gear controls. (There is an interactive map of RFB areas of competence and links to RFB websites, which provide management information and scientific recommendations, at www.fao.org/fishery/rfb/en.)

Biodiversity/wildlife management information:

- Protected species listed in the State's national legislation and by the other regional and multilateral environmental agreements to which the State is a Party (see, for example, www.speciesplus.net/).
- Marine protected areas, where fisheries are regulated, restricted or prohibited (www.protectplanetocean.org/).

Species information:

- Global: www.redlist.org
- National: www.nationalredlist.org
- Porbeagle shark *Lamna nasus*: See Text Box 3.

In addition, **Annex 3** of this Guidance contains management risk assessments for Porbeagle *Lamna nasus*, with much relevant information to assist Authorities in their decision-making throughout the NDF process for this species. This information was prepared by TRAFFIC under a DEFRA (Department for Environment, Food and Rural Affairs) project to develop a rapid management-risk assessment method for fish species through its application to sharks (Lack *et al*., 2014).

Text Box 3.

Key sources of information on Porbeagle shark *Lamna nasus*

Atlantic Ocean

Joint ICCAT/ICES stock assessment: ICCAT SCRS/ICES (2009)

ICES WGEF reports: http://www.ices.dk/community/groups/Pages/WGEF.aspx

Canadian stock assessment: DFO (2005).

Godin and Worm (2010).

ICCAT landings and effort data (ICCAT Rec 07-06).

Mediterranean: Landings and effort data (Rec. GFCM/36/2012/3); GFCM Secretariat (2010).

NEAFC landings and effort data (Rec. 2: 2012, 6: 2012; Scheme of Control and Enforcement, Article 9, ICES (2012b), Book 9 Section 9.4.7).

Southern hemisphere

IOTC landings and effort data (Res. 05/05; 13/03).

WCPFC landings and effort data (CMM 2011-4); Harley *et al*. (2013).

CCBST (stock assessment underway by Japan, New Zealand and Australia).

New Zealand data analysis: NZ Ministry for Primary Industries (2012).

General

CITES. (2013).

Figure 1. Flow chart illustrating NDF process

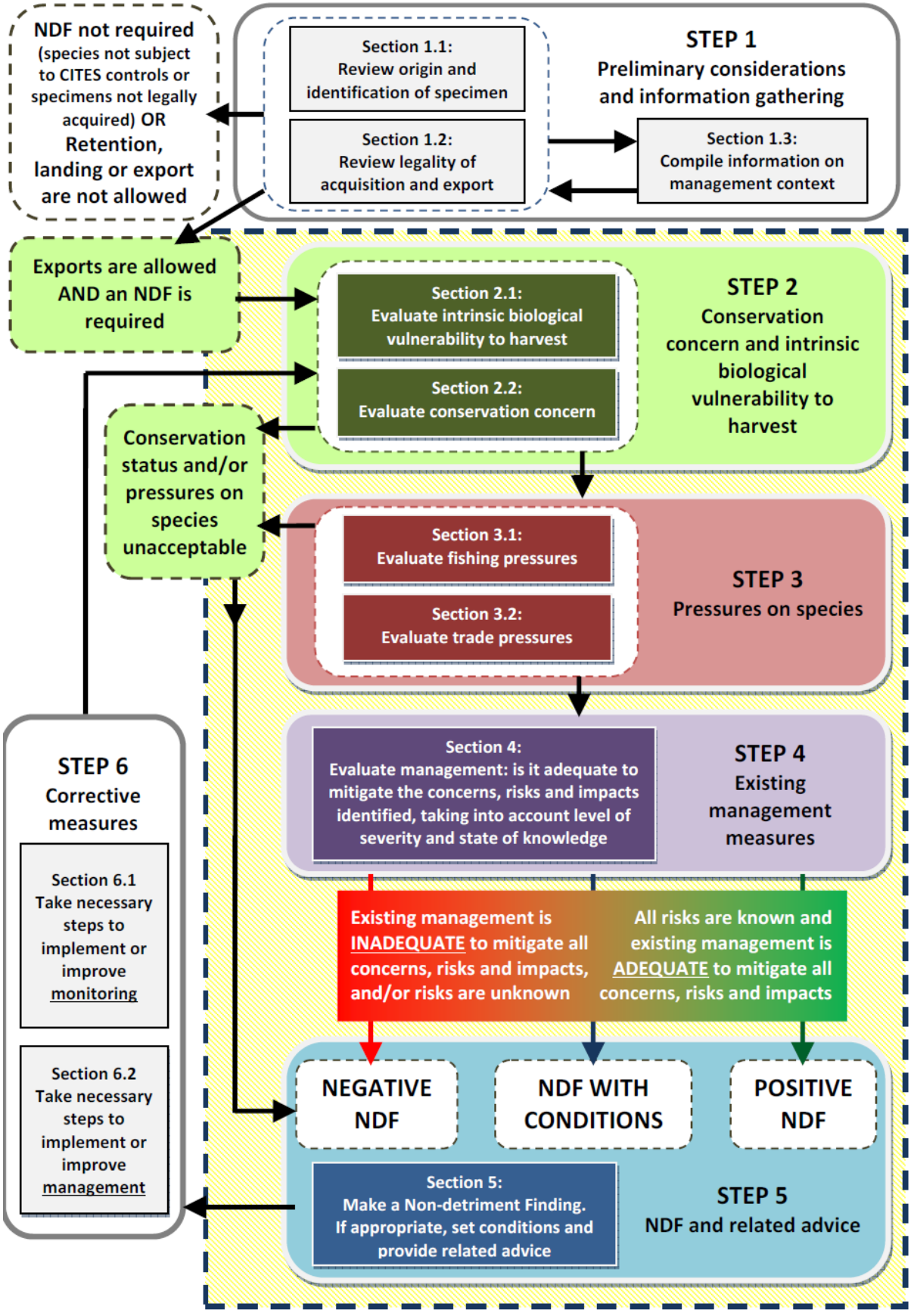


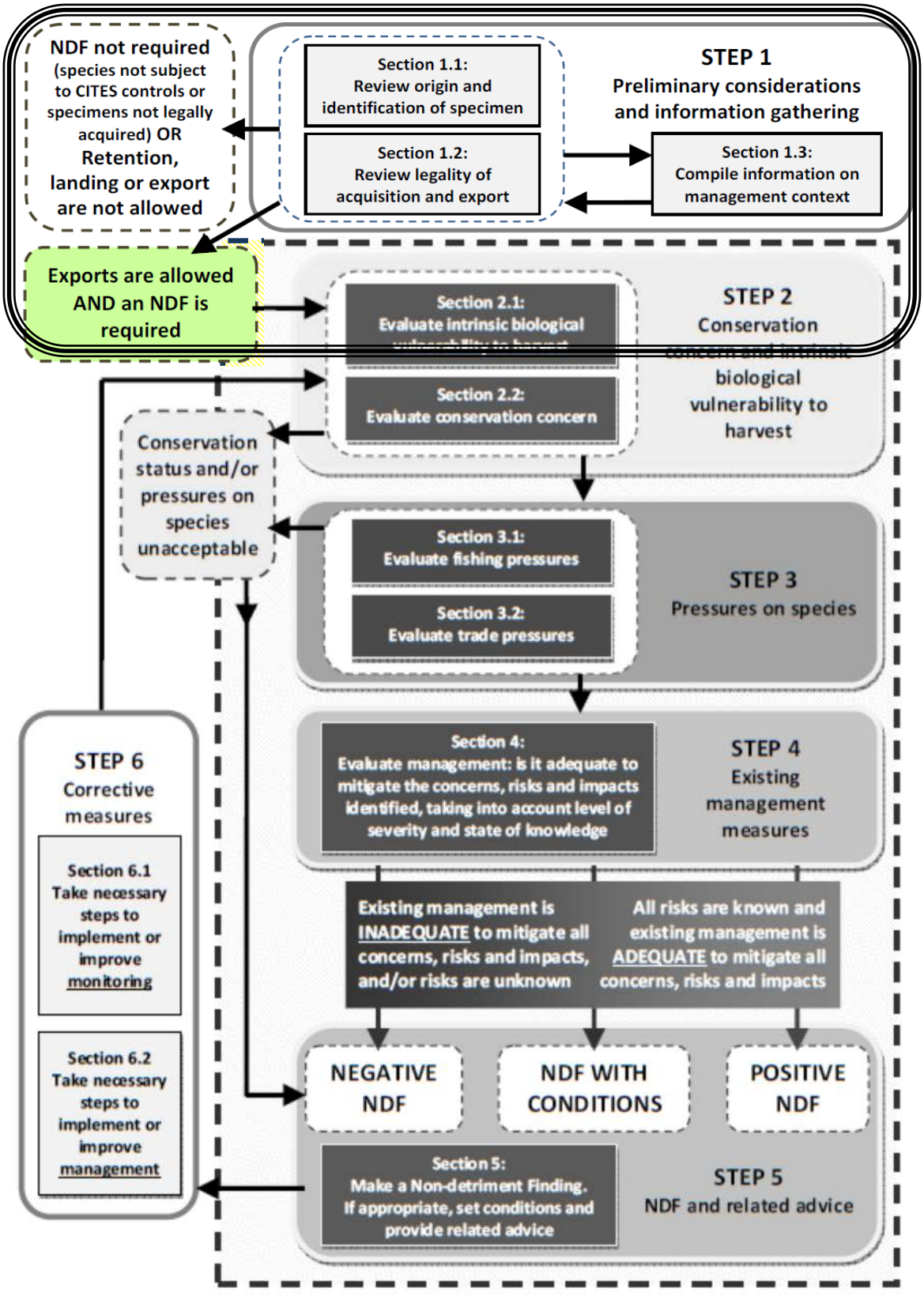
Table 1. Structure of the Guidance

Steps	Sections	Questions
Step 1 Preliminary considerations and information gathering (to be carried out prior to NDF process)	**Section 1.1** Review origin and identification of specimen	**Question 1.1(a)** Is the specimen subject to CITES controls? (Can the specimen be confidently identified?)
		Question 1.1(b) Where, or from which stock of the species, was (will) the specimen (be) taken? (Can origin be confidently identified?)
	Section 1.2 Review legality of acquisition and export	**Question 1.2** Was (will) the specimen (be) legally obtained and is export allowed?
	Section 1.3 Review available information on management context	**Question 1.3** What does the available management information tell us?
NDF starts here:		
Step 2 Intrinsic biological vulnerability to harvest and conservation concern	**Section 2.1** Evaluate intrinsic biological vulnerability to harvest	**Question 2.1** What is the level of intrinsic biological vulnerability of the species to harvest?
	Section 2.2 Evaluate conservation concern	**Question 2.2** What is the severity and geographic extent of conservation concern?
Step 3 Pressures on species	**Section 3.1** Evaluate fishing pressures	**Question 3.1(a)** What is the severity of risk of fishing on the stock of the species concerned?
		Question 3.1(b) Based on the information available, what is the level of confidence associated with the evaluation of fishing risk made under Question 3.1(a)?
	Section 3.2 Evaluate trade pressures	**Question 3.2(a)** What is the severity of risk of trade on the stock of the species concerned?
		Question 3.2(b) Based on the information available, what is the level of confidence associated with the evaluation of trade risk made under Question 3.2(a)?

Table 1 continued

Steps	Sections	Questions
Step 4 Existing management measures		**Question 4.1(a)** What generic and species-specific management measures are in place for the stock of the species concerned?
		Question 4.1(b) Are the management measures identified in Question 4.1(a) appropriate to address the pressures affecting the stock of the species concerned?
		Question 4.1(c) Are the management measures identified in Question 4.1(a) being implemented?
		Question 4.1(d) Are the management measures identified in Question 4.1(a) effective or likely to be effective in reducing the impacts on the stock of the species concerned?
Step 5 Non-detriment Finding and related advice		**Question 5.1** What is the final outcome of the previous steps? The Scientific Authority now has to decide whether to give positive advice, or positive advice subject to conditions, or negative advice regarding the non-detriment finding.
NDF finishes here		
Step 6 Corrective measures	**Section 6.1** Improvements in monitoring or information required	-
	Section 6.2 Improvements in management required	-

STEP 1:
PRELIMINARY CONSIDERATIONS AND INFORMATION GATHERING



Overview

An overview of the structure of **Step 1**, including Sections and Questions to be answered is provided in **Table 2**. Relevant Worksheets are contained in Annex 2 to this Guidance.

Table 2. Overview of Step 1

Steps	Sections	Questions
Step 1 Preliminary considerations and information gathering	**Section 1.1** Review origin and identification of specimen	**Question 1.1(a)** Is the specimen subject to CITES controls? (Can the specimen be confidently identified?)
		Question 1.1(b) Where, or from which stock of the species, was (will) the specimen (be) taken? (Can origin be confidently identified?)
	Section 1.2 Review legality of acquisition and export	**Question 1.2** Was (will) the specimen (be) legally obtained and is export allowed?
	Section 1.3 Review available information on management context	**Question 1.3** What does the available management information tell us?

Rationale

This first step has two important **objectives**:

1. **to confirm whether an NDF will be needed, and**
2. **to compile the information used to reach this decision.**

CITES assigns Management Authorities the task of reviewing the origin and identification of the specimens for which an export permit is needed, and confirming whether the specimens were legally obtained. The activities identified in this section are not, therefore, part of the Scientific Authority's NDF-development duties. Nonetheless, guidance for this preliminary step is included here because the same experts may be involved in both processes, and the information obtained at this stage is also important for making decisions during **Steps 2–5** in this NDF Guidance.

There are **two reasons why a Management Authority will initiate this step**:

1. A **request has been received** for an export permit and/or an introduction from the sea (**IFS**) certificate (for prospective catches or for catches that have already taken place).
2. For the purposes of **management planning of the shark stock concerned** (for example, setting a sustainable harvest and/or export quota), where future requests for IFS certificates or export permits are expected but have not yet been received.

Is an NDF necessary?

As discussed in the **Introduction** to this Guidance (see "**What are CITES Non-detriment Findings?**"), an NDF for CITES-listed Appendix II shark species must be issued by a Party if:

1. An **export permit is to be issued**, in cases where:

- Sharks are caught within the **national waters of a State** (territorial waters or Exclusive Economic Zone - **EEZ**) and then, **following landing in a Port of the same State, that State wishes to export the specimens.**
- Sharks are caught within the **national waters of a State** (territorial waters or EEZ) and the specimens are to be **landed in the Port of a different State** from the one in which they were caught.
- A **State's vessel** catches sharks on the **high seas** and **lands them in the Port of another State** (see **Text Box 1** above for further information).

2. An **IFS certificate is required**, in cases where:

- A **State's vessel** catches sharks on the **high seas** and **lands the specimens in its own Port** (see **Text Box 1** above for further information).

However, if any of the following circumstances apply, **an NDF will NOT be required**. Further Guidance to assist authorities in their decision-making in such situations is provided in **Sections 1.1** and **1.2** below.

- The specimen has **not been correctly identified** on the export permit application and the actual species to be exported is **not subject to CITES controls** (see **Section 1.1**).
- The specimen was **obtained illegally** and, because it is in contravention of applicable national or sub-national laws, export is not allowed (see **Section 1.2**).
- **International export is banned** by national legislation (see **Section 1.2**).

In addition, Scientific Authorities **will NOT be required to make a new NDF if the export permit is consistent with an existing NDF** which, for example, used scientific advice to set a catch quota, Total Allowable Catch (**TAC**), and/or export quota for a one year period (see **Text Box 3** below). In this case, individual export permits may continue to be issued throughout the year under that NDF, for as long as they are **consistent with the scientific advice** and **do not exceed** any specified limits or contravene other conditions. Under **Article IV.3** of CITES, a Scientific Authority is obliged to **monitor** both the **export permits granted** by that State for specimens of species included in Appendix II and the **actual exports** of such specimens.

International trade of **captive-bred** specimens of CITES Appendix II listed species require the Scientific Authority to make an NDF. However, while specimens of other CITES-listed fish species (e.g. sturgeon) may be derived from captive-bred sources, this issue will rarely apply to specimens of CITES-listed sharks. The NDF procedures applicable for specimens derived from captive-bred sources are not, therefore, considered further in this Guidance.

Once it has been determined that international export is permitted under national legislation and that a new NDF is required, it is useful to review available information on the management context for the shark stock concerned. This information will inform decision-making under **Steps 2 to 5** of this Guidance. The type of information required is described under **Section 1.3** below. Some of this information will also be relevant to decisions made under **Sections 1.1 to 1.2** below; therefore, in practice, collation of information on the management context is likely to take place alongside consideration of these preliminary issues.

Section 1.1:
Review origin and identification of specimen

Is the specimen subject to CITES controls?

In order to know whether an NDF is required, it is first necessary to determine whether the product (specimen) [15] derives from a species subject to CITES controls (see **Introduction** for shark species currently listed on Appendix II of CITES). This requires consideration of the **effectiveness of specimen identification** and **traceability**.

There are many detailed **visual identification guides**[16] for sharks, for use at landing sites and when live animals are traded to aquaria, and for identifying some of the most common products of CITES-listed species in international trade to species level (e.g. unprocessed shark fins and dried manta gill rakers). It is also relatively easy to identify teeth and jaws traded as curios, trophies and souvenirs.

The rapid identification to species level of other shark parts, products and derivatives (e.g. meat, skin, oil, and cartilage supplements) is more challenging. This is particularly true of highly processed specimens, where there are several stages in the international supply chain (from fishery to end-market) – in these cases it is important to have in place **traceability measures** that allow products to be traced back to the original animal from which they were derived. A number of approaches have been implemented for other types of fish and fisheries products that could assist in the verification of shark products along the supply chain, including eco-labelling and catch/trade documentation schemes (Mundy-Taylor and Crook, 2013). **Genetic analyses** can also be used to confirm species identification and sometimes even geographic origin (Chapman and Abercrombie, 2010).

Species identification is also challenging in situations where fins are transported in **large volumes or as mixed shipments** (e.g. combining CITES listed and non-listed species) and without the labelling of individual species. A further challenge arises where fins of CITES-listed "look-alike" species are commonly being traded as those of other species on CITES permit applications – this is particularly likely where the look-alike species is subject to significant levels of illegal trade. The use of available rapid visual fin identification guides can assist in such circumstances.

Where, or from what stock, was (will) the specimen (be) taken?

It is desirable to confirm the location of harvest, and hence the stock from which the specimen(s) is (are) derived, because **stock identity influences other decisions** such as **legality of acquisition** and **whether previous NDFs are still relevant**. It will also determine whether the specimens came from the **Convention area of a Regional Fisheries Body** (**RFB**), which is important if the State involved is a Member of that RFB, and if RFB management is in force for the listed species.

Certain situations can require more precise information with respect to geographic origin of harvest. For example, if a no-take marine protected area overlaps with part of the geographical

[15] Under CITES definitions, "specimen" refers to any animal, whether alive or dead, or any readily recognizable part or derivative thereof.
[16] See http://www.cites.org/eng/prog/shark/traceability.php; also list of identification guides in Appendix N of *Into the deep: Implementing CITES measures for commercially-valuable sharks and manta rays* (2013) (www.traffic.org/fisheries-reports/traffic_pub_fisheries15.pdf).

distribution of a stock, the legality of harvest will depend upon whether the specimen was harvested within or outside the closed area. Stock boundaries are also important, as NDF decision-making will involve different considerations for stocks shared between States and/or occurring on the high seas, compared with stocks that are restricted in distribution to a single EEZ.

To assist in answering this question, CITES Authorities may wish to **consider whether more detailed information should be requested on the geographical location** of the harvest of marine fish species, including sharks, during the permit application process. It would become easier to determine origin if existing forms and permits can be adapted to require more detailed harvest location data (see **Resolution Conf. 12.3 (Rev. CoP16)**).

Determining the stock from which the specimen was derived will also affect assessments made under **Steps 2-5** of this Guidance. Conservation concerns, harvest/trade impacts, and applicable management measures may vary among and between stocks; ideally each stock should be considered separately when making an NDF.

STEP 1, SECTION 1.1:
QUESTIONS AND GUIDANCE NOTES

Question 1.1(a)
Is the specimen subject to CITES controls?
(Can the specimen be confidently identified?)

GUIDANCE NOTES

CITES Authorities do not normally see the specimens for which a permit is being sought, therefore a judgment on the correct identification of the species must be made on the basis of the information supplied on the permit.

Factors to consider when addressing this question include:

- In what **form** are the specimens being traded? Are they (highly) **processed**?
- What **stage in the supply chain** does the export permit correspond to? (The potential for species substitution and confusion in identification increases further along the chain.)
- Are any **traceability measures** in place to ensure that the specimen (if it is a part or product) can be traced back to the original animal from which it derives?

Examples of how a CITES Authority can be confident that the specimen concerned has been correctly identified include the following:

a) The specimen(s) for export is/are **identified on the permit application** to the **level of species**; **AND** the specimen was or will be **recorded to the species level at the point of landing**; **AND** there is a **system of traceability/chain of custody** in place to ensure substitution with another specimen cannot take place in the interim (e.g. the specimen is/will be accompanied with catch or trade documentation, or tagged or bar-coded, and this information recorded).

b) The specimen was/will be **identified by an expert at a previous stage in the supply chain AND** there is a **system of traceability/chain of custody** in place to ensure that substitution with another

specimen has not taken place in the interim (e.g. the specimen is accompanied with catch or trade documentation, or has been tagged or bar-coded and this information recorded).

c) The specimen has been **identified by an expert at this time** or at the **immediately preceding stage in the supply chain** (using morphological characteristics or through molecular testing).

USEFUL SOURCES

- CITES Appendices: http://www.cites.org/eng/resources/pub/checklist11/index.html
- CITES Species Database: http://www.cites.org/eng/resources/species.html
- CITES Resources for Implementation: http://www.cites.org/eng/prog/shark/traceability.php
- *Into the deep: Implementing CITES measures for commercially-valuable sharks and manta rays (2013)*. www.traffic.org/fisheries-reports/traffic_pub_fisheries15.pdf
- Other references on traceability and chain of custody, for example:
  - Eco-labelling: Marine Stewardship Council (**MSC**) eco-label (http://www.msc.org/), FAO Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries (available at: http://www.fao.org/fishery/topic/13293/en)**.**
  - Catch and trade documentation: e.g. Lack (2008); catch documentation scheme implemented under the European Union (**EU**) IUU Regulation[17] - see http://ec.europa.eu/fisheries/cfp/illegal_fishing/info/index_en.htm
  - Technological initiatives: such as using digital technology such as smart phones to facilitate traceability (see, e.g. Thisfish: http://thisfish.info/)

DECISION AND NEXT STEPS

OPTION 1: YES, the specimen is subject to CITES controls (i.e. the species is listed in the CITES Appendices and is likely to be correctly identified)

- Example conditions a, b or c (above) or equivalent **are met**.
- There is a low risk that the specimen has been incorrectly identified (by intention or by error) and the species is listed in a CITES Appendix.
- Complete the **Worksheet for Step 1 Question 1.1(a)** and **GO TO Question 1.1(b)**

OPTION 2: NO, it is uncertain whether the specimen is subject to CITES controls (i.e. whether the specimen is of a species listed in the CITES Appendices)

- Example conditions a, b or c (or equivalent) **are not met** and identification is inconclusive.
- Use the **Worksheet for Step 1 Question 1.1(a)** to describe any concerns about the identification of the specimens or the species. Make recommendations that would improve the future identification of specimens. These might include:
  - (i) improving chain of custody and traceability procedures, starting at the landing site;
  - (ii) ensuring that specimens can readily be identified at landing sites by requiring them to be landed with fins attached;

[17] Council Regulation (EC) No 1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing (**EU IUU Regulation**).

(iii) requiring fins to be traded in "fin sets" (all fins from one animal are kept together).

- The Scientific Authority may consider calling upon the Management Authority to investigate a concern about the intentional or unintentional substitution of another species for the one named in the permit application, particularly in cases where look-alike species have significant levels of illegal trade. If the Management Authority is unable to resolve these concerns, then describe the problems in the **Worksheet for Step 1 Question 1.1(a)**, ensure that all recommendations for resolving these problems are communicated to the applicant, and **GO TO Question 1.1(b)**

OPTION 3: NO, the specimen is not subject to CITES controls

- Example conditions a, b or c are met and the specimen has been identified, but it is not from a CITES-listed species. **NO NDF IS NECESSARY.**

Question 1.1(b)
Where, or from which stock of the species, was (will) the specimen (be) taken? (Can origin be confidently identified?)

GUIDANCE NOTES

CITES Authorities are required to make a judgment on the origin of the specimen (i.e. the stock from which the specimen is, or will be, derived), on the basis of the information supplied on the permit.

Information on the management context for the species concerned will be relevant in determining the level of resolution of geographical origin that is required (see **Section 1.3 below**). This information is particularly important where no-take protected areas or fisheries management measures **affect only part of the stock concerned,** or where stocks **occurring in the waters of more than one State and/or on the high seas** are harvested within an RFB Convention area where relevant management measures have been adopted.

Factors to consider when addressing this question include:

- Can the specimen be **traced** with the required level of certainty to the origin stated on the export permit application?
- Are any of the following **traceability mechanisms** in place: eco-labelling scheme, catch/trade documentation schemes, permitting, prior notification of catches, chain of custody measures, technological initiatives (e.g. tagging system)?
- Are the **traceability** mechanisms in place **adequate** to support the claim on the export permit application of the origin of the specimen?
- Can **evidence** be provided in support of the origin stated on the export permit application? (see below under Useful Sources)

Examples of how a CITES Authority can be confident that the specimen concerned is of the origin stated on the export permit include the following:

a) The **origin of the specimen(s)** for export is **identified to a sufficient level of detail on the permit application AND**

b) The origin of the specimen is **recorded at the point of landing**; the **system of monitoring, control and surveillance** (**MCS**) in place is **adequate** to ensure that the origin specified on the permit corresponds to the actual location of harvest of the specimen; **AND** there is a **system of traceability/chain of custody** in place to ensure substitution with another specimen has not taken

place in the interim (e.g. the specimen is accompanied with catch or trade documentation, or has been tagged or bar-coded and this information recorded).

c) The **origin of the specimen** has been **confirmed by an expert at this time** or at the **immediately preceding stage** in the supply chain (through molecular testing).

d) The **origin of the specimen** was **confirmed by an expert at a previous stage** in the supply chain (through molecular testing) **AND** there is a **system of traceability/chain of custody** in place to ensure substitution with another specimen has not taken place in the interim (e.g. the specimen is accompanied with catch or trade documentation, or has been tagged or bar-coded and this information recorded).

USEFUL SOURCES

- CITES Resources for Implementation: http://www.cites.org/eng/prog/shark/traceability.php
- **Annex 3** of this Guidance (management risk assessment), for stock structure information for Porbeagle *Lamna nasus*.
- *Into the deep: Implementing CITES measures for commercially-valuable sharks and manta rays (2013)*. www.traffic.org/fisheries-reports/traffic_pub_fisheries15.pdf
- See also Useful Sources under **Question 1.1(a)** above.

DECISION AND NEXT STEPS

OPTION 1: YES, the origin of the specimen(s) has been identified

- Example conditions a **AND** b, or c, or d (or equivalent) are met.
- Use the **Worksheet for Step 1 Question 1.1(b)** to describe the traceability measures in place, or the evidence provided in support of the origin of the specimen stated on the export permit application, record the information sources used, and **GO TO Section 1.2**.

OPTION 2: NO, the origin of the specimen(s) has not been identified satisfactorily

- Example condition a **OR** b, or c, or d (or equivalent) are not met.
- Use the **Worksheet for Step 1 Question 1.1(b)** to describe why the traceability measures in place or evidence of origin of the specimen are inadequate. The Scientific Authority may consider calling upon the Management Authority for advice on the origin of the species concerned. If the Management Authority is unable to resolve these issues then describe any concerns about origin in the **Worksheet for Step 1 Question 1.1(b)**.
- **GO TO Section 1.2,** but note that if the origin of the specimen cannot be identified, it may be impossible for the Management Authority to determine conclusively whether the specimens were taken legally or illegally.

Section 1.2:
Review legality of acquisition and export

If the Management Authority determines that a specimen was **obtained (or landed or retained) in contravention of applicable national or sub-national legislation**, or if **export is not permitted** under the relevant legal framework, then the specimen **should not be granted an export permit** under CITES. The **process stops here**, because an export permit cannot be granted and an NDF is not necessary.

Specimens of shark species may be obtained in contravention of applicable laws if, for example, they are:

- Derived from illegal fishing activities, such as through the use of prohibited fishing gears or methods, or where fins and carcasses were landed in contravention of finning regulations, or where there is a zero quota, or the quota has been exceeded.
- Sourced from within areas closed to fishing activities, for example, inside the boundaries of "no-take" marine protected areas (**MPAs**) or reserves.
- Caught during closed fishing seasons.
- Taken in violation of relevant RFB management measures.
- Caught on the high seas, landed in the same State as the Flag State, but without an IFS certificate.

It is noted that the issuance of an IFS certificate does not require a legal acquisition finding in the strict sense (see **Text Box 1** above). Therefore, even if an IFS certificate is present, a legal acquisition finding will need to be made before an export permit can be granted.

STEP 1, SECTION 1.2:
QUESTIONS AND GUIDANCE NOTES

Question 1.2
Was (will) the specimen (be) legally obtained and is export allowed?

GUIDANCE NOTES

Factors to consider when addressing this question:

- For specimens caught in national waters (EEZs):
  - Is harvest and export of the specimen(s) permitted by **national or relevant sub-national legislation or regulation**, or under **RFB management measures**?
  - Is the **harvest method consistent** with this legislation?
  - Are **adequate MCS systems** in place to enable legality of harvest to be determined? (For example, where fisheries have been banned in specific protected areas in national waters and the location of harvest requires verification.)
  - If **doubts** regarding the **precise origin** of the specimen were identified in **Question 1.1(b),** can **legality of harvest still be determined**?

- For specimens caught in waters beyond national jurisdiction:
  - Was the specimen **acquired and landed in a manner consistent** with:
    - the provisions of Resolution Conf.14.6 (Rev. CoP16) regarding international law for the conservation and management of living marine resources and illegal, unreported or unregulated (**IUU**) fishing activity; and
    - with relevant RFB management measures covering the area of origin (regardless of whether the State issuing the permit is an RFB member)?
  - Are **adequate MCS systems** in place to ensure that the obligations set out in Resolution Conf. 14.6 (Rev. CoP16) and RFB measures are satisfied?
  - If **doubts** regarding the **precise origin** of the specimen were identified in **Question 1.1(b)**, can **legality of harvest still be determined**?

USEFUL SOURCES

- National legislation and sub-national legislation relevant to the catch, landing and/or export of species (see Party responses to CITES Decision 16.128)
- Information on RFB measures for shark conservation and management relevant to this species (see information collated pursuant to CITES Decision 16.128 and RFB websites); geographical areas of competence of RFBs (http://www.fao.org/fishery/rfb/search/en)
- International law relevant to high seas area from which the specimen was derived
- Lack *et al*. (2014); Mundy-Taylor and Crook (2013); FAO review of the implementation of the IPOA-Sharks (Fischer *et al*., 2012) for summaries of international, RFB and national measures.
- **Annex 3** of this Guidance (management risk assessments) for international, RFB and national measures for Porbeagle and information on IUU fishing activities.
- IUU vessel black lists established under relevant RFB (see RFB websites) or other legal instruments (e.g. the EU IUU Regulation[18]
  - see http://ec.europa.eu/fisheries/cfp/illegal_fishing/info/index_en.htm)
- NGO reports of IUU fishing and vessel lists
- Information obtained from INTERPOL (e.g. under Project Scale: http://www.interpol.int/Crime-areas/Environmental-crime/Projects/Project-Scale)
- Records of catches, including discards where possible (or at least landings) over time, derived from on-board observer/Vessel Monitoring System (**VMS**) data, on-board cameras, catch documentation, databases, logbooks, landings at ports (to detect IUU fishing activities)
- Information obtained from other MCS sources (see Useful Sources under **Question 4.1(c)** below)

[18] Council Regulation (EC) No 1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing (**EU IUU Regulation**).

DECISION AND NEXT STEPS

OPTION 1: YES, the specimens were legally acquired and export is permitted

- There is **high confidence** that the specimens were **legally acquired AND** that take and export are **permitted under national or sub-national law** and **relevant RFB regulations**.
- Use **Worksheet for Step 1 Question 1.2** to describe the legislation or regulation(s) and their relevance, note the MCS systems in place and their appropriateness/effectiveness in relation to the risks of IUU fishing activities, and record information sources used.
- Then **GO TO Section 1.3.**

OPTION 2: There is some doubt as to whether the specimens were legally acquired or that export is permitted

- It **cannot be said with confidence** that the specimens were **legally acquired OR that export is permitted** under national or sub-national law or relevant RFB regulations.
- Use **Worksheet for Step 1 Question 1.2** to describe the legislation or regulation(s) and their relevance, note the MCS systems in place and their appropriateness/effectiveness in relation to the risks of IUU fishing activities, and record information sources used.
- Consider the implications if **Question 1.1(b)** found that the origin of specimens is uncertain.
- Depending on the level of concern/doubt regarding legality of acquisition/export, the Management Authority may wish to refer this question to the responsible authority for fisheries and/or biodiversity enforcement.
- Then **GO TO Section 1.3.**

OPTION 3: NO, the specimens were not legally acquired and/or export is not permitted

- It **can be said with confidence** that the specimens were **not legally acquired AND/OR** that **take/export are not permitted** under national or sub-national law or relevant RFB regulations.
- Describe the evidence used to reach this decision in the **Worksheet for Step 1 Question 1.2**, including the legislation or regulation(s) and their relevance, noting the MCS systems in place and their appropriateness/effectiveness in relation to the risks of IUU fishing activities, and record information sources used.
- The Management Authority may wish to notify the responsible authorities for fisheries and/or biodiversity enforcement (in other countries, where relevant), and should consider taking such information to the relevant RFB level where breaches of RFB regulations are suspected.
- It is not possible to issue an NDF. The **PROCESS STOPS HERE**.

Section 1.3:
Review available information on management context

Question 1.3
What does the available management information tell us?

Information on the relevant management context is very important for underpinning the assessments carried out under **Steps 2 to 5** of this Guidance. For example, in order to assess the adequacy of existing management measures (**Step 4**), it is valuable to know the number and nature of the relevant management units and management bodies for the stock concerned. This information is also useful to inform the preliminary considerations described under **Sections 1.1 and 1.2** above.

Examples of the types of information to be collated on the management context, with Guidance Notes and recommended Sources of Information, are provided in **Table 3** below. Useful species-specific sources of information include the most recent CITES listing proposals for CoP16, the IUCN and TRAFFIC Analyses of the Proposals (IUCN and TRAFFIC, 2012), and the FAO Expert Panel reviews of those proposals (FAO, 2013). In addition, **Annex 3** of this Guidance presents management risk assessments for Porbeagle (prepared by Lack *et al*., 2014) that may be used to populate the **Worksheet for Step 1 Question 1.3**.

Part 2 of the **Worksheet for Step 1 Question 1.3** on stock/context-specific information should be completed through further consideration of the sources set out in **Part 1** and any other more detailed reports/information available.

Table 3. Key information to be considered regarding management context and guidance notes

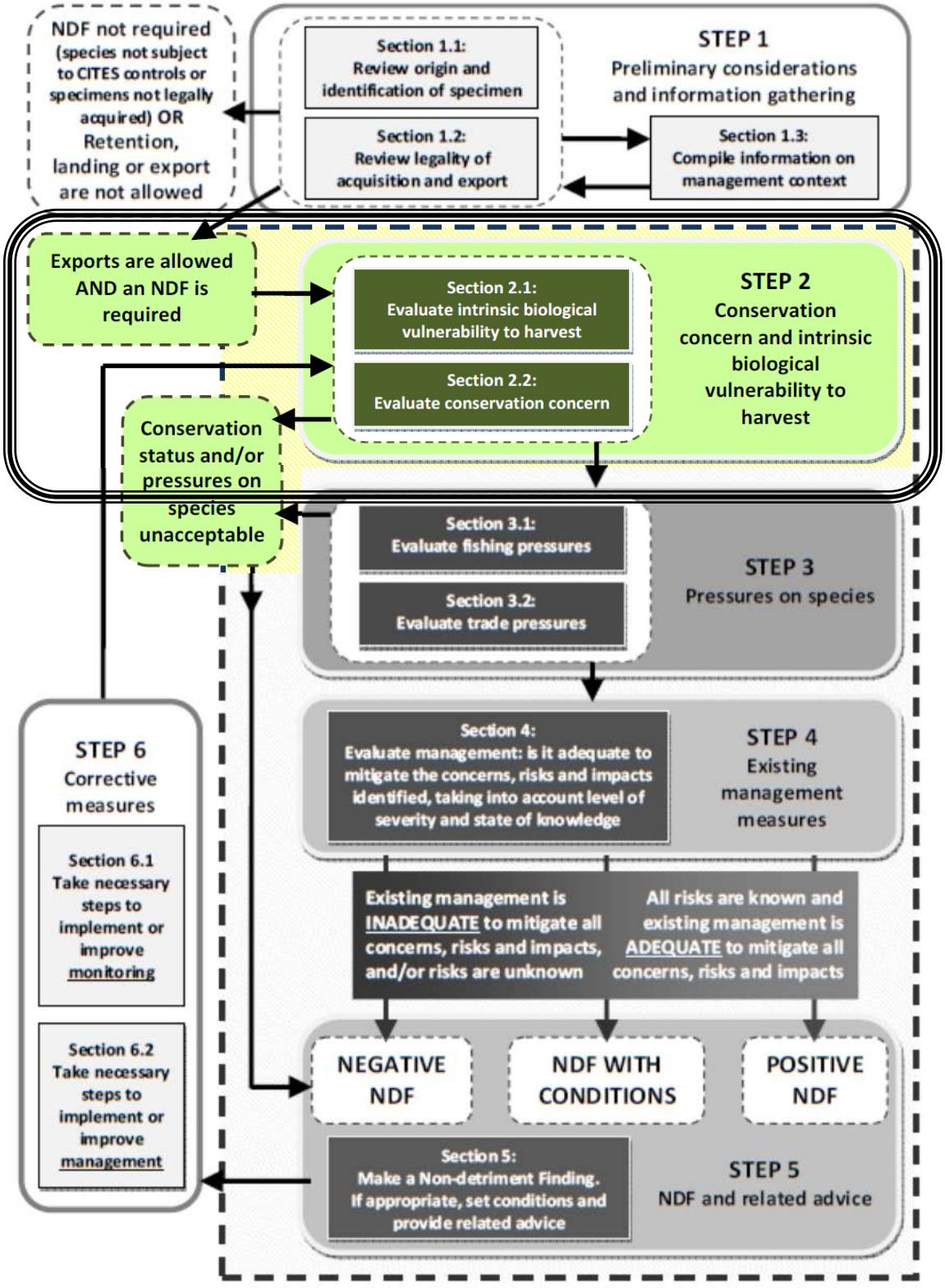
Management Aspect	Guidance and Explanatory Notes	Source of Information
Part 1. Global-level information (to be provided to Scientific Authorities as part of species-specific guidance)		
1. Reported global catch	Average annual catch in tonnes for the previous 5-year period. N.B. FAO Capture Production data should only include species-specific data and exclude general categories that contain the species.	FAO Capture Production database: www.fao.org/fishery/statistics/global-capture-production/en ; CITES proposals; IUCN and TRAFFIC (2012); Mundy-Taylor and Crook (2013).
2. Species distribution	Insert map if available or provide a description.	IUCN Red List Assessments (www.iucnredlist.org), Fishbase (www.fishbase.org), or maps prepared for recent CITES listing proposals; FAO (2013); IUCN and TRAFFIC (2013); Mundy-Taylor and Crook (2013)
3. Known stocks	Describe what is known about the stock structure of the species. Note that stock structure may or may not be known, or may be partially known (i.e. some stock delineation may have been determined).	IUCN Red List Assessments (www.iucnredlist.org), Fishbase (www.fishbase.org), CITES proposals, national assessments, RFB assessments.
4. Main catching countries	Countries responsible for taking the bulk of the reported global catch based on FAO Capture Production data for the most recent 5 years.	FAO Capture Production database: www.fao.org/fishery/statistics/global-capture-production/en ;CITES proposals; IUCN and TRAFFIC (2012); FAO (2013); Mundy-Taylor and Crook (2013)
5. Main gear types by which the species is taken	Use available information to identify main gear types by which species taken.	IUCN Red List Assessments (www.iucnredlist.org), Fishbase (www.fishbase.org), CITES proposals, RFB assessments, national assessments, and information at www.cites.org/eng/prog/shark/legality.php; FAO (2013); Mundy-Taylor and Crook (2013)
6. Global conservation status	Include information on IUCN Red List Status and year of assessment	IUCN Red List Assessments (www.iucnredlist.org); CITES proposals; IUCN and TRAFFIC (2012)
7. Stock assessments	Include information on available stock assessments (and those currently under preparation)	RFB assessments, scientific publications, CITES proposals; FAO (2013); Mundy-Taylor and Crook (2013)

Management Aspect	Guidance and Explanatory Notes	Source of Information
8. Cooperative management arrangements	8a. For non-highly migratory species shared across EEZs, include information on countries fishing shared stocks. Note that UNCLOS obliges countries fishing shared stocks to cooperate in stock management. 8b. For highly migratory species or those found on the high seas, identify relevant Regional Fisheries Bodies (RFBs). These are: (i) those identified by FAO as having a management mandate; (ii) whose areas of competency overlap with the species distribution; and (iii) for which there is some reliable information that the species is taken in fisheries managed by the RFB.	Highly migratory species are those listed in Annex I to UNCLOS. Migratory or possibly migratory if identified as such by SSG (2007 a, b). If neither applies, classify as "other". For 8a: See FAO Capture production database by sub-ocean for indication of likely relevant countries in the absence of more specific information. For 8b: See FAO Regional Fisheries Bodies: http://www.fao.org/fishery/rfb/search/en
9. RFB membership	Identify main catching countries that are not members of relevant RFBs (if applicable). The management measures of these countries will be relevant to Management aspect 10 below.	See RFB website addresses and membership at http://www.fao.org/fishery/rfb/search/en
10. Main management bodies	Determine main management bodies based on information above on stock structure, main catching countries, cooperative management arrangements and gaps in RFB membership.	See Management aspects 3, 4, 8 and 9
11. Multilateral Environmental Agreements	• CITES: have any of the main catching countries taken out a reservation? • CMS: are the main catching countries signatories to the Memorandum of Understanding and Action Plan, if relevant to the species? • Regional Agreements (e.g. OSPAR, Barcelona): What are requirements for listed species, and have any Parties taken out reservations?	For CITES reservations see http://www.cites.org/eng/app/reserve.php For CMS see: http://www.sharksmou.org/ http://www.cms.int/species/index.htm http://www.ospar.org/ http://www.rac-spa.org
12. Products in trade	Information on main products from the species traded internationally.	Mundy-Taylor and Crook (2013). FAO Fisheries Commodities and Trade database: www.fao.org/fishery/statistics/global-commodities-production/en National online trade databases, including Eurostat epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database Other FAO publications, IUCN Red List Assessments etc.

Management Aspect	Guidance and Explanatory Notes	Source of Information
Part 2. Stock/context-specific information		
1. Nature of harvest	Include whether the stock concerned is being harvested directly in target fisheries or as secondary catch in non-target fisheries.	IUCN Red List Assessments (www.iucnredlist.org), National conservation assessments (www.nationalredlist.org), Fishbase (www.fishbase.org), CITES proposals, IUCN and TRAFFIC (2012), RFB assessments, FAO (2013), Mundy-Taylor and Crook (2013)
2. Fishery types	Include information on the main fisheries responsible for catches of individuals from the stock concerned. Relevant information includes: 1. Target species (where species taken as secondary catch) 2. Main gear types by which species is taken 3. Scale of fishery (industrial or small-scale/artisanal)	IUCN Red List Assessments (www.iucnredlist.org), National conservation assessments (www.nationalredlist.org), Fishbase (www.fishbase.org), CITES proposals, IUCN and TRAFFIC (2012), RFB assessments, FAO (2013), Mundy-Taylor and Crook (2013)
3. Catching countries	Countries responsible for taking the bulk of the reported catch in respect of stock concerned based on FAO Capture Production data for the most recent 5 years. Use oceanic breakdown of FAO data as a guide.	FAO Capture Production database: www.fao.org/fishery/statistics/global-capture-production/en. Supporting information from CITES Proposals, IUCN and TRAFFIC (2012), RFB assessments, FAO (2013), Mundy-Taylor and Crook (2013)
4. Management units	Identify main bodies responsible for management of the stock concerned (RFBs/country-level). Note if there are any clear gaps in management, i.e. high seas stock not falling within the competence of any RFB.	See Management aspects 3, 4, 8 and 9 of **Global-level information** section (above) for main management bodies. Compare with Management aspect 2, to identify gaps.
Source: after Lack *et al*. (2014).		

STEP 2:

INTRINSIC BIOLOGICAL VULNERABILITY TO HARVEST AND CONSERVATION CONCERN



Overview

An overview of the structure of **Step 2**, including Sections and Questions to be answered is provided in **Table 4**. Relevant Worksheets are contained in Annex 2 to this Guidance.

Table 4. Overview of Step 2

Steps	Sections	Questions
Step 2 Intrinsic biological vulnerability to harvest and conservation concern	**Section 2.1** Evaluate intrinsic biological vulnerability to harvest	**Question 2.1** What is the level of intrinsic biological vulnerability of the species to harvest?
	Section 2.2 Evaluate conservation concern	**Question 2.2** What is the severity and geographic extent of conservation concern?

Rationale

This step measures:

1. the **intrinsic vulnerability** of a listed species to depletion (regardless of whether this is driven by accidental mortality, exploitation for domestic consumption, or to supply international trade demand), and
2. the current **conservation status** of the listed species as a result of exploitation and other pressures.

It is relatively easy to assess the intrinsic vulnerability of a CITES-listed species to over-exploitation and the severity of the conservation concern for the stock being considered. Sources of information on stock declines and other metrics are described below.

An NDF is, however, concerned with more than ensuring the survival of a listed species, or its relative short-term extinction risk (**Article IV.2(a)**). **Article IV.3** also considers whether limiting trade is necessary in order to "maintain that species throughout its range at a level consistent with its role in the ecosystems in which it occurs" as well as "above the level at which that species might become eligible for inclusion in Appendix I". Guidelines are not yet available for assessing the role of a shark species in its ecosystem and cannot be provided here, but several publications have described field research and model results that illustrate the potentially serious habitat and ecosystem impacts of removing large numbers of predatory sharks from the marine environment[19].

The Guidance Notes to **Steps 3 and 4** provide advice on how the results of the analysis undertaken in **Step 2** may be taken into account in the NDF decision-making process. Essentially, the **greater the intrinsic vulnerability** of the species to over-exploitation, and the **higher the overall severity and extent of conservation concern**, the greater the requirements are for:

- good **quality of information**;
- the **rigour of fisheries management** to mitigate (reduce the severity of) the risks and pressures identified; and
- the **degree of precaution** that should be applied to making the NDF.

[19]See, e.g, Ferretti *et al*. 2010; Friedlander and DeMartini, 2002; Heithaus *et al*., 2008, 2010; Ruppert *et al*., 2013; Stevens *et al*., 2000.

Section 2.1:
Evaluate intrinsic biological vulnerability of species to harvest

Some species are naturally more susceptible to the detrimental effects of over-exploitation than others, based on their intrinsic biological characteristics. **Sharks appear to be particularly vulnerable to the pressures of fishing** due to their "slow" **life-history characteristics**, but assessments are often complicated by the lack of comprehensive baseline data (e.g. Stevens *et al*., 2000). Additionally, the migratory nature of many shark species can make estimating stock size and devising management plans especially problematic. Recent work by RFB Scientific Committees and government agencies has developed useful relative assessments of intrinsic biological vulnerability, using risk assessments conducted at the fishery level. For example, Hobday *et al*. (2007) used the following biological parameters in different fish species to assess and score their intrinsic vulnerability to exploitation pressure:

- average age at maturity; average maximum age;
- average size at maturity; average maximum size;
- fecundity; reproductive strategy;
- trophic level

The US National Oceanic and Atmospheric Administration (NOAA) has adapted and extended this approach with these additional parameters:

- population growth (*r*)
- growth coefficient (*k*)
- natural mortality (*M*)

This Guidance draws upon these examples by applying a range of suitable parameters for evaluating shark species' "intrinsic biological vulnerability", on the understanding that certain biological characteristics contribute to the risk that harvest will be detrimental to species' survival. Scientific Authorities are prompted in this section to identify and quantify the particular biological factors that contribute to vulnerability of the species under consideration (i.e. the risk that harvest will be detrimental to this species' survival), and to use these results to assess whether that vulnerability is high, medium, or low. The rationale for this approach is described in Sant *et al*. (2012) and Oldfield *et al*. (2012). Many of the metrics for the different levels of vulnerability are taken from Sant et al. (2012), others from FAO (2001).

STEP 2, SECTION 2.1:
QUESTIONS AND GUIDANCE NOTES

Question 2.1:
What is the level of intrinsic biological vulnerability of the species to harvest?

GUIDANCE NOTES

The biological factors listed below can be used to assess the severity of the intrinsic vulnerability of the shark species to over-exploitation (harvest). As many factors as possible should be considered. Bear in mind that several methods may be used to calculate and interpret some stock assessment metrics.

The **Worksheet for Step 2 Question 2.1** has been completed for Porbeagle *Lamna nasus*, to illustrate the process, using data collated by Sant *et al*. (2012) for a report to develop a method to identify high risk commercially-exploited aquatic organisms in trade[20]. Follow-on work focused on shark species in trade (listed and non-listed species) (Oldfield *et al*., 2012); the biological characteristics can be made available to authorities as necessary. Data were also taken from Lack *et al*. (2014) (e.g. for stock size and abundance – see **Annex 3**).

Intrinsic biological factors	Level of vulnerability	Species-specific indicator/metric
a) Average age at which 50% of a cohort reaches maturity	Low	<5 year
	Medium	5–15 years
	High	>15 years
	Unknown	
	Notes: *Later sexual maturation, higher vulnerability. Age at maturity can fall in a heavily fished stock; the metric used here should be for a lightly-fished or unfished stock.*	
b) Average size at which 50% of a cohort reaches maturity	Low	<40 cm (total length)
	Medium	40–200 cm (total length)
	High	>200 cm (total length)
	Unknown	
	Notes: *Larger size at maturity, higher vulnerability. Size at maturity can fall in a heavily fished stock; the metric used here should be for a lightly-fished or unfished stock.*	
c) Maximum age/ longevity	Low	<10 years
	Medium	10–25 years
	High	>25 years
	Unknown	

[20] Sant, G., Goodman, G., Crook, V., Lack, M. and Oldfield, T.E.E. (2012). Fish and Multilateral Environmental Agreements: developing a method to identify high risk commercially-exploited aquatic organisms in trade and an analysis of the potential application of MEAs. *JNCC Report No. 453*. Joint Nature Conservation Committee, Peterborough. Available at http://jncc.defra.gov.uk/page-6120

	Notes: *Longer lifespan, higher vulnerability. May be calculated as the age reached by 1% of a cohort.*	
d) Maximum size	Low	<100 cm (total length)
	Medium	100–300 cm (total length)
	High	>300 cm (total length)
	Unknown	
	Notes: *Larger size, higher vulnerability*	
e) Natural mortality rate (M)	Low	<0.17
	Medium	0.17–0.5
	High	>0.5
	Unknown	
	Notes: *Lower rate of natural mortality, higher vulnerability*	
f) Fecundity (maximum litter size or number of eggs)	Low	>2000
	Medium	100–2000
	High	>100
	Unknown	
	Notes: *Smaller litter size/fewer eggs, higher vulnerability*	
g) Reproductive rate/ intrinsic rate of population increase[21]	Low	<0.15
	Medium	0.15–0.35
	High	<0.35
	Unknown	
	Notes: *Low rates of population increase, higher vulnerability*	
h) Geographic distribution	Low	
	Medium	
	High	
	Unknown	
	Notes: • *Assess known range and distribution of the species* • *Consider whether distribution of the species is broad and continuous, or to what degree it is restricted to certain areas and fragmented* • *Restricted distribution and/or highly fragmented, higher vulnerability*	
i) Stock size and abundance	Low	<25% of baseline abundance
	Medium	25–60% of baseline abundance
	High	>60% of baseline abundance

[21] Using methodology in Beddington, J.R. and Cooke, J.G. 1983. *The potential yield of fish stocks. FAO Fisheries Tech. Pap*. 242.

	Unknown	
	Notes: • *Assess spatial distribution across the range of the species/size of stock subject to NDF* • *Consider whether stock is homogenous across range or scattered at low densities* • *Smaller stock, scattered across range at lower densities –> higher vulnerability*	
j) Reliance on critical habitats and habitat vulnerability	Low	
	Medium	
	High	
	Unknown	
	Notes: • *Consider whether species is associated with critical habitats during key life stages, e.g. coastal nursery grounds (gravid females, newborns and early juveniles easily targeted by fisheries), spawning areas/feeding grounds. Consider availability of habitats and threats to these habitats. How susceptible are habitats to human and other impacts? (e.g. habitat loss and degradation through land claim of coastal nursery grounds, damage by fishing gears)* • *Does the species aggregate at particular sites?* • *(High) reliance on critical habitats or tendency to aggregate at key sites –> higher vulnerability*	

Section 2.2:
Evaluate conservation concern

In this Step, Scientific Authorities are encouraged to draw on available information from **existing conservation status assessments** to document relevant threats and to support an evaluation of the severity of conservation concern associated with the stock(s) of the species concerned. The Scientific Authority is not required to undertake conservation status assessments as part of the NDF, where these are lacking, outdated, or incomplete, but may wish to do so.

Conservation and stock status assessment systems have a variety of forms (e.g. Red Lists, Red Data Books, threatened species listings, fish stock assessments) and a range of geographic scopes (sub-national, national, regional, or global).

For shark species, fish stock assessments, where these exist, **are the most comprehensive and rigorous sources of information** available on the status of the stock concerned. Parties are therefore **encouraged to undertake stock assessments** for CITES-listed shark species: for high seas shark stocks, these may be developed through their membership of RFBs. Stock assessments provide:

- **estimates of stock size** at the time of assessment (spawning stock biomass relative to the level before exploitation);
- **forecasts of future stock size** and **growth rates** under different scenarios;
- and **advice on sustainable levels of harvest**.

However, **in the absence of stock assessments**, other sources (e.g. RFB risk and vulnerability assessments for sharks and IUCN Red Lists) may provide useful background information to inform management decisions. It is important to note, however, that the definition of assessment criteria and categories vary between different assessment systems.

Conservation status, in the IUCN Red List context, **is an assessment of the relative risk of extinction posed to a species (or stock of the species)**. Conservation status assessments may take many **factors into account to evaluate risk of extinction**. These factors may be relevant to other Steps in this Guidance. For example:

- **Number of individuals** (or biomass) remaining in the population being assessed, and recent trends in population size (**Section 2.1** and **Step 3**).
- **Known threats**, such as harvest and trade impacts, loss or degradation of habitat (**Steps 3**).
- Existence and effectiveness of **management systems** in place (**Step 4**).

A detailed, well-documented, and up-to-date conservation status assessment may therefore provide information relevant to several of the remaining steps of this Guidance.

STEP 2, SECTION 2.2:

QUESTIONS AND GUIDANCE NOTES

Question 2.2

What is the severity and geographic extent of conservation concern?

GUIDANCE NOTES

When consulting relevant conservation status assessments to evaluate the severity and geographic extent of conservation concern under this Question, it will be important to consider both the **criteria** and **scientific data** that were used to make these assessments.

Caution should be taken when considering the **national or regional implications of global conservation status**, particularly for a widespread or globally distributed species, as:

- A national or regional population may be considered threatened (e.g. by localised impacts on locally small populations) while the global population may not qualify as threatened.
- Alternatively, the global population of a species may be considered threatened, but particular national or regional populations may be more secure (due to the absence of threats or effective management in place).

Ideally, therefore, the **best conservation assessments** to consider are those **carried out at a geographical scope that includes the stock that is the subject of the NDF**. Where **stocks are not well-defined**, conservation concern should be evaluated at the **level of each relevant management unit** (these units may include an entire EEZ, or an RFB area).

When answering **Question 2.2**, the following **sources of information** can be consulted:

1. Where a **stock assessment** exists, this will generally represent the most comprehensive information available to assess the severity and geographic extent of conservation concern for the stock of the species concerned.
2. For stocks occurring in **more than one country's EEZ and/or on the high seas**, conservation or stock status assessments made at the **regional level** (e.g. through a relevant RFB) will be of most use in evaluating conservation concern. Alternatively, **joint stock assessments** may have been developed for stocks shared by more than one country.
3. Where there is **no stock assessment**, consider whether status has been assessed **under other conservation status assessment systems**, including national or regional Red List assessments (many of these are summarised at www.nationalredlist.org).
4. Where a **national or regional assessment is lacking or outdated**, a **global assessment** can provide useful information about threats and indicate the severity of concern (see www.redlist.org) – but note the cautions above regarding extrapolating from a global to a regional assessment.
5. If the stock(s) of the species has been included in **more than one assessment system** or **geographic scope of assessment**, the Scientific Authority may **select one assessment** to evaluate the severity of conservation concern that **best combines the following qualities**:
   - Most **indicative of the threat of extinction** to the stock(s) of the species, and the **effective functioning** of the species in its ecosystem.
   - Most **recent/up to date**.
   - Most **transparent** and **informative criteria** for identifying threats and other factors on which the assessment is based.

6. **Current assessments** should be used wherever available; old (>5 years old) or out of date (>10 years old) assessments may contain useful information, but they should be treated with an understanding that the information on which they were based may no longer be accurate.
7. In addition to information contained in stock assessments, **other indicators of adverse fishing impacts** that can be revealed by shark population monitoring include:
    - decline in the **spatial distribution** of the stock; decline in catch per unit effort (CPUE);
    - decline in the **mean size/age of individuals**; and
    - changes in the **sex ratio**.

    Where information on these parameters is available, this should be **taken into consideration** when assessing conservation status of the stock concerned.

The following **notes are provided to assist in interpretation of the results** of any available information on stock assessments / fisheries status:

- Information on **biomass or level of depletion** will provide information on **whether the stock is "overfished"**:
    - A stock is considered overfished when it is **exploited beyond a specified safe limit** at which its abundance is considered too low to ensure safe reproduction.
    - In many fisheries fora the term is used when biomass has been estimated to be below a **"limit biological reference point"** that is used as the signpost defining an "overfished condition".
    - The stock may remain overfished (i.e. with a biomass well below the agreed limit) for some time if recovery is slow, even though fishing pressure might be reduced or suppressed[22].
    - NOTE: where the stock is not overfished but there are **no fisheries mortality data available**, the severity of conservation concern should not be considered "low" because there is still a **risk that overfishing is occurring**.
- Information on **fishing mortality** will inform **whether "overfishing" is occurring**:
    - Overfishing is used to refer to the state of a stock subjected to a level of fishing effort or fishing mortality such that a **reduction of effort** would, in the medium term, **lead to an increase in the total catch**.
    - This is **often referred to as overexploitation** and **equated to biological overfishing**; it results from a combination of "**growth overfishing**" and "**recruitment overfishing**". These may occur together with "ecosystem overfishing" and "economic overfishing"[23].
    - NOTE: where the exploitation rate is not excessive but there are **no biomass data available**, the severity of conservation concern should not be considered "low" as there is still a **possibility that the stock is overfished**.

Scientific Authorities may wish to consider whether it is appropriate for an NDF to be issued in cases when a stock of a species listed in Appendix II is overfished, and overfishing is still occurring.

Further Guidance to assist in answering this question is provided in **Table 5** below.

[22] FAO Fisheries Glossary: http://www.fao.org/fi/glossary/default.asp

[23] FAO Fisheries Glossary: http://www.fao.org/fi/glossary/default.asp

USEFUL SOURCES

- Lack *et al*. (2014); Sant *et al*. (2012).
- Stock assessment/status (see RFB websites, relevant scientific publications).
- See **Annex 3** of this Guidance (management risk assessments) for stock status information for Porbeagle *Lamna nasus*.
- Natural mortality rates, intrinsic rates of population increase etc.: consult CITES listing proposals, FAO appraisals of CITES proposals, stock assessments, Fishbase, Red List Assessments, DFO (2012).
- Global conservation status assessment systems (e.g. www.iucnredlist.org).
- CITES Proposals/IUCN-TRAFFIC Analyses (IUCN and TRAFFIC, 2012); FAO Expert Panel analyses of listing proposals (e.g. FAO, 2013).
- Sub-national, national and regional conservation status assessment systems, including state, provincial, and national Red Data books, nature conservation act listings (e.g. www.nationalredlist.org; www.regionredlist.com). Conservation Data Centres (for example, see www.natureserve-canada.ca/en/cdcs.htm).
- Other sub-national, national, regional (including RFB) and global assessments (e.g. Shark Assessment Reports (SAR) and fishery management plans; National and Regional Plans of Action for Sharks (NPOA and RPOA-Sharks).
- Other sources detailed above under the Useful Sources section of **Question 2.1**.

NEXT STEPS

- Describe the relevant stock assessment or conservation status assessment in the **Worksheet for Step 2 Section 2.2**.
- Evaluate the severity and geographic extent/scope of conservation concern based on the relevant assessment(s), including reasons for the conclusions drawn and information on sources used.
- On the basis of the assessments made under **Step 2 (Questions 2.1 and 2.2)**, Scientific Authorities should be in a position to make a judgment on whether the intrinsic vulnerability of the stock to harvest and/or severity of conservation concern is too high and therefore does not allow for the NDF process to **proceed to Step 3**.
- **OPTION 1: Based on the assessments made in Step 2, the NDF process can proceed**
  - GO TO **Step 3, Question 3.1(a)**.
- **OPTION 2: Based on the assessments made in Steps 2, the NDF process CANNOT proceed**
  - A **NEGATIVE NDF** is required and the **PROCESS STOPS HERE**.

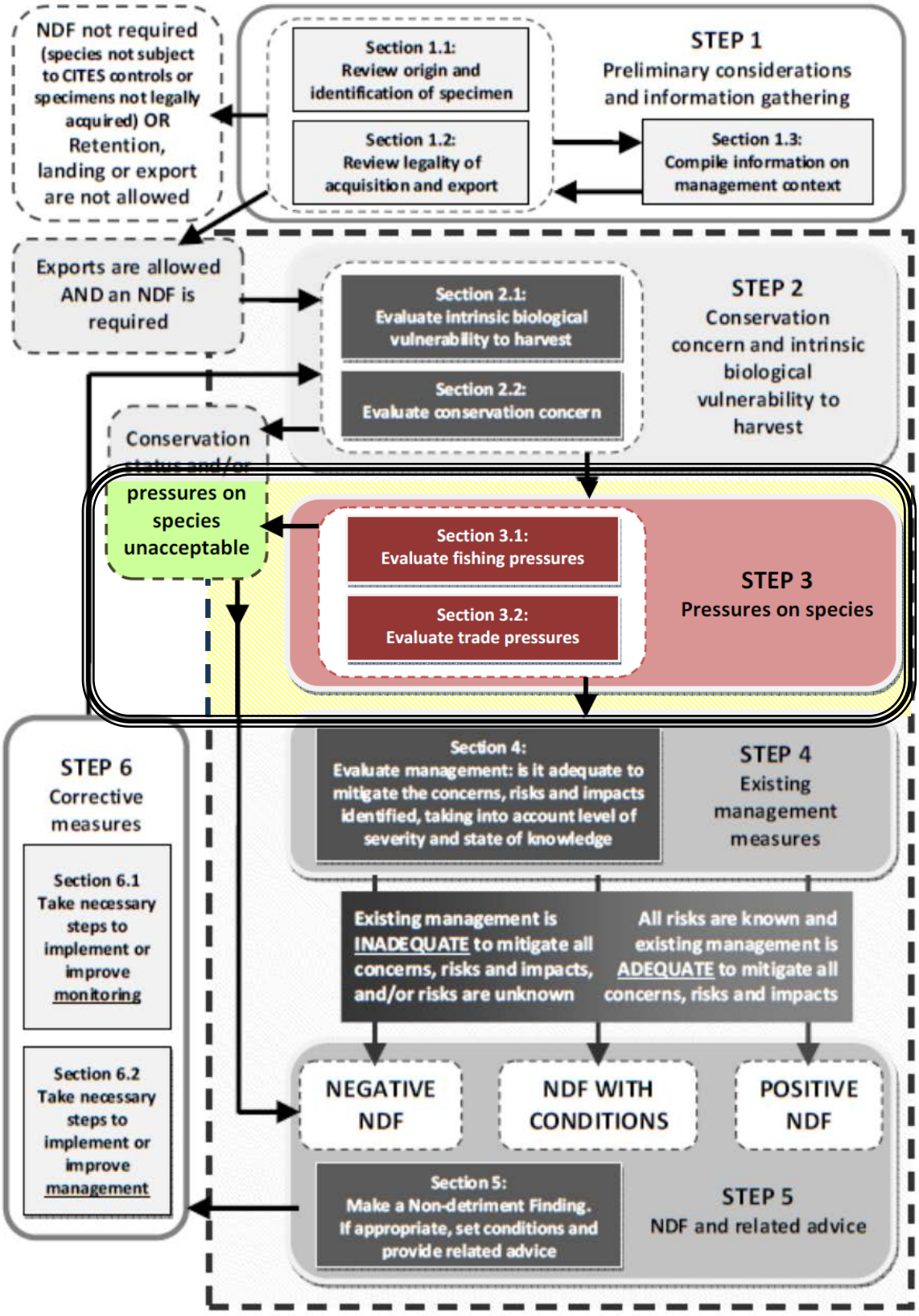
Table 5. Indicators of Conservation Concern

Factor	Severity / Scope of Concern	Indicator
Conservation Status *(measured in terms of biomass and fishing mortality, or Red List Assessment or equivalent)*	Low	Where there is a stock assessment: • The stock is not overfished AND overfishing is not taking place. • The fishing mortality (*F)* ≤ 0.75 natural mortality (*M)*[24] • Spawning stock biomass above precautionary reference point (*B* > *B*pa*)* Where there is no stock assessment: • The species, population, or stock has been assessed and is **not threatened**. • The assessment or listing is based on defined criteria (e.g. IUCN Red List category Least Concern/LC or equivalent categories used in other systems).
	Medium	Where there is a stock assessment: • The stock is either overfished OR overfishing is taking place. • The fishing mortality (*F)* = 0.75–1.1 natural mortality (*M)* • Spawning stock biomass lies between the precautionary and the target or limit reference points (*B*lim < *B* < *B*pa*)* Where there is no stock assessment: • The species, population, or stock has been assessed and is considered to be **moderately threatened**. • The assessment or listing is based on defined IUCN criteria (e.g. IUCN Red List categories Near Threatened (NT), Vulnerable (VU), or equivalent categories used in other systems).
	High	Where there is a stock assessment: • The stock is overfished AND overfishing is taking place. • The fishing mortality (*F)* >1.1 natural mortality (*M)* • Spawning stock biomass is below the target reference point ($B < B\mathrm{lim}$*)*. Where there is no stock assessment: • The species, population, or stock has been assessed and qualifies as **seriously threatened.** • The assessment or listing is based on defined criteria (e.g. IUCN Red List Critically Endangered/CR, Endangered/EN, or equivalent categories used in other systems).
	Unknown	• There is no stock assessment, or an attempted stock assessment or best available scientific evidence has concluded that it is impossible to estimate either absolute or relative present status, or relative trend. • The conservation status of the species, population, or stock has not been assessed (e.g. IUCN Red List category Not Evaluated/NE, equivalent categories used in other systems); OR • There are insufficient data to evaluate the conservation status of the species, population, or stock against defined criteria (e.g. IUCN Red List

[24] DFO. 2012. Guidance related to bycatch and discards in Canadian commercial fisheries. *DFO Can. Sci. Advis. Sec. Sci. Advis. Rep*. 2012/022.

Factor	Severity / Scope of Concern	Indicator
		category Data Deficient/DD or equivalent categories used in other systems); OR • The assessment is outdated or in doubt; OR • The severity of conservation concern cannot be determined for other reasons.
	Notes: • This factor considers any existing sub-national, national, regional, or global conservation status assessments that include the population or stock(s) of the species that are the subject of the NDF. • Other indicators may also be used here, e.g. changes in sex ratio, decline in average size/age, decline in spatial distribution.	
Geographic extent/scope of conservation concern	None	The species is not considered threatened and no threats have been identified.
	Local	Identified threats affect only one or a few stocks of the species, but other stocks are not affected.
	National/ Regional	Identified threats affect the national/regional stock of the species.
	Global	Identified threats affect the entire global population of the species.
	Unknown	• The conservation status of the species has not been assessed (e.g. IUCN Red List category Not Evaluated/NE, equivalent categories used in other systems); OR • There are insufficient data to evaluate the conservation status of the species, population, or stock against defined criteria (e.g. IUCN Red List category Data Deficient/DD or equivalent categories used in other systems).
	Notes: This factor considers the geographic extent of identified threats in relation to the distribution of the species, and hence its global severity.	

STEP 3:
PRESSURES ON SPECIES



Overview

An overview of the structure of **Step 3**, including Sections and Questions to be answered is provided in **Table 6**. Relevant Worksheets are contained in Annex 2 to this Guidance.

Table 6. Overview of Step 3

Steps	Sections	Questions
Step 3 Pressures on species	**Section 3.1** Evaluate fishing pressures	**Question 3.1(a)** What is the severity of risk of fishing on the stock of the species concerned?
		Question 3.1(b) Based on the information available, what is the level of confidence associated with the evaluation of fishing risk made under Question 3.1(a)?
	Section 3.2 Evaluate trade pressures	**Question 3.2(a)** What is the severity of risk of trade on the stock of the species concerned?
		Question 3.2(b) Based on the information available, what is the level of confidence associated with the evaluation of trade risk made under Question 3.2(a)?

Rationale

Having described the intrinsic vulnerability of the species and its current conservation or stock assessment status in the previous step of this Guidance, the aim of **Step 3** is to consider the **external pressures** that are **continuing to affect its stocks**.

The Global Shark Red List Assessment[25] concluded that **fisheries mortality** (target and incidental) is by far the **single greatest cause of shark population depletion**, and that international trade drives a significant amount of that mortality. In comparison, other threats to sharks (such as habitat loss and damage, depletion of food sources, persecution and climate change) generally have only a minor impact upon their status. **Step 3 therefore focuses exclusively upon the impact on shark stocks of fisheries exploitation and trade demand**, because these are the major factors driving mortality that need to be considered when developing CITES NDFs.

In terms of the implications of this step for NDF decision-making, a **positive NDF is more likely**:

- for a stock that is **not depleted** AND which is **not subject to a great deal of fishing mortality**,
- than for a **depleted stock**, which is of elevated conservation concern, AND which is **still subject to fishing pressure**.

In the latter case, permitting trade on a depleted stock could result in further declines, potentially driving the population down to a level where its survival is threatened and it qualifies for listing in Appendix I. There are, naturally, "grey areas" between these two extremes.

Completing the **Worksheets for Step 3** with the aid of the Guidance Notes under Sections 3.1 and 3.2 below, will enable Scientific Authorities to make a **judgement** on whether the **status of the stock** assessed in Step 2, combined with the **pressures on the stock** assessed in Step 3, are at levels that would **allow for the NDF process to proceed** to Step 4, **OR** whether a decision should be made at the end of Step 3 that a **negative NDF finding is required**.

[25] Dulvy *et al.* (in press). *Extinction risk and conservation of the world's sharks and rays*. *eLife* Decision: 28-01-2013-RA-Elife-00590.

Section 3.1:
Evaluate fishing pressures

Fishing can exert pressure on shark stocks by way of **targeted/directed catch** and **secondary catch/bycatch** (whether retained or discarded). The total level of mortality experienced by the stock is key to its past and future status, regardless of whether that mortality occurs as a result of targeted fishing or secondary catch as part of other target fisheries. The same is true whether that catch occurs within EEZs or on the high seas, and whether it is discarded, used domestically or exported. **In short, all mortality needs to be considered when making an NDF**.

The **potential impacts of harvest mortality** on **shark stocks** and **ecosystems** include:

- **Death** or **injury** of individuals, whether retained or discarded;
- Limitation of future population growth through the **removal of particular sizes/life stages** (e.g. juveniles at coastal nursery grounds, aggregations of mature adults);
- Reduction in reproduction by **catching more of one sex than the other** (e.g. targeting aggregations of pregnant females); and
- **Degradation of ecosystems and habitats**, when stock depletion means that the shark population can no longer maintain its role in the ecosystem.

Scientific Authorities can identify and evaluate these impacts by considering the **best available information on fishing practices** (methods, gears) and **fishing intensity** (e.g. fishing effort – number of boats, fishing trips; proportion of the overall stock affected). **Population trends** are almost always a **useful indicator of fishing impacts**, as stock declines for sharks are only occasionally due to impacts other than fishing (which may have been identified in existing conservation status assessments in **Step 2**). **Trends in effort and landings**, however, can be driven by market forces rather than reflecting trends in stock status, and so **should be evaluated with due caution**.

In addition, **illegal, unreported and unregulated (IUU) fishing** exerts pressures of largely unknown magnitude on shark stocks. IUU fishing not only **compromises the accuracy of data** used to undertake stock assessments (generally leading to an underestimate of fishing mortality), but also **undermines the effectiveness of existing conservation and management measures** (García Núñez, 2008).

Because many CITES Parties can exert fishing pressure on a single high seas shark stock, **it is important that all high seas captures of all States are considered when developing NDFs for introductions from the sea**. The same is true when **more than one State fishes a stock that occurs within the waters of more than one State**. In these cases, which are common to many shark species, it is not sufficient to consider just those fisheries operating inside the exporting State's EEZ, or only the harvests made by the flag vessels of that State.

In order to make robust evaluations of the pressures exerted by fishing on the stock of a shark species, in many cases there will be a need to **improve reporting** of catch, bycatch, discard and landings data by species and by weight, in order to determine contribution of bycatch and discards to overall shark mortality. Data should be both timely and standardised, to allow effective monitoring of the state of fisheries resources (see also **Step 6**) and to detect established and emerging trends.

As similarly noted under **Step 2** above, the **greater the severity of fishing risk** for the stock of the species concerned, the **greater are the requirements** of:

- **information quality**;
- **management rigour** required to mitigate (reduce the severity of) risks and pressures identified; and
- **degree of precaution** that Scientific Authorities should apply to making the NDF.

NOTE:

In this **Section 3.1,** Scientific Authorities should make an effort to **assess the severity of fishing risk, without taking into account the potential impacts of existing management measures**. While in some cases the risks posed by fishing may be reduced by existing management measures, the extent to which existing management is appropriate and being effectively implemented to mitigate the fishing risks is considered in **Step 4**.

STEP 3, SECTION 3.1: QUESTIONS AND GUIDANCE NOTES

Question 3.1(a)

What is the severity of risk of fishing on the stock of the species concerned?

GUIDANCE NOTES

1. What does this step involve?

This step involves an assessment of severity of fishing risk for the stock of the shark species concerned on the basis of available qualitative and quantitative information as "Low", "Medium", "High", or "Unknown".

2. What information is relevant to answering this question?

Information relevant to assessing severity of fishing risk is described above under **Section 1.3 (Review available information on management context)** and **Step 2 (Evaluation of intrinsic biological vulnerability to harvest and conservation concern)**.

In addition to these Guidance Notes, the explanations contained in the **Worksheet for Step 3, Question 3.1(a)** are intended to assist Scientific Authorities in answering this Question. Useful Sources of information are also listed below.

For stocks or populations identified in **Step 2** as of **"Medium" or "High" intrinsic biological vulnerability to harvest or as having "Medium" or "High" conservation concern**, efforts should be made to use **higher-quality information** to fill any remaining information gaps for **Section 3.1**. For species lacking relevant conservation status assessments in **Step 2 (Section 2.2)**, Scientific Authorities will need to gather any available information about fishing impacts for **Section 3.1**.

3. What factors should be considered when evaluating the severity of fishing risk for the shark stock concerned?

(a) Fishing mortality (retained catch)

- This factor considers the **characteristics of the harvest** that determine the scope or extent of impact, and the **proportion of the total stock that is removed by fishing** (targeted and secondary catch). The relevant characteristics of the harvest to consider are:
  - The **type** of impact (what fishing gears are used and how selective are they?)
  - The **frequency** of the impact (is fishing of the stock continuous/regular, or occasional?)
  - The **extent** of impact (i.e. is fishing limited to certain parts of the stock only?)
- For shark species, an **appropriately precautionary rate of fishing mortality (F)**, is less than half M (natural mortality rate): **F ≤ 0.5 M**, or a precautionary **F ≤ 0.4 M** in data-poor situations (DFO 2012).
- **To estimate impact**, the number (or biomass) of sharks in the wild and their intrinsic rate of population increase should ideally be compared to the number (or biomass) being caught. **Abundance should be estimated conservatively**, given the uneven distribution of individuals across shark stocks. In addition, as many different metrics and methods of assessment as possible should considered (e.g. if CPUE is used, it is important not to overlook the possible impact of additional mortality from discards and IUU fisheries).

(b) Discard mortality

- This factor considers the **discard rate** (i.e. the proportion of the catch that is not retained on board the vessel but returned to the sea, compared to proportion that is landed) specific to the particular gears/fleets concerned.
- A relevant consideration should be the **total level of mortality arising from discards**, which varies according to species, the fishing method, and the way in which catch is handled prior to release (García Núñez, 2008). If discard mortality is high, this has a significant impact upon total mortality levels even if only a small proportion of the catch is landed. If a large proportion of the total catch is thrown back, but survival rates following release are high, then the severity of impact on the harvested stock will be lower.
- **To estimate impact**, it will ideally be necessary to know about the discard rates and the levels of post-release mortality for the species/fishery/gear combination concerned.

(c) Size/age/sex selectivity

- This factor considers the **extent to which fishing** has the **potential to harm the breeding stock disproportionately and influence future recruitment** through the targeting of particular life history stages. Fisheries that are highly selective for a particular size class can result in greater long term negative impacts on wild stocks than less selective fisheries that take small and large sharks.
- It is important to find out whether the species is associated with critical habitats during certain periods of its life cycle (e.g. coastal nursery grounds) and the way in which fishing interacts with the stock of the species concerned during these periods. For example, if a fishery removes a significant proportion of juveniles, fewer individuals will reach maturity and contribute to the next generation, but the long-term impact upon recruitment rates may not become apparent for many years.
- To estimate impact, compare natural length:age:sex frequency plots to those for sharks in catches.

(d) Magnitude of illegal, unreported and unregulated (IUU) fishing

- This factor considers whether the magnitude and trend in legal fishing is significant in proportion to the abundance of the species, whether known illegal fishing exists, and whether illegal fishing comprises a significant proportion of the total harvest. Issues to take into account include whether the fishery is well-documented, and any mismatch between fishing and trade records.

4. What are the indicators of adverse fishing impact? Are there any other considerations that should be taken into account when answering Question 3.1(a)?

(a) Indicators

Changes in stock parameters over time may be caused by adverse impacts of fishing practices on the stock of the species concerned. **Indicators of adverse fishing impacts include**:

- declines in **spatial distribution** of the stock
- declines in **relative abundance** (stock size or catch per unit effort)
- declines in **mean size/age** of individuals
- changes in the **sex ratio**

Monitoring for indicators of adverse impacts from fishing activities can take the form of **stock monitoring** (standardised fishery-independent surveys) or **monitoring of fisheries and/or markets** (catches and discards, where possible, or at least landings). Fisheries-dependent monitoring data are only useful and dependable if accompanied by data on fishing effort, because trends in landings can also be influenced by changing market demand and/or fisheries management measures. See **Section 6.1** below for further information.

(b) Trade data

In some cases, **fisheries dependent/independent data will not be available** to assess the severity of fishing risk on the population or stock of the shark species concerned. In these cases, it **may be possible to consult trade data as a proxy for stock information**.

Such data may include **trends in trade volumes, values** (at different stages in the supply chain) and **patterns** (e.g. shifts in trade routes/markets/uses). However, it is **necessary to exercise care** when using trade data as a proxy for stock information as, for example, changes in trade volumes could indicate changes in either supply or demand. For further information, see **Section 3.2** below.

(c) Intrinsic vulnerability

The **impact of catch level** on a species will **vary according to the intrinsic vulnerability of the species** (see **Section 2.1** above). This should be taken into account when assessing fishing risk severity associated with fishing/discard mortality. For example, fishing mortality (retained catch) risk severity may be assessed as high (due to the species being highly vulnerable), even though only a moderate proportion of the stock is removed by all fishing activities. This will require a judgment to be made on the basis of available information and assessments made under **Section 2.1**.

(d) Diversity of fishing methods and gears

When considering the severity of the impact of harvest on the relevant stock of the shark species in question, it is necessary to **take into account all fishing methods and gears that interact with the stock** (see **Section 1.3** above). The greater the number of fishing methods and gears, the more complex the assessment and management of fishing impacts.

(e) Data quality issues

Information on fishing mortality is often poorly documented, with generally a lack of reliable, species-based data on catch. Species-specific catch information in the FAO Capture Production database is known to significantly underestimate total fishing mortality due to: (i) underreporting; (ii) inclusion of species specific catch in general fish catch categories; (iii) exclusion of discards in the data; and (iv) exclusion of IUU catch (Lack *et al*., 2014).

USEFUL SOURCES

- In addition to sources recommended for Section 2:
- Permit applications (number or volume of specimens included in relation to other permits for specimens from the same stock in the current year)
- Conservation status/stock assessments (see under the Useful Sources section of **Question 2.2** above) – population trends and harvest impacts. See **Annex 3** of this Guidance (management risk assessments) for stock status information for Porbeagle and information on IUU fishing activities.
- Population monitoring data, sampled and modelled stock parameters (e.g. changes in relative abundance, spatial distribution, age or size structure, sex ratio). Scientific publications/reports describing fishing practices, population trends. Surveys and inventories (e.g. surveys conducted at fishing locations and at no-take marine protected areas).
- Records of catches, including discards where possible (or at least landings) over time, derived from on-board observer/Vessel Monitoring System (**VMS**) data, on-board cameras, catch documentation, databases, logbooks, landings at ports**.** Consult catch data reported in global (FAO Capture Production database – species-specific categories), regional (RFB) and national databases.
- Other relevant data for assessing shark stocks recorded in RFB databases; species-specific vulnerability assessments undertaken by RFBs.
- Expert, fishing industry, local community, resource manager reports of fishing practices used, occurrence of illegal fishing**.** Qualitative indices (e.g. perceptions of local communities/fishing industry of change in shark abundance, mean size of animals caught).
- Vessel blacklists established under, e.g. the EU IUU Regulation, RFBs*;* reports on IUU fishing (e.g. by NGOs); information disseminated through NGO/other initiatives to combat IUU fishing (e.g. Stop Illegal Fishing: http://www.stopillegalfishing.com); fisheries trade data (UN Comtrade, FAO Fishstat, Eurostat and national Customs statistics) to assist in assessing IUU fishing activities (see http://www.fisheries-trade-data.org).
- Quantitative indices (e.g. decline in supply, increase in demand, increase in price).

NEXT STEPS

- In the **Worksheet for Step 3 Question 3.1(a)** and based on available qualitative and quantitative information, assess the overall severity of fishing risk for the stock of the shark species concerned as "Low", "Medium", "High", or "Unknown". Include reasons for the assessment and information on sources used.
- GO TO **Question 3.1(b)**.

Question 3.1(b)

Based on the information available, what is the level of confidence associated with the evaluation of fishing risk made under Question 3.1(a)?

GUIDANCE NOTES

This question involves an assessment of the **quality of information** used to evaluate impacts of fishing on the stock of the species concerned (**Question 3.1(a)**). The higher the quality of the information (e.g. quantitative vs. qualitative/anecdotal reports), and greater the amount of corroborating information, the higher the confidence level associated with the evaluation of fishing risk/impact severity.

USEFUL SOURCES

See under **Question 3.1(a)** above.

NEXT STEPS

- In the **Worksheet for Step 3 (Section 3.1, Question 3.1(b))**, include an assessment of the confidence level associated with the evaluation of severity of fishing risk for the stock of the species concerned.
- GO TO **Section 3.2**.

Section 3.2: Evaluate trade pressures

The impacts of trade can be detrimental to the survival of the species concerned because trade may increase total mortality by driving fishing pressure and unsustainable harvest rates; this is the potential threat most relevant to CITES. Scientific Authorities can identify and evaluate these impacts by considering the available information about the scale and trend of legal and illegal trade – both international and domestic.

Although **Step 3, Section 3.1** considers the impact of all harvest, whether for domestic use or international trade, it is useful to consider the impact of international trade in relation to that of any domestic trade (both legal and illegal). Where products are associated with high values on international markets, international demand for the product is likely to drive increased catch, particularly of unmanaged stocks of the species concerned (Lack *et al*. 2014). High prices in international trade may also be associated with higher risks of laundering of products into trade in contravention of relevant laws and regulations.

Improving available **information on trade dynamics** for shark species would assist authorities in more accurately evaluating the pressures exerted by trade on shark stocks. This may be achieved through:

- the establishment of (regional) **databases** with information on exports and imports of shark products;
- carrying out analyses of **supply and distribution chains**;
- improving the use of **conversion factors** between live weight, landed dead weight and weight of traded products for listed shark species; and
- improving trade monitoring, facilitated by the introduction of **species-specific Customs codes**.

As similarly noted under **Step 2** and **Section 3.1** above, the **greater the severity of trade risk** for the stock of the species concerned, the **greater are the requirements** of:

- **information quality;**
- **management rigour** required to mitigate (reduce the severity of) risks and pressures identified; and
- the **degree of precaution** that Scientific Authorities should apply to making the NDF.

NOTE:

In **Section 3.2** Scientific Authorities should make an effort to assess the severity of trade risk **without taking into account** the potential impacts of existing management measures. The extent to which existing management is appropriate and being effectively implemented to mitigate the trade risks identified in **Section 3.2** is considered in **Step 4**.

STEP 3, SECTION 3.2: QUESTIONS AND GUIDANCE NOTES

Question 3.2(a)
What is the severity of risk of trade on the stock of the species concerned?

GUIDANCE NOTES

1. What does this step involve?

This step involves an assessment of the severity of trade risk for the stock of the shark species concerned on the basis of available qualitative and quantitative information as "Low", "Medium", "High", or "Unknown".

2. What information is relevant to answering this question?

Information relevant to answering this question is described under **Section 1.3** (**Review available information on management context**) and **Step 2 (Evaluation of intrinsic biological vulnerability to harvest and conservation concern)**. Trade data may also have been analysed under **Section 3.1** to **assess the magnitude of IUU fishing**.

In addition to these Guidance Notes, the explanations contained in **Worksheet for Step 3, Question 3.2(a)** are intended to assist Scientific Authorities in answering this Question. Useful Sources of information are also listed below.

For stocks or populations identified in **Step 2** as of **"Medium" or "High" intrinsic biological vulnerability to harvest or as having "Medium" or "High" conservation concern**, efforts should be made to use **higher-quality information** to fill any remaining information gaps for **Section 3.2**. For species lacking relevant conservation status assessments in **Step 2 (Section 2.2)**, Scientific Authorities will need to gather any available information about trade impacts for **Section 3.2**.

3. What factors should be considered when evaluating the severity of trade risk for the shark stock concerned (in terms of driving unsustainable levels of harvest)?

(a) Magnitude and trend of legal trade

This factor considers the magnitude of trade in relation to the harvest and trade volume trend (decreasing, stable, or increasing). Risks may be higher, for example, where trade volume/market demand is high in relation to information on the abundance of the species. Trade volumes and prices of products in trade might be increasing or decreasing, which could indicate changes in supply, demand, or management.

Increasing prices might indicate that:

- demand is stable/continuing but there is reduced supply due to a declining resource (but note that stockpiling or release of stockpiles may be used to influence markets); or
- demand is increasing but supply is unable to increase to meet this demand because the resource is exploited to its limit; or
- improved fisheries or biodiversity management measures are restricting catches and reducing the availability of products in trade.

Falling prices might indicate that:

- demand is decreasing (e.g. because public awareness campaigns are changing consumption patterns); or
- economic problems are affecting consumer spending; or
- the market is being flooded with product (e.g. due to increased exploitation or the release of stockpiles).

(b) Magnitude and trend of illegal trade

This factor considers whether illegal trade is known to exist, whether the magnitude and trend in illegal trade is significant in proportion to the abundance of the species, whether illegal trade is significant in proportion to the overall volume of trade, and whether the substitution for a look-alike species in trade has a significant influence on the species of concern's survival.

Issues to take into account include:

- whether the trade chain is **transparent**;
- the extent of **differences** between **fishing and trade records**; and
- whether fisheries and trade (domestic and international) are **well documented**.

4. What are the indicators of adverse trade impact? Are there any other considerations that should be taken into account when answering Question 3.2(a)?

(a) Indicators

Changes in stock parameters over time may point to the adverse impacts of trade on the stock of the species concerned, where trade is driving harvest.

Indicators of potential adverse trade impacts include:

- declines in certain population parameters (e.g. spatial distribution of the stock, relative abundance [stock size or catch per unit effort] and mean size/age of individuals);
- changes in the sex ratio.

Declines in supply and **increases in demand/price** can also provide an indication of the adverse impact of trade on the shark stock concerned (unless it is clear that these are the direct result of improved harvest management), as can shifts in trade patterns (e.g. emergence of new markets/destinations) and the appearance of novel products in trade.

For further information on the monitoring of domestic and international trade volumes and characteristics (and potential uses of this information) see **Section 6.1** below.

(b) Products in domestic and international trade

When considering the severity of the impact of trade on the relevant stock(s) of the shark species in question, it is necessary to take into account all products in both domestic and international trade (fins, meat, other products). The more products/markets, the more complex the networks of domestic and international trade, and the more difficult it can be to understand the impact, monitor and regulate trade.

USEFUL SOURCES

- Export permit applications (proposed volume or number of specimens)
- Quantitative information on numbers of specimens exported (CITES trade database), also see guide to using the trade database, including trends over time. Additional information from the CITES trade database: (http://www.cites.org/eng/resources/trade.shtml), and the database user guide: (http://www.unep-wcmc-apps.org/citestrade/docs/CITESTradeDatabaseGuide_v7.pdf)
- Trends in national export volumes over time: Customs data contained in global databases derived from national Customs statistics (FAO Fishstat, UN Comtrade); regional databases (Eurostat); national Customs statistics (for more detailed information – see **Note** below)
- Trends in volume of domestic trade
- Market and field reports, surveys, information from traders, the fishing industry/local communities, fisheries managers
- Internet searches for both common and scientific names to give an indication of demand, including sales through B2B (business to business) trade platforms
- Enforcement and NGO reports on legal and illegal trade
- Reports of illegal trade contained in CITES Annual and Biennial Reports (e.g. seizure data, enforcement information)
- Eurostat for regional information in/out of EU
- US Fish and Wildlife Service (**FWS**) LEMIS and EU-TWIX databases (for illegal trade)
- Shark catch data (FAO Fishstat, RFB databases) to assist in assessing levels of illegal trade
- **Annex 3** of this Guidance (management risk assessments) for information on IUU fishing activities affecting stocks of Porbeagle.

Note: The highest level of detail of trade reported in UN Comtrade is under the 6 digit Harmonised System. More detailed trade information may be reported in national Customs statistics (e.g. reported under the 8 digit Combined Nomenclature system of the EU).

NEXT STEPS

- In the **Worksheet for Step 3 Question 3.2(a)** and based on available qualitative and quantitative information, assess the overall severity of fishing risk for the stock of the shark species concerned as “Low”, “Medium”, “High”, or “Unknown”. Include reasons for the assessment and information on sources used.
- GO TO **Question 3.2(b)**.

Question 3.2(b)

Based on the information available, what is the level of confidence associated with the evaluation of trade risk made under Question 3.2(a)?

GUIDANCE NOTES

This question involves an assessment of the **quality of information** used to evaluate impacts of trade on the stock of the species concerned (**Question 3.2(a)**). The higher the quality of the information (e.g. quantitative vs. qualitative/anecdotal reports), and greater the amount of corroborating information, the higher the confidence level associated with the evaluation of trade risk/impact severity.

USEFUL SOURCES

See under **Question 3.2(a)** above.

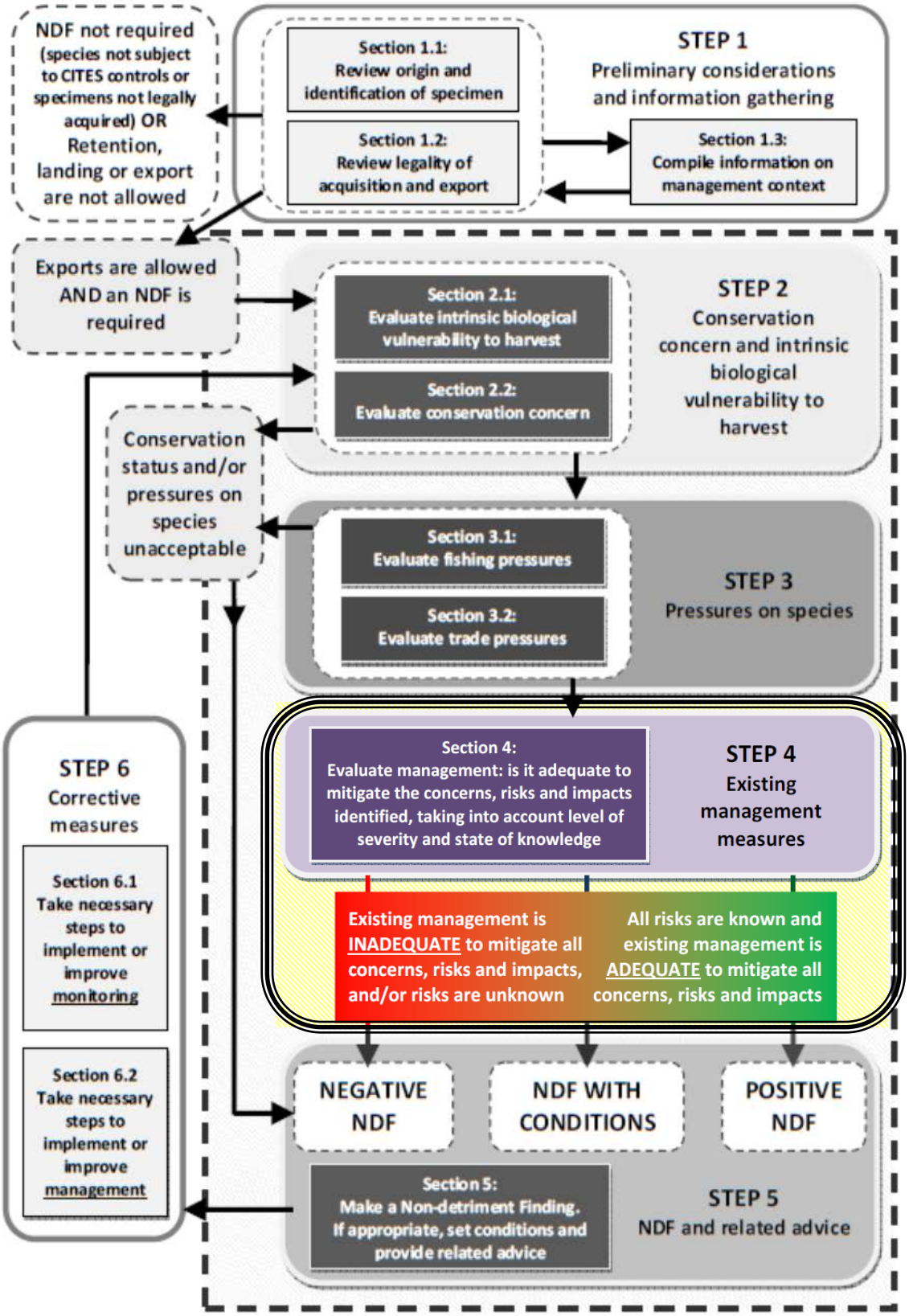
NEXT STEPS

- In the **Worksheet for Step 3 (Section 3.2, Question 3.2(b))**, include an assessment of the confidence level associated with the evaluation of severity of trade risk for the stock of the species concerned.
- On the basis of the assessments made under **Sections 3.1 (Questions 3.1(a) and (b)) and 3.2 (Questions 3.2(a) and (b))**, Scientific Authorities should be in a position to make a judgment on whether:
  - the status of the stock assessed in **Step 2**, combined with
  - the pressures on the stock assessed in **Step 3**,
  - are at levels that would allow for the NDF process to **proceed to Step 4**.

- **OPTION 1: Based on the assessments made in Steps 2 and 3, the NDF process can proceed**
  - Fishing and/or trade do not present unacceptable risks to the stock of the species concerned, bearing in mind the conservation status/intrinsic biological vulnerability of the stock/species assessed in **Step 2**. Mitigation of these risks could be possible through management, which should be considered in **Step 4**.
  - In the majority of cases, existing management measures will need to be evaluated (under **Step 4**) before an NDF decision can be made. Therefore, **Option 1** is the most likely scenario to arise in practice.
  - GO TO **Step 4, Question 4.1(a)**.

- **OPTION 2: Based on the assessments made in Steps 2 and 3, the NDF process CANNOT proceed**
  - Fishing and/or trade present unacceptable risks to the stock of the species concerned, bearing in mind the conservation status/intrinsic biological vulnerability of the stock/species assessed in **Step 2**. Mitigation of these risks is not possible through management.
  - A **NEGATIVE NDF** is required and the **PROCESS STOPS HERE**.

STEP 4:
EXISTING MANAGEMENT MEASURES



Overview of Step 4

An overview of the structure of **Step 4**, including Sections and Questions to be answered is provided in **Table 7**. Relevant Worksheets are contained in Annex 2 to this Guidance.

Table 7. Overview of Step 4

Steps	Sections	Questions
Step 4 Existing management measures	-	**Question 4.1(a)** What generic and species-specific management measures are in place for the stock of the species concerned?
	-	**Question 4.1(b)** Are the management measures identified in Question 4.1(a) appropriate to address the pressures affecting the stock of the species concerned?
	-	**Question 4.1(c)** Are the management measures identified in Question 4.1(a) being implemented?
	-	**Question 4.1(d)** Are the management measures identified in Question 4.1(a) effective or likely to be effective in reducing the impacts on the stock of the species concerned?

Rationale

For most harvested shark species listed in CITES Appendix II, non-detrimental trade requires the effective implementation of **management measures**.

Steps 2 and 3 of this Guidance have supported Scientific Authorities to evaluate the species concerned as "Low", "Medium", or "High" for intrinsic biological vulnerability to harvest, conservation concern, and fishing and trade pressures, and to identify the particular factors that contribute to the severity of concern, risk, and impact.

Step 4 guides Scientific Authorities in the use of available information to evaluate whether management measures are **adequate** to mitigate (reduce the severity of) the identified concerns, risks and impacts, taking into account level of severity and state of knowledge. Specifically, management measures in place (see **Question 4.1(a)** below) are evaluated in terms of whether they are:

1. **Appropriate** to mitigate the specific intrinsic risks, conservation concerns and harvest/trade pressures identified for the species concerned and its stocks (**Question 4.1 (b)**);
2. **Being implemented** (i.e. adequate enforcement is taking place to ensure management measures are complied with) (**Question 4.1(c)**);
3. **Effective** in mitigating the concerns, risks and impacts identified (i.e. positive results must be demonstrated through robust monitoring) (**Question 4.1(d)**); and
4. **Flexible and adaptive**, meaning that there is a system in place to monitor and review management outcomes and to adjust the measures in place as necessary (**Question 4.1(d)**).

As similarly noted above under **Steps 2 and 3**, the **greater the severity of intrinsic biological vulnerability, conservation concern, and fishing/trade risks** for the stock of the species concerned, the **greater are the requirements** of **information quality** with regard to the management measures in place and their impact and **management rigour** required to mitigate (reduce the severity of) risks and pressures identified.

STEP 4:
QUESTIONS AND GUIDANCE NOTES

Question 4.1(a)
What generic and species-specific management measures are in place for the stock of the species concerned?

GUIDANCE NOTES

1. What does this step involve?

This step identifies the **generic** and **species-specific management** measures that are of potential relevance to the stock of the species concerned (i.e. have the potential to mitigate some or all of the concerns, risks and impacts identified in **Steps 2 and 3** above). These include measures implemented at the **national**, **regiona**l (e.g. RFB) and **international** level.

(a) Generic fisheries management measures

Those in place to manage overall effort or catch in a fishery that are not specific to the species concerned but may have some benefit to that species, e.g. limited entry or catch controls on other target species, controls on species groups such as shark finning controls and gear restrictions.

(b) Species-specific management measures

Those that relate explicitly and directly to the species being assessed e.g. a catch quota for the species, an effort control in a target fishery for the species or an area closure specifically designed to protect life cycle stages of the species (Lack *et al*., 2014). Certain RFBs have also implemented measures to prohibit retention of certain non-target species (including sharks), often accompanied by a requirement to ensure that any incidental catch of the species is immediately returned to the sea without further harm in order to maximise chances of post-capture survival.

2. What information is relevant to answering this question?

Information relevant to answering this question is described under **Section 1.3** (**Review available information on management context**) and may also be derived from the conservation status assessments consulted for **Step 2** (**Evaluation of intrinsic biological vulnerability to harvest and conservation concern**). A list and description of commonly used generic and species-specific fisheries management measures (harvest and trade) is provided in **Annex 1**. Further information on catch and export quotas is provided in **Text Box 3** under **Step 5** below.

USEFUL SOURCES

- **Annex 1** of this Guidance (for generic and species-specific fisheries management measures)
- **Annex 3** of this Guidance (management risk assessments) for management measures in place for stocks of Porbeagle.
- RFB websites for RFB measures
- Approved local/national/state/provincial management plan(s); national fisheries websites; National Plans of Action for Sharks (NPOA-Sharks); national legislation for conservation, harvest and trade measures
- Conservation status assessments specifying existing management (see, e.g. **Useful Sources** for **Question 2.2** above)
- Lack *et al*. (2014) for RFB and national measures; information collated by the CITES Secretariat under Decision 16.128 on domestic laws and regulations, and RFB measures, relating to shark management and conservation; Mundy-Taylor and Crook (2013); Fischer *et al.* (2012)
- A Fishery Manager's Guidebook (Cochrane and Garcia, 2009)

http://www.fao.org/docrep/015/i0053e/i0053e.pdf

- *Manual of Techniques for the Management of Elasmobranch Fisheries* (Musick and Bonfil, 2005)
- *Fisheries management. 1. Conservation and management of sharks. FAO Technical Guidelines for Responsible Fisheries. No. 4, Suppl. 1* (FAO Marine Resources Service, 2000): ftp://ftp.fao.org/docrep/fao/003/x8692e/x8692e00.pdf
- *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): http://www.cites.org/common/disc/coop/CITES-FAO-Genazzano-workshop-report2010.pdf
- Quantitative off-take thresholds (e.g. estimates of maximum sustainable yield)

NEXT STEPS

- In the **Worksheet for Step 4 (Section 4.1, Question 4.1(a))**, indicate the relevant generic and species-specific management measures in place, including a brief description of the measures and sources of information used.
- GO TO **Question 4.1 (b).**

Question 4.1(b)

Are the management measures identified in Question 4.1(a) appropriate to address the pressures affecting the stock of the species concerned?

GUIDANCE NOTES

1. What does this step involve?

In this step, the list of **generic** and **species-specific management measures** compiled for **Question 4.1(a)** is compared with the severity of fishing and trade pressures identified in **Step 3**. This involves determining which management responses are **appropriate** to address the pressures identified, rather than assessing the effectiveness of the responses in mitigating concerns, risks and impacts. This is, therefore, **an assessment of potential rather than actual impact**.

NOTE:

- **Question 4.1(c)** below assesses whether the measures are actually **being implemented**.
- **Question 4.1(d)** assesses whether the measures are **effective** in mitigating identified pressures on the stock of the species concerned.

2. What information is relevant to answering this question?

Annex 1 provides details of generic and species-specific management measures and their appropriateness for mitigating pressures on shark stocks from fisheries and trade. Other Useful Sources of information on possible approaches for the management of shark fisheries are provided under **Question 4.1(a)** above.

USEFUL SOURCES

See under **Question 4.1(a)** above.

NEXT STEPS

- In the **Worksheet for Step 4 (Section 4.1, Question 4.1(b))**, for each fishing and trade pressure, indicate which generic and species-specific management measures in place are potentially appropriate for addressing these pressures.
- GO TO **Question 4.1(c)**.

Question 4.1(c)
Are the management measures identified in Question 4.1(a) being implemented?

GUIDANCE NOTES

1. What does this step involve?

In this step, the extent to which the generic and species-specific management measures identified in **Question 4.1(a)** are being implemented is assessed. This necessitates an evaluation of the MCS measures in place to ensure enforcement of and compliance with fisheries management.

2. What information is relevant to answering this question?

Information on relevant MCS measures to ensuring compliance with the generic and species-specific management measures identified in **Question 4.1(a)** is provided in **Annex 1**.

Additional sources of information to assist Scientific Authorities in assessing the compliance regime in place are provided under Useful Sources below.

USEFUL SOURCES

- **Annex 1** of this Guidance (information on generic and species-specific fisheries management and relevant MCS measures)
- **Annex 3** of this Guidance (management risk assessments) for information on the compliance regime in place to support generic and species-specific management measures for stocks of Porbeagle.
- Approved local/national/state/provincial management plan(s); national fisheries websites; National Plans of Action for Sharks (NPOA-Sharks) (for national MCS measures)
- RFB websites for regional MCS measures
- NGO and other reports on compliance with management measures (e.g. by INTERPOL); reports from enforcement authorities; information disseminated through NGO/other initiatives to monitor IUU fishing (e.g. Stop Illegal Fishing: http://www.stopillegalfishing.com)
- Reports of illegal trade contained in CITES Annual and Biennial Reports (e.g. seizure data, enforcement information); illegal trade reported in US FWS LEMIS and EU-TWIX databases
- Fisheries trade data (UN Comtrade, FAO Fishstat, Eurostat and national Customs statistics) to assist in assessing IUU fishing activities (see also http://www.fisheries-trade-data.org)
- Vessel blacklists established under, e.g. the EU IUU Regulation, RFBs
- Surveys and inventories (e.g. surveys conducted at fishing locations and at no-take marine protected areas)
- Expert, fishing industry, local community, resource manager reports of occurrence of illegal fishing

NEXT STEPS

- In the **Worksheet for Step 4 (Section 4.1, Question 4.1(c))**, indicate relevant MCS measures in place, assess the comprehensiveness of the compliance regime and, on this basis, assess whether the management measures relevant to the fishing/trade pressures identified are likely being implemented. Provide reasons to justify this assessment, including any sources used.
- GO TO **Question 4.1(d).**

Question 4.1(d)
Are the management measures identified in Question 4.1(a) effective or likely to be effective in reducing the impacts on the stock of the species concerned?

GUIDANCE NOTES

1. What does this step involve?

In this step, a judgment is made based on the information available as to the effectiveness or likely effectiveness of existing management measures in mitigating the fishing and trade pressures identified in **Step 3**.

2. What information is relevant to answering this question?

In assessing the effectiveness of management, it will also be useful to consider any information gathered under **Step 2 (assessments of conservation status/stock assessments)**. Information relevant to answering this question may also have been compiled and/or considered under **Section 1.3 (review available information on management context)** and **Step 3 (evaluation of fishing and trade pressures)**. Useful Sources of information are also listed below.

In addition, the information gathered under **Questions 4.1(b) and (c)** can also provide an indication of the likelihood that measures are effective, i.e. if measures are appropriate to the pressures they are trying to mitigate and being adequately implemented, they are more likely to be effective.

NOTE:

- The greater the severity of intrinsic biological vulnerability, conservation concern, fishing pressure and/or trade pressure identified under **Steps 2 and 3**, the greater the effort that should be made to utilise available **higher-quality information** to assess the effectiveness or likely effectiveness of management measures in mitigating the risks identified.
- **Higher-quality information** may include:
    - Results of stock assessments/conservation status assessments
    - Quantitative monitoring of fisheries dependent and/or independent data
    - Quantitative monitoring of domestic and export trade volumes
    - Quantitative off-take thresholds (e.g. estimates of maximum sustainable yield)

3. What are the indicators of management effectiveness? Are there any other considerations that should be taken into account when answering Question 4.1(d)?

Ideally, management effectiveness should be demonstrated through **robust monitoring** of the stock concerned. Where **stocks** are estimated to be **stable** or increasing in size over time, then **management can be considered effective**. If, however, stock numbers are declining or other indicators of adverse impacts are observed (such as changes in the sex ratio or average body size of the population), then improvements to existing management will be necessary. This is discussed further in **Section 6.2** below.

In the **absence of stock monitoring** over a sufficiently long time frame, other factors may provide an indication of the likely effectiveness of management. This includes whether the measures are **based on scientific advice** and whether a system of **adaptive management** is in place. Adaptive management, as defined in this Guidance, refers to the process of monitoring the effectiveness of management and making necessary adjustments where deficiencies are observed. Therefore, when answering this question, it may be useful to consider the following (Lack *et al*., 2014):

- Is there a **requirement for species-specific information to be collected** to inform the status of the stock (e.g. on landings or, if retention is prohibited, on discards)?
- Are these data analysed to inform management decisions?
- Are the **management measures in place consistent with scientific advice** (i.e. do the measures implemented respond appropriately to the needs identified by the available scientific advice, **OR** do they reflect the specific management advice provided by the scientific advisory body)?

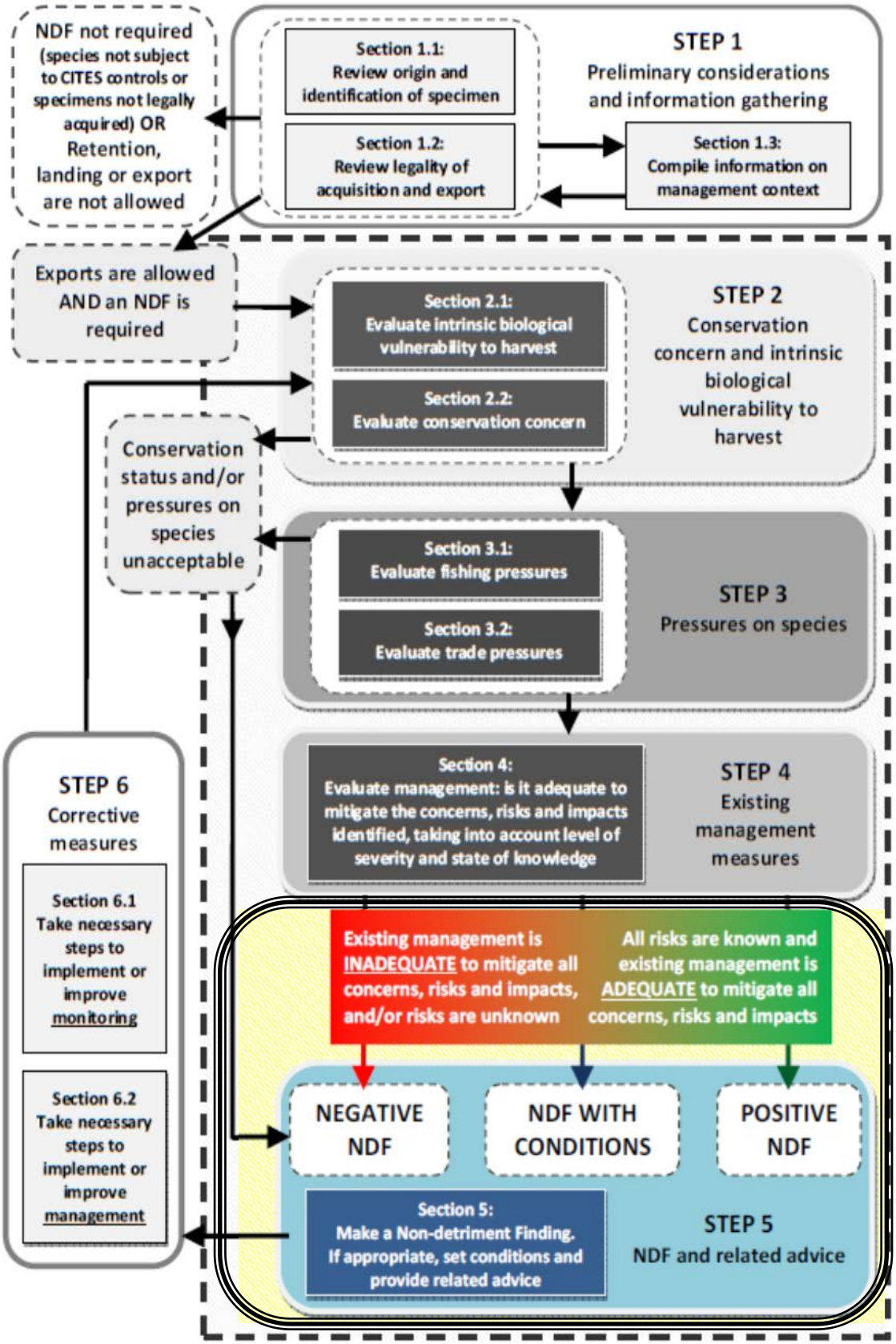
USEFUL SOURCES

- Conservation status assessments (**Step 2, Section 2.2**) – population trends and harvest impacts; stock assessment/status (see RFB websites, relevant scientific publications); species-specific vulnerability assessments undertaken by RFBs (see **Useful Sources** section under **Question 2.2** above). Other scientific publications/reports describing population trends
- **Annex 3** of this Guidance (management risk assessments) for stock status information for Porbeagle and requirements relating to the collection and analysis of data on landings and fishing effort, and the scientific analysis of these data to inform management.
- RFB websites for RFB data collection requirements and advice of scientific committees; other relevant data for assessing shark stocks recorded in RFB databases
- Management plans (local, national, state, provincial); national fisheries websites; National Plans of Action for Sharks (NPOA-Sharks); national legislation for conservation, harvest and trade measures.
- Information on existing quotas (and the basis for setting them)
- Quantitative monitoring of fisheries dependent and/or independent data.
  - Population monitoring data, sampled and modelled stock parameters (e.g. changes in relative abundance, spatial distribution, age or size structure, sex ratio).
  - Records of catches, including discards where possible (or at least landings) over time, derived from on-board observer/Vessel Monitoring System (**VMS**) data, on-board cameras, catch documentation, databases, logbooks, landings at ports. Shark catch data reported in global (FAO Capture Production database – species-specific categories), regional (RFB) and national databases. Landings or, if retention of sharks prohibited, data on discards.
- Quantitative monitoring of domestic and export trade volumes (UN Comtrade, FAO Fishstat, Eurostat and national Customs statistics). Quantitative indices (e.g. decline in supply, increase in demand, increase in price)
- Qualitative indices (e.g. perceptions of local communities/fishing industry of change in shark abundance, mean size of animals caught)
- Interviews with fishers, traders, fisheries managers, enforcement officers, and other stakeholders

NEXT STEPS

- In the **Worksheet for Step 4 (Section 4.1, Question 4.1(d))**, assess whether the management measures relevant to the fishing/trade pressures identified are effective/likely to be effective in mitigating these pressures. Provide reasons to justify this assessment, including any sources used.
- Complete the **Summary Worksheet for Step 4.**
- GO TO **Step 5**.

STEP 5:
NON-DETRIMENT FINDING AND RELATED ADVICE



Overview of Step 5

An overview of the structure of **Step 5**, including Sections and Questions to be answered is provided in **Table 8**. Relevant Worksheets are contained in Annex 2 to this Guidance.

Table 8. Overview of Step 5

Steps	Sections	Questions
Step 5 Non-detriment Finding and related advice	-	**Question 5.1** What is the final outcome of the previous steps? The Scientific Authority now has to decide whether to give positive advice, or positive advice subject to conditions, or negative advice regarding the non-detriment finding.

Rationale

Steps 1 to 4 of this Guidance have been structured to guide Scientific Authorities through a series of Questions and decision paths to make "**a science-based assessment that verifies whether a proposed export or introduction from the sea (IFS) is detrimental to the survival of that species**".

This Guidance additionally supports Scientific Authorities to gather, evaluate, and document relevant information for which the **data quality** is "**proportionate to the vulnerability of the species concerned**" – in other words, based on a **risk assessment**.

The tasks remaining for the Scientific Authority in **Step 5** are to:

- make a **positive** or **negative NDF** or **related decision**; and
- **provide advice on any management conditions** that might need to be set or **measures taken to limit the grant of export permits** for specimens of that species or to improve monitoring or management actions (see **Article IV.3**[26] and **Text Box 3** below on the establishment of catch and export quotas). This may be particularly important in cases where risks are considered high and therefore could threaten the role of the species in the ecosystem and/or reduce stocks to Appendix I levels[27].

In later years, when existing NDFs have been made, the Scientific Authority should undertake regular re-appraisals of these NDFs to ensure that they are still valid.

[26] According to **Article IV.3**, "a Scientific Authority in each Party shall monitor both the export permits granted by that State for specimens of species included in Appendix II and the actual exports of such specimens. Whenever a Scientific Authority determines that the export of specimens of any such species should be limited in order to maintain that species throughout its range at a level consistent with its role in the ecosystems in which it occurs and well above the level at which that species might become eligible for inclusion in Appendix I, the Scientific Authority shall advise the appropriate Management Authority of suitable measures to be taken to limit the grant of export permits for specimens of that species."

[27] See Resolution Conf. 9.24 (Rev. CoP16) (Criteria for amendment of Appendices I and II): http://www.cites.org/eng/res/09/09-24R16.php

Text Box 4
Setting catch and export quotas

- The **management aim of a catch and/or export quota** is to **limit fishing mortality (F)** by regulating the number of sharks being caught.
- It is important to consider that **export quotas will not limit catches where sharks are obtained as bycatch**. In such cases any use of quotas should be combined with other precautionary measures, given the uncertainty as to how export quotas influence catches.
- A **Party may establish IFS or catch and export quotas unilaterally**, but **quotas can also be set regionally, or by the CITES CoP** (www.cites.org/eng/resources/quotas/index.php). Any relevant fisheries body (including a RFB or national agency) could be appointed to act as a Scientific Authority and advise on international TACs and national and vessel quotas.
- Setting a quota that establishes the maximum number of specimens of a species that may be taken and/or exported over the course of a year without having a detrimental effect on the species' survival will contribute to meeting the CITES requirement for an NDF. However, Parties must ensure they take into account **the level of harvest for domestic use as well as for export**, **and other sources of mortality** (particularly when other fleets are harvesting the same stock).
- **Export quotas** can be a **useful tool for assisting in making NDFs**, providing they are established based on appropriate science and necessary precaution. Scientific Authorities should note that a given national export quota could still be detrimental to a stock if other sources of mortality and uses are unsustainable.
- See also:
  - Management of nationally established export quotas: Res. Conf. 14.7 (Rev. CoP15) (http://www.cites.org/eng/res/14/14-07R15.php)
  - Periodic reports of the national CITES Authority to the CITES Secretariat, including updates on national export quotas:(http://www.cites.org/eng/resources/quotas/index.shtml)

STEP 5:
QUESTION AND GUIDANCE NOTES

Question 5.1

What is the final outcome of the previous steps? The Scientific Authority now has to decide whether to give positive advice, or positive advice subject to conditions, or negative advice regarding the non-detriment finding.

GUIDANCE NOTES

This question considers the evaluation of fishing/trade pressures and management measures made under **Steps 3 and 4** of this Guidance with a view to determining whether a positive NDF (with or without conditions) can be made, or whether an negative NDF is required. When considering the assessments made in **Steps 3 and 4**, it is also essential to keep in mind (as over-arching considerations) the level of **conservation concern** and **intrinsic vulnerability to harvest** of the stock of the species concerned (from **Step 2**) and, in view of this, whether existing management is **sufficiently precautionary**.

Three possible Scenarios may be identified under this step:

1. A POSITIVE NDF can be considered where:

- The existing **management measures** identified in **Step 4** are **ADEQUATE** to mitigate all concerns, risks and impacts identified in **Steps 2 and 3**.
  - For example, **all fishing/trade risks are low** (confidence levels: medium or high) **AND** a judgment is made that **management** is **adequate to mitigate these small risks**, **OR**
  - Existing management is appropriate, being implemented and effective/likely to be effective **to mitigate ALL fishing/trade risks (whether low, medium or high)**.

NOTE: where fishing/trade risks are low, medium or high and there is a low level of confidence/lack of information available, it may still be possible to issue a positive NDF if existing management in place is sufficiently precautionary.

2. A POSITIVE NDF WITH CONDITIONS can be considered where:

- The existing **management measures** identified in **Step 4** are at least **PARTLY ADEQUATE** to mitigate the level of concern, the risks and the impacts identified in **Steps 2 and 3**. (This scenario is the most likely.)
- It is noted that, when any "conditions" (e.g. Corrective Measures – see **Step 6**) need to be implemented before the export takes place, this is a **negative NDF with advice** on Corrective Measures - see instead **Scenario 3** below.

NOTE that where available information indicates that fishing/trade risks are low (confidence levels - medium or high) a judgment needs to be made as to whether management needs to be improved before a positive NDF can be issued.

3. A NEGATIVE NDF is made where:

- At least one of the major fishing and trade risks is **high** (confidence levels: medium or high) **AND management** of this risk is **unknown, non-existent, inappropriate, not implemented or ineffectual**.

For Scenarios 2 and 3, **Corrective Measures** such as the following will be required (further information is provided under **Step 6**):

A. Improvements in monitoring and information are required where:

- Any of the fishing/trade risks are medium or high (confidence levels – medium or high) AND the effectiveness of management is unknown; **OR**
- Any of the fishing/trade risks are unknown (confidence level – no information) **OR** any of the fishing/trade risks are low, medium or high and confidence levels are low.

B. Improvements in management are required where:

- Any of the fishing/trade risks are medium or high; **AND**
- Confidence levels are medium or high; **AND**
- Existing management is either not appropriate, not being implemented or not effective/likely to be effective.

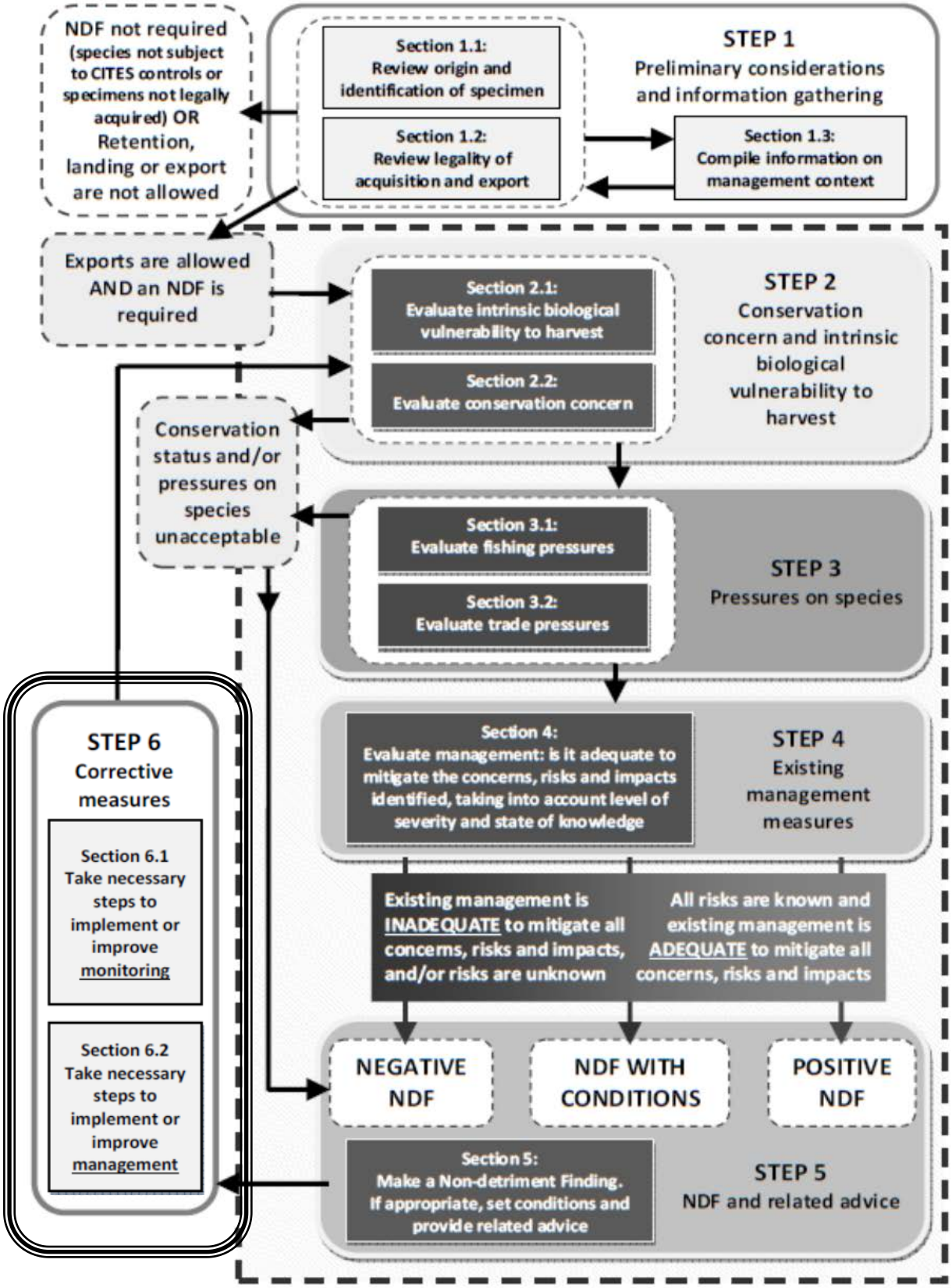
USEFUL SOURCES

Information gathered and assessments made under **Steps 1 to 4**.

NEXT STEPS

- Complete **Worksheet for Step 5 Question 5.1**, assess whether corrective measures are required (i.e. improvements in monitoring and/or management), or other recommendations / conditions are necessary, providing information on sources used and reasons.
- **OPTION 1: If Corrective Measures are required, GO TO Step 6**
- **OPTION 2: If no Corrective Measures are required, make a positive NDF and provide related advice, if appropriate, to the Management Authority and any other relevant bodies.**

STEP 6:
CORRECTIVE MEASURES



Overview of Step 6

An overview of the structure of **Step 6**, including Sections and Questions to be answered is provided in **Table 9**. Relevant Worksheets are contained in Annex 2 to this Guidance.

Table 9. Overview of Step 6

Steps	Sections	Questions
Step 6 Corrective measures	**Section 6.1** Improvements in monitoring or information required	-
	Section 6.2 Improvements in management required	-

Rationale

As already noted in **Step 4**, non-detrimental trade in the products of most harvested shark species listed in CITES Appendix II requires **adequate management** to be in place to mitigate the impact of exploitation upon stocks and to enable sustainable trade to take place.

In **Step 5**, Scientific Authorities were required to make a judgment on whether to issue a **positive or negative NDF**, and whether to provide **related advice**, based on the assessments made in **Steps 1 to 4** of this Guidance.

The current step, **Step 6**, is intended to guide authorities in making the **necessary improvements to monitoring or management** (together, "Corrective Measures"), as appropriate, in order to address shortcomings in information availability or adequacy of management in mitigating the concerns, risks and impacts identified. This step, which is primarily the responsibility of **Management Authorities**, is particularly relevant where Scientific Authorities have decided to issue a **positive NDF with conditions or a negative NDF**. The information below may, however, also be of wider interest to Parties as they develop and implement flexible and adaptive management of their shark fisheries.

Recommendations for corrective measures may not only be directed to national level fisheries management (and/or other relevant) authorities but, where shared stocks are involved, may necessarily be **directed to any relevant RFB** with responsibility for the stock concerned.

It is noted that, unless stocks are very healthy and fisheries closely managed and monitored, **shark NDFs for export permits and IFS certificates will generally be valid for a single year**, during which period a Total Allowable Catch (**TAC**) and quota system may operate (see **Text Box 4** above for further information on the setting of catch and export quotas). At the end of the year, during which any corrective measures may have been implemented (whether at the national or regional, e.g. RFB, level) it would be useful to work **through Steps 3, 4 and 5** of this Guidance again to see if the NDF needs to be revised.

Section 6.1:
Improvements in monitoring or information required

This section provides examples of how monitoring or information gathering could be improved in order to address cases where:

- any **risks from fishing or trade** were considered **unknown**,
- there is a lack of information on **existing management measures** (i.e. considered **unknown**) particularly where the fishing/trade risks requiring mitigation were identified as medium or high, **AND/OR**
- **confidence levels** were **low** for any assessment.

Monitoring of adverse impacts from fishing/trade pressures on shark stocks may take the following forms:

(a) Population monitoring (fisheries-independent data)

- For example, longline, tag and release, baited remote underwater video (**BRUV**) or other underwater surveys.
- Data collected from such monitoring may include: species composition, presence/absence, densities/abundance indices, sex ratios (males, females, juveniles), fecundity, age distribution, reproductive cycle, intrinsic rates of population increase, natural mortality rates.

(b) Fisheries monitoring (fisheries-dependent data)

- Monitoring of catches, including discards where possible, for example through onboard observers, landings at port, onboard cameras, vessel monitoring systems (**VMS**), interviews, catch documentation schemes, databases, and logbooks.
- Data collected from such monitoring may include: methods of harvest (e.g. target/secondary catch, fishing gear), fishing locations, spatial/temporal variability of catches, catch volumes (including discards), post-release survival, catch characteristics (sex ratios, size/age structure), fishing effort (number of boats, number of trips, duration of tows, etc.).
- Note that coordination among fleets and homogenisation of adopted procedures is essential for achieving desired quality of data on shark catches (García Núñez, 2008).

(c) Monitoring of domestic and international trade volumes and characteristics

- For example, through market sampling, interviews with fishermen/traders, genetic analysis, trade documentation schemes, Customs and other databases
- Data collected from such monitoring may include: volumes (at different points in market chain), values (at different points in market chain), uses (domestic and international) trade/market structure and dynamics, seasonality of trade, trade routes (including spatial and temporal trends).
- In addition, carrying out comparisons of trade and catch records can provide an indication of levels of IUU fishing/trade (for further information, see for example http://www.fisheries-trade-data.org).

NOTE: Trade monitoring is often useful for supplementing information on stock status/levels of harvest and can be more available/straightforward to collect than stock/harvest data. For example, trade data and trend information can provide an indication of commercial demand for shark products and mortality when landings are under-reported. However, while analysis of international trade data can provide an additional tool for long-term assessment and monitoring, there is a need for species-specific commodity codes and identification guides to allow shark products (particularly those in highly-processed form) in international trade to be monitored (García Núñez, 2008). There is also a need for consistent Customs codes between countries to trace trade volumes along international supply chains.

Authorities are encouraged to list the improvements in monitoring or information that are required to address cases where any risks were considered unknown, management was considered unknown, and/or confidence levels were low for any assessment in the **Worksheet for Section 6.1**. **Recommendations should be as specific as possible** to address any gaps/shortcomings identified, with **clearly defined objectives and time-frames** (including with regard to the review of progress on implementation).

Section 6.2:
Improvement of management is required

This section provides brief guidance to authorities when considering the types of improvements in management to address cases where:

- any fishing/trade risks were medium/high (confidence levels medium or high – for lower levels of confidence, see **Section 6.1** above); **AND**
- management was considered non-existent, inappropriate, insufficient, not being implemented or not effective/likely to be effective.

As noted in the previous steps, above, in such cases management needs to be addressed before trade can be considered non-detrimental to wild stocks.

As a starting point for effective management of shark stocks, Parties are encouraged to implement the UN FAO International Plan of Action for the Conservation and Management of Sharks (**IPOA-Sharks**) at the national and regional levels (as previously recommended, for example, by the CITES CoP in **Decisions 14.115 and 14.116**).

Based on the assessments made in **Step 5**, there are **three possible scenarios** with regard to the status of existing management (Foster and Vincent, 2013):

1. If management is **non-existent, inappropriate or insufficient** then**:**
    - **Add appropriate management.**
    - Consult **Annex 1** to this Guidance for a list of commonly used species-specific and generic shark management measures, as well as other sources of information on fisheries management listed under Useful Sources for **Step 4 Question 4.1(a)** above.
2. If management is appropriate **but not being implemented** then:
    - **Increase enforcement and/or incentives/other mechanisms for compliance.**
    - Consult **Annex 1** to this Guidance for examples of MCS measures relevant to commonly used species-specific and generic shark management measures, as well as other sources of information on compliance listed under Useful Sources for **Step 4 Question 4.1(c)** above.

3. If management is appropriate and implemented **but not sufficiently effective** then:
    - **Recommend improvements to that management**, depending on the shortcomings identified.
    - For example, existing catch and/or export quotas may need to be altered (reduced) to address continued population declines (see **Text Box 3** above); closed fishing seasons may need to be lengthened or moved to enhance protection of vulnerable life-history stages; or no-take zones may need to be increased in size to improve resilience of the population to fishing pressures or re-located to better match critical areas or habitat.

Authorities are encouraged to list the improvements in management that are required to address cases where risks were medium/high and management was considered non-existent, inappropriate, insufficient, not being implemented or not effective/likely to be effective in the **Worksheet for Section 6.2**. As noted above in **Section 6.1**, **recommendations should be as specific as possible** to address any gaps/shortcomings identified, with **clearly defined objectives and time-frames** (including with regard to the review of progress on implementation).

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ANNEX 1: Management measures and their appropriateness for mitigating pressures on shark stocks from fisheries and trade

The tables below describe 14 potential harvest-related measures and 2 potential trade-related measures for the management of shark populations. This is intended as a non-exhaustive summary of the most common measures, but other management possibilities certainly exist.

A. Harvest-related management measures

Aim(s)	Implementation	Appropriate for which pressures?	Relevant compliance measures
1. LIMITED ENTRY			
To limit fishing mortality by restricting access to the fishery to a specific group or number of operators (as the first step in controlling fishing effort)	Typically through issue of fishing right e.g. permit or licence	**Fishing mortality (retained catch): ✓** • Targeted catch – if used in combination with other effort controls such as a catch quota specific to the shark species concerned • Secondary catch – if used in combination with a catch quota (as above) and/or spatial restrictions on the use of fishing gears associated with bycatch of the shark species concerned **IUU fishing: ✓** • Provides a basis for exerting further control over fishery (e.g. restricting access to vessels on IUU black lists) and the implementation of associated compliance measures • Supports collation of information on vessels fishing in a particular area	• Sound licensing system in place • At sea and in port inspections of vessels and authorisations to fish • Vessel lists used by RFMOs or other national/regional organisations (e.g. EU IUU vessel list established under the EU IUU Regulation): o White lists – identify vessels authorized to fish in (RFMO) area o Black lists – identify vessels considered or determined to have been fishing in breach of (RFMO) measures. Used as a basis for imposing restrictions on access of the listed vessels to ports through the introduction of port State measures.
2. FISHING TIME RESTRICTIONS			
i. To limit fishing effort by restricting number of days that fishers can operate ii. To increase selectivity of	Adoption of fishing seasons (closed/open for certain months of year, e.g. to coincide with peak reproduction	**Fishing mortality (retained catch): ✓– with caution** • Targeted catch – appropriate, although may need to be combined with a catch quota specific to the shark species concerned. • Secondary catch – appropriate, although may need to be combined with a catch quota specific to the shark species concerned. Degree to which appropriate for reducing fishing mortality (retained catch)	• Vessel monitoring system (monitor fishing activity in and around periods of closure) • On-board observers or E-monitoring (on board cameras) • Reporting requirements (where and when specimens caught)

Aim(s)	Implementation	Appropriate for which pressures?	Relevant compliance measures
fishing operations to minimize take of certain segments of target stock, or of non-target species	periods) or time restrictions (time of day, e.g. restrict night-setting of pelagic longlines to reduce interactions)	may also depend on design of measures, e.g. whether seasonal restrictions are timed to coincide with peaks in reproduction. Consult available life history information for breeding/reproductive season. **Size/age/sex selectivity: ✓ - with caution** • If implemented based on seasonal patterns in behaviour of shark species concerned. Consult available life history information for breeding/reproductive season. • If life history information not available, implement temporal closures and monitor overall take from the area.	
3. FISHING GEAR RESTRICTIONS			
i. To limit fishing effort by controlling quantity of gear that can be deployed or type of gear that can be used ii. To improve selectivity of the gear so as to avoid catching particular size/life stages of target species or non-target species iii. To improve post-release survivorship	i. Controls on number of hooks, length of net or prohibition on use of drift nets, etc. ii. Restrictions on net mesh size, minimum hook size, etc. iii. Specifying gear characteristics and use (e.g. circle hooks/ corrodible hooks on pelagic longlines; limits on soak time)	**Fishing mortality (retained catch): ✓** • Targeted catch – appropriate, although may need to be combined with a catch quota specific to the shark species concerned (to guard against increased intensity of effort – e.g. increase in number of boats deployed to compensate for decreased CPUE) • Secondary catch – if restrictions are placed on the use of non-selective gears associated with higher levels of bycatch of the shark species concerned **Discard mortality: ✓** • If restrictions are placed on the use of non-selective gears associated with higher levels of bycatch of the shark species concerned • Certain fishing gears/gear characteristics may be associated with increased post-release survivorship in some shark species, e.g. use of circle hooks/corrodible hooks on pelagic longlines. Reducing soak time of pelagic longlines may also increase survivorship. **Size/age/sex selectivity: ✓** • Gear restrictions can be designed so as to reduce impact on certain life history stages of the population of the shark species concerned	• In-port and at-sea inspections of gear

Aim(s)	Implementation	Appropriate for which pressures?	Relevant compliance measures
4. PERMANENT AREA CLOSURES			
To protect certain segment of the target species population (e.g. spawning grounds, nursery area)	Through spatial closure of fishing grounds	**Fishing mortality (retained catch): ✓– with caution** Targeted and secondary catch: • Where enforced permanent area closures buffer against fishing pressures • Particularly if implemented so as to target specific area where individuals are abundant (e.g. through underwater surveys, catch landings analyses or discussions with fishers and traders) • However, it is important to note the possible displacement of fishing effort - may be necessary to combine with other measures **Discard mortality: ✓ - with caution** • Where enforced these buffer against fishing pressures • Particularly if implemented so as to target specific area where individuals are abundant (e.g. through underwater surveys, catch landings analyses or discussions with fishers and traders) • However, note possible displacement of fishing effort – may be necessary to combine with other measures **Size/age/sex selectivity: ✓** • If implemented so as to target particular life history period (e.g. nursery area, spawning ground). Consult available information on areas associated with particularly life stages.	• Vessel monitoring system (monitor fishing activity in and around closed area) • On-board observers or E-monitoring (on-board cameras) • Reporting requirements (where specimens caught)
5. SANCTUARIES			
To minimize fishing mortality of one or more species or to protect certain habitat/ecosystem types	Through prohibitions on all fishing in an area (e.g. through declaration of a Marine Protected Area where no fishing is allowed) or	**Fishing mortality (retained catch): ✓– with caution** Targeted and secondary catch: • Where enforced sanctuaries buffer against all pressures • Particularly if implemented so as to target specific area where individuals are abundant • However, it is important to note the possible displacement of fishing	• Vessel monitoring system (monitor fishing activity in and around sanctuary) • On-board observers or E-monitoring (on-board cameras) • Reporting requirements (where specimens caught)

Aim(s)	Implementation	Appropriate for which pressures?	Relevant compliance measures
	the prohibition on the retention of certain species (e.g. via declaration of shark sanctuaries)	effort – may be necessary to combine with other measures **Discard mortality: ✓ - with caution** • Where enforced these buffer against all pressures • However, note possible displacement of fishing effort – may be necessary to combine with other measures **Size/age/sex selectivity: ✓** • If implemented so as to target particular life history period (e.g. nursery area, spawning ground). Consult available information on areas associated with particularly life stages.	
6. TOTAL ALLOWABLE CATCH (TAC)			
To limit fishing mortality on a species or a group of species	Through the establishment of a species/species group catch limit for the fishery as a whole in relation to a defined period (e.g. a fishing season or year)	**Fishing mortality (retained catch): ✓- with caution for secondary catch** • Targeted catch – appropriate, as fishers targeting the shark species concerned are able to limit their catch volumes and so fishing mortality • Secondary catch – appropriate only where a fishery is completely closed once the shark species bycatch quota is met **NOTE:** • If only landings are monitored, catch quotas must be set conservatively to allow for discarding at sea before landing. • Uncertainties in key variables (abundance, biomass and F) result in high risk of overfishing. In such circumstances, catch quotas should be combined with other precautionary measures. • An appropriately precautionary catch quota would be calculated as: **current abundance*biomass^{-1}*F** where F ≤ 0.5*M (M = natural mortality) • Abundance should be estimated conservatively, given the uneven distribution of individuals across shark populations.	• Catch documentation scheme • Real time or near real time catch reporting • Controls on transshipment at sea • Landings inspections

Aim(s)	Implementation	Appropriate for which pressures?	Relevant compliance measures
7. INDIVIDUAL QUOTA (IQ)			
To provide individual fishers or community groups with security of access to a specific portion of the TAC	Allocation of TAC across eligible fishers or countries, usually expressed as percentage of TAC (or as quantities of fish). Right to catch quantity of fish associated with IQ is often, especially under national schemes, tradeable, either seasonally (leased) or permanently (sold)	**Fishing mortality (retained catch): ✓– with caution for secondary catch** • Targeted catch – appropriate, as fishers targeting the shark species concerned are able to limit their catch volumes and so fishing mortality • Secondary catch – appropriate only where a fishery is completely closed once the shark species bycatch quota is met	• Appropriate level of observer coverage • Landings inspections • Catch documentation scheme or paper trail of documentation to track fish through catch, disposal, processing, etc. • Controls on transshipment at sea
8. FISHING TRIP LIMITS			
To control mortality of target or non-target species	A per vessel limit on the quantity of fish that can be landed at the end of a fishing trip	**Fishing mortality (retained catch): ✓– with caution for secondary catch** • Targeted catch – appropriate, as fishers targeting shark species concerned must limit their catch volumes per trip, so fishing mortality • Secondary catch: o If fishing trip limit relates to the shark species concerned, bycatch fishing mortality will depend on likelihood of survival once released. May encourage fishers to return more animals to the sea alive. o If fishing trip limit relates to the target species of the fishery (with which the shark species concerned is caught in association as bycatch), placing a limitation on target catch per trip should result in a corresponding reduction in bycatch of the shark species concerned. **Note** that for both targeted and secondary catches of the shark species concerned, other measures may be required to guard against possible increases in fishing effort (number of trips made).	• Catch documentation scheme • In-port inspections • Real time or near real time catch reporting • Controls on trans-shipment at sea

Aim(s)	Implementation	Appropriate for which pressures?	Relevant compliance measures
		Discard mortality: ✓– with caution • See above for **Fishing mortality (retained catch): secondary catch.**	
9. PROHIBITED RETENTION			
To minimize fishing mortality of a certain species	Through prohibitions on the landing of a specified species and often a requirement to ensure that any incidental catch of the species is immediately returned to the sea without further harm in order to maximise chances of post-capture survival	**Fishing mortality (retained catch): ✓– with caution for secondary catch** • Targeted catch – appropriate, as shark species concerned can no longer be the subject of targeted capture, reducing fishing mortality to zero • Secondary catch – prohibiting retention may stimulate changes in fishing gear characteristics/method of use to reduce interactions with the shark species concerned (direct feedback loop). In the absence of such changes, bycatch fishing mortality will depend on likelihood of survival once released. **Discard mortality: ✓– with caution** • Handling requirements for secondary catch (e.g. immediate return to the sea without further harm) may reduce discard mortality. Will depend on likelihood of survival once released. **IUU fishing: ✓** • Such restrictions can provide the basis for improved recording/reporting of catches of shark species for which retention prohibited (e.g. logbook requirements, data collection by relevant RFMO). Can help to address IUU fishing. • Needs to be associated with requirement to land trunks of any retained sharks intact, including with fins attached, in order to provide for identification of any retained specimens of the prohibited species.	• Logbooks or other formal recording mechanisms to record discards and life status • At-sea inspections • Observer coverage of 20% or above to estimate post-release survival • E-monitoring systems (e.g. onboard cameras) to augment or replace observer coverage and at-sea inspections • Control of trans-shipments at sea (or ban on unobserved trans-shipments) • Random in-port inspection of trans-shipment and unloading
10. FISH SIZE LIMITS			
(i) To ensure each fish can spawn at least once prior to capture and that fish are not removed before reaching a size at	(i) Through imposing minimum legal size limits on retained fish (ii) Through maximum size	**Fishing mortality (retained catch): ✓– with caution** • Targeted catch - if fishers targeting the shark species concerned are able to be selective, taking only those individuals larger and/or smaller than the agreed minimum/maximum size limit, such a measure can help to reduce overall take from the wild. If not, this might increase discard mortality, depending on the likelihood of survival post-release. • Secondary catch – non-selective fishing gears that catch the shark	• In-port and at-sea inspections • Logbooks or other formal recording mechanisms to record life status • On-board observers

Aim(s)	Implementation	Appropriate for which pressures?	Relevant compliance measures
which maximum growth and productivity would be obtained from the stock (ii) To maximise contribution of individuals to the stock	limits that preclude the retention of mature individuals beyond a certain size (usually associated with age)	species concerned are unlikely to be selective for size of individuals. Likely that individuals not conforming to size limits will be discarded, the effect of which will depend on the likelihood of survival post-release. **Size/age/sex selectivity: ✓** • If fishers targeting the shark species concerned are able to be selective with regard to the size of individuals caught, then imposing size limits is appropriate to address size (and, likely, age) selectivity concerns associated with fishery. • To determine impact, monitor size of sharks in catch and/or landings. Compare with length/age frequency plots sharks in the wild.	
11. GENDER-BASED RESTRICTIONS			
To protect spawning females in order to minimize the impact of fishing on recruitment to the stock	Through prohibition on retention of females or females bearing eggs	**Size/age/sex selectivity: ✓** • If fishers targeting the shark species concerned are able to be selective with regard to the gender of individuals caught (e.g. avoiding nursery grounds), then imposing gender-based restrictions is appropriate to address sex selectivity concerns associated with fishery. • To determine impact, monitor sex/reproductive status of sharks in catch and/or landings.	• In-port and at-sea inspections • Logbooks or other formal recording mechanisms to record life status • On-board observers
12. PRODUCT-FORM RESTRICTIONS			
To reduce fishing mortality on a species	Through requirements that a species can be landed only in a certain form, on the assumption, or knowledge, that this will provide a disincentive to retention of the species (e.g. requirements for	**Fishing mortality (retained catch): ✓– with caution for secondary catch** • Targeted catch – if appropriately designed, product-form restrictions can reduce fishing mortality arising from targeted catch (e.g. requiring sharks to be landed with fins attached – fewer specimens can be transported/stored) • Secondary catch – if product-form restrictions are designed to provide a disincentive to retention of the species then they can reduce fishing mortality arising from secondary catch. However, unless this prompts changes to more selective fishing gears/methods of use to reduce interactions with the shark species concerned, bycatch fishing mortality will depend on the likelihood of survival once released.	• Observers required for trans-shipment • Landings inspections

Aim(s)	Implementation	Appropriate for which pressures?	Relevant compliance measures
	shark to be landed with fins attached or that shark fins can only be landed with the associated trunks)	**IUU fishing: ✓** • Some requirements, such as for sharks to be landed with fins attached, can facilitate monitoring and reporting of shark catches to the species level, due to improved potential for identification • Product-form restrictions can assist authorities in detecting breaches of fisheries management measures, e.g. prohibited retention of certain species.	
13. MOVE-ON PROVISIONS			
To minimize fishing mortality of a certain species, usually a non-target species	Through requiring fishers to move a specified distance from a fishing ground when catch rates of a species reach a specified level	**Fishing mortality (retained catch): ✓** • Targeted and secondary catch – appropriate for targeted and secondary catch, although more generally used for reducing fishing mortality of a non-target species **Discard mortality: ✓** • If properly implemented, should result in reduced catch rates of non-target species and associated reduction in discard mortality.	• High level of observer coverage
14. BYCATCH REDUCTION DEVICES (BRDs)			
To reduce fishing impacts on a non-target species	Through the use of specified by-catch mitigation devices such as circle hooks, etc.	**Fishing mortality (retained catch): ✓ - for secondary catch** • Use of appropriate mitigation devices can result in reduced levels of bycatch of the shark species concerned **Discard mortality: ✓** • Use of appropriate mitigation devices can result in reduced levels of bycatch of the shark species concerned and/or improve survival of animals following release	• In-port and at-sea inspections to ensure BRDs are being used/used correctly

Adapted from Lack *et al*. (2014); Foster and Vincent (2013)

B. Trade-related management measures

Aim(s)	Implementation	Appropriate for which pressures?	Relevant compliance measures
1. DOCUMENTATION SCHEMES			
To assist in validating catch data and/or minimising opportunities for product taken by IUU fishing to reach markets	Through requiring documentation for products that enter international trade (trade documentation scheme – TDS) or for all catch and trade (catch documentation scheme – CDS)	**IUU fishing:** ✓ • If properly implemented, CDS and TDS can both assist in addressing IUU fishing **Illegal trade:** ✓ • If properly implemented, CDS and TDS can both assist in addressing illegal trade in fisheries products	**N/A** Used as part of a monitoring, control and surveillance regime
2. EXPORT QUOTAS			
To limit export volumes in the expectation that this will limit catches and hence fishing mortality	Through the establishment of a species/species group export limit in relation to a defined period (e.g. a year)	**Fishing mortality (retained catch): ✓ - with caution and for targeted catch only** • A precautionary export quota would result in total fishing mortality (F) at half estimated natural mortality (M) of the species: **F ≤ 0.5*M** • Any use of export quotas should be combined with other precautionary measures, given the uncertainty as to how export quotas will influence catches **Legal trade:** ✓	• Catch/documentation scheme • Real time or near real time catch reporting • Controls on trans-shipment at sea • Landings inspections • Monitoring of trade volumes

Adapted from Lack *et al*. (2014); Foster and Vincent (2013)

CITES Non-detriment Findings Guidance for Shark Species

A Framework to assist Authorities in making Non-detriment Findings (NDFs) for species listed in CITES Appendix II

Victoria Mundy-Taylor, Vicki Crook, Sarah Foster, Sarah Fowler, Glenn Sant and Jake Rice.

ANNEX 2. WORKSHEETS

24 February 2014

Worksheet for Step 1:
Preliminary considerations and gathering key information

Question 1.1(a) **Is the specimen subject to CITES controls?** **(Can the specimen be confidently identified?)**		
Species name	**CITES Appendix**	**Sources of information on identification**
In view of the above, is the specimen subject to CITES controls?	**YES**	**GO TO Question 1.1(b)**
	NOT CERTAIN	Describe concerns in more detail above, and **GO TO Question 1.1(b)**
	NO	**NDF is not required**

Question 1.1(b) **From which stock will the specimen be taken/was the specimen taken?** **(Can origin be confidently identified?)**		
	Description/comments	**Sources of information**
Ocean basin		
Stock location/ distribution/ boundaries (attach a map)		
Is this a shared stock (i.e. occurring in more than one EEZ[1] and/or the high seas)?		
If the stock occurs in more than one EEZ, which other Parties share this stock?		
If a high seas stock, which other Parties fish this stock?		
Which RFB(s)[2] cover(s) the range of this stock?		
Are all Parties listed above (which fish or share the stock concerned) Members of the relevant RFB(s)?		
Are there geographical management gaps?		

[1] Exclusive Economic Zone
[2] Regional Fisheries Body

Worksheet for Step 1:
Preliminary considerations and gathering key information

How reliable is the information on origin? *		
Is information on origin sufficiently detailed for Question 1.2 to be answered? **(Use answer at end of Question 1.2)**		**YES** **POSSIBLY** **NO**

Question 1.2 **Was (will) the specimen (be) legally obtained and is export allowed?**		
Is the species:	**Description/comments**	**Sources of information**
Protected under wildlife legislation, a regional biodiversity Agreement, or (for a CMS[3] Party) listed in CMS Appendix I?		
Sourced from illegal fishing activities (e.g. in contravention of finning regulations, or where a TAC[4] is zero or exceeded)?		
Taken from a no-take marine protected area or during a closed season?		
Taken in contravention of RFB recommendations?		
Listed as a species whose export is prohibited?		

In view of the above and the final row of the Worksheet for Question 1.1(b), was the specimen legally acquired and can exports be permitted?	**YES**	**GO TO Question 1.3**
	SOME DOUBT	Describe concerns in more detail above, and **GO TO Question 1.3**
	NO	Export cannot be permitted, **NDF is not required**

[3] Convention on Migratory Species.
[4] Total Allowable Catch

Question 1.3 **What does the available management information tell us?**		
Part 1. Global-level information (provide to Scientific Authorities as part of species-specific guidance)		
	Description/comments	**Sources of information**
Reported global catch		
Species distribution		
Known stocks/populations		
Main catching countries		
Main gear types by which the species is taken		
Global conservation status		
Stock assessments		
Cooperative management arrangements		
RFB membership		
Main management bodies		
Multilateral Environmental Agreements		
Products in trade		
Part 2. Stock/context-specific information		
Nature of harvest		
Fishery types		
Catching countries		
Management units		

Worksheet for Step 2: Evaluate intrinsic biological vulnerability to harvest and conservation concern

Question 2.1
What is the level of intrinsic biological vulnerability of the species to harvest?

Annex 3 provides data for the completion of this Worksheet for **Porbeagle *Lamna nasus*** (provided below, as an example) and several other listed shark species.

Intrinsic biological factors	Level of vulnerability	Indicator/metric
a) Average age at maturity (minimum)	Low	
	Medium	**9.67 years**
	High	
	Unknown	
b) Average size at maturity (minimum)	Low	
	Medium	**186 cm**
	High	
	Unknown	
c) Average age/longevity (maximum)	Low	
	Medium	
	High	**27 years**
	Unknown	
d) Average size (maximum)	Low	
	Medium	
	High	**322 cm**
	Unknown	
e) Natural mortality rate	Low	
	Medium	
	High	**0.05 – 0.2 (depending on age)**
	Unknown	
f) Fecundity (maximum litter size or number of eggs)	Low	
	Medium	
	High	**4 pups/litter**
	Unknown	
g) Reproductive rate/intrinsic rate of population increase	Low	
	Medium	
	High	**5-7% (N. Atlantic). 2.6% (SW Pacific)**
	Unknown	

Intrinsic biological factors	Level of vulnerability	Indicator/metric
h) Geographic distribution	Low	
	Medium	**Fairly fragmented**
	High	
	Unknown	
i) Stock size and abundance	Low	
	Medium	**Depleted Atlantic. Unknown other.**
	High	
	Unknown	
j) Reliance on critical habitats and habitat vulnerability	Low	
	Medium	**Opportunistic fisheries target aggregations**
	High	
	Unknown	
k) Trophic level (position of the species within the larger fish community)	Low	
	Medium	
	High	**4.5**
	Unknown	

SUMMARY for Question 2.1

Intrinsic biological vulnerability of species to harvest

Provide an assessment of the overall intrinsic biological vulnerability of the species to harvest/over-fishing (tick appropriate box below). Explain how these conclusions were reached and the main information sources used.

High	*Medium*	*Low*	*Unknown*

Explanation of conclusion and sources of information used:

Worksheet for Step 2: Evaluate intrinsic biological vulnerability to harvest and conservation concern *continued*

Question 2.2
What is the severity and geographic extent of the conservation concern?

Factor	Severity / Scope of Concern	Indicator
Conservation Status	Low	
	Medium	
	High	
	Unknown	
	Comments:	
Geographic extent/scope of conservation concern	None	
	Local	
	National/ Regional	
	Global	
	Unknown	
	Comments:	

SUMMARY for Question 2.2
Severity and geographic extent of the conservation concern

Provide an assessment of the severity and geographic extent of conservation concern for this species or stock (tick appropriate box below). Explain how these conclusions were reached and the main sources of information used.

High	*Medium*	*Low*	*Unknown*

Explanation of conclusion and sources of information used:

CONCLUSION for Step 2 **Evaluate intrinsic biological vulnerability to harvest and conservation concern**		
Is the conservation status of the stock unacceptable?	**YES**	**NDF process cannot proceed**
	NO	**GO TO Step 3**
Explanation of conclusion:		

Worksheet for Step 3: Evaluate pressures on species

Question 3.1(a)
What is the severity of risk of fishing on the stock of the species concerned?

In the table below, circle the **level of risk** associated with each factor using the description in the **Indicator** column as a guide. Consider **all fishing methods and gears** that interact with the shark stock concerned.

Note that it may be necessary to increase or decrease the level of fishing risk severity depending on the level of **intrinsic biological vulnerability** to harvest assessed in **Step 2.1**. For example, a low amount of fishing pressure may present a relatively high risk to a stock with characteristics that make it unable to withstand even low levels of harvest. Therefore, if intrinsic biological vulnerability to harvest is high but fishing risk severity has been assessed as low, consider whether it would be appropriate to increase the fishing risk severity to medium or high to account for this vulnerability.

Where, based on the information currently available, it is not possible to evaluate fishing risk severity for any of the four factors below, circle "Unknown". **Section 6.1** of the Guidance document provides details of how monitoring can be improved to generate the information necessary to make such assessments in future.

Factor	Fishing risk severity	Indicator
Fishing mortality (retained catch)	Low	Small proportion of stock removed by all fishing activities
	Medium	Moderate proportion of stock removed by all fishing activities
	High	High proportion of stock removed by all fishing activities
	Unknown	Unknown proportion of stock removed by all fishing activities
	Reasoning	
Discard mortality	Low	• None or only a small proportion of total catch is thrown back • Survival rates of released individuals is high
	Medium	• A moderate proportion of total catch is thrown back • Survival rates of released individuals is moderate
	High	• A large proportion of total catch is thrown back • Survival rates of released individuals is low
	Unknown	• An unknown proportion of total catch is thrown back • Survival rates of released individuals is unknown
	Reasoning	

Factor	**Fishing risk severity**	**Indicator**
Size/age/sex selectivity	Low	Fisheries are not selective for any size-age classes, or for male/female individuals
	Medium	Fisheries are moderately selective for certain size-age classes, and/or for male/female individuals
	High	Fisheries are highly selective for certain size-age classes, and/or for male/female individuals
	Unknown	Unknown size/age/sex selectivity
	Reasoning	
Magnitude of illegal, unreported and unregulated (IUU) fishing	Low	• Good documentation of catches • Trade chain transparent • Estimated harvest and estimated volume in legal domestic and reported export trade are approximately equal
	Medium	• Poor documentation of catches • Trade chain difficult to follow • Some concerns about whether estimated harvest and volume in legal domestic and reported export trade are approximately equal
	High	• Documented illegal fishing • Trade chain not transparent • Clear evidence showing mis-match between estimated harvest, and volume in legal domestic and reported export trade
	Unknown	Information about this factor is unavailable
	Reasoning	

Worksheet for Step 3:
Evaluate pressures on species *cont.*

Question 3.1(b)

Based on the information available, what is the level of confidence associated with the evaluation of fishing risk made under Question 3.1(a)

From the **Worksheet for Question 3.1(a)** above, transfer the **risk severity** for each factor into the second column in the table below. For each factor, circle the **level of confidence** associated with each assessment of fishing risk severity, based on the explanation provided in the **Guidance** column. Include any relevant **notes** in the table below to highlight where, for example, information is particularly lacking. This will help to guide the design and implementation of population or fisheries monitoring programmes that may be considered necessary in light of findings from this NDF process (see **Section 6.1** of the Guidance document).

Factor	Fishing risk severity	Confidence level	Guidance
Fishing mortality (retained catch)		High	Information available from authoritative sources with little or no extrapolation or inference required
		Medium	Some reliable information available but inference and extrapolation required
		Low	Limited information available
		Unknown	No information available
		Notes	
Discard mortality		High	Information available from authoritative sources with little or no extrapolation or inference required
		Medium	Some reliable information available but inference and extrapolation required
		Low	Limited information available
		Unknown	No information available
		Notes	

Factor	**Fishing risk severity**	**Confidence level**	**Guidance**
Size/age/ sex selectivity		High	Information available from authoritative sources with little or no extrapolation or inference required
		Medium	Some reliable information available but inference and extrapolation required
		Low	Limited information available
		Unknown	No information available
		Notes	
Magnitude of IUU fishing		High	Information available from authoritative sources with little or no extrapolation or inference required
		Medium	Some reliable information available but inference and extrapolation required
		Low	Limited information available
		Unknown	No information available
		Notes	

Worksheet for Step 3:
Evaluate pressures on species *cont.*

Question 3.2(a)

What is the severity of risk of trade on the stock of the species concerned?

In the table below, circle the **level of risk** associated with each factor using the description in the **Indicator** column as a guide. Consider **all products in both domestic and international trade**.

Where, based on the information currently available, it is not possible to evaluate trade risk severity for any of the four factors below, circle "Unknown". **Section 6.1** of the Guidance document provides details of how monitoring of domestic and international trade can be improved to generate the information necessary to make such assessments in future.

Factor	Trade risk severity	Indicator
Magnitude of legal trade	Low	• Number or volume of specimens in trade is small in relation to abundance of the species • Trade volume / market demand decreasing over time • No shortage of products in trade observed
	Medium	• Number or volume of specimens in trade neither small nor large in relation to abundance of the species • Trade volume / market demand stable or slowly increasing over time
	High	• Multiple uses in commercial trade (i.e. the species supplies several products to different types of markets) • Trade volume / market demand high in relation to abundance of species and part used • Trade volume / market demand increasing quickly, or decreasing in response to limited resource availability • High prices per unit product or rapid price increases; shortages of products in trade
	Unknown	Information about this factor is unavailable
	Reasoning	

Factor	Trade risk severity	Indicator
Magnitude of illegal trade	Low	• Good documentation of domestic and international trade • Trade chain transparent • Little concern about substitution for a look-alike species • Estimated harvest and estimated volume in legal domestic and reported export trade are approximately equal
	Medium	• Moderate documentation of trade (domestic and international) • Trade chain difficult to follow • Some concern about substitution for a look-alike species • Some concerns about whether estimated harvest and volume in legal domestic and reported export trade are approximately equal
	High	• Documented illegal trade • Poor documentation of trade (domestic and international trade) • Trade chain not transparent • Great concern about substitution for a look-alike species • Quantities legally exported are significantly smaller than quantities reported by importing countries
	Unknown	Information about this factor is unavailable
	Reasoning	

Worksheet for Step 3:
Evaluate pressures on species *cont.*

Question 3.2(b)

Based on the information available, what is the level of confidence associated with the evaluation of trade risk made under Question 3.2(a)

From the **Worksheet for Question 3.2(a)** above, transfer the **risk severity** for each factor into the second column in the table below. For each factor, circle the **level of confidence** associated with each assessment of trade risk severity, based on the explanation provided in the **Guidance** column. Include any relevant **notes** in the table below to highlight where, for example, information is particularly lacking. This will help to guide the design and implementation of trade monitoring that may be considered necessary in light of findings from this NDF process (see **Section 6.1** of the Guidance document).

Factor	Trade risk severity	Confidence level	Guidance
Magnitude of legal trade		High	Information available from authoritative sources with little or no extrapolation or inference required
		Medium	Some reliable information available but inference and extrapolation required
		Low	Limited information available
		Unknown	No information available
		Notes	
Magnitude of illegal trade		High	Information available from authoritative sources with little or no extrapolation or inference required
		Medium	Some reliable information available but inference and extrapolation required
		Low	Limited information available
		Unknown	No information available
		Notes	

CONCLUSION for Step 3 Evaluate pressures on species		
Is the severity of fishing and/or trade risk to the stock unacceptable?	**YES**	**NDF process cannot proceed**
	NO	**GO TO Step 4**
Explanation of conclusion:		

Worksheet for Step 4:
Evaluate existing management measures

Question 4.1(a)

What generic and species-specific management measures are in place for the stock/population of the species concerned?

In the table below, indicate the relevant generic and species-specific management measures in place for the stock population of the species concerned. Consider measures implemented at the **(sub-)national, regional and international level** (i.e. including any measures implemented by relevant RFBs). Include a brief description of each measure and the sources of information used. A table of commonly used generic and species-specific fisheries management measures is provided in **Annex 1** to the Guidance document.

Identified management response	Generic or species-specific?	Description	Source of information
NATIONAL			
REGIONAL/ INTERNATIONAL			

Worksheet for Step 4:
Evaluate existing management measures *cont.*

Question 4.1(b)

Are the management measures identified in Question 4.1(a) appropriate to address the pressures affecting the stock/population of the species concerned?

From the **Worksheet for Question 4.1(a)** above, transfer information on existing generic and species-specific management measures that are **appropriate** to address the fishing and trade risks that have been identified. A table of commonly used generic and species-specific fisheries management measures, and the risks they are intended to address/can help to mitigate, is provided in **Annex 1** to the Guidance document.

Assess which of the management measures currently in place have the potential to mitigate the fishing and trade risks identified. To put this the other way, for each management measure in place ask the question: which risks can this measure help to mitigate? For example, is the measure aimed at mitigating the effects of fishing on bycatch species, including the species concerned? At this stage only **potential impact** should be considered (i.e. is the **type of measure** appropriate to address the risks identified). **Actual impact** or **"effectiveness"** of the measure is considered later under **Question 4.1(d)**.

A Notes column is also provided in the below table to note down any comments or observations as this worksheet is completed, for example considerations, issues or shortcomings relating to any of the management measures identified that will need to be kept in mind when completing the **Worksheets for Questions 4.1(c) and 4.1(d)** below.

Factor	**Appropriate management measure(s) (*Assessment of potential impact*)**	**Notes**
FISHING RISKS		
Fishing mortality (retained catch)		
Discard mortality		

Factor	**Appropriate management measure(s) (*Assessment of potential impact*)**	**Notes**
Size/age/ sex selectivity		
Magnitude of IUU fishing		
TRADE RISKS		
Magnitude of legal trade		
Magnitude of illegal trade		

Worksheet for Step 4:
Evaluate existing management measures *cont.*

Question 4.1(c)
Are the management measures identified in Question 4.1(a) being implemented?

From the **Worksheet for Question 4.1(b)** above, transfer information on appropriate management measures currently in place into the column in the table below entitled **"Appropriate management measure(s)"**, alongside the relevant fishing/trade factor.

In the column entitled **"Relevant MCS measure(s)"**, include information on existing monitoring, control and surveillance (**MCS**) measures that are relevant to the implementation of the management measures identified. **Annex 1** to this Guidance document provides information on MCS measures that can help to secure compliance with commonly used fisheries management responses.

Based on the explanations provided in the column in the table below entitled "**Assessment of compliance regime"**, make a judgment as to whether the management measure(s) identified is/are likely being implemented (i.e. adequately enforced/complied with). Provide reasons to justify this assessment, including any sources used.

<table>
<tr><th>Factor</th><th>Appropriate management measure(s)</th><th>Relevant MCS measure(s)</th><th colspan="2">Assessment of compliance regime
Tick as appropriate</th></tr>
<tr><td colspan="5">FISHING RISK</td></tr>
<tr><td rowspan="8">Fishing mortality (retained catch)</td><td rowspan="4"></td><td rowspan="4"></td><td>No relevant compliance measures in place or no information on compliance</td><td></td></tr>
<tr><td>Very limited relevant compliance measures in place</td><td></td></tr>
<tr><td>Limited compliance measures in place</td><td></td></tr>
<tr><td>Comprehensive relevant compliance measures in place</td><td></td></tr>
<tr><td colspan="4">Management measure(s) likely being implemented? (Tick as appropriate)</td></tr>
<tr><td>Yes</td><td colspan="2">No</td><td>Insufficient information</td></tr>
<tr><td colspan="4">Reasoning</td></tr>
</table>

<table>
<tr><th>Factor</th><th>Appropriate management measure(s)</th><th>Relevant MCS measure(s)</th><th colspan="3">Assessment of compliance regime
Tick as appropriate</th></tr>
<tr><td rowspan="8">Discard mortality</td><td rowspan="4"></td><td rowspan="4"></td><td colspan="2">No relevant compliance measures in place or no information on compliance</td><td></td></tr>
<tr><td colspan="2">Very limited relevant compliance measures in place</td><td></td></tr>
<tr><td colspan="2">Limited compliance measures in place</td><td></td></tr>
<tr><td colspan="2">Comprehensive relevant compliance measures in place</td><td></td></tr>
<tr><td colspan="5">Management measure(s) likely being implemented? (Tick as appropriate)</td></tr>
<tr><td>Yes</td><td colspan="2">No</td><td colspan="2">Insufficient information</td></tr>
<tr><td colspan="5">Reasoning</td></tr>
<tr><td rowspan="8">Size/age/ sex selectivity</td><td rowspan="4"></td><td rowspan="4"></td><td colspan="2">No relevant compliance measures in place or no information on compliance</td><td></td></tr>
<tr><td colspan="2">Very limited relevant compliance measures in place</td><td></td></tr>
<tr><td colspan="2">Limited compliance measures in place</td><td></td></tr>
<tr><td colspan="2">Comprehensive relevant compliance measures in place</td><td></td></tr>
<tr><td colspan="5">Management measure(s) likely being implemented? (Tick as appropriate)</td></tr>
<tr><td>Yes</td><td colspan="2">No</td><td colspan="2">Insufficient information</td></tr>
<tr><td colspan="5">Reasoning</td></tr>
</table>

<table>
<tr><th>Factor</th><th>Appropriate management measure(s)</th><th>Relevant MCS measure(s)</th><th colspan="3">Assessment of compliance regime
Tick as appropriate</th></tr>
<tr><td rowspan="8">Magnitude of IUU fishing</td><td rowspan="4"></td><td rowspan="4"></td><td>No relevant compliance measures in place or no information on compliance</td><td></td></tr>
<tr><td>Very limited relevant compliance measures in place</td><td></td></tr>
<tr><td>Limited compliance measures in place</td><td></td></tr>
<tr><td>Comprehensive relevant compliance measures in place</td><td></td></tr>
<tr><td colspan="4">Management measure(s) likely being implemented? (Tick as appropriate)</td></tr>
<tr><td>Yes</td><td>No</td><td colspan="2">Insufficient information</td></tr>
<tr><td colspan="4">Reasoning</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="6">TRADE RISK</td></tr>
<tr><td rowspan="8">Magnitude of legal trade</td><td rowspan="4"></td><td rowspan="4"></td><td>No relevant compliance measures in place or no information on compliance</td><td></td></tr>
<tr><td>Very limited relevant compliance measures in place</td><td></td></tr>
<tr><td>Limited compliance measures in place</td><td></td></tr>
<tr><td>Comprehensive relevant compliance measures in place</td><td></td></tr>
<tr><td colspan="4">Management measure(s) likely being implemented? (Tick as appropriate)</td></tr>
<tr><td>Yes</td><td>No</td><td colspan="2">Insufficient information</td></tr>
<tr><td colspan="4">Reasoning</td></tr>
<tr><td colspan="5"></td></tr>
</table>

<table>
<tr><th>Factor</th><th>Appropriate management measure(s)</th><th>Relevant MCS measure(s)</th><th colspan="3">Assessment of compliance regime
Tick as appropriate</th></tr>
<tr><td rowspan="8">Magnitude of illegal trade</td><td rowspan="4"></td><td rowspan="4"></td><td colspan="2">No relevant compliance measures in place or no information on compliance</td><td></td></tr>
<tr><td colspan="2">Very limited relevant compliance measures in place</td><td></td></tr>
<tr><td colspan="2">Limited compliance measures in place</td><td></td></tr>
<tr><td colspan="2">Comprehensive relevant compliance measures in place</td><td></td></tr>
<tr><td colspan="5">Management measure(s) likely being implemented? (Tick as appropriate)</td></tr>
<tr><td>Yes</td><td>No</td><td colspan="3">Insufficient information</td></tr>
<tr><td colspan="5">Reasoning</td></tr>
</table>

Worksheet for Step 4:
Evaluate existing management measures *cont.*

Question 4.1(d)
Are the management measures identified in Question 4.1(a) effective or likely to be effective in reducing the impacts on the stock/population of the species?

From the **Worksheet for Question 4.1(b)** above, transfer information on appropriate management measures currently in place into the column in the table below entitled **"Appropriate management measure(s)"**, alongside the relevant fishing/trade factor.

In the relevant columns in the table below, for each management measure indicate with a tick in the appropriate box whether:

- monitoring/data collection is required;
- data are analysed to inform management decisions;
- management is consistent with scientific advice.

Based on the responses to these three questions, make a judgment as to whether the management measures(s) identified is/are effective/likely to be effective. Provide reasons to justify this assessment, including any sources used.

Note that for each fishing/trade risk identified, there may be more than one appropriate management measure currently in place aimed at mitigating the risk. When assessing whether the management of a particular risk is effective/likely to be effective, the aim should be to consider the combined effect of measures (i.e. taken together) at effectively mitigating the risks identified.

Factor	**Appropriate management measure(s)**	**Is monitoring/ data collection required?** *Tick as appropriate*		**Are data analysed to inform management decisions?** *Tick as appropriate*		**Is management consistent with scientific advice?** *Tick as appropriate*	
FISHING RISK							
Fishing mortality (retained catch)		No data/unknown		No data/unknown		Not consistent	
		Landings data		No analysis		No scientific advice on management identified	
		Landings and effort data		Some data analysis undertaken		Scientific advice partially implemented	
		Comprehensive data required		Full stock assessment		Consistent	
	Management measure(s) effective/likely to be effective? (Tick as appropriate)						
	Yes		*No*		*Insufficient information*		
	Reasoning						

Factor	**Appropriate management measure(s)**	**Is monitoring/ data collection required?** *Tick as appropriate*		**Are data analysed to inform management decisions?** *Tick as appropriate*		**Is management consistent with scientific advice?** *Tick as appropriate*	
Discard mortality		No data/unknown		No data/unknown		Not consistent	
		Landings data		No analysis		No scientific advice on management identified	
		Landings and effort data		Some data analysis undertaken		Scientific advice partially implemented	
		Comprehensive data required		Full stock assessment		Consistent	
	Management measure(s) effective/likely to be effective? (Tick as appropriate)						
	Yes		*No*		*Insufficient information*		
	Reasoning						
Size/age/ sex selectivity		No data/unknown		No data/unknown		Not consistent	
		Landings data		No analysis		No scientific advice on management identified	
		Landings and effort data		Some data analysis undertaken		Scientific advice partially implemented	
		Comprehensive data required		Full stock assessment		Consistent	
	Management measure(s) effective/likely to be effective? (Tick as appropriate)						
	Yes		*No*		*Insufficient information*		
	Reasoning						

<table>
<tr><th>Factor</th><th>Appropriate management measure(s)</th><th colspan="2">Is monitoring/ data collection required?
Tick as appropriate</th><th colspan="2">Are data analysed to inform management decisions?
Tick as appropriate</th><th colspan="2">Is management consistent with scientific advice?
Tick as appropriate</th></tr>
<tr><td rowspan="8">Magnitude of IUU fishing</td><td rowspan="4"></td><td>No data/unknown</td><td></td><td>No data/unknown</td><td></td><td>Not consistent</td><td></td></tr>
<tr><td>Landings data</td><td></td><td>No analysis</td><td></td><td>No scientific advice on management identified</td><td></td></tr>
<tr><td>Landings and effort data</td><td></td><td>Some data analysis undertaken</td><td></td><td>Scientific advice partially implemented</td><td></td></tr>
<tr><td>Comprehensive data required</td><td></td><td>Full stock assessment</td><td></td><td>Consistent</td><td></td></tr>
<tr><td colspan="7">Management measure(s) effective/likely to be effective? (Tick as appropriate)</td></tr>
<tr><td colspan="2">Yes</td><td colspan="2">No</td><td colspan="3">Insufficient information</td></tr>
<tr><td colspan="7">Reasoning</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td colspan="8">TRADE RISK</td></tr>
<tr><td rowspan="8">Magnitude of legal trade</td><td rowspan="4"></td><td>No data/unknown</td><td></td><td>No data/unknown</td><td></td><td>Not consistent</td><td></td></tr>
<tr><td>Landings data</td><td></td><td>No analysis</td><td></td><td>No scientific advice on management identified</td><td></td></tr>
<tr><td>Landings and effort data</td><td></td><td>Some data analysis undertaken</td><td></td><td>Scientific advice partially implemented</td><td></td></tr>
<tr><td>Comprehensive data required</td><td></td><td>Full stock assessment</td><td></td><td>Consistent</td><td></td></tr>
<tr><td colspan="7">Management measure(s) effective/likely to be effective? (Tick as appropriate)</td></tr>
<tr><td colspan="2">Yes</td><td colspan="2">No</td><td colspan="3">Insufficient information</td></tr>
<tr><td colspan="7">Reasoning</td></tr>
<tr><td colspan="8"></td></tr>
</table>

<table>
<tr><th>Factor</th><th>Appropriate management measure(s)</th><th colspan="2">Is monitoring/ data collection required?
Tick as appropriate</th><th colspan="2">Are data analysed to inform management decisions?
Tick as appropriate</th><th colspan="2">Is management consistent with scientific advice?
Tick as appropriate</th></tr>
<tr><td rowspan="6">Magnitude of illegal trade</td><td rowspan="4"></td><td>No data/unknown</td><td></td><td>No data/unknown</td><td></td><td>Not consistent</td><td></td></tr>
<tr><td>Landings data</td><td></td><td>No analysis</td><td></td><td>No scientific advice on management identified</td><td></td></tr>
<tr><td>Landings and effort data</td><td></td><td>Some data analysis undertaken</td><td></td><td>Scientific advice partially implemented</td><td></td></tr>
<tr><td>Comprehensive data required</td><td></td><td>Full stock assessment</td><td></td><td>Consistent</td><td></td></tr>
<tr><td colspan="7">Management measure(s) effective/likely to be effective? (Tick as appropriate)</td></tr>
<tr><td colspan="2">Yes</td><td colspan="2">No</td><td colspan="3">Insufficient information</td></tr>
<tr><td colspan="7">Reasoning</td></tr>
</table>

Worksheet for Step 4:
Evaluate existing management measures *cont.*

SUMMARY WORKSHEET FOR STEP 4

From the **Worksheets for Questions 3.1(a) and 3.2(a)** above, transfer the **severity of risk** for each fishing and trade factor into the second column in the table below.

From the **Worksheets for Questions 3.1(b) and 3.2(b)** above, transfer the **confidence levels** associated with the assessments of severity of risk (for fishing and trade factors) into the third column in the table below.

Based on the information contained in the **Worksheet for Question 4.1(b)**, state in the table below whether there are appropriate management measures in place to address the risks identified, or whether there is insufficient information to make such an assessment.

Based on the information contained in the **Worksheet for Question 4.1(c)** above, state in the table below whether the management measures appropriate to mitigate each of the risks identified are (likely) being implemented, or whether there is insufficient information to make such an assessment.

Based on the information contained in the **Worksheet for Question 4.1(d)** above, state in the table below whether the management measures appropriate to mitigate each of the risks identified are effective/likely to be effective, or whether there is insufficient information to make such an assessment.

Factor	Severity of risk	Confidence level	Appropriate management measures in place?	Management measures implemented?	Management measures effective?
FISHING RISKS					
Fishing mortality (retained catch)			*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*
Discard mortality			*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*
Size/age/ sex selectivity			*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*
Magnitude of IUU fishing			*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*

Factor	**Severity of risk**	**Confidence level**	**Appropriate management measures in place?**	**Management measures implemented?**	**Management measures effective?**
TRADE RISKS					
Magnitude of legal trade			*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*
Magnitude of illegal trade			*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*	*Yes* *No* *Insufficient information*

Worksheet for Step 5:
NDF and related advice

Transfer all results from **Steps 2–4** to the Table below by circling the appropriate descriptors.

Step 2. Intrinsic biological vulnerability to harvest and conservation concern				
Intrinsic biological vulnerability to harvest: Question 2.1	*High*	*Medium*	*Low*	*Unknown*
Conservation concern: Question 2.2	*High*	*Medium*	*Low*	*Unknown*

Step 3. Pressures on species			**Step 4. Existing management measures**		
Pressure	Severity of risk	Confidence level	Appropriate management measures in place?	Management measures implemented?	Management measures effective?
Fishing pressures : Questions 3.1(a) and 3.1(b)					
Fishing mortality (retained catch)	High Medium Low Unknown	High Medium Low Unknown	Yes No Unknown	Yes No Unknown	Yes No Unknown
Discard mortality	High Medium Low Unknown	High Medium Low Unknown	Yes No Unknown	Yes No Unknown	Yes No Unknown
Size/age/ sex selectivity	High Medium Low Unknown	High Medium Low Unknown	Yes No Unknown	Yes No Unknown	Yes No Unknown
IUU fishing	High Medium Low Unknown	High Medium Low Unknown	Yes No Unknown	Yes No Unknown	Yes No Unknown
Trade pressures Questions 3.2(a) and 3.2(b)					
Magnitude of legal trade	High Medium Low Unknown	High Medium Low Unknown	Yes No Unknown	Yes No Unknown	Yes No Unknown
Magnitude of illegal trade	High Medium Low Unknown	High Medium Low Unknown	Yes No Unknown	Yes No Unknown	Yes No Unknown

Question 5.1 **Based on the outcomes of the previous steps of this Guidance, is it possible to make a positive NDF for the export (with or without associated conditions) or are corrective measures required?**		
Can a positive NDF be made?	Yes	No
Are corrective measures required?	Yes **(GO TO Question 6)**	No
Are there any other recommendations/conditions?	Yes **(list below)**	No

Worksheet for Step 6:

Corrective measures

Section 6.1 **Improvement in monitoring or information is required**
In the space below, list the improvements in monitoring or information that are required to address cases where any risks were considered unknown, management was considered unknown, and/or confidence levels were low for any assessment.
Section 6.2 **Improvement of management is required**
In the space below, list the improvements in management that are required to address cases where any risks were medium/high and management was considered non-existent, inappropriate, insufficient, not being implemented or not effective/likely to be effective.

CITES NON-DETRIMENT FINDINGS GUIDANCE FOR SHARK SPECIES

A Framework to assist Authorities in making Non-detriment Findings (NDFs) for species listed in CITES Appendix II

24 February 2014

Victoria Mundy-Taylor, Vicki Crook, Sarah Foster,
Sarah Fowler, Glenn Sant and Jake Rice.

Annex 3
Management risk assessment for the Porbeagle shark (*Lamna nasus*)

Extracted from:

Lack, M., Sant, G., Burgener, M., Okes, N. (2014). Development of a Rapid Management-risk Assessment Method for Fish Species Through its Application to Sharks. Report to the Department of Environment, Food and Rural Affairs. Defra Contract No. MB0123. TRAFFIC.

IN PRESS

(To be submitted as an Information Document to the 27th Meeting of the CITES Animals Committee)

http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18800&FromSearch=Y&Publisher=1&SearchText=TRAFFIC&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description

Management risk assessments for six Appendix II-listed shark species, including Porbeagle, were prepared by TRAFFIC under a DEFRA project to develop a rapid management-risk assessment method for fish species through its application to sharks.
These contain relevant information to assist CITES Authorities in their decision-making throughout the NDF process for these species.

M-RISK ASSESSMENT		Porbeagle *Lamna nasus*	
Date	Sep-13		
A	**Management Context**		**References**
1	Reported average global annual catch of the species (2007-2011)	516 t Note: the 2013 CITES proposals notes that "ICCAT/ICES (2009) reported landings grossly underestimate actual landings and the FAO data has no *L. nasus* data from Japan, Taiwan, Province of China or the Republic of Korea."	FAO Fisheries Department (2013)
2	What is the distribution of the species?	Circumglobal in temperate waters of the southern hemisphere. Western Atlantic: Greenland and Newfoundland, Canada to Bermuda; possibly southern Brazil to Argentina. Eastern Atlantic: Iceland and western Barents Sea to Morocco, including the Mediterranean. Southwest Pacific: Australia and New Zealand. Southeast Pacific: Chile. Indian Ocean: South Africa to Australia. In subantarctic waters off South Georgia, Marion, Prince-Edward and the Kerguelen Islands.	Fishbase (Froese and Pauly, 2011) http://www.fishbase.org/summary/Lamna-nasus.html; CITES (2013)
3	Known stocks/populations	Two isolated populations in the North Atlantic and the Southern Oceans. Possibly separate stocks in the Northeast and Northwest Atlantic, likely also in the Mediterranean, and in the southeast and southwest Atlantic. The latter extent into the Southwest Indian Ocean and the Southeast Pacific, but Southern Hemisphere stock boundaries are unclear and other Indo-Pacific stocks have not been identified.	CITES (2013)
4	Main catching countries:	Species: France, Spain, Canada, New Zealand Northeast Atlantic: France, Spain Northeast Atlantic: France, Spain	FAO Fisheries Department (2013)
5	Main gear types by which the species is taken	Targeted mainly by longline and taken as bycatch mainly in pelagic longline fisheries but also in midwater and bottom trawling, demersal longline and gillnets	
6	IUCN Red List status, if assessed, and year of assessment	Global: Vulnerable(2006) Northeast Atlantic and Mediterranean: Critically endangered (2006) Northwest Atlantic: Endangered (2006)	Stevens et al. (2006)
7	Nature of the species	Highly Migratory	UNCLOS Annex 1 (Family Isuridae now Lamnidae)
7a	If the species is 'migratory' or 'other' and the stocks are shared across countries, identify the countries fishing the shared stocks.	Not relevant	
7b	If the species is highly migratory or if it is found on the high seas what are the relevant RFMOs?	Southern Hemisphere stock: CCAMLR, CCSBT, IATTC, IOTC, WCPFC Northeast Atlantic: ICCAT, GFCM, NEAFC, Northwest Atlantic: NAFO	CITES (2013)
8	Identify any main catching countries that are not members of the relevant RFMOs (if applicable)?	Based on areas where catch is recorded, the majority of the main catching countries are members of the relevant RFMOs with the exception that the European Union is a cooperating non-member of the CCSBT.	
9	What are the main management bodies	Southern Hemisphere stock: CCAMLR, CCSBT, IATTC, IOTC, WCPFC, New Zealand Northeast Atlantic: ICCAT, GFCM, NEAFC, the European Union, of which the main catching countries of Spain and France are members Northwest Atlantic: NAFO and Canada and USA The main catching countries of EU, Canada and New Zealand are all considered to have stronger management measures in place than the RFMOS for the stocks they fish. These three management entities have been included in the assessment. No information was identified about the management arrangements for porbeagle in Uruguay.	
10	Is the species listed in the Appendices of either CITES or the CMS?	Listed in Appendix II of CITES; Listed in Appendix II of the CMS	
10a	Are the main catching countries issuing expert-permits for the species if it is listed in Appendix II of CITES?	CITES listing not in effect until September 2014	
10b	Have any of the main catching countries taken out a reservation against the CITES listing?	Canada has taken out reservations to all amendments to Appendix I and Appendix II at CoP17 owing to the necessity to complete its domestic legal requirements.	
10c	Are the main catching countries signatories to any CMS Agreement or Memorandum of Understanding relating to the species	Canada, New Zealand and Uruguay are not signatories to the MoU on the Conservation of Migratory Sharks	
11	Main products from the species that are internationally traded	Meat	CITES (2013)
12	Which, if any, of these products are considered to be of high value?	Meat	CITES (2013)
12a	Weight for trade/value	0.8	

B.	Risk Assessment				
	Assessment	Basis for assessment	Score	Confidence	References
Stock Status					
1. What is the status of each stock OR the status of the species in each management unit if stocks are not well-defined?					
CCAMLR	Unknown	No assessment of stock status available	1	3	
CCSBT	Overfished but fishing impact not causing overfishing	NO stock assessment conducted. Area of competence overlaps with ICCAT, IOTC and WCPFC. ICCAT results applied	2	2	ICCAT SCRS Report 2012. P. 191
GFCM	Overfished but fishing impact not causing overfishing	This species has virtually disappeared from the Mediterranean. No stock assessment. ICCAT assessment for NE Atlantic applied	2	3	GFCM Secretariat (2010); ICCAT SCRS Report (2012).
IATTC	Unknown	No assessment of stock status available	1	3	
ICCAT	Overfished but fishing impact not causing overfishing	Stocks in the Northwest, Southwest and Northeast Atlantic were assessed as being overfished but not subject to overfishing.	2	3	ICCAT SCRS Report 2012. P. 191
IOTC	Unknown	No assessment of stock status available	1	3	
NAFO	Overfished but fishing impact not causing overfishing	ICCAT assessment results for NW Atlantic applied, ICES advice to NEAFC confirms that the stock is depleted (not defined)	2	2	ICCAT SCRS Report 2012. P. 191
NEAFC	Overfished but fishing impact not causing overfishing	ICCAT assessment results for NE Atlantic applied, ICES advice to NEAFC confirms that the stock is depleted (not defined)	2	3	ICCAT SCRS Report 2012. P. 191; ICES (2012a)
WCPFC	Unknown	No assessment of stock status has been made by the WCPFC.	1	3	
EU	Overfished but fishing impact not causing overfishing	The stock fished by EU vessels I the ICCAT are considered to be overfished but not subject to overfishing	2	3	ICCAT SCRS Report 2012. P. 191
Canada	Overfished but fishing impact not causing overfishing	Most recent stock assessment in 2009. Stock is stable but at low biomass. Estimated to recover if catch maintained at around 185t (the current TAC).	2	3	Godin and Worm (2010)
New Zealand	Overfished and overfishing occurring	The fishery in New Zealand is assumed to be part of the wider South western Pacific Ocean stock. An assessment of CPUE data was undertaken by New Zealand in 2008. New Zealand considers it likely that the stock is below Bmsy and likely that fishing mortality is greater than Fmsy.	1	3	New Zealand Ministry for Primary Industries (2012a)
Adaptive management system					
Monitoring and Analysis					
2. Is information collected to inform the status of the stock?					
CCAMLR	Landings and effort data required	Extensive catch and effort reporting system requirements are in place for al species taken in the CCAMLR Area.	3	3	CM 23-01, 23-02, 23-03, 24-04, 23-05, 23-04.
CCSBT	Landings and effort data required	Submission of shark catch data is the subject of a CCSBT non-binding recommendation. However, members are required to report under the reporting requirements of ICCAT, IOTC and WCPFC	3	3	
GFCM	Landings and effort data required	Information on fishing activities, catch, incidental take, release and discarding required	3	3	Rec. GFCM/36/2012/3
IATTC	No data required	Reporting of shark catch by species is not required. There are no fishery independent surveys conducted or length/age data routinely collected	1	3	
ICCAT	Landings and effort data required	Rec 07-06 requires Task 1 and Task II data (catch and effort statistics) to be reported for sharks and requires size frequencies for shark to be reported. No fisheries independent surveys or age data routinely collected.	3	3	Rec 07-06
IOTC	Landings and effort data required	Rec 05/05 requires that data on catches of sharks be reported in line with IOTC data reporting requirements. Resolutions 12/03 and its replacement 13/03 require that catch and effort data for scalloped hammerhead be reported for longline and gillnet gear. No fisheries independent surveys are conducted or age data routinely collected.	3	3	Res. 05/05; 13/03
NAFO	No data required	In 2012 it became a requirement that all catches of sharks to be reported at the species level, to the extent possible, however sharks can be recorded simply as large sharks or dogfishes, therefore there is no mandated provision of species level data for porbeagle. No fisheries independent surveys are conducted or age/length data routinely collected.	1	3	Article 28
NEAFC	Landings and effort data required	Rec. 6: 2012 prohibits directed fishing for porbeagle and requires all bycatch to be returned to the sea. Article 9 requires reporting of all retained and discarded species by weight.	3	3	Rec. 2: 2012; NEAFC Scheme of Control and Enforcement, Article 9.
WCPFC	Landings and effort data required	Effort data required. Catch data for porbeagle taken south of 20 degrees S required to be reported.	3	3	CMM 2011-4
EU	Discard data not required	Zero landing quota now in place but discards not required to be reported.	1	2	ICES (2012a)
Canada	Landings and effort data required	Catch monitoring of sharks is well established in Canada but observer coverage is variable. Two fishery independent shark surveys were conducted on the Atlantic coast.	3	3	Godin and Worm (2010)
New Zealand	Landings data required	Catch data are required to be reported by commercial fishers.	2	3	

3. Have the available data been analysed to inform management decisions?					
CCAMLR	No analysis	No specific analysis of porbeagle catch data conducted	1	3	
CCSBT	No analysis	No specific analysis of porbeagle catch data conducted. Japan, New Zealand and Australia are working towards a stock assessment/ERA.	1	3	CCSBT ERSWG Report 2012 para 71.
GFCM	Some data analysis	Data on capture of porbeagle was analysed in 2010	2	3	GFCM Secretariat (2010)
IATTC	No analysis	No data collected	1	3	
ICCAT	Full stock assessment	Stock assessment in 2009.	4	3	
IOTC	No analysis	No analysis of data conducted	1	3	
NAFO	No analysis	No data collected	1	3	
NEAFC	Some data analysis	ICES has analysed the data	2	3	ICES (2012a)
WCPFC	No analysis	Resources to analyse porbeagle data are not currently allocated under the Shark Research Programme	1	3	Harley et al. (2013)
EU	Stock assessment	Latest stock assessment for the North East Atlantic Stock conducted in 2009. Future analysis of data will be compromised by the zero quota	1	3	ICES (2012a)
Canada	Stock assessment	Stock assessment conducted in 2009	1	3	CITES (2013)
New Zealand	Some data analysis	Yes, CPUE data have been analysed	2	3	
Species/stock-specific management					
4. How does the management unit manage the stock?					
CCAMLR	No species-specific management	There is a general prohibition on the targeting of sharks and bycatch is required to be returned to the sea, but no requirements specific to porbeagle.	1	3	CM 32-18 (2006)
CCSBT	No species-specific management		1	2	
GFCM	Species-specific management but not adaptive/no evidence of feedback loop	Retention of Porbeagle is prohibited by GFCM (Rec GFCM/36/2012/3) since the species is listed in Annex II of the Specially Protected Areas and Biological Diversity Protocol of the Barcelona Convention.	2	3	GFCM/36/2012/3
IATTC	No species-specific management		1	3	
ICCAT	Species-specific management but not adaptive/no evidence of feedback loop	Rec 07-06 requires that members reduce fishing mortality in fisheries targeting porbeagle.	2	3	Rec 07-06
IOTC	No species-specific management		1	3	
NAFO	No species-specific management	There is no species specific management of porbeagle by NAFO.	1	3	CITES (2013)
NEAFC	Species-specific management but not adaptive/no evidence of feedback loop	Directed fishing for porbeagle prohibited and catches to be released for the period 2012-14	2	3	Rec 6:2012
WCPFC	No species-specific management	There is no species-specific management for porbeagle in the WCPFC.	1	3	
EU	Species-specific management but not adaptive/no evidence of feedback loop	Members of the EU are the main catching countries of the stock managed by ICCAT. The EU reduced its TAC for porbeagle to zero in 2010 and from 2012 EU member states are prohibited to land or to fish for Porbeagle anywhere in the world. The species cannot be finned. These measures will not prevent mortality of catch taken as bycatch and there is no evidence that discards are being monitored to estimate mortality and to assess the impact of this on the stock. ICES notes that "Recent data are lacking as dead bycatch is discarded (i.e. removals from the stock)."	2	3	CITES (2013); ICES (2012a) p. 143
Canada	Species-specific management but not adaptive/no evidence of feedback loop	Canada is a main catching country of the stock managed by NAFO. Canada's fishery is managed under quota management. Finning is prohibited. The stock has now stabilised under a rebuilding plan. While the TAC is set at 185 t catches average only around 100 t, suggesting that the TAC is ineffective and that there is little feedback in the system..	2	3	CITES (2013)
New Zealand	Species-specific management with some evidence of feedback loop	The stock fished by New Zealand is assumed to be part of a broader southern western Pacific stock. New Zealand is a main catching country. New Zealand has managed porbeagle under the quota management system since 2004, however catch limits are not informed by a stock assessment. The TAC was halved from 249t to 129 t in 2012/13 to reflect a more precautionary approach to the stock.	3	3	New Zealand Ministry of Primary Industries (2012a)

5. Are the measures consistent with the species-specific advice for the stock?					
CCAMLR	No scientific advice on management identified		2	3	
CCSBT	No scientific advice on management identified		2	3	
GFCM	Consistent	Measures consistent with the Appendix II listing in the Barcelona Convention	4	3	
IATTC	No scientific advice on management identified		2	3	
ICCAT	Not consistent	SCRS notes that new targeted porbeagle fisheries should be prevented, porbeagle retrieved alive should be released alive and all catch should be reported. Rec. 07-06 requires reporting of shark catch but only requires that measures be taken to reduce fishing mortality in fisheries targeting porbeagle.	1	3	ICCAT SCRS Report 2012, P. 189
IOTC	No scientific advice on management identified		2	3	
NAFO	Not consistent	In 2008 the NAFO Scientific Council was warned that overfishing of porbeagle in the high seas NAFO regulatory area was undermining Canada's management for the species and would lead to population crash but NAF agreed that shark management was ICCAT's remit.	1	3	CITES Proposal (2013)
NEAFC	Not consistent	Measures prohibit directed fishing and require release of incidental catch, consistent with the scientific advice of zero catch) but do not require development of a rebuilding plan as advised by ICES.	1	3	ICES (2012b), Book 9 Section 9.4.7
WCPFC	No scientific advice on management identified		2	3	
EU	Consistent	A zero quota has been set for all EU vessels	4	3	CITES (2013)
Canada	Not consistent	In 2006 the Committee on the Status of Endangered Wildlife in Canada assessed the status of porbeagle and recommended that it be listed as endangered. However the recommendation was rejected on the grounds of the economic costs to fishers and associated industries and the loss of biological information for monitoring population recovery.	1	3	Godin and Worm (2010)
New Zealand	Consistent	The TAC was halved from 249t to 129 t in 2012/13 to reflect a more precautionary approach to the stock.	4	3	New Zealand Ministry of Primary Industries (2012a)
Compliance			**Score**		
6. How comprehensive is the compliance regime in place to support these species-specific measures?					
CCAMLR	No species-specific management in place		**1**	**3**	
CCSBT	No species-specific management in place		**1**	**3**	
GFCM	No relevant compliance measures in place	Compliance arrangements to support a policy of no retention do not appear to be in place.	**1**	**2**	
IATTC	No species-specific management in place		**1**	**3**	
ICCAT	No relevant compliance measures in place	Management measures require members to reduce catch. Data supports a reduction in catch since the measure was introduced in 2007. However it is reported that compliance is not monitored.	**1**	**3**	**CITES (2013)**
IOTC	No species-specific management in place		**1**	**3**	
NAFO	No species-specific management in place		**1**	**3**	
NEAFC	Very limited relevant compliance measures in place	NEAFC does not have a general observer program, although there is a requirement for observers on bottom trawlers in some circumstances. There is a provision for reporting of transshipments but there is no requirement for observer oversight of transshipment. There is a system of at-sea inspection in place however the extent of such inspections is unclear. Taken together these MCS measures provide little confidence that prohibition on targeting porbeagle and the requirement to release porbeagle taken incidentally, is enforced.	**2**	**3**	
WCPFC	No species-specific management in place		**1**	**3**	
EU	No information on the nature of the compliance measures	Compliance will be the responsibility of the EU member states.	1	0	
Canada	Comprehensive	The objective of the Dockside Monitoring Program (DMP) is to provide accurate, timely, and independent third party verification of landings. DMP constitutes one of the primary sources of landing information on which the management of the fisheries is based.	4	3	DFO (2013)

New Zealand	Comprehensive	New Zealand uses a number of compliance tools to control the activities of vessels fishing within New Zealand fisheries waters and New Zealand flagged vessels fishing on the high seas. These tools include: Fishing permit requirements; Requirement to hold annual catch entitlement to cover all target and bycatch species caught, or alternatively, to pay deemed values; Fishing permit and fishing vessel registers; Vessel Monitoring System (VMS) requirements; Vessel and gear marking requirements; Fishing gear and method restrictions; Observer Programme; Reporting (including catch and effort reporting) requirements; Vessel inspections; Control of landings (e.g. requirement to land only to licensed fish receivers); Record keeping requirements; Auditing of licensed fish receivers; Control of transhipment; Monitored unloads of fish; Information management and intelligence analysis; Analysis of catch and effort reporting and comparison with VMS, observer, landing and trade data to confirm accuracy; Boarding and inspection by fishery officers at sea; Aerial and surface surveillance, and; Any other measures agreed by RFMOs to which New Zealand is a member.	4	3	New Zealand Ministry of Fisheries (2004)
7. What is the level of compliance with the reporting requirements for the stock?					
CCAMLR	No information available	No specific compliance assessment identified	1	2	
CCSBT	No information available	No specific compliance assessment identified	1	2	
GFCM	No information available	No specific compliance assessment identified	1	2	
IATTC	There are no reporting requirements for the stock		1	3	
ICCAT	Information supports a conclusion of ongoing low compliance	ICCAT reports indicate that many countries are not in compliance with data reporting	2	2	ICCAT (2012)
IOTC	Information supports a conclusion of ongoing low compliance	Assessment identified in relation to requirements of Res. 05/05. No data yet available on compliance with reporting requirements of Res. 12/03 or 13/03	2	3	IOTC Scientific Committee Report 2012 Para 96-99
NAFO	There are no reporting requirements for the stock	The NAFO Standing Committee on International Control (STACTIC) noted in 2012 that there has been a lack of species-specific reporting of shark catches. However, it is not mandatory to report sharks at species level in all cases.	1	3	
NEAFC	No information available	No specific compliance assessment identified	1	2	
WCPFC	Information supports a conclusion of ongoing low compliance	WCPFC Compliance Monitoring Report not released publicly.			WCPFC Scientific Committee 2012 para 81
EU	There are no reporting requirements for the stock	Zero quota but discards are not required to be reported	1	3	ICES (2012a)
Canada	Information could not be identified	No information in relation to compliance with reporting requirements for porbeagle could be identified	1	0	
New Zealand	Information could not be identified	No information in relation to compliance with reporting requirements for porbeagle could be identified	1	0	

8. Is IUU fishing recognized as a problem for the stock, if it is a target stock, or for the fishery in which it is taken in association with, if it is a bycatch?					
CCAMLR	Ongoing recognised problem	There is an ongoing IUU fishing problem for toothfish in the CCAMLR area.	1	3	CCAMLR (2012)
CCSBT	Has been a recognized problem but measures to address it appear successful	There has been a recognised IUU fishing problem for southern Bluefin tuna in the past (significant over catch of quota by one member). Measures have been introduced to address this and these appear to have been successful.	3	2	
GFCM	Ongoing recognised problem	In recent years, issues relating to IUU fishing in the GFCM Area, including in relation to the Mediterranean Sea, have come to the fore. A GFCM Enforcement and Control Scheme to fight IUU fishing was adopted in 2005 already. However, despite of all the efforts by GFCM Members to halt IUU fishing and put measures in place to that end, the problem still persists.	1	3	
IATTC	Has been a recognized problem, some measures in place to address it but not clear whether measures are successful	In 2012, in implementing a measure on transsshipment (C-12-07) the IATTC noted the need to combat IUU fishing activities because they undermine the effectiveness of the conservation and management measures already adopted by the IATTC and expressed grave concern that organized tuna-laundering operations have been conducted, and a significant amount of catches by IUU tuna longline fishing vessels has been transshipped under the names of duly licensed fishing vessels.	2	3	IATTC (2012)
ICCAT	Has been a recognized problem, some measures in place to address it but not clear whether measures are successful	In 2012, in adopting a recommendation on a process for the establishment of a catch certification scheme, ICCAT expressed its concerns about the impact that illegal, unregulated and unreported (IUU) fishing has in the ICCAT Convention area	2	3	ICCAT 2012 report
IOTC	Has been a recognized problem, some measures in place to address it but not clear whether measures are successful	In 2013, in adopting a resolution (Res. 13-02) on IOTC Record of vessels authorised to operate in the IOT area of competence, the IOTC recognised the need to take further measures to effectively eliminate the IUU large scale tuna fishing vessels.	2	3	IOTC (2013)
NAFO	Has been a recognized problem but measures to address it appear successful	There has been a recognised IUU fishing problem in the NAFO Regulatory Area. However measures including collecting and sharing information about non-member vessels, at-sea boardings, denying port access or extensive port inspection, follow-up action by NFA members and pressing for action by flag States of IUU vessels, appear to have largely addressed the problem.	3	2	Fisheries and Oceans Canada (2013)
NEAFC	Has been a recognized problem but measures to address it appear successful	NEAFC has implemented a range of measures to address IUU fishing. In a report to the United Nations in 2012 NEAFC reported as follows: "NEAFC has reported widely about its success in stopping IUU fishing with an approach using blacklists, shared with neighbouring RFMOs, and an efficient Port State Control System which goes in some ways somewhat beyond what has been agreed in FAO. Due to the continued success of NEAFC's measures against IUU fisheries, these are not considered to be a very significant problem regarding fisheries managed by NEAFC."	2	3	NEAFC (2012)
WCPFC	Has been a recognized problem, some measures in place to address it but not clear whether measures are successful	The most recent Commission Report indicate an ongoing level of concern by both Pacific Island States and NGOs about IUU fishing in the area of competence of the WCPFC, particularly in areas of the so called 'high seas pockets' between the EEZs of Pacific Island States.	2	2	WCPFC (2011); (2012)
EU	Not a recognized problem	No information was identified to suggest that IU fishing in eh fisheries in the which in which porbeagle is taken by EU vessels is a recognised problem	4	1	
Canada	Ongoing recognized problem	Unknown and unregulated catches on the high seas may jeopardize recovery of the stock.	1	3	Godin and Worm (2010)
New Zealand	Not a recognized problem	New Zealand reports an 84% compliance with its fisheries regulations and this is considered stable	4	3	New Zealand Ministry for Primary Industries (2012b)

Generic management					
9. Are the generic management measures in place likely to reduce the impacts on the species being assessed?					
CCAMLR	Some reduction likely	There is a general prohibition on the targeting of sharks and bycatch is required to be returned to the sea in the CCAMLR area. CCAMLR imposes a range of conservation measures to control the harvest of marine resources in its area of competence. These include gear regulations, fishing seasons closed areas and prohibitions on fishing, catch limits for some species by area and the protected areas.	3	2	
CCSBT	Some reduction likely	Catch quota on the target species, SBT, is likely to place some restriction on shark mortality when taken as bycatch. In relation to shark finning controls, which should (but it is not a requirement) be implemented in line with requirements in ICCAT, IOTC and WCPFC, reductions in mortality rely on post release survival. The rates of both fishing mortality and post release survival of porbeagle are largely unknown.	3	2	
GFCM		Management arrangements to recover and manage target tuna stocks and other species (catch limits, area/time closures) are likely to restrict mortality of porbeagle. In relation to shark finning controls, reductions in mortality rely on post release survival. The rates of both fishing mortality and post release survival for porbeagle are largely unknown	3	2	Rec. GFCM/36/2012/3
IATTC	Some reduction likely	2014-16 measures (time/area closures for the purse seine fleet and catch limits for bigeye tuna in the longline fleet) should reduce impacts on sharks. In relation to shark finning controls, reductions in mortality rely on post release survival. The rates of both fishing mortality and post release survival for porbeagle are largely unknown.	3	2	Res. C-05-03
ICCAT	Some reduction likely	Management arrangements to recover and manage target tuna stocks (catch limits, area/time closures) are likely to restrict mortality of porbeagle. In relation to shark finning controls, reductions in mortality rely on post release survival. The rates of both fishing mortality and post release survival for porbeagle are largely unknown	3	2	Rec. 04-09
IOTC	Some reduction likely	There are no controls on catch of target species in place that would likely reduce the impact on sharks. In relation to shark finning controls, reductions in mortality rely on post release survival. The rates of both fishing mortality and post release survival for porbeagle are largely unknown	3	2	Res. 05/06
NAFO	Some reduction likely	Manages 11 species. Fishing Moratorium in place for 5 species. TACs in place for the remaining species. These catch restrictions should provide some protection for porbeagle. Finning Controls are in place for sharks. In relation to shark finning controls, reductions in mortality rely on post release survival. The rates of both fishing mortality and post release survival for porbeagle are largely unknown.	3	2	Article 12
NEAFC	Some reduction likely	NEAFC manages a range of species and utilises management measures including gear controls, effort controls, catch controls, area closure and seasonal closures. These measures are likely t reduce the impact of fishing activities on porbeagle. Finning Controls are in place for sharks. In relation to shark finning controls, reductions in mortality rely on post release survival. The rates of both fishing mortality and post release survival for porbeagle are largely unknown	3	2	NEAFC (2006)
WCPFC	Some reduction likely	Measures in place for the management of bigeye and yellowfin tuna (limits on purse seine sets on FADs, purse seine effort limits and catch limits for longline caught bigeye tuna) are likely to have some impact on shark mortality. In relation to shark finning controls, reductions in mortality rely on post release survival. The rates of both fishing mortality and post release survival for porbeagle are largely unknown.	3	2	
EU	Reduction in impact unknown	The impact of domestic measures/EU measures place in the fisheries in which EU member countries take porbeagle is unknown.	2	0	
Canada	Reduction in impact unknown	Other fisheries in which porbeagle are taken are subject to strong fisheries management controls and these could have some mitigating effect on incidental impacts on porbeagle. However the specifics of these measures and the extent of this impact is unknown.	2	0	
New Zealand	Some reduction likely	No shark finning controls in place. About 50% of the commercial catch of porbeagle shark is taken by tuna longliners and most of the remainder by mid-water and bottom trawlers. About 50% of the porbeagle shark catch in the tuna fishery are processed with about 80% of those finned and 20% processed for the flesh and fins. The fisheries in which porbeagle is taken as bycatch are generally under ITQ management.	3	2	New Zealand Ministry of Primary Industries (2012a)

10. How comprehensive is the compliance regime in place to support the generic management measures that are relevant to the stock?					
CCAMLR	Limited relevant compliance measures	CCAMLR has a scheme of International Scientific Observation. However the functions of observers do not include enforcement or monitoring of compliance with regulatory measures. There is a provision for transshipments prior notice of transhipments to be given, but there is no requirement for observer oversight of transshipment. There is a system of at-sea inspection in place however the extent of such inspections appears limited. In 2011/12 only seven reports of inspections were received. Taken together these compliance measures provide little confidence that the prohibition on the targeting sharks and the requirement to release sharks taken incidentally is enforced.	**3**	**2**	
CCSBT	Very limited relevant compliance measures	CDS in place to monitor catch of target species. Low level of observer coverage. Comprehensiveness of compliance regime for other measures applied by overlapping RFMOs have informed the score.	2	2	
GFCM	Limited relevant compliance measures	Some controls on transshipment and requirements for observers are in place in relation to fishing operations for bluefin tuna. There is a requirement for VMS to assist in enforcement of area and seasonal closures. Capacity to enforce finning controls appears limited.	**3**	**2**	
IATTC	Limited relevant MCS measures	VMS in place to monitor time/area closures. Observer requirements for transhipping at sea. No specific requirements on in-port inspections. Low level of observer coverage. NO CDS in place to monitor catch limits for longline fleet.	3	2	IATTC management measures.
ICCAT	Limited relevant MCS measures	CDS in place for Atlantic bluefin tuna but not other target species. Appropriate level of observer coverage. VMS in place. Observers required for at-sea transshipment.	3	2	ICATT management measures.
IOTC	Very limited relevant MCS measures	Observers required for at-sea transshipment. Low level of observer coverage on fishing operations.	2	2	IOTC management measures.
NAFO	Comprehensive relevant compliance measures in place.	100% observer coverage. All transhipment therefore observed. VMS in place to enforce area specific quotas. A joint inspection and surveillance scheme including at-sea and port inspections is in place.	4	3	Conservation and Enforcement Measures
NEAFC	Limited relevant compliance measures in place	NEAFC's System of Control and Enforcement is extensive but without a high level of observer coverage, cannot, for example, ensure compliance with shark finning controls.	3	2	
WCPFC	Very limited relevant compliance measures	100% observer coverage on purse seine operations. Low level of observer coverage on longlines. No CDS in place to monitor catch limits.	2	2	WCPFC management measures.
EU	No information on the nature of the compliance measures	Compliance will be the responsibility of the EU member states.	1	0	
Canada	Comprehensive	The objective of the Dockside Monitoring Program (DMP) is to provide accurate, timely, and independent third party verification of landings. DMP constitutes one of the primary sources of landing information on which the management of the fisheries is based.	4	3	DFO (2013)
New Zealand	Comprehensive relevant compliance measures in place.	New Zealand uses a number of compliance tools to control the activities of vessels fishing within New Zealand fisheries waters and New Zealand flagged vessels fishing on the high seas. These tools include: Fishing permit requirements; Requirement to hold annual catch entitlement to cover all target and bycatch species caught, or alternatively, to pay deemed values; Fishing permit and fishing vessel registers; Vessel Monitoring System (VMS) requirements; Vessel and gear marking requirements; Fishing gear and method restrictions; Observer Programme; Reporting (including catch and effort reporting) requirements; Vessel inspections; Control of landings (e.g. requirement to land only to licensed fish receivers); Record keeping requirements; Auditing of licensed fish receivers; Control of transhipment; Monitored unloads of fish; Information management and intelligence analysis; Analysis of catch and effort reporting and comparison with VMS, observer, landing and trade data to confirm accuracy; Boarding and inspection by fishery officers at sea; Aerial and surface surveillance, and; Any other measures agreed by RFMOs to which New Zealand is a member.	4	3	New Zealand Ministry of Fisheries (2004)

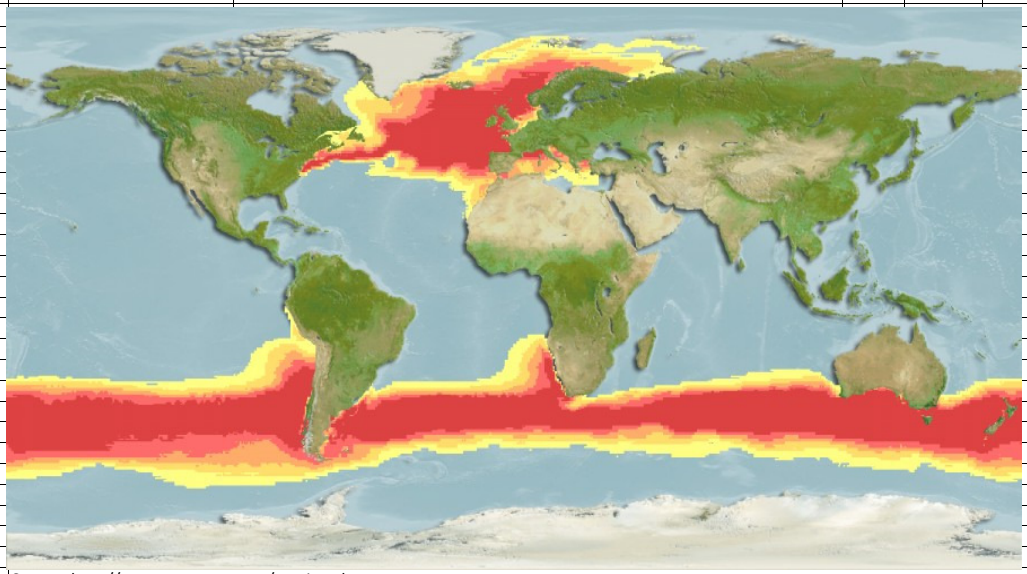
SCORING

Unweighted scores

	Stock Status	Adaptive management (Average score)	Generic	Total
CCAMLR	1.00	1.43	3.00	**5.43**
CCSBT	2.00	1.71	2.50	**6.21**
GFCM	2.00	2.00	3.00	**7.00**
IATTC	1.00	1.29	3.00	**5.29**
ICCAT	2.00	2.14	3.00	**7.14**
IOTC	1.00	1.71	2.50	**5.21**
NAFO	2.00	1.29	3.50	**6.79**
NEAFC	2.00	1.86	3.00	**6.86**
WCPFC	1.00	1.43	2.50	**4.93**
EU	2.00	2.00	1.50	**5.50**
Canada	2.00	1.86	3.00	**6.86**
New Zeal	1.00	2.86	3.50	**7.36**

Weighted score

	Total weighted score	Risk Category	Confidence Score	Confidence rating
CCAMLR	8.57	High Risk	27.0	High
CCSBT	10.69	High Risk	24.0	Some confidence
GFCM	12.00	High risk	26.0	High confidence
IATTC	8.11	High Risk	28.0	High
ICCAT	12.46	High Risk	27.0	High
IOTC	9.09	High risk	28.0	High
NAFO	10.11	High risk	27.0	High
NEAFC	11.54	High Risk	27.0	High
WCPFC	8.17	High risk	24.0	Some confidence
EU	10.80	High risk	18.0	Some confidence
Canada	11.54	High Risk	24.0	Some confidence
New Zeal	13.54	Medium Risk	26.0	High



Source: http://www.aquamaps.org/receive.php