INDONESIAN WORKSHOP
NON-DETRIMENT FINDINGS FOR
CITES APPENDIX II SHARKS AND RAYS

29-30th March 2017

Serang, Indonesia

WORKSHOP REPORT

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Group photo of workshop participants at Ratu Sari Hotel in Serang, Banten.

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Executive Summary

The Ministry of Marine Affairs and Fisheries (MMAF) of Indonesia requested training in developing Non-Detriment Findings (NDFs) documents to assist in the process of assessing shark and ray species' trade sustainability and to decide upon national policies for the species concerned. Specifically, the listing of Mobula rays, Silky Sharks, and Thresher Sharks in Appendix II of CITES at CoP17 is due to come into effect on April 4th 2017 (for rays) and October 4th 2017 (for sharks), requiring individual Parties to make NDFs to assess whether or not export will harm the wild populations of the species. To provide capacity building in the NDF process to the Indonesian Government and key stakeholders, a workshop was held in Serang (Banten), Indonesia on 29th & 30th March 2017. During the workshop, the Indonesian Government officially agreed (and voted) to adopt the Mundy-Taylor et al., (2014) NDF framework as a standardised tool for species trade sustainability assessment in producing NDFs for CITES listed species.

Key points:

- In Indonesia, the Indonesian Institute of Sciences (LIPI) acts as the CITES Scientific Authority (SA). The Ministry of Environment and Forestry is listed as the official CITES Management Authority (MA) for Indonesia, however it is the Ministry of Fisheries and Marine Affairs (MMAF) that currently manages CITES listed marine species, including shark and rays, and that is responsible for implementing CITES listings.
- Mobula rays do not currently benefit from any policy regulating their catch or trade in Indonesia, however the Indonesian Government has drafted a policy to ban exports of all mobula species' products.
- There is currently an export ban in place in Indonesia for Oceanic Whitetip Shark, Scalloped Hammerhead Shark, Smooth Hammerhead Shark and Great Hammerhead Shark since December 2014 and which has been reviewed thrice. The next review will occur on December 31st 2017.
- The development of an NDF enables the systematic assessment of a CITES-listed species' intrinsic vulnerability (biology, ecology), pressure (fisheries, trade) and management to assess whether trade can be undertaken sustainably and does not threaten a species survival. Hence, the development of NDFs can result in a negative NDF when sustainable trade cannot be guaranteed, in which case exports cannot occur.
- In the case of limited data, a precautionary approach should always be taken, to ensure the sustainable use of a species.
- As a component of a National Plan of Action for sharks and rays, Indonesia has drafted a policy to regulate the landing of neonate sharks (which are to be released after inspection of the presence of an umbilical scar) and pregnant female sharks of all

species. The draft policy also regulates fishing in key nursery grounds located in mangrove areas due to the high proportion of juvenile sharks.

- The Indonesian government and all stakeholders present voted to adopt the Mundy-Taylor et al., (2014) NDF framework as a standard template for the development of NDFs for sharks and rays.
- Data on shark and ray landings in Indonesia is available and was brought forth by the government and regional offices of the MMAF (BPSPL), WWF Indonesia, and WCS Indonesia.
- The Mobula and hammerhead Indonesian NDF templates developed by Dr. Cassie Rigby for the workshop were provided to the MMAF, the CITES Scientific Authority (LIPI) and other stakeholders present at the workshop, as a starting point for developing national NDF documents.

Challenges

- The Indonesian Government is experiencing socio-economic pressures at a regional and national level related to the shark trade, in fishing communities and especially from companies that export shark fins. Although socio-economic pressures are not to be considered in the NDF assessment process, in reality, these pressures may affect the outcome of the NDF for sharks.
- Difficulties were identified in bringing data together for use by the government, especially concerning the availability of landings/ trade data from regional level offices (BPSPL) to the national level of the MMAF.
- In most cases, shark and ray landings and trade data is grouped as 'sharks' and 'rays' and encompasses all species, which limits the amount of data directly useful for creating NDFs.

Recommendations

- Indonesian NDFs be developed for CITES Appendix II listed species, following templates provided for Mobula rays and Scalloped, Smooth and Great Hammerhead Sharks, and populated with data available on a national and regional level.
- NDFs should be continually improved and reassessed, for example every year after first completion, in order to incorporate updated data on the species and evolving pressure. Hence a positive NDF can later become negative and vice-versa depending on best available data.
- Best available data reliability should be assessed and commented upon in the NDF document. A precautionary approach should be opted for in case of uncertainty or insufficient data.
- There is a need to collect data from fisheries in locations that have not traditionally been surveyed by either the Indonesian Government, the LIPI or NGOs in Indonesia,

with data needed for both sharks and rays. Although key fisheries have been moderately surveyed, information from relevant, but less studied, sites will provide a more complete picture of fishery pressure and trade on sharks and rays in Indonesia.

Resource needs

- A need for capacity building in species identification at a local, regional and national level was identified for customs and quarantine offices, relating to whole animal identification at fishing ports/ landing sites and to traded product identification (shark fins, mobulid gill plates, vertebrae, meat).
- Given the difficulty to identify species from meat and bone products, testing capacity such as DNA kits and associated training is needed.
- The help of multiple organisations is required to assist the LIPI in developing NDFs, since LIPI does not currently have the capacity to develop these documents alone. Organisations that could take part in the process include the MMAF, WCS, and WWF.
- Organisations that provided capacity building in the development of NDFs for shark and rays through the organisation of this workshop were: USAID, WCS, the Manta Trust, and PEW.

Contents

Background and Aims of Workshop

The Convention of International Trade in Endangered Species of Flora and Fauna (CITES) is an international agreement between governments, legally binding the CITES member Parties to implement the Convention through national laws. Two species of manta rays (the Oceanic Manta Ray- *Manta birostris* and the Reef Manta Ray- *Manta alfredi*) and several shark species (Scalloped Hammerhead- *Sphyrna lewini*, Great Hammerhead- *Sphyrna mokarran,* Smooth Hammerhead- *Sphyrna zygaena*, Oceanic Whitetip Shark- *Carcharhinus longimanus*, and Porbeagle- *Lamna nasus*) were listed on Appendix II of CITES at CoP16 in 2013. At CoP17 held in Johannesburg in September 2016, all species of Mobula rays (*Mobula japanica*, *Mobula mobular*, *Mobula tarapacana*, *Mobula thurstoni*, *Mobula kuhlii*, *Mobula eregoodootenkee, Mobula munkiana*, *Mobula rochebrunei*, *Mobula hypostoma*), three species of thresher sharks (Common Thresher- *Alopias vulpinus*, Pelagic Thresher- *Alopias pelagicus*, and Bigeye Thresher- *Alopias superciliosus*) and the Silky Shark (*Carcharhinus falciformis*) were listed on Appendix II of CITES. Other CITES listed shark species include the White Shark (*Carcharodon carcharias*), five species of Sawfish (*Pristidae* spp.- listed on Appendix I), the Whale shark (*Rhincodon typus*), and the Basking Shark (*Cetorhinus maximus*).

The CITES Appendix II listing requires Parties to develop Non-Detriment Findings (NDFs) if the Parties are considering trade in the listed species. The NDF is an assessment process that aims to determine the threat posed by trade on a species of interest. It aims to ensure that 'such export will not be detrimental to the survival of the species' (Article IV.2(a)). Only in the case of a positive NDF assessment by the Scientific Authority will the Management Authority be able to issue a CITES Export Permit, and only if the specimens were legally acquired (Mundy-Taylor et al., 2014).

The aims of this workshop were to:

1. Gain a general understanding of shark and rays CITES listings and what they entail.
2. Provide training in the complete NDF process, using the framework developed for shark and rays by Mundy-Taylor et al., (2014).
3. Discuss the NDF process in the context of shared stocks (e.g. hammerheads).
4. Advance on a Mobula ray NDF with available data from the literature and data brought forth by Indonesia.
5. Advance on a shark (Scalloped, Great, Smooth Hammerhead) NDF based on data from the literature and data brought forth by Indonesia.

In order to reach these goals, the NDF workshop was conducted in Serang, Indonesia at the request of the Ministry of Marine Affairs and Fisheries (MMAF). Invited to the workshop were representatives from the CITES Scientific Authority: Indonesian Institute of Sciences (Lembaga Ilmu Pengetahuan Indonesia- LIPI), the Directorate of Marine Biodiversity and Conservation of

the MMAF (Direktorat Konservasi & Kaenekaragaman Hayati Laut- KKHL), the Agency for Human and Resource Development of the MMAF, Directorate of Fish Resources (Direktorat Sumber Daya Ikan- SDI), Directorate of Surveillance for Marine and Fisheries Resources (Direktorat Pengawasan Sumber Daya Kelautan dan Perikanan- PSDKP), Fish Quarantine and Inspection Agency, Head of Technical Implementing Units (BPSPL Regional Fisheries Officers) of the MMAF: BPSPL Padang (Region: Sumatera), BPSPL Pontianak (Region: Kalimantan), BPSPL Denpasar (Regions: Bali, East Java, West Nusa Tenggara), BPSPL Makassar (Region: Sulawesi), LPSPL Serang (Region: part of Sumatera & West Java), LPSPL Sorong (Region: Papua & West Papua, Maluku & North Maluku), Wildlife Conservation Society (WCS) Indonesia, (World Wildlife Fund) WWF Indonesia and Conservation International Indonesia. The workshop was funded by USAID, Manta Trust, and the PEW Charitable Trusts (PEW) and was organised by the WCS and The Mobula Project Indonesia, following a need for such capacity building expressed by the MMAF in 2016. The workshop aimed to develop capacity building in the NDF development process for shark and ray species listed on Appendix II of CITES, and provided specific case-studies for the Mobula rays encountered in Indonesia, and for the Scalloped Hammerhead, for which a preliminary NDF had been initiated in Indonesia.

Background materials provided to workshop participants (Appendix A) included a draft agenda, a list of participants (in Bahasa) and a draft Indonesian NDF templates in the form of the worksheets from the CITES Non-Detriment Findings Guidance for Shark Species (Mundy-Taylor et al., 2014). Workshop participants were encouraged to bring shark and mobulid ray catch and trade data available (published or unpublished) and to present it in a short 10-minute presentation at the workshop, with particular emphasis on catch and trade data collected by genus or species for CITES Appendix II listed species, including Mobula and hammerhead species.

Workshop Presentations and Discussions

Introduction to Workshop

Welcoming remarks were provided by Pak Lubis, Director of the Conservation and Marine Biodiversity Directory (KKHL) of the Ministry of Marine Affairs and Fisheries of Indonesia (office responsible for implementing CITES listings for marine species in the country), emphasising the need for the NDF workshop.

Pak Lubis highlighted the need for more discussions concerning appropriate management approaches that should be considered for CITES listed species (FMA management, regional management, or production quotas). Pak Lubis noted that the government realises that Indonesia needs international cooperation to protect wildlife from overexploitation. Based on the text of the convention of CITES, Pak Lubis recognised that the Scientific Authority (SA) will be required to provide an NDF assessment to determine whether trade can occur.

An NDF is a decisional document, where a recommendation from LIPI (Indonesian SA) is to be implemented by the Management Authority, and in the preparation of an NDF, these two CITES authorities both have a role; LIPI as the Scientific Authority of CITES with the right to give scientific recommendations in the NDF process and the MMAF as the institution that has the right to manage the licences to trade (export-import, re-export, and introduction from the sea) according to the management recommendations made by the SA. Pak Lubis mentioned that the Ministry of Marine Affairs and Fisheries wants to put a quota system in place for the trade of shark parts (fins, meat, bone). This would be allocated at a regional level within 11 Fisheries Management Areas (FMAs) through further scientific assessment and would be enforced by the MMAF.

Dr. Cassie Rigby (James Cook University- 'JCU') presented the aims and background information to the NDF process in the context of Indonesia shark and ray listings. An introduction on the nature of CITES and the meaning of Appendix II listings was provided. In Indonesia, the CITES designated Scientific Authority is LIPI and the designated CITES Management Authority is Ministry of Environment and Forestry, however the MA is in effect the Ministry of Marine Affairs and Fisheries for marine species. Participants were encouraged to participate and ask questions throughout the workshop to encourage discussion. It was emphasized that if trade of a species cannot be deemed sustainable, then exports should not occur, according to the text of the Convention of CITES. The Scientific Authority of Parties have the obligation to assess the best available data to make the non-detriment finding, and in the case where data are lacking, to assess the effect of potential trade on species' survival, Scientific Authorities are encouraged to adopt a precautionary approach to the assessment. The precautionary approach is defined under Principle 15 of the Rio Declaration on Environment and Development (https://www.gdrc.org/u-gov/precaution-7.html) as "*lack of scientific certainty is no reason to postpone action to avoid potentially serious or irreversible harm to the environment. Central to principle 15 is the element of anticipation, reflecting a requirement that effective environmental measures need to be based upon actions which take a long-term approach and which might anticipate changes on the basis of scientific knowledge*".

It was stated that workshop participants and CITES parties would need to agree on a standard NDF framework/ template to be used during the workshop and in the future by the government for developing NDFs in a consistent manner.

Non-Detriment Findings (NDFs) for Sharks and Rays

Copies of the CITES guidance for shark species by Mundy-Taylor et al. (2014) were distributed to participants and presented, including the key steps involved in the NDF process outlined in

the guidance. Dr. Cassie Rigby (JCU) outlined (a) the nature of NDFs, (b) the institutions that are to be involved in the NDF process, (c) the development of the Non-Detriment Findings Guidance for Sharks, and (d) the key steps in the NDF process.

- What is an NDF: The NDF is a science-based assessment, it is a process which can result in two possible scenarios: (1) if exports are considered not detrimental to the sustainability of the species, the NDF is deemed non-detrimental and exports are possible, sometimes with restrictive conditions; (2) if the NDF process determines that export would be detrimental for the species, the NDF is negative and the SA recommends that no exports occur.
- Who does an NDF: In Indonesia, the LIPI provides the NDF assessment and recommends a positive or negative NDF to the MA, in effect the MMAF. In the case of a positive NDF and exportation, the MA needs to advise whether the product was legally acquired (Legal Acquisition Finding- LAF). The NDF document is broken down into 5 main steps. The first step is undertaken by the MA and aims to determine the origin of the product and whether it was legally acquired. Steps 2 to 5 are to be completed by the SA and consist of the actual scientific assessment of the species biological vulnerability, conservation concern, severity of fishing and trade pressure, and current management measures and their effectiveness. Step 6 is done by the MA and describes further monitoring and management measures recommended. In the case of a positive NDF with an export permit granted by the MA, the Scientific Authority is responsible for monitoring the actual exports against the export permit.
- When is an NDF done: Ideally before any CITES listed species has been fished, landed and traded, with the obligation to complete an NDF before any such species is exported.
- How is an NDF done: CITES does not oblige Parties to follow a specific NDF template, however, TRAFFIC and shark and ray experts developed a NDF framework that would be most suitable for sharks and rays. This NDF framework was then evaluated using some shark species as case studies and modified to produce the final CITES Non-Detriment Findings Guidance for Shark Species (Mundy-Taylor et al., 2014).

Essential factors necessary to develop robust NDFs include good communication between Fisheries Authorities and CITES Authorities and the use of standard approaches for all species. Potential challenges can be encountered in developing an NDF in the case of shared stocks. Many shark and ray species are migratory or highly migratory animals, which can mean that stocks are shared between more than one country. For this reason, international coordination is necessary to understand the full scope of pressure faced by a species, and eventually to elaborate an NDF in agreement with countries sharing the same stock. Hence, if the possibility of the sustainability of trade is assessed for a migratory species fished over multiple Exclusive Economic Zones (EEZs) and the High Seas, it is important to consider a higher pressure is inflicted on the stock that what occurs solely on a national level. In this case, if only national

level data are taken into account in the NDF, a positive NDF could be the outcome when the full consideration of pressure on the species could have led to a negative NDF assessment. Regional Fisheries Management Organisations (RFMOs) can provide information and assistance in the development of regional NDFs and can act as a Scientific Authority if necessary (see Mundy-Taylor et al., 2014, page 2). Participants noted the importance of shark catches is the High Seas (in an area not under the jurisdiction of any state), especially the Pelagic Thresher in tuna fisheries which are landed in Indonesia. In this case, an Introduction from the Sea certificate is necessary (and only in the case of a positive NDF) (see Mundy-Taylor et al., 2014, page 4).

Participants understood that the NDF six worksheet template provided at the workshop and taken from the NDF guidelines by Mundy-Taylor et al. (2014) constitutes the entire NDF process. Once the steps 2-5 are completed by the Scientific Authority with data inputted and assessed, these Steps 2-5 form the NDF document that is then provided to the Management Authority. The Management Authority then completes Steps 1 and 6. Both authorities, however can assist one another to provide all the data and information for the NDF process. The Mundy-Taylor et al., 2014 NDF Guidance document provides a rational and logical approach to an NDF with detailed explanations and examples of the information required to be considered in an NDF. Participants discussed different NDF document formats that were made available by other CITES parties on the CITES website, such as relatively short summaries (e.g. Costa Rica or the USA). It was mentioned that a summary can be made available to CITES if desired. It was emphasised how important it is to go through the entire NDF process- that is, filling the NDF worksheet template in order to robustly assess the data and information that is relevant to the requirements of an NDF (as described in Mundy-Taylor et al. 2014), rather than using subjectively chosen data.

It is important to note the while there are no binding guidelines on the making of NDFs and it is up the national Scientific authorities to advise which levels of export are detrimental, CITES has a "safety net" process to identify situations where export of Appendix II listed species takes place at detrimental levels, called Review of Significant Trade (included at Appendix E) (RST, see CITES FAO standard presentation). During a Review of Significant Trade, countries with significant levels of trade will be asked to provide the scientific basis by which they established that their exports are not detrimental to the survival of the species concerned and compliant with relevant CITES provisions. If an exporting country cannot do so, the relevant CITES Scientific Committee (in case of sharks, the Animals Committee) will make recommendations on which measures the exporting country needs to take in order to comply with CITES regulations within a strict timeframe. If a country fails to implement these recommendations it will be subject to compliance measures, which may include trade suspension.

Non-Detriment Findings Template

It is important to firstly determine whether developing an NDF is necessary, since an NDF is not required where national protections or export bans are already in place. Dr Cassie Rigby listed the CITES Appendix II species in Indonesia and summarised which will require NDFs. Species which benefit from national protection in Indonesia, such as the Oceanic Manta Ray (*Manta birostris*), the Reef Manta Ray (*Manta alfredi*) and the Whale shark (*Rhincodon typus*) do not need to go through an NDF process as no trade or export is allowed, and as retention and landing are also forbidden in Indonesia. Moreover, it is not relevant for Indonesia to develop NDFs for the Porbeagle shark (*Lamna nasus*), the Basking shark (*Cetorhinus maximus*), and the White shark (*Carcharodon carcharias*), since these species, although listed on CITES- do not occur in Indonesian waters. If, however, any of these CITES Appendix II species are taken on the High Seas by Indonesian flag vessels and landed, that is referred to as an Introduction from the Sea and is included in the CITES definition of trade and therefore requires an NDF. Depending on where it is landed, it will also require either an Introduction from the Sea certificate or an export permit (and legal acquisition finding) (see Mundy-Taylor et al., 2014, page 4). For shared and high seas stocks, CITES allows an NDF to be developed and issued at a regional level, with for example, a Regional Fisheries Management Organisation to act as an International Scientific Authority (see Mundy-Taylor et al., 2014, page 2).

There is a current ban on exportation of all products from hammerhead shark (Scalloped, Great and Smooth Hammerhead), and the Oceanic Whitetip Shark, which was implemented three years ago (December 2014) and which has been reviewed on a yearly basis. The current ban is to be reviewed by 31st December 2017. The Government of Indonesia intends to develop an NDF for the hammerhead, as an informative document (although not currently required in the context of exportation bans) to assess whether eventual export would be deemed sustainable. The MMAF stated that there are socio-economic pressures upon them to release the ban on export of Hammerheads, and also acknowledged they are required to develop an NDF first, which needs to be assessed independently of any intentions to change policies, that is, through scientific consideration of the vulnerability of the species to trade.

Silky Shark and Thresher Shark (three species) listings on Appendix II are to be enacted by Parties on October 4th 2017. Currently, Indonesia has not drafted any national regulation to enforce a ban on export of the four species concerned. Indonesia is required to develop NDFs for each of these species. If the NDF process cannot ensure sustainable trade of the species, exports cannot occur. If a positive NDF is the outcome of the process, such an NDF needs to ensure the species can be traded sustainability, that is, with no harm to the species. In the case that sufficient data cannot be obtained a precautionary approach is needed in the assessment of the available information.

Mobula ray listings (nine species in total globally, of which at least four occur in Indonesia) on

Appendix II are to be enacted by April 4th 2017. The Government of Indonesia has submitted a draft regulation to forbid exports of all Mobula parts. This currently waits to be passed as national law and will be valid for one year. After this one-year period, the MMAF intends to consider a full protection status on a national level for Mobula rays, which will be filed based on the results of a public consultation in which stakeholders give their position with regards to a full protection status. The WCS has recently established a permanent project base in Aceh, which is expected to provide useful information to better understand the importance of mobulid fisheries in this location.

The MMAF wishes to develop an NDF for Mobula species to assess and monitor the vulnerability of Mobula species to trade on a national level. It is possible that international trade pressure will still place pressure on Mobula species in Indonesia to some extent, since illegal trade of gill plates has been reported for manta rays, which tend to follow similar supply chains (Booth, 2016). Nevertheless, the ban of all gill plate exports is expected to enable better enforcement at customs since Manta ray gill plates have often been hidden amongst Mobula gill plates in the past (Customs and Quarantine officer, pers. comm.).

The NDF template process was presented by Dr Cassie Rigby and discussed with participants. It is important to keep in mind that the documenting of sources of data and information used in the development of the NDF document and assessment process is crucially important.

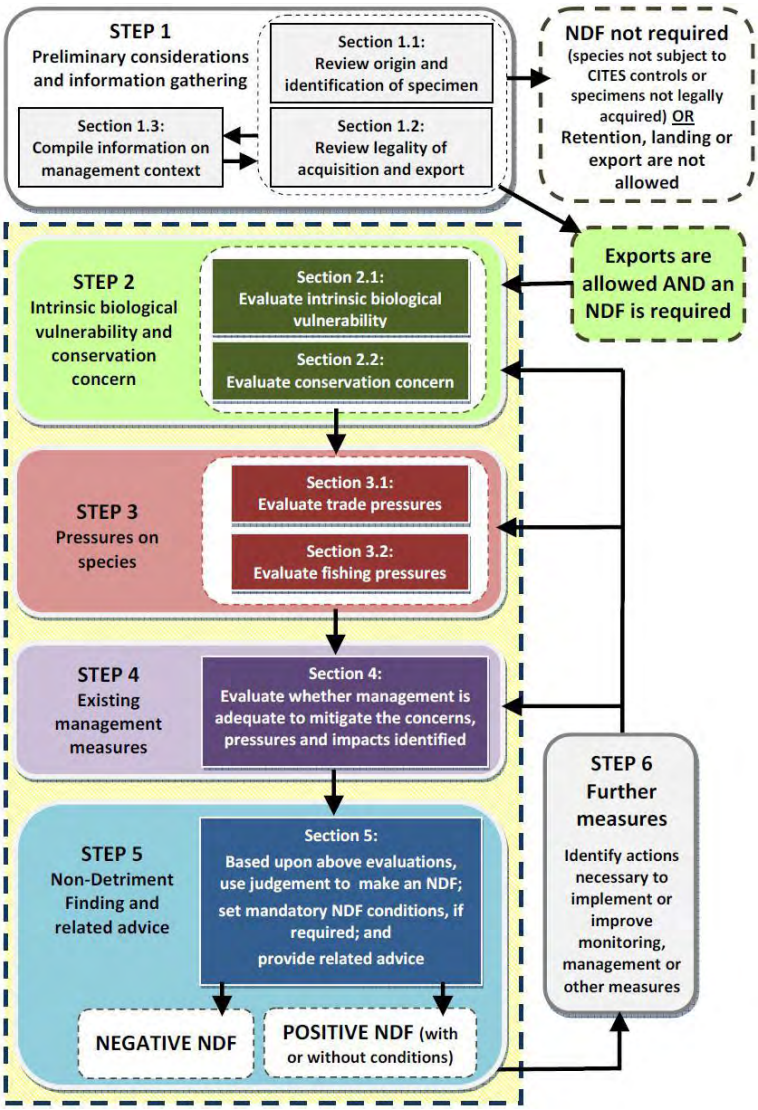

Fig. 1. Key NDF steps (Mundy-Taylor et al., 2014).

- STEP 1: Developing an NDF is deemed not necessary or necessary by the CITES Management Authorities. When an NDF is necessary, the Management Authority determines whether the products were legally obtained and provides information on the management and catches of the species. The Management Authority then requests a scientific assessment of the vulnerability of the species to trade by the Scientific Authority of CITES.

- STEP 2: Information on the species biological and conservation concern is gathered by the SA, as detailed in the NDF guidelines and template. If no information on stock assessment is available, refer to the IUCN Red List for Threatened Species status of the species, and cite the information. IUCN assessments often contain data on biology, conservation and population trends (on a global and/ or national level) (http://www.iucnredlist.org/). Following the guidelines, the summary information

sheet is to be completed and a qualitative assessment of both the level of biological vulnerability and conservation concern ('High', 'Medium' or 'Low' levels) is agreed upon by the CITES Scientific Authority.

- STEP 3: This step concerns evaluation of the severity of trade and fishing pressure on the species. It can include data on fishing practices, intensity, effort and landing trends (Catch Per Unit Effort- CPUE is always preferred) and information on magnitude of trade (qualification and quantification of trade pressures). If limited data is available, the IUCN Red List often provides background information on these pressures both on a national and international level. The best available data is to be used, which can include unpublished information such as is that included in reports. For each type of information included in the NDF, the level of confidence needs to be recorded (low, medium, high) which involves an assessment of the quality of the information. In the case of poor data or data deficiency, a precautionary approach should be adopted and recommendations entered into Step 6 to improve fisheries and trade data availability and monitoring. These recommendations can be detailed and based on what data is deficient, can prioritise specific data needs that will enable a more confident and robust future NDF assessment. In terms of the implications of this step for 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 (Mundy-Taylor et al., 2014, page 27).

- STEP 4: List and evaluate whether existing management measures currently in place for the species are appropriate and adequate to mitigate pressures identified above. These can include both national level and international (global, regional) measures.

  STEP 5: Consists of the assessment of the NDF (see Mundy-Taylor et al., 2014, page 96 for detailed considerations in this step). This step is where it is determined whether data indicated that trade of the species can occur/continue without causing concern for the species survival (positive NDF- sometimes with restrictive conditions), or that the assessment of the data indicated that sustainable trade cannot occur without putting the species survival at risk (negative NDF). In the case of a positive NDF, the Scientific Authority may set a condition that allow exports to continue for a defined period (i.e. positive NDF is valid for a limited period only), with recommendations as to improvements in monitoring and management (entered in Step 6) that should be undertaken during that period. In the case of a negative NDF, further measures (entered in Step 6, for e.g. to improve monitoring or management) need to be implemented before any export takes place (see Mundy-Taylor et al., 2014, page 50).

- STEP 6: During the NDF process, the Scientific Authority can enter recommendations

for improvements in data collection, monitoring and management to address cases where information was lacking. These recommendations are considered advice to the Management Authority to lead to improved data and management measures. They are part of an adaptive management approach and recommended to be included for both positive and negative NDFs (see Mundy-Taylor et al., 2014, pages 3). They can contribute to a more robust reassessment of the NDF in the future.

The Indonesian government, including CITES SA and the MMAF, officially agreed that the NDF framework and template developed by Mundy-Taylor et al., (2014) will be used by Indonesia in the development of NDF documents for CITES-listed species, including shark and rays, and (as suggested by the SA of CITES- LIPI) eventually for other marine species.

Indonesian NDF template for the Mobula rays

All four Mobula species that occur in Indonesia (*Mobula japanica*, *M. tarapacana*, *M. thurstoni* and *M. kuhlii*) were compiled into a single NDF template, although species-specific data was presented in each section where available. The draft template was populated with data from the literature and relevant organisations (e.g. IUCN, FAO) by Dr. Cassie Rigby (JCU) and shared with workshop participants for use as a basis for developing an NDF for Mobula rays in Indonesia. It should be noted that although four Mobula species were included in the draft template developed by Dr. Cassie Rigby (JCU), it is currently uncertain whether a fifth pigmy Mobula species (*Mobula eregoodootenkee*) forms a species-complex with *Mobula kuhlii* (White & Last, 2017), or whether these represent separate species (Sciara et al., 2017), as it is currently listed on the IUCN Red List (http://www.iucnredlist.org/details/41832/0). Additionally, although very little information is available on *M. eregoodootenkee* (potentially cf. *kuhlii*), Indonesia is listed as a range country on the IUCN Red List website. Moreover, an occurrence has recently been reported at a landing site in Kalimantan and rare aggregations occurred in Eastern Nusa Tenggara (Laglbauer, pers. comm.).

Annual landings data is available for mobulids (mobulids refers to mantas and mobulas combined) on the website of the FAO Global Capture Production (www.fao.org). From 2011-215, reported Indonesia mobulid landings averaged 4463 tons (FAO 2017). In terms of management strategies, a recent publication by an international group of experts has provided a comprehensive list of measures to be put in place to promoted mobulid conservation and sustainability of stocks (Lawson et al., 2017). Overall, given the available information, the scientific consensus would tend toward a negative NDF in the case of Indonesian mobula rays, given the high intrinsic vulnerable biology, high conservation concern, large population declines in Indonesia (Lewis et al., 2015), high fishing and trade pressure and the lack of any specific mobulid management measures (Lewis et al., 2015).

Pak Dharmadi (Agency of Research and Human Resource of the MMAF) gave a presentation on 'Research Management of Elasmobranchs in Indonesia', which comprised of data collected

over more than a decade on mobulid and shark biology, ecology and fisheries throughout Indonesia. This work has resulted in many peer-reviewed publications and more unpublished data available for use in NDF documents. Pak Dharmadi presented age and growth data (Drew et al., 2015) for *Alopias pelagicus* and *Sphyrna lewini*, sex ratios, morphometric and species-specific relative abundance data collected from fisheries for *Sphyrna lewini, Sphyrna mokarran, Alopias pelagicus, Alopias superciliosus, Carcharhinus falciformis,* and *Carcharhinus longimanus.*

Miss Benaya Simeon (WCS Indonesia) gave a talk on the 'Utilization and Growth Parameters of Sharks and Rays- Study Case: Tanjung Luar Landing Site'. Biological, ecological and fisheries data was presented on sharks (*Sphyrna lewini*, *Sphyrna mokarran, Carcharhinus falciformis, Alopias pelagicus, Alopias superciliosus*) and Mobula rays (*Mobula japanica*) collected by the Wildlife Conservation Society (WCS). This data is informative in the development of NDF documents. The study suggested that 44% of all catches within the shark fishery (surface and bottom longlines) of Tanjung Luar (Lombok) are for species listed in Appendix II of CITES. An increase in the size of the fishing fleets from 2014 to 2016 was noted, while total shark CPUE decreased by 25% in that same period. Approximately 180 households depend on shark fisheries in Tanjung Luar (Lestari et al., 2017). The study suggested that an important proportion of the catch includes juveniles (ranging from 10% of total catch in *Alopias superciliosus* to as much as 23% in *Mobula japanica*), and that pregnant females also constitute up to 35% of total catches for *Sphyrna mokarran*.

Indonesian NDF template for the Scalloped Hammerhead

Pak Lubis (MMAF) presented a draft national regulation that has been deposited by the MMAF and LIPI for official adaptation by the government, within the scope of a National Plan of Action (NPOA) developed by Indonesia for the period 2016-2020. It concerns all shark species and will regulate the retention of pregnant females, the retention of 'juveniles' (neonates- since the presence of an umbilical scar will determine release- Pak Fahmi- pers. comm.), and fisheries in areas of high concern such as shark nursery grounds.

Dr. Cassie Rigby prepared a template NDF for Scalloped hammerhead (and also for Great and Smooth Hammerhead) to be used as background information by Indonesia, which was populated with data from the literature. There is currently a ban on the exportation of Scalloped hammerhead products which is due to be reviewed on December 31st 2017. For this reason, the MMAF wishes to develop an NDF for hammerhead species in order to re-assess the vulnerability of the Indonesian stocks to local trade pressure to determine whether the ban will remain in place (in the case of a negative NDF) or whether international trade would not be detrimental to the sustainability of these species (in the case of a positive NDF). Hammerheads are particularly at risk of overexploitation due to high fishing pressure, and their intrinsic biology and ecology. For example, hammerheads are known to aggregate in large

schools which puts them at especially high risk from fishing pressure. Dr Alastair Harry (Harry 2011) modelled data from a pelagic longline fishery within Indonesia which predicted only 10.6% of Scalloped Hammerhead females could be harvested before the population growth rates would fall below zero (Harry 2011, page 164). This highlights that hammerheads cannot sustain high fishing pressure, especially on females.

Miss Regina Rosa Beryllinda (BPSPL Office of the MMAF located in Surabaya/ Msc. Student at CITES-affiliated Master in Spain) presented an overview of the NDF process and information on a preliminary template for *Sphyrna* species. Miss Beryl presented a summary of data from the literature indicating landing declines for hammerhead sharks, including major annual production declines for hammerheads in Indonesia starting from 2012 (LIPI). No stock assessments are currently available on a national level. Miss Beryl showed that in 2016, *Sphyrna* species landings increased over 1 year by 49% and 119% in three main fishing regions - however, no effort information is available. Given the fishing effort increases described by the WCS in other locations (Tanjung Luar), it is likely that the increase in landings was in fact due to an increase in effort- not CPUE (catch per unit effort). Miss Beryl indicated that over 78.9% of hammerheads caught during the high season (July-August) in Muncar, East Java were juveniles or foetuses. In 2015-2016, 65% of the shark products presented for export at the BPSPL Surabaya were genetically identified as *Sphyrna* species and to a lesser extent *C. longimanus* (Oceanic Whitetip Shark). Various monitoring and management measures were suggested, and are outlined in the following figure from the presentation.

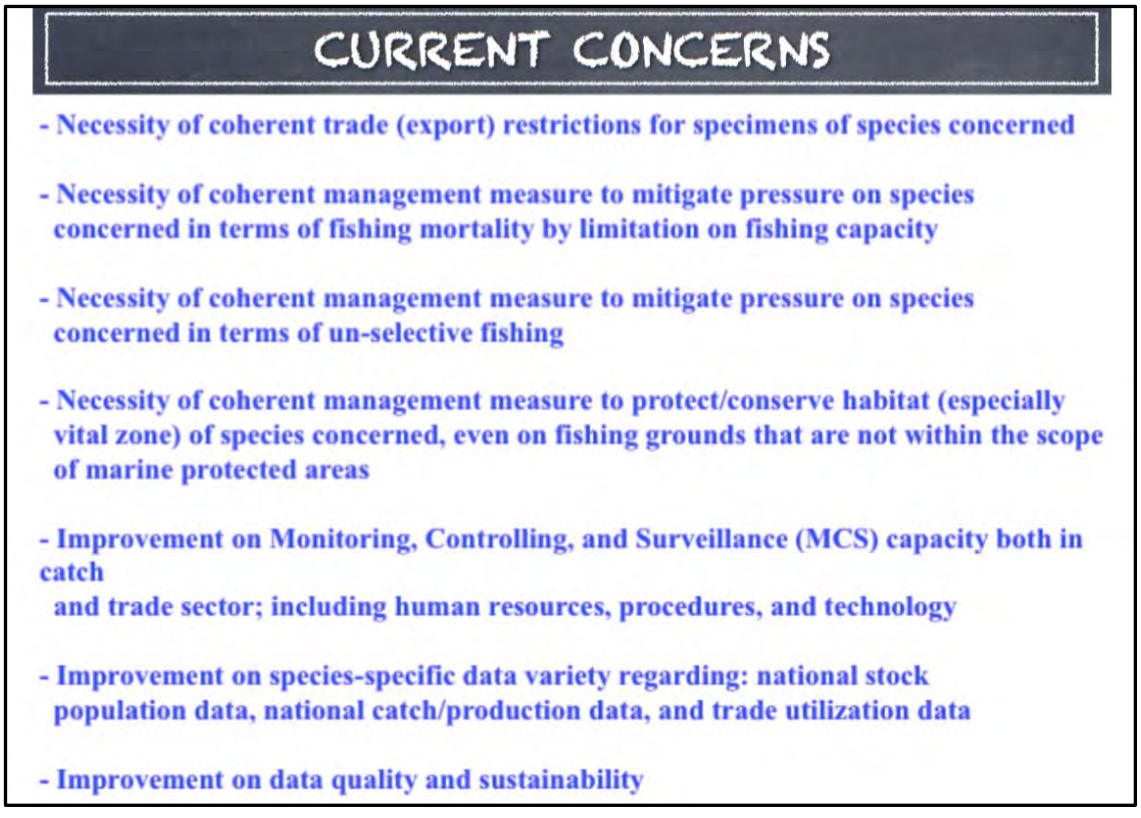

Fig. 2: Excerpt from Miss Beryl's presentation.

Mr Dwi Ariyoga Gautama (WWF Indonesia) gave a presentation on 'Sharks Data for NDF Document'. Mr Yoga described the work conducted by WWF on shark fisheries in 15 locations throughout Indonesia, through landings data, observer's data and visual census. Data on landings over the year were documented for various locations for key shark species and relative abundance of diverse shark species revealed that shark landings in Lamongan (North Java) were dominated by Scalloped Hammerheads (72% of total shark catch) especially foetuses and juveniles, while in Muncar (East Java), they were dominated by Silky shark (61.6%), followed by Scalloped Hammerhead (12.7%). In Muncar, 97% of the elasmobranch fishery was sharks, while the rest was composed of mobulids, amongst other rays or teleosts. Declines in landings of Alopias pelagicus in Cilacap (West Java) occurred from 2011 to 2013.

Shared Stocks

Dr Cassie Rigby presented on shared stocks; what they are and why they are important to consider for an NDF. Shared stocks are sub-populations of a species that have no or limited interaction due to non-overlapping distributions. Importantly, a stock is the unit at which assessment and management should occur. In the case of a stock that has a distribution which ranges over multiple jurisdictional boundaries (countries), the stock should be jointly managed by range countries. For many of the CITES Appendix II listed shark and rays in the Indo-Pacific Ocean, there is a high probability of shared stocks. NDFs need to certify that products come from a sustainable source and this can only be determined at the stock level. In order to discriminate between stocks of a species, tagging, tracking (e.g. satellite tagging), genetics, parasites and life history characteristics can be used. For example, if maximum disc width (one of the measurements used in life history) is consistently higher in a specific region compared to another, this may be an indication that it is a different stock in that region. Hypothetical stock structure maps were presented for Scalloped Hammerhead based on biogeographical barriers.

Regional Data Collection

Regional data collection is important to determine stocks and to assess stocks exploited by a number of neighbouring countries. Dr Cassie Rigby presented on data collection and showed it is relevant to Steps 1 and 6 of an NDF in terms of what the available data tells about the stocks and what data collection improvements may be required. Regional Fisheries Monitoring Organisations (RFMOs) such as the Western and Central Pacific Fisheries Commission (WCPFC) and Indian Ocean Tuna Commission (IOTC) provide annual catch estimates for key shark species. In the Western and Central Pacific Ocean (WCPO), the

Secretariat Pacific Community (SPC) is the data manager that stores, collates and analyses the data from the Western and Central Pacific Ocean. The WCPFC Members provide the catch data to the SPC. The IOTC Secretariat manages databases on the production and bycatch that includes key shark species.

Observer programs are an important component of regional data collection. The WCPFC has a Regional Observer Program (ROP) and within the WCPO there are in-country national observer programs. Indonesian participants at the workshop mentioned there is an Indonesian observer program. The WCPFC ROP has requirements for the percentage of longline (5%) and purse seine fleets (100%) that need to be accompanied by observers. The IOTC Regional observers program include key shark species (Blue shark, Oceanic Whitetip, Scalloped Hammerhead, Silky Shark and Thresher Sharks). Although mobulids are not key species, the IOTC Regional Observer Scheme includes identification cards for three species of mobula rays (M. japanica, M. tarapacana, and M. thurstoni). A current project (Areas Beyond National Jurisdiction) is encouraging data to be shared and exchanged between tuna RFMOs and has developed a Bycatch Data Exchange Protocol (BDEP) template that consist of inventories of bycatch data holdings. This template is being trialled by WCPFC which recommends the trial continue in 2017.

Coastal and national data collection can be difficult in countries with limited resources and a Rapid Assessment Toolkit is being developed by TRAFFIC, JCU, Secretariat of the Pacific Community (SPC) and the WWF. The toolkit intends to provide a manual to explain data collection methods in a relatively simple way so as consistent methods can be implemented. The data collected can then be used to provide data required in both NDFs and National Plans of Action.

Monitoring Control, Surveillance (MCS) and Traceability

Monitoring, Control, Surveillance

Dr. Cassie Rigby described the relevance of MCS to the NDF process. It is a supporting requirement in Step 1 for the legal acquisition finding (needed to link the shark product to the source) and in Step 4 where NDF trade needs to be effectively monitored. Dr Rigby outlined the main mechanisms of MSC in (1) the pelagic realm and (2) the coastal realm. In the pelagic realm, MSC is usually quite strong and can include vessel monitoring scheme, vessel day scheme, in port and sea inspections, onboard observers and Catch Documentation Schemes (CDS). The Common Ocean Tuna project is trialling cameras located onboard longline vessels in Fiji to record what species are being landed and released at all times (http://www.commonoceans.org/news/news-detail/en/c/380064/). Such electronic monitoring can assist with enforcement of bans where breaches can be easily visually detected such as no retention of Oceanic Whitetip Sharks and no transhipments at sea.

Useful resources for MSC:

- Towards the Quantification of Illegal, Unreported and Unregulated (IUU) Fishing in the Pacific Islands Region http://www.mragasiapacific.com.au/Recent-Publications
- FAO Guide to identify shark fins- aimed at port inspectors, customs agents, fish traders and other stakeholders without formal taxonomic training, iSharkFin allows the identification of shark species from a picture of the fin. http://www.fao.org/ipoa-sharks/tools/software/isharkfin/en/
- Traceability and Catch Documentation Scheme: http://www.traffic.org/home/2016/1/7/new-traffic-study-throws-light-on-supply-chain-traceability.html
- Case study: Catch documentation and traceability of shark products in Costa Rica (2016). It is on the CITES Sharks and Rays webpage under Publications https://cites.org/eng/prog/shark/Information_resources_from_Parties_and_other_stakeholders.
- Development of WCPFC CDS standards (version 2) https://www.wcpfc.int/node/27784\.
- Link to Key Australian Fish Stocks Report. http://fish.gov.au/. This website contains a lot of data, but the information can be accessed in a book format which is more user friendly http://frdc.com.au/research/final-reports/Pages/2014-030-DLD.aspx

Traceability

Dr Cassie Rigby outlined two recent studies on issues of traceability of shark products and some potentially useful Catch Documentation Schemes (TRAFFIC and Costa Rica links above). A CDS links catch and trade documents to trace the shark/ray product from point of capture to final destination. WCPFC are developing CDS standards (link above) that aim to provide a means to prevent products identified as caught or originating from Illegal, Unreported and Unregulated (IUU) activities from moving through the commodity chain and entering markets. The Scheme is currently designed for tuna, but once established may be expanded to include sharks and rays.

Miss Julia Gross (PEW) intervened on the topic of traceability to describe the work conducted by PEW on shark policy at a national level with Governments that want to strengthen their shark protection. PEW recognises that species identification can be challenging so they have put together a comprehensive identification guide for CITES listed species. Copies of identification guide for Thresher and Silky Sharks were provided to governmental participants.

Participants understood the importance of species-level data to enable traceability, and for the need to list sharks and rays by species on NDF documents- although species can be compiled into one NDF, species-specific data should be included wherever possible.

Further Steps

Further capacity building activities that are necessary to enforce CITES shark and ray listings were identified:

- The quarantine and customs representative mentioned that identification training for shark and ray products at both a regional and national level is needed.
- Species identification at a local (enumerators collecting landings data) and regional level is needed.
- Portable DNA kits are needed at customs to identify species traded- especially in the case of cartilage, and meat.

Further improvements for better data standardisation and sharing is needed. The LIPI (CITES SA) has previously developed online databases for other taxa such as coral and seagrass (www.coremap.or.id). There is a need for a similar database for sharks and rays, particularly for standardised data collection. The MMAF, LIPI and NGOs present at the workshop discussed the possibility of agreeing upon standardised logbook templates for data collection.

The CITES SA (LIPI), the internal MMAF Authority and NGOs agreed to meet directly following the NDF workshop at the hotel in Serang on March 31st in order to compile available data brought forward by different parties to advance on a Mobula NDF and a hammerhead NDF. A follow-up meeting is to be held on April 20-21st at the CITES Scientific Authority in Jakarta to continue the NDF assessment process.

Pak Lubis (MMAF) announced during the closure speech that, due to socio-economic pressure, the Indonesian government cannot enforce exportation bans for CITES listed shark species such as the Silky and Thresher Sharks (which are due to be enforced on 4th October 2017) and that the MMAF intends to lift the export ban on hammerhead species which has been in place for the third consecutive year and which is due to be reassessed on 31st December 2017.

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Appendix A Draft Agenda

Indonesian Workshop on Non-Detriment Findings for CITES Appendix 11 Sharks and Rays
29-30 March Serang, Indonesia
Draft Agenda

DAY 1: Wednesday 29 March 2017

TIME	TOPIC	LEAD
9:00 – 9:15	**Welcoming remarks** Welcoming remarks from Indonesian Ministry of Marine Affairs and Fisheries	Ministry of Marine Affairs and Fisheries
9:15 – 9:30	**Introductions** Self-introductions by participants	All
9:30 – 10:00	**Introduction to workshop and CITES listings of sharks and rays** Content: What are the CITES Appendix 11 species. What does CITES Appendix 11 listing mean. Describe what will be covered in this workshop.	James Cook University (JCU) – Dr Cassie Rigby
10:00-10:30	**Non-detriment Findings (NDFs) for Sharks** Content: What are NDFs, who does the NDFs, development of the Non-Detriment Findings Guidance for Sharks, and the steps in the NDF Process. Outcome: Participants understand the NDF Guidance for Shark species and NDF Process.	James Cook University (JCU) – Dr Cassie Rigby Materials: CITES Non-detriment Findings Guidance for Shark Species https://cites.org/eng/prog/shark/index.php (Information Resources)
10:30 – 11:00	**Morning tea**	
11:00 – 12:30	**NDF Template** Content: JCU presents a draft NDF template that could be used by Indonesia, and briefly outlines the common data (e.g. life history) entered by JCU prior to workshop. Discussion on draft NDF template format with devilrays (*Mobula japanica, Mobula tarapacana, Mobula thurstoni, and Mobula kuhlii*) as an example. Outcome: Agreement on the format of an NDF template for use by Indonesia to develop national NDFs.	JCU – Dr Cassie Rigby Indonesia participants Materials: Draft NDF template with devilrays (*Mobula japanica, Mobula tarapacana, Mobula thurstoni, and Mobula kuhlii*) as an example
12:30 – 13:30	**Lunch**	
13:30 – 15:00	**Mobulid draft NDF template** Content: JCU presents a Mobulid draft NDF template and collated public domain Indonesian catch and trade data on mobulid rays. Indonesia describe their available national catch and trade data of mobulid rays.	JCU- Dr Cassie Rigby Indonesia participants Materials: Draft NDF template with devilrays (*Mobula japanica, Mobula tarapacana, Mobula thurstoni, and Mobula kuhlii*) as an example.
15:00-15.30	**Afternoon Tea**	

15:30– 17:00	**Mobulid draft NDF template** Content (cont'd): Discussion on Research and Management of Elasmobranchs in Indonesia Smaller group discussions of mobulid NDF. Outcome: Catch and trade data presented. Discussion on mobulid NDF and possible outcomes.	JCU- Dr Cassie Rigby Pak Dharmadi (MMAF) Indonesia participants Guest speaker: Nadya (WCS)

DAY 2: Thursday 30 March 2017

TIME	TOPIC	LEAD
8:30 – 9:00	**Review** Any questions from previous day?	JCU- Dr Cassie Rigby
9:00– 10:30	**Shared stocks, mobulid NDF and hammerhead NDF** Content: JCU presents on shared stocks and considerations for an NDF. Finalise discussion on mobulid NDF. BPSPL presents on hammerhead data and draft NDF (Regina Rosa Beryllinda) Indonesia describe their available national catch and trade data of hammerheads. Discussion on hammerhead NDF.	JCU- Dr Cassie Rigby Guest speaker: Mbak Regina Rosa Beryllinda (BPSPL Surabaya) Indonesia participants Guest speaker: Pak Dwi Ariyoga Gautama (WWF)
10:30 – 11:00	**Morning tea**	
11:00 – 12:30	**Hammerhead NDF (cont'd)** Content: smaller group discussions on hammerhead NDF Outcome: Finalise discussion on hammerhead NDF	JCU- Dr Cassie Rigby Indonesia participants
12:30 – 13:30	**Lunch**	
13:30 – 15:45	**Regional data collection and Monitoring Control Surveillance (MCS)** Content: JCU presents on regional data collection of CITES Appendix II shark and ray species (pelagic and coastal) including a new initiative Rapid Assessment Toolkit; and considerations of MCS in context of the NDF. Outcome: Identification of issues, responsibilities and discussion of ways to improve data collection, data sharing and awareness of MCS issues.	JCU- Dr Cassie Rigby Materials: ABNJ work ABNJ update Aug 2016; Bycatch is troublesome - deal with it; TRAFFIC Traceability report Catch documentation traceability shark Costa Rica State of global market for shark products
15:45 – 16:00	**Afternoon Tea**	
16:00 – 17:15	Open discussion of Mobulid and Hammerhead NDF templates and any other points raised during workshop.	Dr Cassie Rigby

17:15– 17:30	Review and close of meeting	Ministry of Marine Affairs and Fisheries

Appendix B Draft Indonesian NDF Template for Mobula Rays

DRAFT
Indonesia Non-Detriment Finding Template for the Mobula devilrays, *Mobula japanica*, *Mobula tarapacana*, *Mobula thurstoni*, *Mobula kuhlii*

Dr Cassandra Rigby

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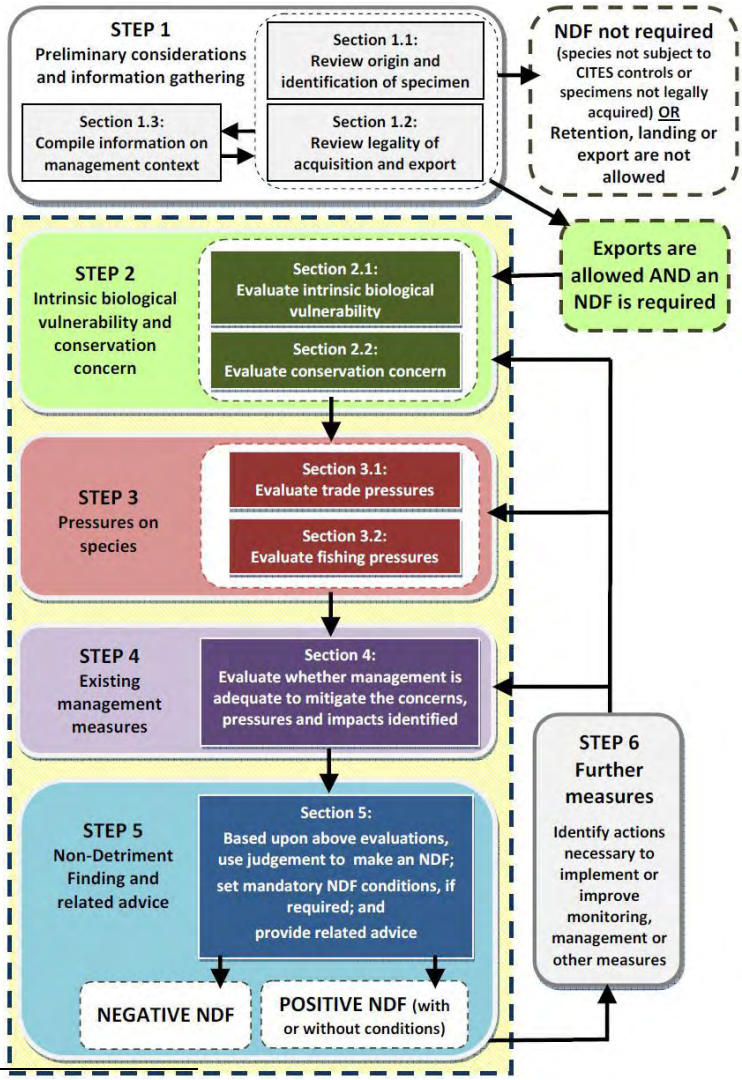
March 2017

Draft Indonesia Non-detriment finding (NDF) for Spinetail Devilray *Mobula japanica,* Sicklefin Devilray *Mobula tarapacana,* Bentfin Devilray *Mobula thurstoni* and Lesser Devilray *Mobula kuhlii*

All four species of Devilrays are listed on CITES Appendix II and trade in these species requires that the CITES Management Authority of the exporting country (or a designated competent authority in countries that are not Parties to CITES) must verify that these species were legally obtained. The CITES Scientific Authority of the exporting country must advise that export will not be detrimental to the survival of these species (a non-detriment finding). Recommend that as more species-specific information is collected, separate Worksheets are compiled for each species.

The following Worksheets follow a six step process for the NDF that is illustrated in this Flow Chart from the Shark NDF Guidance[1]. The Worksheets are supported at each step by information in the Shark NDF Guidance.



[1] Mundy-Taylor, V., Crook, V., Foster, S., Fowler, S., Sant, G., and Rice, J. 2014. CITES Non-detriment findings guidance for shark species. 2nd, revised version. A framework to assist Authorities in making Non-detriment Findings (NDFs) for species listed in CITES Appendix II. Report prepared for the Germany Federal Agency for Nature Conservation (Bundesamt fur Naturschutz, BfN). Available at https://cites.org/eng/prog/shark/Information_resources_from_Parties_and_other_stakeholders.

Worksheet for Step 1			
Question 1.1 (a) **Is the specimen subject to CITES controls?** **(How did you identify the species?)**			
See pages 64–65 of **Annex 1** for additional Guidance Notes on completing this Worksheet. **Information refers to all four *Mobula* species, unless otherwise specified.**			
	Product Form	**CITES Appendix**	**Source of Identification**
Mobula japanica[2] *Mobula tarapacana* *Mobula thurstoni* *Mobula kuhlii*	Gill plates Country adds this Country adds this Country adds this	II	Manta trust identification guide Country adds this Country adds this Country adds this
NEXT STEPS			
In view of the above, is the specimen subject to CITES controls? Consult 'Decision and Next Steps' guidance in **Annex 1**	**YES**	GO TO **Question 1.1 (b)**	
	NOT CERTAIN	Describe concerns in more detail below, and GO TO **Question 1.1 (b)**	

[2] *Mobula japanica* recently considered conspecific with Giant Devilray *Mobular mobular*, with *Mobular mobular* the valid name (Last, P.R., White, W.T., de Carvalho, M.R., Seret, B., Stehmann, M.F.W., Naylor, G.J.P. Rays of the World. CSIRO Publishing, 790 pp).

	NO	**NDF is not required**
Concerns and uncertainties:		

Worksheet for Step 1 (continued)		
Question 1.1 (b) **From which stock will the specimen be taken/was the specimen taken?** **(Can origin and stock be confidently identified)**		
See pages 66–67 of **Annex 1** for additional Guidance Notes on completing this Worksheet. **Information refers to all four *Mobula* species, unless otherwise specified.**		
	Description/comments	**Sources of information**
Ocean basin	Indo-Pacific Ocean	
Stock location/ distribution/ boundaries (attach a map)	***M. japanica*, *M. tarapacana* and M. *thurstoni*** These three species occur worldwide in tropical and subtropical waters (i.e. Pacific, Indian, Atlantic Oceans). ***M. kuhlii*** Indo- West Pacific tropical and subtropical waters. Updated distribution maps in Lawson et al. 2017.	Kyne et al. 2005, White et al. 2006b, Lawson et al. 2017
Is this a shared stock (i.e. occurring in more than one EEZ[3] and/or the high seas)?	Yes	

[3] Exclusive Economic Zone

If the stock occurs in more than one EEZ, which other Parties share this stock?	***M. japanica*, *M. tarapacana* and *M. thurstoni*** These three species occur worldwide and are shared with many CITES Parties. Main catching countries that are also all CITES Parties that may share these stocks are: Sri Lanka, India, China, Philippines. The species also occur in Peru, Mauritania, Guinea, Mexico (all CITES Parties), and although wide migrations have been reported for *M. japanica* (from New Zealand to Vanuatu and Fiji) (Francis & Jones 2016) and for *M. tarapacana* (nearly 4000km off Africa) (Thorold et al. 2014), it is unlikely that individuals in Indonesia travel as far as Africa and South America. ***M. kuhlii*** Indo-West Pacific shared with a wide number of CITES parties. Main catching countries that are also all CITES Parties that may share these stocks are: Sri Lanka, India, China, Philippines.	However, significant differences in maximum size suggest geographically isolated populations in north-east and south-west Pacific (Francis and Jones 2017). Thorrold et al. 214, Francis and Jones 2017
If high seas stock, which other Parties shark this stock?	Country adds this- depends which High Seas area specimens for export are captured	
Which, if any, RFB[4](s) cover(s) the range of this stock?	In Indo-Pacific region- WCPFC and IOTC. While it is unlikely the Indonesian stocks travel as far as Africa and South America, globally other RFMOs that may interact with these species are- IATTC, ICCAT, NAFO, GFCM, CCBST, SEAFO.	See Simpfendorfer and Rigby 2016 Information (Section 2.2.1) for explanation of acronyms
Are all Parties listed above (which fish or share the stock concerned) members of the relevant RFBs?	Yes, the main catching countries that are likely to shark the Indonesian stocks (which are all CITES Parties) and their membership of the relevant RFMOs are: Sri Lanka- IOTC India- IOTC Indonesia- WCPFC, IOTC China- WCPFC, IOTC, IATTC, ICCAT Philippines- WCPFC, IOTC, ICCAT While it is unlikely the Indonesian stocks travel as far as Africa and South America, globally other	http://www.wcpfc.int http://www.iotc.org/ See Simpfendorfer and Rigby 2016 Information (Section 2.2.1) for explanation of acronyms

[4] Regional Fisheries Body

	countries in which these species occur are members of the following RFMOs: Peru- IATTC Mauritania- ICCAT Guinea- IOTC, ICCAT Mexico-WCPFC (cooperating non-member), IATTC, ICCAT.	
Are there geographical management gaps?	The High Seas.	
How reliable is the information on origin?	Country adds this	
NEXT STEPS		
Is information on origin sufficiently detailed for Question 1.2 to be answered?		**YES**
Consult "Decision and Next Steps" guidance in **Annex 1**. **(Apply this answer at end of Question 1.2)**		**NO**

Worksheet for Step 1 (continued)

Question 1.2

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

See pages 67–68 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**

Information refers to all four *Mobula* species, unless otherwise specified.

Is the species:	**Description/comments**	**Sources of information**
Protected under wildlife legislation, a regional biodiversity Agreement, or (for a CMS[5] Party) listed in CMS Appendix 1?	CITES Appendix II (enacted 4 April 2017), CMS Appendix I & II (note: Indonesia is not a party to CMS).	CITES website (https://cites.org/eng/prog/shark) CMS website (http://www.cms.int/en/page/appendix-i-ii-cms)
Sourced from illegal fishing activities (e.g. in contravention of finning	Country adds this	

[5] Convention on Migratory Species

regulations, or where a TAC[6] is zero or exceeded)?		
Taken from a no-take marine protected area or during a closed season?	Country adds this	
Taken in contravention of RFB recommendations, if any?	Country adds this	
Listed as a species whose export is prohibited?	Country adds this	
Of concern for any other reason?	Country adds this	
NEXT STEPS		
In view of the above and the final section of the Worksheet for Question 1.1(b), was the specimen legally acquired and can exports be permitted? Consult "Decision and Next Steps" guidance in **Annex 1.**	**YES**	**GO TO Question 1.3**
	SOME DOUBT	Describe concerns in more detail below, and **GO TO Question 1.3**
	NO	Export cannot be permitted, **NDF is not required**
Concerns and uncertainties:		

Worksheet for Step 1 (continued)		
Question 1.3 **What does the available management information tell us?**		
See pages 69 and Table A of **Annex 1** for additional Guidance Notes on completing this Worksheet**.** **Information refers to all four *Mobula* species, unless otherwise specified.**		
Part 1. Global-level information		
	Description/comments	**Sources of information**

[6] Total Allowable Catch

Reported global catch	5047 tonne average (2011-2015) (peak of 6319 t in 2013) (Mantas, devilrays nei) (FAO 2017). Global tuna purse seine fishery: 13,000 individuals annually, 7817 Western Central Pacific, 1936 Indian Ocean (Croll et al. 2016) Estimated 94,000 devil rays (all 9 species mobulid) annually (Heinrichs et al. 2011, Pardo et al. 2016a).	White et al. 2006, Heinrichs et al. 2-2011, Pardo et al. 2016a FAO 2017a
Species distribution	***M. japanica*, *M. tarapacana* and *M. thurstoni*** Tropical and subtropical oceans worldwide. For updated distribution maps see Lawson et al. 2017. Possibly sparsely distributed and highly fragmented. ***M. kuhlii*** Tropical and subtropical Indo-West Pacific with a patchy distribution. Country to confirm local distribution	White et al. 2006a, Bizzaro et al. 2009, Lewis et al. 2015, CITES 2016, Lawson et al. 2017
Known stocks/populations	**M. japanica** Little genetic substructure throughout the north-west Pacific, north-east Pacific, Indian and east Atlantic Oceans (Poortvliet et al. 2015). However, significant differences in maximum size suggest geographically isolated populations in north-east and south-west Pacific (Francis and Jones 2017). Possible conspecific population of *Mobula mobular.* ***M. tarapacana*** Little genetic substructure throughout the central-east pacific, central-west pacific and Indian Oceans (Poortvliet et al. 2015). ***M. thurstoni*** Little genetic substructure throughout north-east pacific, south-east Pacific and Indian Oceans (Poortvliet et al. 2015). ***M. kuhlii*** Little genetic substructure through the central-west Pacific and Indian Oceans (Poortvliet et al. 2015).	Notarbartolo di Sciara et al. 2015, Poortvliet et al. 2015, Pardo et al. 2016a, Last et al. 2016, Francis and Jones 2017
Main catching countries	In order of decreasing catch: Sri Lanka, India, Peru, Indonesia, China, (95 % of worldwide Mobula catch), Mauritania, Philippines (Heinrichs et al. 2011, CITES 2016). Other countries with reported levels of catches include Mexico and Guinea.	White et al. 2006a, Fernando & Stevens 2011, Heinrichs et al. 2011, Lewis et al. 2015, Philippines Bureau of Fisheries and Aquatic Resources (unpublished study), CITES 2016, FAO 2017a

	Main catching countries reported by FAO for Manta, devil rays nei are Indonesia followed by Sri Lanka (FAO 2017).	
Main gear types by which the species is taken	Pelagic longlines, purse seine, drift gillnets inshore artisanal fisheries (gillnets, handlines, drumlines, possibly seine nets, hand spears, spear guns, gaff hooks, harpoons), trawl.	White et al. 2006a, Couturier et al. 2012, Pardo et al. 2016a, Lawson et al. 2017 Simpfendorfer and Rigby 2016 Information (Section 2.3)
Global conservation status	IUCN Status: - ***Mobula japanica*** Globally: Near Threatened (2006) Southeast Asia- Vulnerable (2006) - ***Mobula tarapacana*** Globally: Vulnerable (2016) - ***Mobula thurstoni*** Globally: Near Threatened (2016) - ***Mobula kuhlii*** Globally: Data Deficient (2009)	White et al. 2006b, Bizzaro et al. 2009 Pardo et al. 2016b, Walls et al. 2016.
Multilateral Environmental Agreements	CITES Appendix II CMS Appendix 1 and Appendix II Sharks MoU Annex 1 IATTC C-15-04 GFCM (General Fisheries Commission for the Mediterranean)	CITES https://cites.org/eng/prog/shark/index.php CMS http://www.cms.int/en/species Sharks MoU http://www.cms.int/sharks/en/mos2 IATTC http://www.iattc.org/PDFFiles2/Resolutions/C-15-04-Conservation-of-Mobulid-Rays.pdf GFCM (http://www.fao.org/3/a-ax385e.pdf)
Part 2. Stock/context-specific information		
Stock assessments	No stock assessments for the Indo-West Pacific or any other stocks have been done.	CITES 2016

Main management bodies	Indonesia: Indonesian Ministry of Marine Affairs and Fisheries; Forum for the Coordination of Fisheries Management and Utilisation. Regional: WCPFC in the Western and Central Pacific Ocean, IOTC in the Indian Ocean, CCSBT Globally all other RFMOs- IATTC, ICCAT, NAFO, GFCM, CCBST, SEAFO.	Dharmadi et al. 2015, See Simpfendorfer and Rigby 2016 Information (Section 2.2.1) for explanation of acronyms.
Cooperative management arrangements	All Mobula rays have the potential to migrate large distances, however mobula rays are not listed as highly migratory species (under UNCLOS Annex 1). Regionally the relevant RFMOS are: WCPFC, IOTC. Globally all other RFMOs- IATTC, ICCAT, NAFO, GFCM, CCBST, SEAFO.	Couturier et al. 2012, CITES 2016, Francis and Jones 2017 UNCLOS Annex 1 www.un.org/unlcos/annex1; http://www.commonoceans.org/home/en/
Non-membership of RFBs	All main catching countries are members of the relevant RFMOs.	FAO 2017a
Nature of harvest	Taken as target, byproduct and bycatch. Fishing effort is not evenly spread across Indo-West Pacific stock.	FAO 2017a
Fishery types	**All four species** Indonesia - drift gillnet fisheries for Skipjack Tuna (*Katsuwnus pelamis*) (fishers do not use lights to repel mobulids, contrary to other gillnet fishers), target mobulids with artisanal gillnets, bycatch of tuna and bill fish purse seine and longline fisheries (for e.g. in Muncar, East Java), target with harpoon, target with specific trawl nets. ***M. japanica, M. tarapacana*** In the Indo-Pacific region (and globally), large-scale tuna purse seine and to a lesser extent longline fisheries. In Indonesia, main fisheries for mobulids in: Lamakera (East Nusa Tenggara),Tanjung Luar (Lombok, West Nusa Tenggara), Cilacap (Central Java), Muncar (East Java). Fished in Kalimantan, Sumba island, Sumbawa (Bima), Gorong, Flores (Bola, Ende, Labuna Bajo), Alor, Papua Province (Cenderwasih Bay), Gili Islands Industrial trawl, longline and purse seine; gillnet fisheries Country confirms/adds more if needed.	White et al. 2006a, Bizzaro et al. 2009, Couturier et al. 2012, Lewis et al. 2015, Pardo et al. 2016a, CITES 2016, Francis and Jones 2017
Management units	Indonesia: Indonesian Ministry of Marine Affairs and Fisheries; Forum for the Coordination of Fisheries Management and Utilisation. Country confirms/adds more if needed	http://www.wcpfc.int

	Regional: WCPFC in the Western and Central Pacific Ocean, IOTC in the Indian Ocean. Gaps in regional management are in the High Seas Areas Beyond National Jurisdiction (ABNJs). To address management issues in these areas, a five-year project is underway that includes sustainable management of tuna fisheries and biodiversity conservation: Areas Beyond National Jurisdiction (ABNJ or Common Oceans) Tuna Project. A component of the ABNJ Tuna Project specifically addresses the take of sharks and rays.	http://www.iotc.org/ http://www.commonoceans.org/home/en/
Products in trade	Gill plates are the main product that is exported (*Manta* spp gills plates were more valuable than *Mobula* spp gills). *M. tarapacana* (white) and *M. japanica* (black) gills plates highly valued. Meat and skin are sold and consumed domestically for human consumption, animal feed and shark bait but both products are of nominal value. In some cases, meat, skin (for leather) and cartilage (as filler in shark fin soup) are also exported.	White et al. 2006a, Fernando and Stevens 2011, Heinrichs et al. 2011, Lewis et al. 2015, CITES 2016, Croll et al. 2016, Pardo et al. 2016a
Part 3. Data and data sharing		
Reported national catch(es)	4463 tonne average (2011-2015) (peak of 5674 t in 2013) (Mantas, devilrays nei) (FAO 2017a) Almost twice as much average catch from Pacific Ocean (2943t) vs Indian Ocean (1520t) (FAO 2017) 4384 individual devilrays (2001-2005), to, 1024 individual devilrays (2013-2014) (77% reduction) (Lewis et al. 2015, Table 1 Mobula spp and individual species data). For 2001-2005, 4110 individuals per year (estimated at ~544 tonne in total over the 4 years) mobulids landed at only four sites in eastern Indonesia – not the whole of Indonesia (White et al. 2006a). Country confirms, revises	White et al. 2006a, Ward-Paige et al. 2013, Lewis et al. 2015, FAO 2017a
Are catch and/or trade data available from other States fishing this stock?	Catch data-estimates of mobulid catch data in the industrial and artisanal fisheries from other States by region and in some cases, country is available in the literature (Fernando and Stevens 2011, Heinrichs et al. 2011, Couturier et al. 2012, Ward-Paige et al. 2013, Croll et al. 2016, CITES 2016). From Pardo et al. 2016b: Devil rays (labelled as manta rays) were noted as one of the common elasmobranch species identified by observers in purse seine fisheries in the Pacific Island countries and territories (Lack and Meere 2009). In the Western and Central Pacific tuna purse seine fisheries, mobulids were found in 7.4% of sets observed between 1994 and 2004 (Molony 2005).	Molony 2005, Lack and Meere 2009, Fernando and Stevens 2011, Heinrichs et al. 2011, Couturier et al. 2012, Ward-Paige et al. 2013, Croll et al.2016, CITES 2016, O'Malley et al. 2016, FAO 2017b, Simpfendorfer and Rigby 2016 (Section 2.3)

	WCPFC Regional Observer Program, Secretariat Pacific Community data only showed Giant Manta Ray (may include mobulids) 2010-2014: 301 (longline) and 1149 purse seine (number of individuals) (Simpfendorfer and Rigby 2016). Reef Mantas (may include mobulids) are reported to be caught in purse seine Flag States: China, El Salvador, French Polynesia, PNG, Solomon Islands and caught in EEZ of PNG and Solomon Islands (Clarke et al. 2014). Trade data- FAO does not report trade data in the category of 'gill plates' and only reports trade only category for rays (excl. Rajidae rays and skates) with no sharks included is -'rays, chimaeras meat, frozen'. A search of the FAO statistics reported zero trade in this category of product from 2009-2013 (Most recent 5 year period). There are many other product categories that include rays, but they also include shark. No tracking of mobulid trade data is reported by O'Malley et al. (2016). Some mobulid trade data from other States sourced from market surveys; most recent articles -CITES 2016, O'Malley et al. 2016. Estimated global market 60.5- 120.5 tons dried gill plates (2011- 2013). Represents 130,000 individual mobulids: 96% devil rays - 109,000 *M. japanica* and other black gill mobula spp, 17, 000 *M. tarapacana* and 5, 000 *Manta spp.* (CITES 2016) Country confirms, revises	
Reported catches by other States	Industrial fisheries- no species-specific or Mobulid data available. Indonesia is not a member of SPC (Secretariat Pacific Community) that serves as WCPFC's Science Services Provider and Data Manager. From Heinrichs et al. 2011, number of mobulas/year from target and incidental catch: Sri Lanka-55,497 India-24,529 Peru-8,000 Indonesia-3,505 China-2,000 Mauritania-620 Philippines-80	Heinrichs et al. 2011, Pardo et a. 2016b
Catch trends and values	Dramatic declines in Indonesian mobulid (manta and devil rays) catches from 2001-05 to 2013-14 have been reported, with declines of between 50% and 100% in different parts of Indonesia (Lewis et al. 2015).	Lewis et al. 2015, CITES 2016, Pardo et al. 2016b

	Dramatic declines in catches have been reported in other regions of the world for *Mobula* spp: >50% in India; 78-89% in Pacific Ocean (Peru, Costa Rica; 61% in Atlantic Ocean (Guinea) (CITES 2016)	
Have RFBs and/or other States fishing this stock been consulted during or contributed data during this process?	Not yet	

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NEXT STEPS

The information collated in the above worksheets can now be passed to the Scientific Authority, so that the NDF process can begin with Step 2

Worksheet for Step 2

Question 2.1

What is the level of intrinsic biological vulnerability of the species?

- See pages 73–75 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**

- In the Worksheet below, circle **the level of vulnerability** associated with each **Intrinsic Biological Factor**. Default indicator/metric figures for listed shark and ray species are provided in **Annex 4** (pages 111-131). These may be inserted here, but they are derived from international standardised data and may not reflect local stock characteristics. Wherever possible, verified local data on stocks should be utilised.
- **Information refers to all four *Mobula* species, unless otherwise specified.**

Intrinsic biological factors *(see page 73 of the Guidance Notes)*	**Level of vulnerability** *(circle or highlight as appropriate)*	**Indicator/metric** *(see page 73 of the Guidance Notes)*
a) Median age at maturity	Low	
	Medium- ***M. japanica***	***M. japanica*** 5-6 years (females) estimated (Pardo et al. 2016a)
	High	
	Unknown- ***M. tarapacana, M. thurstoni, M. kuhlii***	
b) Median size at maturity	Low	
	Medium- ***M. thurstoni, M. kuhlii***	***M. thurstoni*** 150 cm DW (male) (White et al. 2006a, Indonesia)/ 154 cm DW (female) (Couturier et al. 2012, Mexico) ***M. kuhlii*** 115-119 cm DW (male)/female unknown (White et al. 2006a, Indonesia)
	High- ***M. japanica, M. tarapacana***	***M. japanica*** 210 cm DW (male)/~207 cm DW (female) Notarbartolo-di-Sciara 1987, Gulf of California) 198-205 cm DW (male)/ ~236 cm (female) (White et al. 2006a, Indonesia) ***M. tarapacana*** 234-252 cm DW (male)/ female unknown, likely >270 cm DW (White et al. 2006a, CITES 2016)
	Unknown	
c) Maximum age/longevity in an unfished population	Low	
	Medium- ***M. japanica***	***M. japanica***

		19 years (based on 1 band pair per year) (Laglbauer et al. unpublished data). 14 years (Cuevas-Zimbron et al. 2013) 15-20 years (Pardo et al. 2016a)
	High	
	Unknown- ***M. tarapacana, M. thurstoni, M. kuhlii***	
d) Maximum size	Low	
	Medium- ***M. thurstoni, M. kuhlii***	***M. thurstoni*** 180 cm DW (Couturier et al. 2012) ***M. kuhlii*** 120 cm (White et al. 2006a)
	High- ***M. japanica, M. tarapacana***	***M. japanica*** 310 cm DW (White et al. 2006b); 310 cm New Zealand, 284 cm Indonesia, 250 cm NE Pacific (Francis and Jones 2017) ***M. tarapacana*** 370 cm DW (Couturier et al. 2012)
	Unknown	
e) Natural Mortality rate (M)	Low	
	Medium	
	High- ***M. japanica***	***M. japanica*** median M = 0.087 year-1 (0.079-0.097) (Pardo et al. 2016a)
	Unknown- ***M. tarapacana, M. thurstoni, M. kuhlii***	
f) Maximum annual pup production (per mature female)	Low	
	Medium	
	High- ***M. japanica, M. tarapacana, M. thurstoni, M. kuhlii***	***M. japanica*** 1 pup per year (White et al. 2006a, Couturier et al. 2012). ***M. tarapacana***

		1 pup per year (Couturier et al. 2012) ***M. thurstoni*** 1 pup per year (Couturier et al. 2012) ***M. kuhlii*** I pup per year (Couturier et al. 2012) **All four species** Gestation assumed 1-3 years (Croll et al. 2016, Pardo et al. 2016a)
	Unknown	
g) Intrinsic rate of population increase (r)	Low	
	Medium	
	High- ***M. japanica***	***M. japanica*** Median = 0.077 year^{-1} (0.042-0.108 year-1) 1 band pair per year (Pardo et al. 2016a)
	Unknown- ***M. tarapacana, M. thurstoni, M. kuhlii***	
h) Geographic distribution of stock	Low	
	Medium- ***M. japanica, M. tarapacana***, ***M. thurstoni***	***M. japanica, M. tarapacana***, ***M. thurstoni*** Circumglobal tropics and subtropics ***M. japanica*** Possibly geographically isolated populations in north-east and south-west Pacific (Francis and Jones 2017).
	High- ***M. kuhlii***	***M. kuhlii*** Distribution restricted to Indo-West Pacific
	Unknown	
i) Current stock size relative to historic abundance	Low	
	Medium	

	High- ***M. japanica, M. tarapacana, M. thurstoni, M. kuhlii***	***M. japanica, M. tarapacana, M. thurstoni, M. kuhlii*** Declines in all four species over last 12 years in Indonesia ranging from 50-100% (Lewis et al. 2015, CITES 2016). Dramatic declines in all species reported in other regions of the world, including Philippines, India, Mozambique, Mexico (CITES 2016, Croll et al. 2016).
	Unknown	
j) Behavioural factors	Low	
	Medium	
	High- ***M. japanica, M. tarapacana, M. thurstoni, M. kuhlii***	***M. japanica*** Pelagic inshore and offshore (Couturier et al. 2012) Inshore pupping in Banyuwangi, Indonesia (Laglbauer et al. unpublished data). Possibly sparsely distributed and highly fragmented (CITES 2016). ***M. tarapacana*** Oceanic and occasionally coastal waters. Possibly sparsely distributed and highly fragmented (Couturier et al. 2012, CITES 2016) ***M. thurstoni*** Shallow coastal waters ***M. kuhlii*** Shelf and pelagic near continental coastal areas (Couturier et al. 2012). Aggregations observed in Raja Ampat and Komodo (B. Laglbauer pers. comm.) **All four species** Aggregating behaviour and very high at-vessel fishing mortality rates (Lawson et al. 2017, Pardo et al. 2016a, Francis and Jones 2017).

	Unknown	
h) Trophic level	Low	
	Medium-***M. japanica, M. tarapacana, M. thurstoni, M. kuhlii***	***M. japonica***, 3.43 (Sampson et al. 2010) ***M. tarapacana*** 3.8 (Froese and Pauly 2016) ***M. thurstoni*** 3.48 **(Sampson et al. 2010)** **M. kuhlii** 3.4 (Froese and Pauly 2016)
	High	
	Unknown	

SUMMARY for Question 2.1

Intrinsic biological vulnerability of species

Provide an assessment of the overall intrinsic biological vulnerability of the species (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:

All four species

All four mobulid species have a very low fecundity with *dramatic* populations declines reported in some regions of Indonesia. One species with sufficient data (*M. japanica*) has very low rate of population increase, similar to that of Manta Rays. This low rate of population increase is likely for the other three species (due to large size and low reproductive rates) and the dramatic declines combined with their low recovery rates makes them intrinsically highly vulnerable. This makes it difficult for the four species to recover from even low levels of fishing mortality.

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Lewis, S.A., Setiasih, N., Fahmi, Dharmadi, O'Malley, M.P., Campbell, S.J., Yusuf, M., and Sianipar, A.B. 2015. Assessing Indonesian manta and devil ray populations through historical landings and fishing community interviews. *PeerJ PrePrints* **3**, e1642. doi: 10.7287/peerj.preprints.1334v1.

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Pardo, S. A., Kindsvater, H. K., Cuevas-Zimbrón, E., Sosa-Nishizaki, O., Pérez-Jiménez, J. C., & Dulvy, N. K. 2016a. Growth, productivity, and relative extinction risk of a data-sparse devil ray. *Scientific Reports*, *6*.

Sampson, L., Galván-Magaña, F., De Silva-Dávila, R., Aguíñiga-García, S., & O'Sullivan, J. B. 2010. Diet and trophic position of the devil rays *Mobula thurstoni* and *Mobula japanica* as inferred from stable isotope analysis. *Journal of the Marine Biological Association of the United Kingdom*, *90*(05), 969-976.

White W.T., Giles J., Dharmadi D., Potter I.C. 2006a. Data on the bycatch fishery and reproductive biology of mobulid rays (Myliobatiformes) in Indonesia. *Fisheries Research* 82: 65-73.

Additional information is available from Manta Trust http://www.mantatrust.org

NEXT STEPS

- Go to **Section 2.2**

Worksheet for Step 2 (continued)

Question 2.2

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

- See pages 76–80 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- Based on existing stock assessments or conservation status assessments, evaluate the severity and geographic extent/scope of conservation concern, including reasons for the conclusions drawn and information on sources used.
- In the Worksheet below, circle the **level of severity/scope of concern** associated with each **Factor** using the descriptions in the indicator column in **Table B** in the Guidance Notes (**Annex 1**). In the column entitled Indicator in the Worksheet below, note briefly the reason for this assessment of level of severity/scope of concern. Further explanation (including information on sources used) can be provided in the boxes entitled '*Comments*'.
- **Information refers to all four *Mobula* species, unless otherwise specified.**

Conservation concern factors *(see page 78 of the Guidance Notes)*	**Level of severity/scope of concern** *(circle as appropriate)*	**Indicator/metric** *(see page 78 of the Guidance Notes)*
Conservation or stock assessment status	Low	
	Medium	**IUCN Status** ***Mobula japanica*** Global Near Threatened (2006) Southeast Asia Vulnerable (2006) ***Mobula tarapacana*** Vulnerable (2016) ***Mobula thurstoni*** Near Threatened (2016) UCN – Globally Vulnerable. No stock assessments have been done for this species (Marshall et al. 2011a)
	High	
	Unknown	IUCN Status ***Mobula kuhlii*** Data Deficient (2009)
	Comments: No stock assessments have been done for any of the four species (CITES 2016). Draft IUCN updated Red list for status for ***M. japanica*** may be Globally Vulnerable and Endangered in three of the six ocean regions: Southeast Asia, Eastern Pacific and Indian Ocean (CITES 2016)	
Population trend	Low	
	Medium	
	High	Population trend unmanaged, and while there are no historic baseline estimates, declines in Indonesia have been reported for *Mobula* spp of 50-100% in 12 years (slightly greater than estimated one generation time estimated for *Mobula* species of 10 years- CITES 2016). Dramatic declines have been reported in other regions of the world for

		Mobula spp: >50% in India; 78-89% in Pacific Ocean (Peru, Costa Rica; 61% in Atlantic Ocean (Guinea) (CITES 2016)
	Unknown	
	Comments:	
Geographic extent/scope of conservation concern	Low	
	Medium	
	High	Identified threats affect the entire global populations of the four species (CITES 2016)
	Unknown	
	Comments:	

SUMMARY for Question 2.2

Severity and geographic extent of the conservation concern

Provide an assessment of the overall severity and geographic extent of the conservation concern for this species or stock (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:

The four species are ranked in the IUCN Red List as Vulnerable, Near Threatened and Data Deficient with the potential for the species with the most data, M. *japanica*, to be moved to a higher threat level. Historic baselines are unknown for these four species, but all four species have exhibited dramatic declines in catches in recent years and the threat to the four species is high as they have a high value in international trade, with this threat affecting the entire global population which where known, is possibly sparsely distributed and highly fragmented.

References

CITES 2016. Proposal for amendment of Appendix II of CITES, CoP17, proposal 44. https://cites.org/sites/default/files/eng/cop/17/prop/060216/E-CoP17-Prop-44.pdf.

Lewis, S.A., Setiasih, N., Fahmi, Dharmadi, O'Malley, M.P., Campbell, S.J., Yusuf, M., and Sianipar, A.B. (2015) Assessing Indonesian manta and devil ray populations through historical landings and fishing community interviews. *PeerJ PrePrints* **3**, e1642. doi: 10.7287/peerj.preprints.1334v1

Marshall, A., Bennet, M.B., Hinojosa-Alvarez, S., Galvan- Magana, F., Harding, M., Stevens, G., and Kashiwagi, T. 2011a. *Manta birostris.* The IUCN Red List of Threatened Species. Version 2015.4. www.iucnredlist.org. Downloaded on 9 May 2016.

NEXT STEPS

- Go to **Step 3**

Worksheet for Step 3

Question 3.1

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

- See pages 81–84 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- In the Worksheet below, circle the **level of severity** associated with each trade pressure **Factor** using the descriptions in the Indicator column in **Table C** in the Guidance Notes (**Annex 1**). In the column entitled **Indicator/metric** in the Worksheet below, note briefly the reason for this assessment of level of trade pressure severity. Consider **all products in both domestic and international trade.**
- For each Factor, circle the **level of confidence** associated with each assessment of trade pressure severity. This involves an assessment of the **quality of the information** used to evaluate the severity of trade pressure on the stock of the species concerned.
- In the box entitled '*Reasoning*', provide reasons to justify the evaluation of severity of trade pressure and assessment of confidence level (i.e. quality of information used). Here, comments/information should also be provided on:
  - the sources of information used to evaluate severity of trade pressure;
  - whether a precautionary approach was taken to the evaluation of trade pressure severity (e.g. due to a lack of robust trade information to inform the evaluation);
  - whether the evaluation of trade pressure was adjusted (i.e. severity increased to a higher level) to take into account high intrinsic biological vulnerability/conservation concern assessed in **Step 2**;
  - whether information is particularly lacking and, if so, how this data availability may be improved (see also **Section 6.1** of the Guidance Notes in **Annex 1** for further advice).

Information refers to all four *Mobula* species, unless otherwise specified.

Factor *(see page 84 of the Guidance Notes)*	**Level of severity of trade pressure** **Country needs to fill this in** *(highlight or circle as appropriate)*	**Indicator/metric** *(see page 84 of the Guidance Notes)*
a) Magnitude of legal trade	Low	
	Medium	
	High	• Steady decline in mobulid landings despite increased effort across Indonesia for the gill plate trade (Lewis et al. 2015) • 2014-2015 interviews - Lamakera fishers – number of boats targeting mobulids had increased and fishers travelling further to target mobulids - Tanjung Luar progressive decline in Mobulid catch numbers (Lewis et al. 2015). • Increase in gill plate prices and declining catches. Lewis (et al. 2016) reported a slight decline in prices of gill plates in 2015

		in Indonesia, while another report stated that in 2015 manta gill plate prices declined but devil gill ray plate prices remained steady in Indonesia (Booth 2016) • Volume of gill plates traded globally doubled from 2011-2013 and was 96% Mobulids (*M. japanica*, *M. tarapacana*, *M thurstoni* (O'Malley et al. 2016). • Indonesia among 4 countries reported as most frequent gill plate source (O'Malley et al. 2016). • By 2015, main market in Guangzhou, China declined sharply (reportedly in response to conservation campaigns, government policy) but Hong Kong gill plate sales rose dramatically 2011-2015 (O'Malley et al. 2016). • 2014, 64% of global sellers reported decreasing supply, 36% reported stable supply of gill plates reported from Indonesia (O'Malley et al. 2016).
	Unknown	
	Level of confidence *(circle as appropriate): (see page 83 of Guidance Notes)* Low Medium High	
Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of trade pressure been increased in light of the assessment in Step 2?) Community interviews estimated dried gill plate and meat prices for two species, *M. japanica* and M. *tarapacana* so species identification of these products must be possible (Lewis et al. 2015). **Severity of trade pressure on all four species of mobulids in Indonesia is high. All four species have a high intrinsic vulnerability and trade pressure for the high value gill plates continues to be exerted.**		
b) Magnitude of illegal trade	Low	
	Medium	
	High	
	Unknown	

	Level of confidence *(circle as appropriate): (see page 83 of Guidance Notes)*		
	Low	Medium	High

Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of trade pressure been increased in light of the assessment in Step 2?)

It is currently not illegal to trade gill plates from Mobula species in Indonesia (but is illegal in Indonesia to trade gill plates from the two Manta species).

Indonesian fishers from Tanjunbg Luar reported illegally targeting mobulids in northern Australian waters (Lewis et al. 2015). A study of illegal manta ray gill plate trade in Indonesia (Booth 2016) may help inform assessment of the potential for illegal trade of mobulid gill plates, if trade in mobulid gill plates is regulated.

References

Booth, H. 2016. Evaluating the impact of wildlife trade policy: the case of illegal manta ray take and trade in Indonesia. Partial fulfilment of MSc, Imperial College, London.

Lewis, S.A., Setiasih, N., Fahmi, Dharmadi, O'Malley, M.P., Campbell, S.J., Yusuf, M., and Sianipar, A.B. (2015) Assessing Indonesian manta and devil ray populations through historical landings and fishing community interviews. *PeerJ PrePrints* **3**, e1642. doi: 10.7287/peerj.preprints.1334v1.

O'Malley, M.P., Townsend, K.A., Hilton, P., Heinrichs, S., and Stewart, J.D. (2016) Characterization of the trade in manta and devil ray gill plates in China and South-east Asia through trader surveys. *Aquatic Conservation: Marine and Freshwater Ecosystems*, n/a-n/a. doi: 10.1002/aqc.2670

NEXT STEPS

- Add notes in the Worksheet for **Section 6.1** on improvements in trade data availability/monitoring required to evaluate trade pressure under **Section 3.1**.
- GO TO **Section 3.2** to evaluate fishing pressures.

Worksheet for Step 3

Question 3.2

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

- See pages 85–90 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- In the Worksheet below, circle the **level of severity** associated with each fishing pressure **Factor** using the descriptions in the Indicator column in **Table D** in the Guidance Notes (**Annex 1**). In the column entitled **Indicator/metric** in the Worksheet below, note briefly the reason for this assessment of level of fishing pressure severity. Consider **all fishing methods and gears that** interact with the shark stock concerned.
- For each Factor, circle the **level of confidence** associated with each assessment of fishing pressure severity. This involves an assessment of the **quality of the information** used to evaluate the severity of fishing pressure on the stock of the species concerned.
- In the box entitled '*Reasoning*', provide reasons to justify the evaluation of severity of fishing pressure and assessment of confidence level (i.e. quality of information used). Here, comments/information should also be provided on:
  - the sources of information used to evaluate severity of fishing pressure;
  - whether a precautionary approach was taken to the evaluation of fishing pressure severity (e.g. due to a lack of robust information to inform the evaluation);

- o whether the evaluation of fishing pressure was adjusted (i.e. severity increased to a higher level) to take into account high intrinsic biological vulnerability/conservation concern assessed in **Step 2**;
- o whether information is particularly lacking and, if so, how this data availability may be improved (see also **Section 6.1** of the Guidance Notes in **Annex 1** for further advice).

Information refers to all four *Mobula* species, unless otherwise specified.

Factor *(see page 89 of the Guidance Notes)*	**Level of severity of fishing pressure** **Country needs to fill this in and confirm where information is provided** *(highlight or circle as appropriate)*	**Indicator/metric** *(see page 89 of the Guidance Notes)*
a) Fishing mortality (retained catch)	Low	
	Medium	
	High	Fishing mortality (F) and Natural Mortality (M) estimated for M. japanica from small scale artisanal Mexican fishery (Pardo et al. 2016a). F =0.110 year-1. M = 0.077 $year^{-1}$ (0.042-0.108 year-1). F=1.4M hence a high proportion of stock is removed by fishing activities
	Unknown	
	Level of confidence *(circle as appropriate): (see page 88 of Guidance Notes)* Low Medium High	

Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of fishing pressure been increased in light of the assessment in Step 2?)

Fishing mortality was estimated as greater than natural mortality for *M. japanica* which was concluded as "*being fished at a rate high enough to lead to eventual depletion*" (Pardo et al. 2015, page 9). This data is also used to conclude '*there is the potential to drive mobula rays to extinction under low levels of fishing mortality*' (CITES 2016, page 5). This is data for one of the four species for a small scale Mexican artisanal fishery, however as the four species have similar life histories it is applicable as a guide for the fishing and natural mortality of the other three species.

References

CITES 2016. Proposal for amendment of Appendix II of CITES, CoP17, proposal 44. https://cites.org/sites/default/files/eng/cop/17/prop/060216/E-CoP17-Prop-44.pdf

Pardo, S. A., Kindsvater, H. K., Cuevas-Zimbrón, E., Sosa-Nishizaki, O., Pérez-Jiménez, J. C., & Dulvy, N. K. 2016a. Growth, productivity, and relative extinction risk of a data-sparse devil ray. *Scientific Reports*, *6*.

b) Discard mortality	Low	
	Medium	
	High	Target mobulid fisheries in Indonesia – no animals are returned to the water (Lewis et al. 2015). Incidental catch of mobulids-release rates unknown. Recent study of post-release survival rates of *M. japanica* showed low post-release survival (nine tagged, seven tagged animals reported data and four of the seven animals died within 2-4 days of release even though they appeared in good condition on release) (Francis and Jones 2016)
	Unknown	
	Level of confidence *(circle as appropriate): (see page 88 of Guidance Notes)* Low Medium High	

Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of fishing pressure been increased in light of the assessment in Step 2?)

This is data for one of the four species, however as the four species have similar life histories it is applicable as a guide for the discard mortality of the other three species.

Need to improve reporting by catch, bycatch, discard and landings data by species and weight.

References

Francis, M.P., and Jones, E.G. (2017) Movement, depth distribution and survival of spinetail devilrays (*Mobula japanica*) tagged and released from purse-seine catches in New Zealand. Aquatic Conservation: Marine and Freshwater Ecosystems 27(1), 219-236. doi: 10.1002/aqc.2641.

c) Size/age/sex selectivity **Country needs to fill this**	Low	
	Medium	
	High	
	Unknown	
	Level of confidence *(circle as appropriate): (see page 88 of Guidance Notes)* Low Medium High	

Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of fishing pressure been increased in light of the assessment in Step 2?)

d) Magnitude of illegal, unreported and unregulated (IUU) fishing **Country needs to fill this**	Low	
	Medium	
	High	
	Unknown	
	Level of confidence *(circle as appropriate): (see page 88 of Guidance Notes)* Low Medium High	

Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of fishing pressure been increased in light of the assessment in Step 2?)

NEXT STEPS

- Add notes in the Worksheet for **Section 6.1** on improvements in fisheries data availability/monitoring required to evaluate fishing pressure under **Section 3.2**.
- GO TO **Section 4** to evaluate the extent to which existing management measures are effective in mitigating the risks/pressures/concerns identified in **Steps 2 and 3**.

Worksheet for Step 4

Preliminary stage

Compile information on existing management measures

In the table below, provide a list of existing generic and species-specific management measures in place for the stock or 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, the sources of information used and any other comments if appropriate.

A table of commonly used generic and species-specific fisheries management measures is provided in **Annex 5** (page 132). It is **advisable to consult Annex 5 prior to completing the Worksheets in this section, in conjunction with context-specific fisheries management advice.**

Annex 5 has harvest-related management measures under headings of - limited entry, fishing time restrictions, fishing gear restrictions, permanent area closures, no-take marine protected area, total allowable catch, individual quota, fishing trip limits, prohibited retention, size limits, protection of breeding females, product-form restrictions, move-on provisions, bycatch reduction devices.

Annex 5 has trade-related measures under headings of – documentation schemes, export quotas.

Information refers to all four *Mobula* species, unless otherwise specified.

Existing management measures *(see Annex 5 for examples)*	**Is the measure generic or species-specific?**	**Descriptions/comments/sources of information**
(SUB-)NATIONAL **Country needs to confirm and add any additional management measures relevant to mobulids**		
Governor of Raja Ampat, Indonesia Regency (2012), Regulation 9/2012	Generic to sharks and rays	Prohibits capture of sharks, rays and other species-protects All 4 mobula species
Regulation of the Minister of Marine Affairs and Fisheries 4/KEPMEN-KP/014	Manta genera specific	Issued February 2014 (Booth 2016). Both species of manta rays (M. birostris and M. alfredi) are fully protected in Indonesian waters
Indonesian government (1998?)	Generic to manta and mobula rays	Ban on large trap nets set in a migratory channel Lembeh Strait, northeast Sulawesi (Lewis et al. 2015)
National Plan of Action for the Conservation and Management of Sharks	Generic to sharks and rays	Issued in 2010 by Directorate General of Capture Fisheries, Directorate of Fish Resources, Ministry of Marine Affairs and Fisheries
Ministry of Fisheries annual shark catch quotas	(Not sure if it applies to any Mobula species)	See Dharmadi et al. 2015

Presidential Decree 39/1980 concerning the eradication of trawlers from Indonesian waters	Generic to all fish resources	National policy intended to maintain the sustainability of fish resources, including sharks.
Presidential Decree 85/1982 concerning obligation to use turtle excluder devices in the shrimp-trawl bycatch reduction programme	Generic to all fish resources	Applies to operation of shrimp trawlers in Kai, Tanimbar, Aru and Irian Jaya waters, as well as the Arafura Sea, eastward of 130° E. This decree could be used to reduce bycatch of sharks and rays.
Regulation of the Minister of Marine Affairs and Fisheries 3/2010 and 4/2010	Generic to all protection of species, including sharks, listed on CITES Appendices	See Dharmadi et al. 2015 (Table 2)
REGIONAL/INTERNATIONAL		
WCPFC CMM2010-07	Generic to sharks (implemented January 2008)	Requires full utilisation of sharks, or live release of unused sharks, and maintenance of a 5% fin to carcass weight ratio (http://www.wcpfc.int/sharks)
WCPFC CMM2011-04	Specific to Oceanic whitetip sharks (OCS) (implemented January 2013)	Prohibits retention, transhipping, storing or landing of OCS and calls for release with as little harm as possible (http://www.wcpfc.int/sharks)
WCPFC CMM2012-04	Specific to Whale sharks (implemented January 2014)	Prohibits purse seine setting on a whale shark if it is sighted prior to the set and calls for safe release of the whale shark if it is inadvertently encircled in the net (http://www.wcpfc.int/sharks)
WCPFC CMM2013-05	Generic to sharks (issued December 2013)	Requires daily catch and effort reporting, including sharks, when vessels operate in the high seas
WCPFC CMM2013-08	Specific to Silky sharks (implemented July 2014)	Prohibits retention, transhipping, storing or landing of Silky sharks and calls for release with as little harm as possible (http://www.wcpfc.int/sharks)
WCPFC CMM2014-05	Generic to sharks (implemented July 2015)	Reduce use of wire traces and shark lines in tuna and billfish longline fisheries and dedicated shark fisheries require management plans (https://www.wcpfc.int/conservation-and-management-measures)

WCPFC CMM2015-07	Generic to all CMMs and hence also generic to sharks (effective only for 2016 and 2017, pending review in 2017)	WCPFC Compliance Monitoring Scheme (CMS) to ensure implementation and compliance with CMMs (https://www.wcpfc.int/conservation-and-management-measures)
IATTC C-15-04	Specific to Manta and devil rays (implemented August 2016)	Prohibits retention and trade and promotes live release of manta and devil rays (exceptions made for small scale fisheries (http://www.iattc.org/PDFFiles2/Resolutions/C-15-04-Conservation-of-Mobulid-Rays.pdf)
REC.CM-GFCM/36/2012/3	Specific to *Mobula mobular*	Prohibits take of *Mobula mobular* in GFCM area (http://www.fao.org/3/a-ax385e.pdf) pursuant to *M.* mobular listed on Annex II of the SPA/BD Protocol of the Barcelona Convention (http://www.rac-spa.org/sites/default/files/annex/annex_2_en_2013.pdf)

NEXT STEPS

References

Booth, H. 2016. Evaluating the impact of wildlife trade policy: the case of illegal manta ray take and trade in Indonesia. Partial fulfilment of MSc, Imperial College, London.

Dharmadi, Fahmi, Satria, F. 2015. Fisheries management and conservation of sharks in Indonesia. *African Journal of Marine Science,* 37 (2), 249-258.

- GO TO **Question 4.1(a).**

Worksheet for Step 4 (continued)

Question 4.1(a)

Are existing management measures appropriately designed and implemented to mitigate the pressures affecting the stock/population of the species concerned?

- See pages 91–92 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- Firstly assess whether **appropriately designed** management measures are in place to mitigate the pressures affecting the stock/population of the species concerned:
  - From the '**Preliminary stage**' Worksheet above, transfer information on existing management measures into the Worksheet below, alongside the relevant fishing and trade pressure Factor(s) the measures(s) can help to mitigate (as evaluated in **Step 3**).
  - Use the information in the table of commonly used generic and species-specific fisheries management measures in **Annex 5** to determine which pressures the existing management measures in place can help to address/mitigate.
- Next, assess whether the existing management measures in place are being **implemented**:
  - In the column entitled "Relevant Monitoring, Control and Surveillance (MCS) measure(s)", include information on existing MCS measures that are relevant to the implementation of the existing management measures identified. **Annex 5** provides information on MCS measures that can help to secure compliance with commonly used fisheries management measures.
  - Second, based on the explanations provided in the column in the Worksheet below entitled "Overall assessment of compliance regime", make a judgement as to whether the existing management measure(s) identified is/are being implemented (i.e. adequately enforced/complied with).

NOTE: in some circumstances where the fishing/trade pressure severity was assessed as "Low" for any of the Factors in **Step 3**, mitigation may not be required (see also the Guidance Notes for Question 4(a) in **Annex 1**). In such cases, "Not applicable" can be noted under the "Existing management measure(s)" and "Relevant MCS measure(s)" columns in the Worksheet (for that trade/fishing pressure Factor).

- Provide reasons to justify the assessments made in this Worksheet in the box entitled "Reasoning/comments", including any sources used.
- Where certain management measures are being implemented but others are not, this information can also be included under "Reasoning/comments". Also note down any considerations, issues or shortcomings relating to any of the management measures identified that will need to be kept in mind when completing the Worksheet for **Question 4.1(b)** below

Information refers to all four *Mobula* species, unless otherwise specified.

Factor	**Existing management measure(s)**	**Relevant monitoring, control and surveillance (MSC) measure(s)**	**Overall assessment of compliance regime** *(tick as appropriate)*	
TRADE PRESSSURE **Country needs to fill this in**				
a) Magnitude of legal trade			Unknown (no information on compliance)	
			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	
	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?) **Not aware of any management measures to address trade pressure on mobulids- country to confirm**			
b) Magnitude of illegal trade			Unknown (no information on compliance)	
			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	
	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?) **Not aware of any management measures to address trade pressure on mobulids- country to confirm**			
FISHING PRESSSURE **Country needs to fill this in**				
			Unknown (no information on compliance)	

a) Fishing mortality (retained catch)			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	
	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?) **Not aware of any management measures to address fishing mortality on mobulids- country to confirm**			
b) Discard mortality			Unknown (no information on compliance)	
			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	
	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?) **Not aware of any management measures to address discard mortality on mobulids- country to confirm**			
c) Size/age/sex selectivity			Unknown (no information on compliance)	
			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	
	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?)			

	Not aware of any management measures to address discard selectivity on mobulids- country to confirm			
d) Magnitude of IUU fishing			Unknown (no information on compliance)	
			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	
	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?) **Not aware of any management measures to address IUU on mobulids- country to confirm**			

NEXT STEPS

- **Go to Question 4.1(b)**

Worksheet for Step 4 (continued)

Question 4.1(b)

Are existing management measures effective (or likely to be effective) in mitigating the pressures affecting the stock/population of the species concerned?

- See pages 93–94 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- From the **Worksheet for Question 4.1(a)** above, transfer information on existing management measures currently in place into the column in the table below entitled "Existing management measure(s)", alongside the relevant fishing/trade pressure Factor.

NOTE as above for **Question 4.1(a)**: in some circumstances where the fishing/trade pressure severity was assessed as "Low" for any of the Factors in **Step 3**, mitigation may not be required (see also the Guidance Notes for **Question 4(b)** in **Annex 1**). In such cases, "Not applicable" can be noted under the "Existing management measure(s)" and "Relevant MCS measure(s)" columns in the Worksheet (for that trade/fishing pressure Factor).

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

    1. Data are collected and analysed to inform management decisions?

    2. Management is consistent with expert advice?

- Based on the responses to these questions, make a judgement as to whether the management measures(s) identified is/are effective/likely to be effective. Provide reasons to justify this assessment. For example, is effectiveness being compromised by poor design of the management measures or by their inadequate implementation (see responses in the Worksheet for **Question 4.1(a)** above)? Include information on any sources used in the box entitled "Reasoning/comments".
- Note that for each fishing/trade pressure identified, there may be more than one management measure currently in place aimed at mitigating the pressure. When assessing whether the management of a particular fishing/trade pressure is effective/likely to be effective, the aim should be to consider the combined effect of all relevant measures in mitigating the pressure identified.

Information refers to all four *Mobula* species, unless otherwise specified.

Factor	**Existing management measure(s)**	**Are relevant data collected and analysed to inform management**	**Is management consistent with expert advice?** *(tick as appropriate)*

		decisions? (e.g. landings, effort, fisheries independent data) *Tick as appropriate*			
TRADE PRESSSURE Country needs to fill this in					
a) Magnitude of legal trade		No data OR data are of poor quality OR data are not analysed (adequately) to inform management		No expert advice on management identified	
		Limited relevant data are collected AND analysed to inform management		Not consistent	
		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	
		Comprehensive data collected AND analysed to inform management		Consistent	
	Management measure(s) effective/likely to be effective? (circle as appropriate) Yes Partially No Insufficient information				
	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?) **Not aware of any management measures and data collection to address and inform trade pressure on mobulids- country to confirm**				

TRADE PRESSSURE Country needs to fill this in					
b) Magnitude of illegal trade		No data OR data are of poor quality OR data are not analysed (adequately) to inform management		No expert advice on management identified	
		Limited relevant data are collected AND analysed to inform management		Not consistent	
		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	
		Comprehensive data collected AND analysed to inform management		Consistent	
	Management measure(s) effective/likely to be effective? (circle as appropriate) Yes Partially No Insufficient information				
	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?) **Not aware of any management measures and data collection to address and inform trade pressure on mobulids- country to confirm**				
FISHING PRESSSURE Country needs to fill this in					
		No data OR data are of poor quality OR data are not		No expert advice on management identified	

a) Fishing mortality (retained catch)		analysed (adequately) to inform management			
		Limited relevant data are collected AND analysed to inform management		Not consistent	
		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	
		Comprehensive data collected AND analysed to inform management		Consistent	
	Management measure(s) effective/likely to be effective? (circle as appropriate) Yes Partially No Insufficient information				
	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?) **Not aware of any management measures and data collection to address and inform fishing mortality on mobulids- country to confirm**				
FISHING PRESSSURE Country needs to fill this in					
b) Discard mortality		No data OR data are of poor quality OR data are not analysed (adequately) to inform management		No expert advice on management identified	

		Limited relevant data are collected AND analysed to inform management		Not consistent	
		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	
		Comprehensive data collected AND analysed to inform management		Consistent	
	Management measure(s) effective/likely to be effective? (circle as appropriate) Yes Partially No Insufficient information				
	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?) **Not aware of any management measures and data collection to address and inform discard mortality on mobulids- country to confirm**				
FISHING PRESSSURE					
c) Size/age/sex selectivity		No data OR data are of poor quality OR data are not analysed (adequately) to inform management		No expert advice on management identified	
		Limited relevant data are collected AND analysed to inform management		Not consistent	

		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	
		Comprehensive data collected AND analysed to inform management		Consistent	
	Management measure(s) effective/likely to be effective? (circle as appropriate) Yes Partially No Insufficient information				
	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?) **Not aware of any management measures and data collection to address and inform discard selectivity on mobulids- country to confirm**				
d) Magnitude of IUU fishing		No data OR data are of poor quality OR data are not analysed (adequately) to inform management		No expert advice on management identified	
		Limited relevant data are collected AND analysed to inform management		Not consistent	
		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	
		Comprehensive data collected AND analysed to inform management		Consistent	

	Management measure(s) effective/likely to be effective? (circle as appropriate) Yes Partially No Insufficient information
	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?) **Not aware of any management measures and data collection to address and inform IUU on mobulids- country to confirm**

NEXT STEPS

- Add notes in the Worksheet for **Section 6.1** on improvements in data availability/monitoring required to evaluate the effectiveness/likely effectiveness of management under **Question 4.1(b**).
- Add notes in the Worksheet for **Section 6.2** on improvements in management (including compliance systems) required to more fully mitigate the pressures impacting the stock/population of the shark species concerned.
- Go to **Step 5**

Worksheet for Step 5

Question 5.1

Based on the outcomes of the previous steps, is it possible to make a positive NDF (with or without associated conditions) or is a negative NDF required?

- See pages 95–97 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- Transfer all results from **Steps 2–4** to the Table below by circling the appropriate descriptors.
  - From the **Worksheets for Questions 2.1 and 2.2** above, transfer the **level of vulnerability** and **level of severity/scope of conservation concern** into the Worksheet below.
  - From the **Worksheets for Questions 3.1 and 3.2** above, transfer the **level of severity** for each trade and fishing pressure Factor into the second column in the Worksheet below and the **level of confidence** associated with each evaluation of severity into the third column in the Worksheet below.
  - Based on the information contained in the **Worksheets for Questions 4.1(a) and 4.1(b),** state in the Worksheet below whether the **existing management measures are effective/likely to be effective** at mitigating each of the pressures identified (taking into account whether they are **appropriately designed** and **being implemented**), or whether there is insufficient information to make such an assessment.
- Based on the information generated and evaluations made in the previous **Steps**, the Scientific Authority now has to decide whether to make a positive NDF for the export (with or without mandatory conditions), or a negative NDF. A decision tree to assist in this decision-making process is provided in the Guidance Notes in **Annex 1**.
- The final decision regarding the NDF should be indicated in the relevant box at the end of this Worksheet. Under "Reasoning/comments" include justification for the decision made and describe any **mandatory conditions** (for a positive NDF) and/or **recommendations as to further measures** (e.g. improvements in monitoring and/or management required – relevant for both positive and negative NDFs).

Information refers to all four *Mobula* species, unless otherwise specified.

Step 2: Intrinsic biological vulnerability and conservation concern

Intrinsic biological vulnerability **(Question 2.1)**	High	Medium	Low	Unknown
Conservation concern **(Question 2.2)**	High	Medium	Low	Unknown

Step 3: Pressures on species **Country needs to fill some of this in**			**Step 4: Existing management measures** **Country needs to fill this in**
Pressure	**Level of severity (Questions 3.1 and 3.2)**	**Level of confidence (Questions 3.1 and 3.2)**	**Are the management measures effective* at addressing the concerns/pressures/impacts identified? (Question 4.1b)**

			Taking into account the evaluation of management appropriateness and implementation under Question 4.1a
Trade pressures Country needs to fill some of this in			
a) Magnitude of legal trade	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable
a) Magnitude of illegal trade **Country needs to fill this in**	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable
** Only to be used where the trade pressure severity was assessed as "Low" for any of the Factors in **Step 3** and a judgement is made that the impacts on the shark stock/population concerned are so low that mitigation is not required.			
Fishing pressures Country needs to fill some of this in			
a) Fishing mortality (retained catch)	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable
b) Discard mortality	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable
c) Size/age/sex selectivity of fishing **Country needs to fill this in**	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable

d) Magnitude of IUU fishing **Country needs to fill this in**	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable

** Only to be used where the fishing pressure severity was assessed as "Low" for any of the Factors in **Step 3** and a judgement is made that the impacts on the shark stock/population concerned are so low that mitigation is not required.

A) Can a positive NDF be made?	**YES** – *go to B*	**NO** – *go to **Step 6** and list recommendations for measures to improve monitoring/management under Reasoning/comments below*
B) Are there any mandatory conditions to the positive NDF?	**YES -** *list under Reasoning/comments below and go to C*	**NO** – *go to C*
C) Are there any other further recommendations? *(e.g. for improvements to monitoring/management)*	**YES** - *go to **Step 6** and list recommendations for measures to improve monitoring/management under Reasoning/comments below*	**NO**

Reasoning/comments (include justification for decision made and information on mandatory conditions and/or further recommendations)

NEXT STEPS

- OPTION 1: If improvements in monitoring or management are required (whether in the case of a **positive or negative NDF**) go to **Step 6**
- OPTION 2: If no improvements in monitoring or management are required, make a **positive NDF** and stipulate any **mandatory conditions**, if appropriate, to the Management Authority and any other relevant bodies.

Worksheet for Step 6

Further measures

Section 6.1

Improvement in monitoring or information required

In the space below, authorities are encouraged to list the improvements in monitoring or information that are required to address cases where:

(i) The severity of trade/fishing pressures has been assessed as unknown.
(ii) The level of confidence in the evaluation of trade/fishing pressures is low.
(iii) There is insufficient information on the effectiveness of management.

(iv)

Recommendations should be made in **consultation with the national fisheries management agency** and should be as **specific as possible** to address any gaps/shortcomings identified with **clearly defined objectives**. Time-frames for implementation should be specified where possible, including with regard to the review of progress on implementation.

See pages 98-99 of **Annex 1** for additional Guidance Notes on completing this Worksheet.

Information refers to all four *Mobula* species, unless otherwise specified.

Country needs to confirm, revise

Improvements in fisheries data availability/monitoring required to evaluate fishing pressure

Improve reporting of bycatch, bycatch, discard and landings data by species and weight.

From Lawson et al. 2016 (page 16-17): Fisheries assessment and management *(refers to both devil and manta rays, but consider this for just devilrays)*

Devil and manta ray populations and fisheries in which they are taken are monitored and managed for long-term sustainability.

Unmanaged and mostly unmonitored fisheries pose the greatest threat to devil and manta rays. Standardized data collection is needed to assess population trends and inform conservation measures to prevent overexploitation from targeted and incidental mortality.

Actions

5.1 Create incentives for government policy makers to take action on devil and manta ray conservation and management through positive

international media opportunities.

5.2 Collate historical landings and market data.

5.3 Develop standardized guidelines for fisheries data collection (e.g., species identification and sizing, tissue samples, reproductive status) and

monitoring (e.g., landings, discards, fishing effort, gear types).

5.3.1 Develop observer practices that are specific to devil and manta rays (e.g., tissue samples, reproductive data, size estimation, etc.).

5.3.2 Develop a multilingual identification guide/webpage/app to assist observers/customs officers/scientists/NGOs in identification, data

collection, etc.

5.4 Adopt a standardized data collection system across national, state, and/or regional fisheries departments that gathers information on landings,

bycatch, and discards using at-sea and landing site observer programs.

5.5 Report national species-specific landings of devil and manta rays to FAO and/or RFMOs.

5.6 Determine areas of overlap between devil and manta ray distributions and relevant fisheries to identify priority areas to minimize bycatch.

5.7 Estimate the total annual volume of devil and manta ray catch in fisheries bycatch globally, by region, and by gear type.

5.8 Develop gears and fishing practices that minimize bycatch.

5.8.1 Review handling and release procedures using different gears and develop and implement best practice procedures where they don't exist.

5.8.2 Produce education and outreach materials about safe release and handling.

5.8.3 Reduce purse seine sets in locations, during times of year, and in set types where mobulids have been identified as bycatch.

5.9 Estimate post-release mortality across various sizes, species, and gear types for devil and manta rays.

5.10 Develop stock assessment methods for devil and manta rays and coordinate the appropriate agencies, NGOs, and/or fisheries scientists to

undertake assessments.

5.11 Identify and prioritize species and stocks that require assessment within each RFMO, region, and nation.

5.12 Regularly assess and report the status of devil and manta ray fisheries and estimate sustainable catch levels in each RFMO, region, and nation.

5.13 Implement and enforce protections for devil and manta rays to maintain or recover stocks to ecologically relevant levels in each RFMO, region,

and nation.

5.14 Harmonize management arrangements between adjacent nations to ensure consistent assessment of shared stocks and to coordinate data

collection.

5.15 Ensure that important devil and manta ray aggregation sites are protected through existing and/or revised spatial and temporal management

measures in each RFMO, region, and nation.

From Francis and Jones 2016 (abstract): Recommendations for reducing purse seine mortality of mobulid rays are avoiding areas of high ray abundance, avoiding setting on ray-associated tuna schools, and adopting best-practice methods of returning rays to the sea from the net or vessel *(see last paragraph of paper- page 235).*

Improvements in trade data availability/monitoring required to evaluate trade pressure

From Mundy-Taylor et al. 2014 (page 28):

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 CITES-listed shark species; and

- improving trade monitoring, facilitated by the introduction of species-specific Customs codes

From Lawson et al. 2016 (page 17): Trade regulation *(refers to both devil and manta rays, but consider this for just devilrays)*

Imports and exports of devil and manta ray products are traceable, monitored, and regulated for sustainability.

Manta rays were listed under CITES Appendix II in 2013, and devil rays in 2016, meaning that CITES Parties are obliged to monitor and regulate international imports and exports of manta parts, including gill plates. Supporting efforts to monitor and regulate trade is critical to identifying sources of demand and supply and preventing unsustainable levels of trade.

Actions

6.1 Enforce and implement legislation of international conservation agreements for devil and manta rays (e.g., CITES, CMS, and RFMOs).

6.2 Develop and disseminate identification guides for traded devil and manta ray products.

6.3 Ensure the adoption of customs codes for (a) CITES-listed species, and (b) gill plate products.

6.4 Develop a CITES Non-Detriment Finding (NDF) guide to support the implementation of CITES listings in key devil and manta ray fishing

nations.

6.5 Produce country-of-origin standardized certificates for all gill plate exporting and importing states.

6.6 Implement port-state controls (the inspection of foreign vessels by official officers) for all range states.

6.7 Provide catch documentation for individual consignment of gill plates by issuing authorities.

6.8 Conduct market surveys at regular intervals.

6.9 Compare and confirm market survey data with trade data reported by exporters and importers.

6.10 Propose Mobula spp. for inclusion on Appendix II of CITES in collaboration with NGOs, scientists, and devil and manta ray range states.

References

Francis, M.P., and Jones, E.G. (2017) Movement, depth distribution and survival of spinetail devilrays (*Mobula japanica*) tagged and released from purse-seine catches in New Zealand. Aquatic Conservation: Marine and Freshwater Ecosystems 27(1), 219-236. doi: 10.1002/aqc.2641

Lawson, J.M., Fordham, S.V., O'Malley, M.P., Davidson, L.N.K., Walls, R.H.L., Heupel, M.R., Stevens, G., Fernando, D., Budziak, A., Simpfendorfer, C.A., Ender, I., Francis, M.P., Notarbartolo di Sciara, G., and Dulvy, N.K. 2017. Sympathy for the devil: a conservation strategy for devil and manta rays. *PeerJ* 5, e3027. doi: 10.7717/peerj.3027.

Mundy-Taylor, V., Crook, V., Foster, S., Fowler, S., Sant, G., and Rice, J. 2014. CITES Non-detriment findings guidance for shark species. 2nd, revised version. A framework to assist Authorities in making Non-detriment Findings (NDFs) for species listed in CITES Appendix II. Report prepared for the Germany Federal Agency for Nature Conservation (Bundesamt fur Naturschutz, BfN). Available at https://cites.org/eng/prog/shark/Information_resources_from_Parties_and_other_stakeholders.

Section 6.2

Improvement in management is required

In the space below, authorities are encouraged to list the improvements in management that are required to address cases where management has been assessed as partially effective or ineffective at addressing any of the concerns/pressures/impacts identified, particularly where a fishing or trade pressure is assessed as medium or high (confidence levels: low, medium or high).

As noted above for **Section 6.1**, recommendations should be made in **consultation with the national fisheries management agency** and should be as **specific as possible** to address any gaps/shortcomings identified with **clearly defined objectives**. Time-frames for implementation should be specified where possible, including with regard to the review of progress on implementation

See page 100 of **Annex 1** for additional Guidance Notes on completing this Worksheet.

Information refers to all four *Mobula* species, unless otherwise specified.

Country needs to fill this in

Management measures can include a wide range of tools:

Harvest-related: limited entry, fishing time restrictions, fishing gear restrictions, permanent area closures, no-take marine protected area, total allowable catch, individual quota, fishing trip limits, prohibited retention, size limits, protection of breeding females, product-form restrictions, move-on provisions, bycatch reduction devices.

Trade-related measures – documentation schemes, export quotas (see 6.1).

Dharmadi et al. (2015) recommended options for improving sustainable management of shark fisheries in Indonesia, some of which would also be applicable and improve management of the four mobulid species, that is:

Introduction of size limits, regulation of gear types, limiting catch volumes, setting quotas, protecting critical habitat.

References:

Dharmadi, Fahmi, Satria, F. 2015. Fisheries management and conservation of sharks in Indonesia. *African Journal of Marine Science*, 37 (2), 249-258.

Appendix C Draft Indonesian NDF Template Scalloped Hammerhead

Note: Two other separate templates were drafted for Great Hammerhead and Smooth Hammerhead and are available from the author on request.

DRAFT
Indonesia Non-Detriment Finding Template for the *Sphryna lewini*

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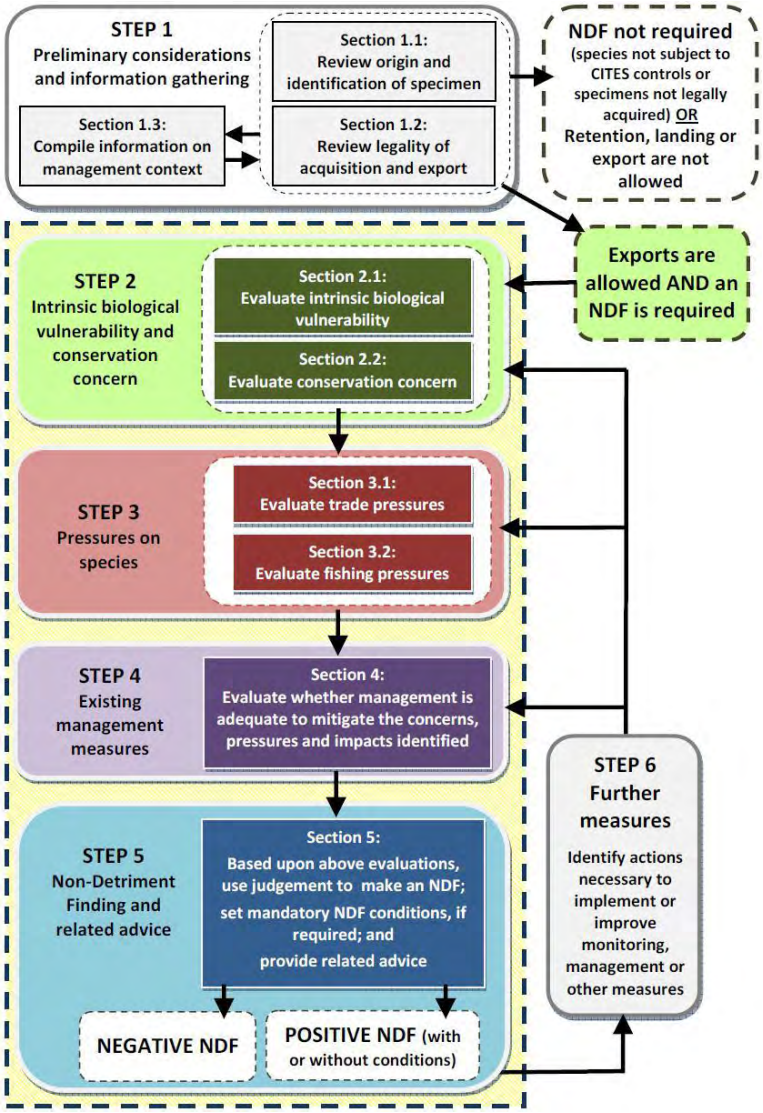
March 2017

Draft Indonesia Non-detriment finding (NDF) for Scalloped Hammerhead *Sphyrna lewini*

The Scalloped Hammerhead is listed on CITES Appendix II and trade in this species requires that the CITES Management Authority of the exporting country (or a designated competent authority in countries that are not Parties to CITES) must verify that the species was legally obtained. The CITES Scientific Authority of the exporting country must advise that export will not be detrimental to the survival of the species (a non-detriment finding).

The following Worksheets follow a six step process for the NDF that is illustrated in this Flow Chart from the Shark NDF Guidance[7]. The Worksheets are supported at each step by information in the Shark NDF Guidance.



[7] Mundy-Taylor, V., Crook, V., Foster, S., Fowler, S., Sant, G., and Rice, J. 2014. CITES Non-detriment findings guidance for shark species. 2nd, revised version. A framework to assist Authorities in making Non-detriment Findings (NDFs) for species listed in CITES Appendix II. Report prepared for the Germany Federal Agency for Nature Conservation (Bundesamt fur Naturschutz, BfN). Available at https://cites.org/eng/prog/shark/Information_resources_from_Parties_and_other_stakeholders.

Worksheet for Step 1			
Question 1.1 (a) **Is the specimen subject to CITES controls?** **(How did you identify the species?)**			
See pages 64–65 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**			
Species Name	**Product Form**	**CITES Appendix**	**Source of Identification**
Sphyrna lewini	Country adds this	II	Country adds this
NEXT STEPS			
In view of the above, is the specimen subject to CITES controls? Consult 'Decision and Next Steps' guidance in **Annex 1**	**YES**	GO TO **Question 1.1 (b)**	
	NOT CERTAIN	Describe concerns in more detail below, and GO TO **Question 1.1 (b)**	
	NO	**NDF is not required**	
Concerns and uncertainties:			

Worksheet for Step 1 (continued)
Question 1.1 (b) **From which stock will the specimen be taken/was the specimen taken?** **(Can origin and stock be confidently identified)**

See pages 66–67 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**		
	Description/comments	**Sources of information**
Ocean basin	Indo-Pacific Ocean.	
Stock location/ distribution/ boundaries (attach a map)	There appear to be two distinct stocks: Atlantic and Indo-Pacific. Map of conceptual population model of Scalloped Hammerhead in the Indo-Pacific is included in the Simpfendorfer and Rigby 2016 (Section 2.1).	Simpfendorfer 2014, Simpfendorfer and Rigby 2016 (Section 2.1)
Is this a shared stock (i.e. occurring in more than one EEZ[8] and/or the high seas)?	Yes	
If the stock occurs in more than one EEZ, which other Parties share this stock?	Occurs across Indo-West Pacific and Atlantic. In the Indo-Pacific includes India, Sri Lanka, Myanmar, Thailand, Viet Nam, China (including Chinese Taipei), Japan, Philippines, Australia (all CITES Parties) and Pacific Island countries (majority of which are CITES Parties, or Competent Authorities (Simpfendorfer and Rigby 2016, Section 2.3).	Brouwer and Harley 2015, Baum et al. 2007, Simpfendorfer and Rigby 2016, Section 2.3
If high seas stock, which other Parties shark this stock?	Country adds this- depends which High Seas area specimens for export are captured.	
Which, if any, RFB[9](s) cover(s) the range of this stock?	In Indo-Pacific region- WCPFC and IOTC. Globally all other RFMOs- IATTC, ICCAT, NAFO, GFCM, CCBST, SEAFO.	Simpfendorfer and Rigby 2016 (Section 2.2.1 for acronym explanation)
Are all Parties listed above (which fish or share the stock concerned) members of the relevant RFBs?	In the Indo-Pacific, yes (except Myanmar and Viet Nam): India-IOTC Myanmar- none (as far as can ascertain) Thailand -IOTC Viet Nam - none (as far as can ascertain) China - WCPFC, IOTC, IATTC, ICCAT Japan - WCPFC, IOTC, IATTC, ICCAT Sri Lanka-IOTC Philippines- WCPFC, IOTC, ICCAT Pacific Island countries- WCPFC	http://www.wcpfc.int http://www.iotc.org/
kAre there geographical management gaps?	The High Seas	

[8] Exclusive Economic Zone
[9] Regional Fisheries Body

How reliable is the information on origin?	Country adds this	
NEXT STEPS		
Is information on origin sufficiently detailed for Question 1.2 to be answered?		**YES**
Consult "Decision and Next Steps" guidance in **Annex 1**. **(Apply this answer at end of Question 1.2)**		**NO**

Worksheet for Step 1 (continued)

Question 1.2

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

See pages 67–68 of **Annex 1** for additional Guidance Notes on completing this Worksheet.

Is the species:	**Description/comments**	**Sources of information**
Protected under wildlife legislation, a regional biodiversity Agreement, or (for a CMS[10] Party) listed in CMS Appendix 1?	CITES Appendix II, CMS Appendix II (note: Indonesia is not a party to CMS).	CITES website (https://cites.org/eng/prog/shark) CMS website (http://www.cms.int/en/page/appendix-i-ii-cms)
Sourced from illegal fishing activities (e.g. in contravention of finning regulations, or where a TAC[11] is zero or exceeded)?	Country adds this	
Taken from a no-take marine protected area or during a closed season?	Country adds this	
Taken in contravention of RFB recommendations, if any?	Country adds this	
Listed as a species whose export is prohibited?	Country adds this	
Of concern for any other	Country adds this	

[10] Convention on Migratory Species
[11] Total Allowable Catch

reason?		
NEXT STEPS		
In view of the above and the final section of the Worksheet for Question 1.1(b), was the specimen legally acquired and can exports be permitted? Consult "Decision and Next Steps" guidance in **Annex 1.**	**YES**	**GO TO Question 1.3**
	SOME DOUBT	Describe concerns in more detail below, and **GO TO Question 1.3**
	NO	Export cannot be permitted, **NDF is not required**
Concerns and uncertainties:		

Worksheet for Step 1 (continued)

Question 1.3

What does the available management information tell us?

See pages 69 and Table A of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**

Part 1. Global-level information

	Description/comments	**Sources of information**
Reported global catch	180 tonnes (average global annual catch 2011-2015). This is considered a significant underestimate.	FAO 2017, Simpfendorfer and Rigby 2016 (Section 2.1.1)
Species distribution	Tropical and warm temperate oceans worldwide.	Last and Stevens 2009, Simpfendorfer and Rigby 2016 (Section 2.1.2)
Known stocks/populations	Global stock structure is different between males and females. For females, there are at least four genetically distinct subpopulations: Northwest Atlantic, Southwest Atlantic, Eastern Atlantic, and Indo-West Pacific. For males, there appear to be no genetically distinct populations across and between ocean basins.	Duncan et al. 2006, Baum et al. 2007, Daley-Engel et al. 2012, NOAA 2013, Heupel et al. 2015, Simpfendorfer and Rigby 2016 (Section 2.1.3)
Main catching countries	Average 2011-2015: Mauritania (67 tonne), Brazil (50 t) and Ecuador (37 t) (FAO 2017) Hammerhead Shark (general): Indonesia (2160 t), Senegal (1115t), Mexico (845 t), Congo (520t), Taiwan Province of China (322 t), Benin (294 t), Liberia (105 t), Sri Lanka (105 t) (FAO 2017).	Mundy-Taylor and Crook 2013, FAO 2017, Simpfendorfer and Rigby 2016 (Section 2.1.4)

Main gear types by which the species is taken	Trawls, purse seines, gillnets, fixed bottom longlines, pelagic longlines and inshore artisanal fisheries.	Baum et al. 2007, Simpfendorfer and Rigby 2016 (Section 2.1.5)
Global conservation status	IUCN Status: Globally: Endangered (2007) Eastern Central and Southeast Pacific: Endangered (2007) Eastern Central Atlantic: Vulnerable (2007) Northwest and Western Central Atlantic: Endangered (2007) Southwest Atlantic: Vulnerable (2007) Western Indian Ocean: Endangered (2007)	Baum et al. 2007, Simpfendorfer and Rigby 2016 (Section 2.1.6)
Multilateral Environmental Agreements	CITES Appendix II, reservation by Japan (WCPFC CITES Party) CMS Appendix II, reservation by Australia Sharks MoU Annex 1	CITES https://cites.org/eng/prog/shark/index.php CMS http://www.cms.int/en/species Sharks MoU http://www.cms.int/sharks/en/mos2 Simpfendorfer and Rigby 2016 (Section 2.1.7)
Part 2. Stock/context-specific information		
Stock assessments	No stock assessments for the Indo-West Pacific Stock have been done. Due to the lack of data, a stock assessment is currently not feasible.	Lack et al. 2014, Rice et al. 2015, Simpfendorfer and Rigby 2016 (Section 2.2.2)
Main management bodies	WCPFC for the Indo-West Pacific stock in the Western and Central Pacific Ocean, IOTC in the Indian Ocean. Other global areas, IATTC, ICCAT, NAFO, CCBST, GCFM, SEAFO (see Simpfendorfer and Rigby 2016 for acronym explanation).	Lack et al. 2014, Simpfendorfer and Rigby 2016 (Section 2.2.1)
Cooperative management arrangements	Scalloped Hammerhead is a Highly migratory species and the relevant RFMOS are: WCPFC, IATTC, ICCAT, IOTC and NAFO. Within the Pacific Ocean, SPC and FFA are also involved in data management and monitoring and surveillance. An advisory body (Council of Regional Organisations in the Pacific) facilitates cooperation between RFMOs. The ABNJ project is also aiming to improve cooperation between tuna RFMOs.	UNCLOS Annex 1 www.un.org/unlcos/annex1; http://www.commonoceans.org/home/en/ Lack et al. 2014, Clarke and Nichols 2015, Simpfendorfer and Rigby 2016 (Section 2.2.3)
Non-membership of RFBs	The main catching country of Hammerhead (general) in the Indo-West Pacific is Indonesia, which is a member of WCPFC.	FAO 2017

	Countries in the Indo-West Pacific where this species occurs are all members of WCPFC or IOTC except Myanmar and Viet Nam.	
Nature of harvest	Taken as target, byproduct and bycatch. Fishing effort is not evenly spread across Indo-West Pacific stock; Indonesia takes all the Indo-West Pacific area reported Hammerhead (general) FAO catch. Catch by other Asian/Pacific countries is poorly known.	Baum et al. 2007, FOA 2017
Fishery types	Country adds this.	Simpfendorfer and Rigby 2016 (Section 2.2.6) for summary of fisheries, target species, main gear types, and scale of fisheries.
Management units	In the Pacific region, the main body responsible is WCPFC. In Indian Ocean region, the main body responsible is IOTC. Gaps in regional management are in the Areas Beyond National Jurisdiction (ABNJs). National level: Country adds this	http://www.wcpfc.int http://www.iotc.org/
Products in trade	Fins are the main product. In some cases, meat, skin, liver oil and jaws are also traded. Country needs to verify products in trade.	CITES 2013a, Lack and Meere 2009.
Part 3. Data and data sharing		
Reported national catch(es)	Indonesia: WCPFC Data Catalogue Longline Hammerheads 1978-2014 zero catches recorded in logsheets for Indonesia (P. Williams, SPC, pers comm). Indonesia: WCPFC Data Catalogue purse seine no data on hammerhead sharks for any WCPFC Flag State. Note: FAO database 2017 reports Hammherhead (general) Indonesian catches separately for Indian (1578 t) and Pacific (581) Ocean: the average catch (2011-2015) was almost 3 times higher in the Indian Ocean. Country adds this	
Are catch and/or trade data available from other States fishing this stock?	Yes, the tuna bycatch observer and logsheet data are managed by SPC with coastal data also managed by SPC. Access to the data requires permission from each member country for both the pelagic and coastal catch data. Added IOTC catch 2013- 52 tonne (IOTC 2016)	Simpfendorfer and Rigby 2016 (Section 2.3)

	Trade data reported by some Pacific countries to FAO.	
Reported catches by other States	Yes, there are reported catches by many other WCPFC Flag States. Average annual catch in tonnes of all hammerheads in the WCPFC for 2009-2013: Australia: 5.3, Fiji: 29.3, Korea: 12.7, Marshall Islands: 1, New Zealand: 8, Papua New Guinea 3.8, Chinese Taipei: 363. IOTC data – hammerheads do not appear to be listed separately from 'sharks'	WPFC Data Catalogue http://www.wcpfc.int/wcpfc-data-catalogue-0 Simpfendorfer and Rigby 2016 (Section 2.3)
Catch trends and values	The limited catch data precludes any analyses of catch trends with confidence. A standardised Catch per unit effort analyses of the hammerhead shark complex in WCPO indicated a large increase in CPUE from 1997-2001 in the WCPO and no consistent rise or fall in the following years.	Simpfendorfer and Rigby 2016 (Section 2.3) Rice et al. 2015.
Have RFBs and/or other States fishing this stock been consulted during or contributed data during this process?	Yes, SPC was contacted and provided some observer data, WCPFC have hammerhead catches from the longline fishery online and a workshop was held in Fiji 2016 where countries were requested to provide data.	Simpfendorfer and Rigby 2016 (Section 2.3)

Sources of information

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NEXT STEPS

The information collated in the above worksheets can now be passed to the Scientific Authority, so that the NDF process can begin with Step 2

Worksheet for Step 2

Question 2.1

What is the level of intrinsic biological vulnerability of the species?

- See pages 73–75 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- In the Worksheet below, circle **the level of vulnerability** associated with each **Intrinsic Biological Factor**. Default indicator/metric figures for listed shark and ray species are provided in **Annex 4** (pages 111-131). These may be inserted here, but they are derived from international standardised data and may not reflect local stock characteristics. Wherever possible, verified local data on stocks should be utilised.

Intrinsic biological factors *(see page 73 of the Guidance Notes)*	**Level of vulnerability** *(circle or highlight as appropriate)*	**Indicator/metric** *(see page 73 of the Guidance Notes)*
a) Median age at maturity	Low	3.8 years (male), 4.1 years (female) (2 band pairs per year) Chen et al. 1990; Taiwan)
	Medium	8.9 years (male), 13.2 years (female) (1 band pair per year) Drew et al. 2015; Indonesia) 5.7 years (male), (no female estimate) (1 band pair per year)

		(Harry et al. 2011; tropical east coast Australia)
	High	
	Unknown	
b) Median size at maturity	Low	
	Medium	1471 mm L_{ST} (male) (Harry et al. 2011; tropical east coast Australia) 1500 mm L_{ST} (male) (Stephens and Lyle 1989; northern Australia) 1756 mm L_{ST} (male) (White et al. 2008; Indonesia)
	High	2285 mm L_{ST} (female) (White et al. 2008; Indonesia)
	Unknown	
c) Maximum age/longevity in an unfished population	Low	
	Medium	10.6-11 years (male) and 14.0-18.6 years (female) (based on 2 band pairs per year) (Chen et al. 1990, Anislado-Telentino and Robinson-Mendoza 2001, Anislado-Telentino et al. 2008). 21 years (male) (1 band pair per year) (Harry *et al.* 2011)
	High	35 years (female) (1 band pair per year) (Drew et al. 2015)
	Unknown	
d) Maximum size	Low	
	Medium	
	High	3010 mm TL (male), 3460 mm TL (female) (Stephens and Lyle 1989) (observed)
	Unknown	
e) Natural Mortality rate (M)	Low	
	Medium	
	High	0.123 year-1 (Harry et al. 2011); 0.107 $year^{-1}$ (Chen and Yuan 2006).

	Unknown	
f) Maximum annual pup production (per mature female)	Low	12-41 (mean 25-26) (Chen et al. 1988, White *et al.* 2008) (annual cycle)
	Medium	6-21 (mean 12.5-13) biennial cycle (Liu and Chen 1999)
	High	
	Unknown	
g) Intrinsic rate of population increase (r)	Low	
	Medium	0.205 $year^{-1}$ (2 band pairs per year) (Liu and Chen 1999)
	High	0.086 $year^{-1}$ (1 band pair per year) (Chen and Yuan 2006)
	Unknown	
h) Geographic distribution of stock	Low	Global male population (Daly-Engel et al. 2012)
	Medium	Indo-West Pacific female population (Duncan et al. 2006; Baum et al. 2007, NOAA 2013)
	High	
	Unknown	
i) Current stock size relative to historic abundance	Low	
	Medium	
	High	Reported large declines in hammerhead complex abundance of 60-99% over recent decades in Atlantic and Indo-Pacific (CITES 2013a), i.e. <25% of baseline abudance
	Unknown	
j) Behavioural factors	Low	
	Medium	
	High	Inshore pupping and high natural predation on juveniles (Baum et al. 2007), aggregating behaviour, and very high at-vessel fishing mortality rates (Morgan and Burgess 2007)

	Unknown	
h) Trophic level	Low	
	Medium	
	High	4.1 (Froese and Pauly 2015)
	Unknown	

SUMMARY for Question 2.1

Intrinsic biological vulnerability of species

Provide an assessment of the overall intrinsic biological vulnerability of the species (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:

Most of the intrinsic biological factors are ranked as a high vulnerability with females generally more vulnerable than males. The exceptions are pup production which is low to medium vulnerability and male geographic distribution which is also a low vulnerability but medium vulnerability for females. There is a circumglobal distribution but genetic structuring is evident between ocean basins. The Indo-West pacific population is considered as warranted for Endangered listing (NOAA US listing process).

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Liu, K.M., and Chen, C.T. (1999) Demographic analysis of the scalloped hammerhead, *Sphyrna lewini*, in the northwestern Pacific. *Fisheries Science* **65**(2), 218-223.

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NEXT STEPS

- Go to **Section 2.2**

Worksheet for Step 2 (continued)

Question 2.2

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

- See pages 76–80 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- Based on existing stock assessments or conservation status assessments, evaluate the severity and geographic extent/scope of conservation concern, including reasons for the conclusions drawn and information on sources used.
- In the Worksheet below, circle the **level of severity/scope of concern** associated with each **Factor** using the descriptions in the indicator column in **Table B** in the Guidance Notes (**Annex 1**). In the column entitled Indicator in the Worksheet below, note briefly the reason for this assessment of level of severity/scope of concern. Further explanation (including information on sources used) can be provided in the boxes entitled '*Comments*'.

Conservation concern factors *(see page 78 of the Guidance Notes)*	**Level of severity/scope of concern** *(circle as appropriate)*	**Indicator/metric** *(see page 78 of the Guidance Notes)*
Conservation or stock assessment status	Low	
	Medium	

	High	IUCN – Global Endangered and Eastern Central and Southeast Pacific stock Endangered (Baum et al. 2007) NAFO only stock assessment- stock is overfished and overfishing occurring (Lack et al. 2014)
	Unknown	
	Comments:	
Population trend	Low	
	Medium	
	High	Population trend decreasing and global stock of hammerhead complex is estimated at 15-20% of historic baseline (CITES 2013a)
	Unknown	
	Comments:	
Geographic extent/scope of conservation concern	Low	
	Medium	
	High	Identified threats affect the entire global population of the species and the Indo-West Pacific Population (Baum et al. 2007)
	Unknown	
	Comments:	

SUMMARY for Question 2.2

Severity and geographic extent of the conservation concern

Provide an assessment of the overall severity and geographic extent of the conservation concern for this species or stock (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:

The Scalloped Hammerhead is Endangered, populations of the hammerhead complex have decreased dramatically from baseline levels and the threats are high to both the global and Indo-West Pacific population.

Baum, J., Clarke, S., Domingo, A., Durocq, M., Lamonaca, A.F., Gaboir, N., Graham, R., Jorgensen, S., Kotas, J.E., Medina, E., Martinez-Ortiz, J., Monzini, J., Morales, M.R., Navarro, S.S., Perez-Jimenez, J.C., Ruiz, C., Smith, W.D., Valenti, S.V., and Vooren, C.M. 2007. www.iucnredlist.org. Downloaded on 15 December 2015.

CITES. 2013a. https://www.cites.org/eng/cop/16/prop/E-CoP16-Prop-43.pdf. Downloaded on 15 December 2015

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NEXT STEPS

- Go to **Step 3**

Worksheet for Step 3

Question 3.1

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

- See pages 81–84 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- In the Worksheet below, circle the **level of severity** associated with each trade pressure **Factor** using the descriptions in the Indicator column in **Table C** in the Guidance Notes (**Annex 1**). In the column entitled **Indicator/metric** in the Worksheet below, note briefly the reason for this assessment of level of trade pressure severity. Consider **all products in both domestic and international trade.**
- For each Factor, circle the **level of confidence** associated with each assessment of trade pressure severity. This involves an assessment of the **quality of the information** used to evaluate the severity of trade pressure on the stock of the species concerned.
- In the box entitled '*Reasoning*', provide reasons to justify the evaluation of severity of trade pressure and assessment of confidence level (i.e. quality of information used). Here, comments/information should also be provided on:
  - the sources of information used to evaluate severity of trade pressure;
  - whether a precautionary approach was taken to the evaluation of trade pressure severity (e.g. due to a lack of robust trade information to inform the evaluation);
  - whether the evaluation of trade pressure was adjusted (i.e. severity increased to a higher level) to take into account high intrinsic biological vulnerability/conservation concern assessed in **Step 2**;
  - whether information is particularly lacking and, if so, how this data availability may be improved (see also **Section 6.1** of the Guidance Notes in **Annex 1** for further advice).

Factor *(see page 84 of the Guidance Notes)*	**Level of severity of trade pressure** **Country needs to fill this in** *(highlight or circle as appropriate)*	**Indicator/metric** *(see page 84 of the Guidance Notes)*
a) Magnitude of legal trade	Low	
	Medium	
	High	
	Unknown	

	Level of confidence *(circle as appropriate): (see page 83 of Guidance Notes)* Low Medium High	
Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of trade pressure been increased in light of the assessment in Step 2?)		
b) Magnitude of illegal trade	Low	
	Medium	
	High	
	Unknown	
	Level of confidence *(circle as appropriate): (see page 83 of Guidance Notes)* Low Medium High	
Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of trade pressure been increased in light of the assessment in Step 2?)		

NEXT STEPS

- Add notes in the Worksheet for **Section 6.1** on improvements in trade data availability/monitoring required to evaluate trade pressure under **Section 3.1**.
- GO TO **Section 3.2** to evaluate fishing pressures.

Worksheet for Step 3

Question 3.2

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

- See pages 85–90 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- In the Worksheet below, circle the **level of severity** associated with each fishing pressure **Factor** using the descriptions in the Indicator column in **Table D** in the Guidance Notes (**Annex 1**). In the column entitled **Indicator/metric** in the Worksheet below, note briefly the reason for this assessment of level of fishing pressure severity. Consider **all fishing methods and gears that** interact with the shark stock concerned.
- For each Factor, circle the **level of confidence** associated with each assessment of fishing pressure severity. This involves an assessment of the **quality of the information** used to evaluate the severity of fishing pressure on the stock of the species concerned.
- In the box entitled '*Reasoning*', provide reasons to justify the evaluation of severity of fishing pressure and assessment of confidence level (i.e. quality of information used). Here, comments/information should also be provided on:
  - the sources of information used to evaluate severity of fishing pressure;
  - whether a precautionary approach was taken to the evaluation of fishing pressure severity (e.g. due to a lack of robust information to inform the evaluation);
  - whether the evaluation of fishing pressure was adjusted (i.e. severity increased to a higher level) to take into account high intrinsic biological vulnerability/conservation concern assessed in **Step 2**;

- o whether information is particularly lacking and, if so, how this data availability may be improved (see also **Section 6.1** of the Guidance Notes in **Annex 1** for further advice).

Factor *(see page 89 of the Guidance Notes)*	**Level of severity of fishing pressure** **Country needs to fill this in** *(highlight or circle as appropriate)*	**Indicator/metric** *(see page 89 of the Guidance Notes)*
a) Fishing mortality (retained catch)	Low	
	Medium	
	High	Modelled pelagic longline fishery in Indonesia- 10.6% of females could be harvested before population growth rates fell below zero
	Unknown	
	Level of confidence *(circle as appropriate): (see page 88 of Guidance Notes)* Low Medium High	

Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of fishing pressure been increased in light of the assessment in Step 2?)

Harry, A.V. 2011 Life histories of commercially important tropical sharks from the Great Barrier Reef World Heritage Area. James Cook University, PhD thesis. Pp244. Available at: http://researchonline.jcu.edu.au/20775/

Extract P164: Demographic modelling "*a pelagic longline fishery in Indonesia. In this fishery both males and females of nearly all age classes were captured except neonates and one year olds, so all females > 2 year old were considered available to this fishery. Although adults were still captured by this fishery, pre-reproductive age classes were the major component of the fishery. Applying fishing mortality across available age classes predicted that on average 10.6% of females could be harvested before the population growth rates fell below zero (Figure 7.6 c). This was close to the value of λ obtained for the population, which suggested that the population was capable of growing, on average, by around 10.8% annually. However, the male to female sex ratio in this fishery was 1:5 so the probability of encountering females was also much higher*."

b) Discard mortality	Low	
	Medium	
	High	Tuna purse seine- low at vessel mortality – individuals appear good, however 100% post-release mortality. Tuna longline- very high at vessel mortality, very high post-release mortality,

		Stress response of this species to capture is severe (Eddy et al. 2016)
	Unknown	
	Level of confidence *(circle as appropriate): (see page 88 of Guidance Notes)* Low Medium High	
Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of fishing pressure been increased in light of the assessment in Step 2?) Eddy, C., Brill, R., and Bernal, D. (2016) Rates of at-vessel mortality and post-release survival of pelagic sharks captured with tuna purse seines around drifting fish aggregating devices (FADs) in the equatorial eastern Pacific Ocean. Fisheries Research 174, 109-117. doi: http://dx.doi.org/10.1016/j.fishres.2015.09.008		
c) Size/age/sex selectivity	Low	
	Medium	
	High	
	Unknown	
	Level of confidence *(circle as appropriate): (see page 88 of Guidance Notes)* Low Medium High	
Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of fishing pressure been increased in light of the assessment in Step 2?)		
d) Magnitude of illegal, unreported and unregulated (IUU) fishing	Low	
	Medium	
	High	
	Unknown	
	Level of confidence *(circle as appropriate): (see page 88 of Guidance Notes)* Low Medium High	
Reasoning (e.g. has this assessment involved the exercise of precaution, and/or has severity of fishing pressure been increased in light of the assessment in Step 2?)		

NEXT STEPS

- Add notes in the Worksheet for **Section 6.1** on improvements in fisheries data availability/monitoring required to evaluate fishing pressure under **Section 3.2**.
- GO TO **Section 4** to evaluate the extent to which existing management measures are effective in mitigating the risks/pressures/concerns identified in **Steps 2 and 3**.

Worksheet for Step 4

Preliminary stage

Compile information on existing management measures

In the table below, provide a list of existing generic and species-specific management measures in place for the stock or 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, the sources of information used and any other comments if appropriate.

A table of commonly used generic and species-specific fisheries management measures is provided in **Annex 5** (page 132). It is **advisable to consult Annex 5 prior to completing the Worksheets in this section, in conjunction with context-specific fisheries management advice.**

Existing management measures *(see Annex 5 for examples)*	**Is the measure generic or species-specific?**	**Descriptions/comments/sources of information**
(SUB-)NATIONAL **Country needs to confirm and add any additional management measures relevant to Scalloped Hammerhead**		
Regulation of the Minister of Marine Affairs and Fisheries 48/PERMEN-KP/2016 (Valid till 31 December 2017)	Specific to all three species of hammerheads in Indonesia and Oceanic Whitetip sharks	Ban on export of any products from hammerheads and oceanic whitetip sharks. Annual ban first issued in Dec 2014 has been extended each year since.
Regulation of the Minister of Marine Affairs and Fisheries 12/PERMEN/2012 (capture fishery enterprises on the high seas); amended by 26/PERMEN-KP/2013 (capture fishery enterprises in regional fisheries management)	Generic to all sharks taken as bycatch in tuna fisheries (high seas and in RFMOs)	Sharks taken as bycatch in tuna fisheries should be landed whole at ports to reduce finning of sharks and discarding at sea. Pregnant shark and pups should be released. Thresher sharks *Alopias* spp. must be released alive if possible or landed and reported if dead (Dharmadi et al. 2015)
Governor of Raja Ampat, Indonesia Regency (2012), Regulation 9/2012	Generic to sharks and rays	Prohibits capture of sharks, rays and other species- protects Scalloped Hammerhead
National Plan of Action for the Conservation and Management of Sharks	Generic to sharks and rays	Issued in 2010 by Directorate General of Capture Fisheries, Directorate of

		Fish Resources, Ministry of Marine Affairs and Fisheries
Ministry of Fisheries annual shark catch quotas	Not sure if it applies to Scalloped Hammerhead	See Dharmadi et al. 2015
Regulation of the Minister of Marine Affairs and Fisheries 3/2010 and 4/2010	Generic to all protection of species, including sharks, listed on CITES Appendices	See Dharmadi et al. 2015 (Table 2)
Presidential Decree 39/1980 concerning the eradication of trawlers from Indonesian waters	Generic to all fish resources	National policy intended to maintain the sustainability of fish resources, including sharks.
Presidential Decree 85/1982 concerning obligation to use turtle excluder devices in the shrimp-trawl bycatch reduction programme	Generic to all fish resources	Applies to operation of shrimp trawlers in Kai, Tanimbar, Aru and Irian Jaya waters, as well as the Arafura Sea, eastward of 130° E. This decree could be used to reduce bycatch of sharks and rays.
REGIONAL/INTERNATIONAL		
WCPFC CMM2010-07	Generic to sharks (implemented January 2008)	Requires full utilisation of sharks, or live release of unused sharks, and maintenance of a 5% fin to carcass weight ratio (http://www.wcpfc.int/sharks)
WCPFC CMM2011-04	Specific to Oceanic whitetip sharks (OCS) (implemented January 2013)	Prohibits retention, transhipping, storing or landing of OCS and calls for release with as little harm as possible (http://www.wcpfc.int/sharks)
WCPFC CMM2012-04	Specific to Whale sharks (implemented January 2014)	Prohibits purse seine setting on a whale shark if it is sighted prior to the set and calls for safe release of the whale shark if it is inadvertently encircled in the net (http://www.wcpfc.int/sharks)
WCPFC CMM2013-05	Generic to sharks (issued December 2013)	Requires daily catch and effort reporting, including sharks, when vessels operate in the high seas
WCPFC CMM2013-08	Specific to Silky sharks (implemented July 2014)	Prohibits retention, transhipping, storing or landing of Silky sharks and calls for release with as little harm as

		possible (http://www.wcpfc.int/sharks)
WCPFC CMM2014-05	Generic to sharks (implemented July 2015)	Reduce use of wire traces and shark lines in tuna and billfish longline fisheries and dedicated shark fisheries require management plans (https://www.wcpfc.int/conservation-and-management-measures)
WCPFC CMM2015-07	Generic to all CMMs and hence also generic to sharks (effective only for 2016 and 2017, pending review)	WCPFC Compliance Monitoring Scheme (CMS) to ensure implementation and compliance with CMMs (https://www.wcpfc.int/conservation-and-management-measures)

NEXT STEPS

References

Dharmadi, Fahmi, Satria, F. 2015. Fisheries management and conservation of sharks in Indonesia. *African Journal of Marine Science,* 37 (2), 249-258.

- GO TO **Question 4.1(a).**

Worksheet for Step 4 (continued)

Question 4.1(a)

Are existing management measures appropriately designed and implemented to mitigate the pressures affecting the stock/population of the species concerned?

- See pages 91–92 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- Firstly assess whether **appropriately designed** management measures are in place to mitigate the pressures affecting the stock/population of the species concerned:
  - From the '**Preliminary stage**' Worksheet above, transfer information on existing management measures into the Worksheet below, alongside the relevant fishing and trade pressure Factor(s) the measures(s) can help to mitigate (as evaluated in **Step 3**).
  - Use the information in the table of commonly used generic and species-specific fisheries management measures in **Annex 5** to determine which pressures the existing management measures in place can help to address/mitigate.
- Next, assess whether the existing management measures in place are being **implemented**:
  - In the column entitled "Relevant Monitoring, Control and Surveillance (MCS) measure(s)", include information on existing MCS measures that are relevant to the implementation of the existing management measures identified. **Annex 5** provides information on MCS measures that can help to secure compliance with commonly used fisheries management measures.
  - Second, based on the explanations provided in the column in the Worksheet below entitled "Overall assessment of compliance regime", make a judgement as to whether the existing management measure(s) identified is/are being implemented (i.e. adequately enforced/complied with).

NOTE: in some circumstances where the fishing/trade pressure severity was assessed as "Low" for any of the Factors in **Step 3**, mitigation may not be required (see also the Guidance Notes for Question 4(a) in **Annex 1**). In such cases, "Not applicable" can be noted under the "Existing management measure(s)" and "Relevant MCS measure(s)" columns in the Worksheet (for that trade/fishing pressure Factor).

- Provide reasons to justify the assessments made in this Worksheet in the box entitled "Reasoning/comments", including any sources used.
- Where certain management measures are being implemented but others are not, this information can also be included under "Reasoning/comments". Also note down any considerations, issues or shortcomings relating to any of the management measures identified that will need to be kept in mind when completing the Worksheet for **Question 4.1(b)** below

Factor	**Existing management measure(s)**	**Relevant monitoring, control and surveillance (MSC) measure(s)**	**Overall assessment of compliance regime** *(tick as appropriate)*

TRADE PRESSSURE **Country needs to fill this in**				
a) Magnitude of legal trade			Unknown (no information on compliance)	
			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	
	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?)			
b) Magnitude of illegal trade			Unknown (no information on compliance)	
			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	
	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?)			
FISHING PRESSSURE **Country needs to fill this in**				
a) Fishing mortality (retained catch)			Unknown (no information on compliance)	
			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	

	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?)			
b) Discard mortality			Unknown (no information on compliance)	
			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	
	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?)			
c) Size/age/sex selectivity			Unknown (no information on compliance)	
			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	
	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?)			
d) Magnitude of IUU fishing			Unknown (no information on compliance)	
			Poor (limited relevant compliance measures in place)	
			Moderate (some relevant compliance measures in place)	
			Good (comprehensive relevant compliance measures in place)	
	Reasoning/comments (e.g. Are management measures being implemented to varying degrees? Which compliance measures are lacking?)			

NEXT STEPS

- **Go to Question 4.1(b)**

Worksheet for Step 4 (continued)

Question 4.1(b)

Are existing management measures effective (or likely to be effective) in mitigating the pressures affecting the stock/population of the species concerned?

- See pages 93–94 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- From the **Worksheet for Question 4.1(a)** above, transfer information on existing management measures currently in place into the column in the table below entitled "Existing management measure(s)", alongside the relevant fishing/trade pressure Factor.

NOTE as above for **Question 4.1(a)**: in some circumstances where the fishing/trade pressure severity was assessed as "Low" for any of the Factors in **Step 3**, mitigation may not be required (see also the Guidance Notes for **Question 4(b)** in **Annex 1**). In such cases, "Not applicable" can be noted under the "Existing management measure(s)" and "Relevant MCS measure(s)" columns in the Worksheet (for that trade/fishing pressure Factor)

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

    1. Data are collected and analysed to inform management decisions?

    2. Management is consistent with expert advice?

- Based on the responses to these questions, make a judgement as to whether the management measures(s) identified is/are effective/likely to be effective. Provide reasons to justify this assessment. For example, is effectiveness being compromised by poor design of the management measures or by their inadequate implementation (see responses in the Worksheet for **Question 4.1(a)** above)? Include information on any sources used in the box entitled "Reasoning/comments".

- Note that for each fishing/trade pressure identified, there may be more than one management measure currently in place aimed at mitigating the pressure. When assessing whether the management of a particular fishing/trade pressure is effective/likely to be effective, the aim should be to consider the combined effect of all relevant measures in mitigating the pressure identified.

Factor	**Existing management measure(s)**	**Are relevant data collected and analysed to inform management decisions? (e.g. landings, effort, fisheries independent data)** *Tick as appropriate*		**Is management consistent with expert advice?** *(tick as appropriate)*	
TRADE PRESSSURE **Country needs to fill this in**					
a) Magnitude of legal trade		No data OR data are of poor quality OR data are not analysed (adequately) to inform management		No expert advice on management identified	
		Limited relevant data are collected AND analysed to inform management		Not consistent	
		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	
		Comprehensive data collected AND analysed to inform management		Consistent	
	Management measure(s) effective/likely to be effective? (circle as appropriate)				

	Yes	Partially		No	Insufficient information
	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?)				
TRADE PRESSSURE Country needs to fill this in					
b) Magnitude of illegal trade		No data OR data are of poor quality OR data are not analysed (adequately) to inform management		No expert advice on management identified	
		Limited relevant data are collected AND analysed to inform management		Not consistent	
		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	
		Comprehensive data collected AND analysed to inform management		Consistent	
	Management measure(s) effective/likely to be effective? (circle as appropriate)				
	Yes	Partially		No	Insufficient information
	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?)				

FISHING PRESSSURE Country needs to fill this in					
a) Fishing mortality (retained catch)		No data OR data are of poor quality OR data are not analysed (adequately) to inform management		No expert advice on management identified	
		Limited relevant data are collected AND analysed to inform management		Not consistent	
		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	
		Comprehensive data collected AND analysed to inform management		Consistent	
	Management measure(s) effective/likely to be effective? (circle as appropriate) Yes Partially No Insufficient information				
	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?)				
FISHING PRESSSURE Country needs to fill this in					
b) Discard mortality		No data OR data are of poor quality OR data are not analysed (adequately) to inform management		No expert advice on management identified	

		Limited relevant data are collected AND analysed to inform management		Not consistent	
		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	
		Comprehensive data collected AND analysed to inform management		Consistent	
	Management measure(s) effective/likely to be effective? (circle as appropriate) Yes Partially No Insufficient information				
	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?)				
FISHING PRESSSURE					
c) Size/age/sex selectivity		No data OR data are of poor quality OR data are not analysed (adequately) to inform management		No expert advice on management identified	
		Limited relevant data are collected AND analysed to inform management		Not consistent	
		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	

		Comprehensive data collected AND analysed to inform management		Consistent	
	Management measure(s) effective/likely to be effective? (circle as appropriate) Yes Partially No Insufficient information				
	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?)				
d) Magnitude of IUU fishing		No data OR data are of poor quality OR data are not analysed (adequately) to inform management		No expert advice on management identified	
		Limited relevant data are collected AND analysed to inform management		Not consistent	
		Some relevant data are collected AND analysed to inform management		Expert advice partially implemented	
		Comprehensive data collected AND analysed to inform management		Consistent	
	Management measure(s) effective/likely to be effective? (circle as appropriate) Yes Partially No Insufficient information				

	Reasoning/comments (e.g. Is effectiveness compromised by poor design and/or implementation, or is a greater diversity or amount of management required? What data are required to better inform and evaluate management decisions? How is management inconsistent with expert advice?)

NEXT STEPS

- Add notes in the Worksheet for **Section 6.1** on improvements in data availability/monitoring required to evaluate the effectiveness/likely effectiveness of management under **Question 4.1(b**).
- Add notes in the Worksheet for **Section 6.2** on improvements in management (including compliance systems) required to more fully mitigate the pressures impacting the stock/population of the shark species concerned.
- Go to **Step 5**

Worksheet for Step 5

Question 5.1

Based on the outcomes of the previous steps, is it possible to make a positive NDF (with or without associated conditions) or is a negative NDF required?

- See pages 95–97 of **Annex 1** for additional Guidance Notes on completing this Worksheet**.**
- Transfer all results from **Steps 2–4** to the Table below by circling the appropriate descriptors.
  - From the **Worksheets for Questions 2.1 and 2.2** above, transfer the **level of vulnerability** and **level of severity/scope of conservation concern** into the Worksheet below.
  - From the **Worksheets for Questions 3.1 and 3.2** above, transfer the **level of severity** for each trade and fishing pressure Factor into the second column in the Worksheet below and the **level of confidence** associated with each evaluation of severity into the third column in the Worksheet below.
  - Based on the information contained in the **Worksheets for Questions 4.1(a) and 4.1(b),** state in the Worksheet below whether the **existing management measures are effective/likely to be effective** at mitigating each of the pressures identified (taking into account whether they are **appropriately designed** and **being implemented**), or whether there is insufficient information to make such an assessment.

- Based on the information generated and evaluations made in the previous **Steps**, the Scientific Authority now has to decide whether to make a positive NDF for the export (with or without mandatory conditions), or a negative NDF. A decision tree to assist in this decision-making process is provided in the Guidance Notes in **Annex 1**.

- The final decision regarding the NDF should be indicated in the relevant box at the end of this Worksheet. Under "Reasoning/comments" include justification for the decision made and describe any **mandatory conditions** (for a positive NDF) and/or **recommendations as to further measures** (e.g. improvements in monitoring and/or management required – relevant for both positive and negative NDFs).

Step 2: Intrinsic biological vulnerability and conservation concern

Intrinsic biological vulnerability **(Question 2.1)**	High	Medium	Low	Unknown
Conservation concern **(Question 2.2)**	High	Medium	Low	Unknown

Step 3: Pressures on species **Country needs to fill this in**			**Step 4: Existing management measures** **Country needs to fill this in**
Pressure	**Level of severity (Questions 3.1 and 3.2)**	**Level of confidence (Questions 3.1 and 3.2)**	**Are the management measures effective* at addressing the concerns/pressures/impacts identified? (Question 4.1b)**

			Taking into account the evaluation of management appropriateness and implementation under Question 4.1a
Trade pressures Country needs to fill this in			
a) Magnitude of legal trade	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable
a) Magnitude of illegal trade	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable
** Only to be used where the trade pressure severity was assessed as "Low" for any of the Factors in **Step 3** and a judgement is made that the impacts on the shark stock/population concerned are so low that mitigation is not required.			
Fishing pressures Country needs to fill this in			
a) Fishing mortality (retained catch)	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable
b) Discard mortality	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable
c) Size/age/sex selectivity of fishing	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable

d) Magnitude of IUU fishing	High Medium Low Unknown	High Medium Low	Yes Partially No Insufficient Information **Not applicable

** Only to be used where the fishing pressure severity was assessed as "Low" for any of the Factors in **Step 3** and a judgement is made that the impacts on the shark stock/population concerned are so low that mitigation is not required.

A) Can a positive NDF be made?	**YES** – *go to B*	**NO** – *go to **Step 6** and list recommendations for measures to improve monitoring/management under Reasoning/comments below*
B) Are there any mandatory conditions to the positive NDF?	**YES -** *list under Reasoning/comments below and go to C*	**NO** – *go to C*
C) Are there any other further recommendations? *(e.g. for improvements to monitoring/management)*	**YES** - *go to **Step 6** and list recommendations for measures to improve monitoring/management under Reasoning/comments below*	**NO**

Reasoning/comments (include justification for decision made and information on mandatory conditions and/or further recommendations)

NEXT STEPS

- OPTION 1: If improvements in monitoring or management are required (whether in the case of a **positive or negative NDF**) go to **Step 6**
- OPTION 2: If no improvements in monitoring or management are required, make a **positive NDF** and stipulate any **mandatory conditions**, if appropriate, to the Management Authority and any other relevant bodies.

Worksheet for Step 6

Further measures

Section 6.1

Improvement in monitoring or information required

In the space below, authorities are encouraged to list the improvements in monitoring or information that are required to address cases where:

(v) The severity of trade/fishing pressures has been assessed as unknown.
(vi) The level of confidence in the evaluation of trade/fishing pressures is low.
(vii) There is insufficient information on the effectiveness of management.

(viii)

Recommendations should be made in **consultation with the national fisheries management agency** and should be as **specific as possible** to address any gaps/shortcomings identified with **clearly defined objectives**. Time-frames for implementation should be specified where possible, including with regard to the review of progress on implementation.

See pages 98-99 of **Annex 1** for additional Guidance Notes on completing this Worksheet.

Country needs to fill this in

Section 6.2

Improvement in management is required

In the space below, authorities are encouraged to list the improvements in management that are required to address cases where management has been assessed as partially effective or ineffective at addressing any of the concerns/pressures/impacts identified, particularly where a fishing or trade pressure is assessed as medium or high (confidence levels: low, medium or high).

As noted above for **Section 6.1**, recommendations should be made in **consultation with the national fisheries management agency** and should be as **specific as possible** to address any gaps/shortcomings identified with **clearly defined objectives**. Time-frames for implementation should be specified where possible, including with regard to the review of progress on implementation.

See page 100 of **Annex 1** for additional Guidance Notes on completing this Worksheet.

Country needs to fill this in

Appendix D Participants List

Attendance List

WORKSHOP PENYUSUNAN DOKUMEN *NON-DETRIMENT FINDINGS* (NDF)
UNTUK SPESIES HIU DAN PARI APPENDIKS II *CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA* (CITES)

Serang, 29 March 2017

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Attendance List

WORKSHOP PENYUSUNAN DOKUMEN *NON-DETRIMENT FINDINGS* (NDF) UNTUK SPESIES HIU DAN PARI APPENDIKS II *CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA* (CITES)

Serang, 30 March 2017

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Appendix E Review of Significant Trade

Conf. 12.8 (Rev. CoP17)*

Review of Significant Trade in specimens of Appendix-II species

RECALLING that Article IV, paragraph 2 (a), of the Convention requires, as a condition for granting an export permit, that a Scientific Authority of the State of export has advised that the export will not be detrimental to the survival of the species concerned;

RECALLING that Article IV, paragraph 3, requires a Scientific Authority of each Party to monitor exports of Appendix-II species and to advise the Management Authority of suitable measures to be taken to limit such exports in order to maintain such species throughout their range at a level consistent with their role in the ecosystem;

RECALLING also that Article IV, paragraph 6 (a), requires, as a condition for granting a certificate of introduction from the sea, that a Scientific Authority of the State of introduction from the sea has advised that the introduction will not be detrimental to the survival of the species concerned;

CONCERNED that some States permitting export of Appendix-II species are not effectively implementing Article IV, paragraphs 2 (a), 3 and 6 (a), and that, in such cases, measures necessary to ensure that the export of an Appendix-II species takes place at a level that will not be detrimental to the survival of that species, such as population assessments and monitoring programmes, are not being undertaken, and that information on the biological status of many species is frequently not available;

RECALLING that the proper implementation of Article IV is essential for the conservation and sustainable use of Appendix-II species;

NOTING the important benefits of the review of trade in specimens of Appendix-II species by the Animals and Plants Committees as set out in Resolution Conf. 8.9 (Rev.), adopted by the Conference of the Parties at its eighth meeting (Kyoto, 1992) and amended at its 11th meeting (Gigiri, 2000), referred to as the Review of the Significant Trade, and the need to clarify further and simplify the procedure to be followed;

RECALLING that, at its 12th meeting (Santiago, 2002), the Conference of the Parties mandated the Animals and Plants Committees to develop terms of reference for an evaluation of the Review of Significant Trade with the objective of assessing the contribution of the Review of Significant Trade to the implementation of Article IV, paragraphs 2 (a), 3 and 6 (a), and its impact over time on the trade and conservation status of species selected for review and subject to recommendations;

NOTING that, in Resolution Conf. 16.7 (Rev. CoP17) on *Non-detriment findings*, the Conference of the Parties recommended that Scientific Authorities take into account certain concepts and guiding principles in considering whether trade would be detrimental to the survival of the species;

ACKNOWLEDGING that the intent of the Review of Significant Trade process is to ensure that trade in Appendix II species is being conducted sustainably and in accordance with Article IV of the Convention, and to identify remedial action where it is needed with the ultimate intent of improving the implementation of the Convention;

EXPECTING that the implementation of recommendations and actions resulting from the Review of Significant Trade process will improve the capacity of the Scientific Authorities to carry out their non-detriment findings by improving range States' science-based conservation and management actions and improving coordination and communication between Scientific and Management Authorities on the issuance of export permits;

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* *Amended at the 13th and 17th meetings of the Conference of the Parties.*

AFFIRMING that the Review of Significant Trade process should be transparent, timely, and straightforward;

NOTING the *Guide to CITES compliance procedures* found in Resolution Conf. 14.3 on *CITES compliance procedures* and FURTHER NOTING the guidance for Parties regarding the management of export quotas elaborated in Resolution Conf. 14.7 (Rev. CoP15) on *Management of nationally established export quotas*; and

NOTING that Resolution Conf. 4.25 (Rev. CoP14) on *Reservations* recommends that any Party having entered a reservation with regard to any species included in Appendix I treat that species as if it were included in Appendix II for all purposes, including documentation and control;

THE CONFERENCE OF THE PARTIES TO THE CONVENTION

Regarding conduct of the Review of Significant Trade

1. DIRECTS the Animals and Plants Committees, in cooperation with the Secretariat and experts, and in consultation with range States, to review the biological, trade and other relevant information on Appendix-II species subject to significant levels of trade, to identify problems and solutions concerning the implementation of Article IV, paragraphs 2 (a), 3 and 6 (a), in accordance with the following procedure and as outlined in Annex 1 of this Resolution:

   Stage 1: Selection of species/country combinations to be reviewed

   a) the Secretariat shall, within 90 days after each meeting of the Conference of Parties, commence, or appoint consultants to commence, preparation of a summary from the CITES Trade Database of annual report statistics showing the recorded level of direct exports for Appendix-II species over the five most recent years, and an extended analysis of trade to inform the preliminary selection of species/country combinations, to be completed in sufficient time for the first regular meeting of the Animals or Plants Committee following that meeting of the Conference of the Parties (see Annex 2 of this Resolution);

   b) on the basis of recorded levels of direct exports and information available to the Animals or Plants Committee, the Secretariat, Parties or other relevant experts, a limited number of species/country combinations of greatest concern shall be included in Stage 2 of the review process by the Animals or Plants Committee at their first regular meeting following a meeting of the Conference of the Parties; and

   c) in exceptional cases, outside of steps 1 a) and b) above, and where new information provided to the Secretariat by a proponent indicates that rapid action may be needed concerning problems relating to the implementation of Article IV (for a species/country combination), the Secretariat:

      i) will verify that the proponent has provided a justification for the exceptional case, including supporting information;

      ii) may produce, or request a consultant produce a summary of trade from the CITES Trade Database in relation to the species/country combination concerned as necessary; and

      iii) will, as soon as possible, provide the justification and, if appropriate, a trade summary to the Animals or Plants Committee for their intersessional review and decision on whether or not to include the species/country combination in Stage 2 of the review process;

   Stage 2: Consultation with the range States and compilation of information

   d) the Secretariat shall:

      i) within 30 days after the meeting of the Animals or Plants Committee at which species/country combinations are selected, or within 30 days after the Committee has selected a species/country combination on an exceptional basis, notify selected range States that their species has been selected, providing an overview of the review process and an explanation for the selection. The Secretariat shall request range States to provide

the scientific basis by which it is established that exports from their country are not detrimental to the survival of the species concerned and are compliant with Article IV, paragraphs 2 (a), 3 and 6 (a) of the Convention. In its letter, the Secretariat shall provide guidance to range States on how to respond, explain the consequences of not responding to the request, and inform the range States that the responses will be made available on the CITES website as part of the agenda for meetings of the Animals or Plants Committee. Range States shall be given 60 days to respond; and

ii) compile, or appoint consultants to compile, a report about the biology and management of and trade in the species, including any relevant information provided by the range States, to be made available for the next meeting of the Animals or Plants Committee. In doing so, the Secretariat (or consultants) shall actively engage with the range States and relevant experts in the compilation of the report;

e) the report required under subparagraph 1 d) ii) shall include conclusions about the effects of international trade on the selected species/country combinations, the basis on which such conclusions are made and problems concerning the implementation of Article IV, and shall provisionally divide the selected species/country combinations into three categories:

i) 'action is needed' shall include species/country combinations for which the available information suggests that the provisions of Article IV, paragraph 2 (a), 3 or 6 (a), are not being implemented;

ii) 'unknown status' shall include species/country combinations for which the Secretariat (or consultants) could not determine whether or not these provisions are being implemented; and

iii) 'less concern' shall include species/country combinations for which the available information appears to indicate that these provisions are being met; and

f) once the report is completed, the Secretariat shall draw the attention of the relevant range States to the report prepared under subparagraph d) ii) and invite them to provide any additional information for consideration at the second meeting of the Animals or Plants Committee following the Conference of the Parties;

Stage 3: Categorization and Recommendations by the Animals or Plants Committee

g) the Animals or Plants Committee shall, at their second meeting following the Conference of the Parties, review the report of the Secretariat or the consultants, and the responses and additional information received from the range States concerned. For each selected species/country combination the Animals or Plants Committee shall recategorize species/country combinations of 'unknown status' as either 'action is needed' or 'less concern' and provide a justification for such recategorization. Additionally, if appropriate, the Animals and Plants Committee shall revise the preliminary categorization proposed for species/country combinations of those where 'action is needed' or those of 'less concern' and provide a justification for the revision;

i) species/country combinations determined by the Animals or Plants Committee to be of less concern shall be removed from the review process and the Secretariat shall notify the range States accordingly within 30 days; in cases where the species/country combination is of less concern due to the establishment of a zero export quota, any change to this quota should be communicated by the range State to the Secretariat and the Chair of the relevant Committee along with a justification; and

ii) species/country combinations determined by the Animals or Plants Committee to be those for which 'action is needed' shall be retained in the review process. The Animals or Plants Committee shall, in consultation with the Secretariat, formulate time-bound, feasible, measurable, proportionate, and transparent recommendations directed to the range States retained in the review process, using the principles outlined in Annex 3 of this Resolution. The recommendations should aim to build the range State's long term capacity to implement Article IV, paragraphs 2 (a), 3 and 6 (a) of the Convention;

h) the Secretariat shall, within 30 days of the meeting of the Animals or Plants Committee, transmit these recommendations to the range States concerned; and

i) the Animals or Plants Committee shall formulate separate recommendations directed to the Standing Committee for problems identified in the course of the review that are not directly related to the implementation of Article IV paragraph 2(a), 3 or 6(a), following the principles outlined in Annex 3 of this Resolution;

Stage 4: Measures to be taken regarding the implementation of recommendations

j) the Secretariat shall monitor progress against the recommendations, taking account of the different deadlines;

k) once the range State has reported on the implementation of recommendations or the deadlines have passed, whichever is first and, following timely intersessional consultation with members of the Animals or Plants Committee through the Chairs, the Secretariat shall determine whether the recommendations referred to above have been implemented;

   i) where the recommendations have been met, the Secretariat shall, following consultation with the Chair of the Standing Committee, notify the range States concerned that the species/country combination was removed from the review process and include the rationale for its evaluation, noting where relevant, specific commitments made by the range States in question and, in the case where a species/country combination was removed from the review process on the basis of the establishment of an interim precautionary export quota (including a zero export quota) in the place of implementing the recommendations, any change to this quota should be communicated to the Secretariat and Chair of the relevant Committee along with a justification, for their agreement; or

   ii) when the recommendations are not deemed to have been met (and no new information is provided), the Secretariat shall, in consultation with the members of the Animals or Plants Committee through the Chairs, recommend to the Standing Committee appropriate action, which may include, as a last resort, a suspension of trade in the affected species with that State; or

   iii) where the recommendations are not deemed to have been met or have been partially met, and there is new information suggesting the recommendation may require updating, the Secretariat shall, in a timely fashion, request the members of the Animals or Plants Committee, through the Chairs, to prepare a revised recommendation, keeping in mind the principles that recommendations should be time-bound, feasible, measurable, proportionate, transparent, and should promote capacity building. The Secretariat shall provide the revised recommendation to the range States within 30 days of its drafting;

l) the Secretariat shall report to the Standing Committee on its evaluation of the implementation of the recommendations, including the rationale for its evaluation and, where relevant, specific commitments made by the range States in question, and a summary of the views expressed by the Animals or Plants Committees. The Secretariat shall additionally report on any further actions taken by the Animals or Plants Committee in the case of range States where new information has resulted in revised recommendations;

m) for range States where recommendations are not deemed to have been met, the Standing Committee shall decide, at its next regular meeting or intersessionally as appropriate, on necessary action and make recommendations to the range State concerned, or to all Parties, keeping in mind that these recommendations should be time-bound, feasible, measurable, proportionate, transparent, and should promote capacity building. In exceptional circumstances, where the range State under consideration provides new information on the implementation of the recommendations to the Standing Committee, the Standing Committee through the Secretariat, shall consult in a timely fashion with the members of the Animals or Plants Committee through the Chair, prior to making a decision on necessary action;

n) the Secretariat shall notify all Parties of any recommendations or actions taken by the Standing Committee;

o) a recommendation to suspend trade in the affected species with the range State concerned should be withdrawn only when that range State demonstrates to the satisfaction of the Standing Committee through the Secretariat, which shall act, through the Chair, in consultation with the members of the Animals or Plants Committee, in compliance with Article IV, paragraph 2 (a), 3 or 6 (a); and

p) the Standing Committee, in consultation with the Secretariat and the Chair of the Animals or Plants Committee, shall review recommendations to suspend trade that have been in place for longer than two years, evaluate the reasons why this is the case in consultation with the range State, and, if appropriate, take measures to address the situation;

Regarding problems identified not related to the implementation of Article IV

2. DIRECTS the Standing Committee to address problems identified in the course of the review process that are not related to the implementation of Article IV, paragraph 2 (a), 3 or 6 (a), in accordance with other provisions of the Convention and relevant Resolutions;

Regarding support to the range States

3. URGES the Parties, and all organizations and stakeholders interested in the conservation and sustainable use of wildlife, to provide the necessary financial support or technical assistance to those States in need of such assistance to ensure that wild populations of species of fauna and flora subject to significant international trade are not subject to trade that is detrimental to their survival. Examples of such assistance could include:

   a) training of conservation staff in the range States, including by organizing regional workshops;

   b) provision of tools, information and guidance to persons and organizations involved in the production and export of specimens of the species concerned;

   c) facilitation of information exchange among range States, including at the regional level;

   d) provision of technical equipment, support and advice; and

   e) provision of support for field studies on Appendix-II species identified as being subject to significant levels of trade; and

4. DIRECTS the Secretariat to assist with identification and communication of funding needs in the range States and with identification of potential sources of such funding;

Regarding capacity building, monitoring, reporting, and evaluating the review process

5. DIRECTS the Secretariat, for the purpose of monitoring and facilitating the implementation of this Resolution and the relevant paragraphs of Article IV:

   a) to report at each meeting of the Animals or Plants Committee on the implementation by the range States concerned of the recommendations made by the Committee; and

   b) to maintain a database of species/country combinations that are included in the review process set out in this Resolution including a record of progress with the implementation of recommendations;

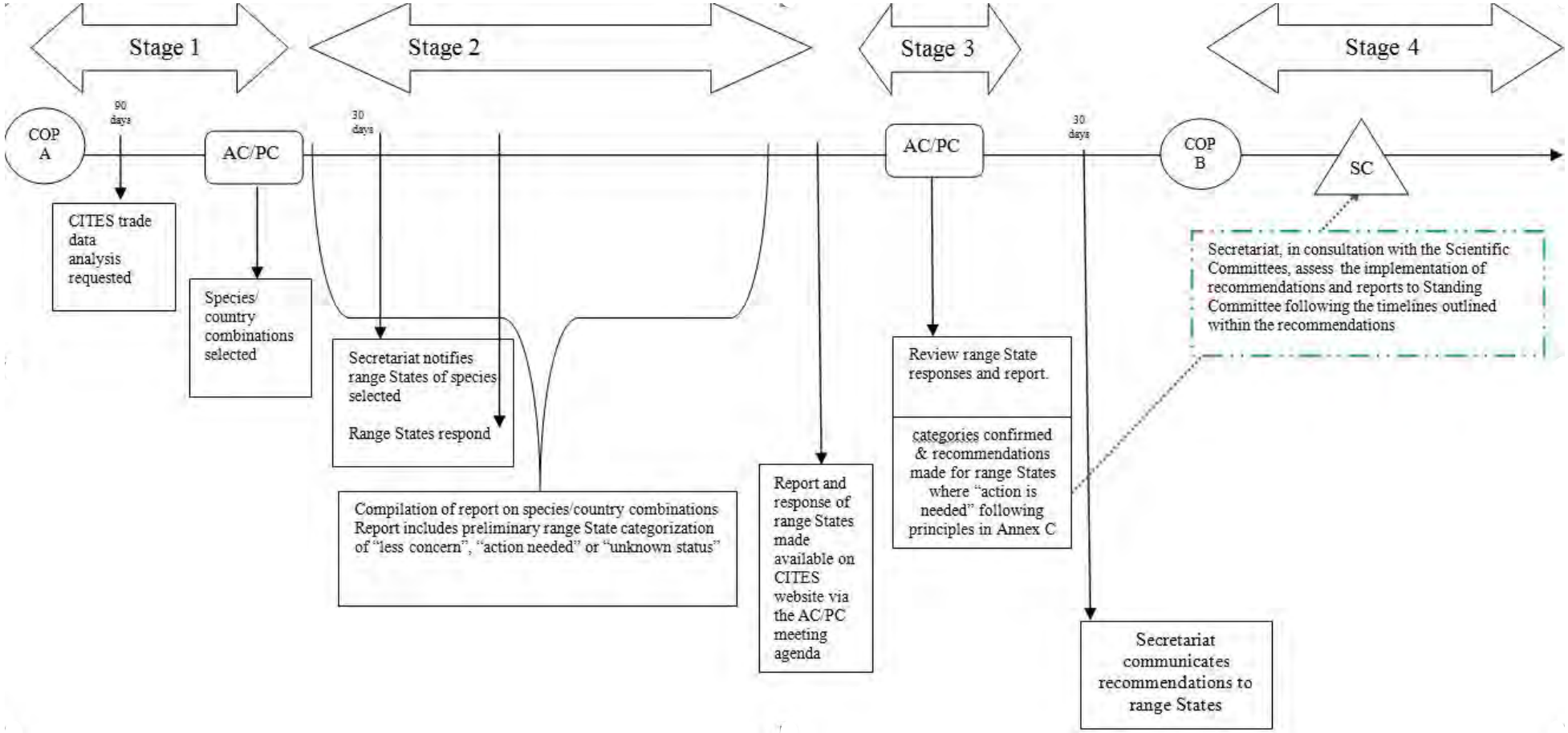
6. DIRECTS the Secretariat to include training on the Review of Significant Trade process as part of its capacity building activities related to the making of non-detriment findings;

7. DIRECTS the Animals or Plants Committee, in consultation with the Secretariat, to undertake a regular review of the outcomes of the Review of Significant Trade by, for example, examining a sample of past species/country combinations to assess whether implementation of Article IV paragraph 2 (a), 3 or 6 (a) was improved. The Animals or Plants Committee should consider the results of this review and revise the Review of Significant Trade process as necessary. In doing so, feedback should be obtained from range States (including their Scientific Authorities) who have been through the review process; and

8. REPEALS Resolution Conf. 8.9 (Rev.) (Kyoto, 1992, as amended at Gigiri, 2000) – *Trade in specimens of Appendix-II species taken from the wild*.

Annex 1

Timeline for the Review of Significant Trade Process



Annex 2 Guidance regarding the selection of species/country combinations

I. Summary

The summary referred to in Stage 1 a) of this Resolution shall include gross exports of Appendix II species over the five most recent years (direct trade, sources W, R, U and blank), and include the following information, by taxon:

1. The countries with direct exports in any of the five most recent years;

2. Trade levels for each country with direct exports[1];

3. Global conservation status as published in The IUCN Red List of Threatened Species or otherwise noted as “Not Evaluated”;

4. The population trend, as published in The IUCN Red List of Threatened Species;

5. Species reported in trade for the first time within the CITES Trade Database (noting those which have been subject to nomenclature changes) since the last Review of Significant Trade selection process; and

6. A note to indicate whether the species/ country combination has been previously subject to the Review of Significant Trade.

Where feasible, the summary output shall contain:

1. Whether there are any countries for which a zero quota or trade suspension has been implemented resulting from the Review of Significant Trade process;

2. Information on whether taxa included are subject to other Multi-lateral Environmental Agreements or Regional Fisheries Management Organisations, and the relevant agreements noted; and

3. Species that are endemic, according to the Species+ database, maintained by UNEP-WCMC.

II. Extended Analysis

The extended analysis requested in Stage 1 a) of this Resolution shall be based on gross exports of Appendix II species including at least the five most recent years (direct trade, sources W, R, U and blank), and shall include;

1. A subset of taxa that meet clearly defined criteria for “High Volume” trade;

2. A subset of taxa that have been assessed by The IUCN Red List of Threatened Species, and that meet clearly defined criteria for “high volume” trade, dependent on the global threat status;

3. A subset of taxa which meet clearly defined criteria for “Sharp increase” in trade; and

4. The above subsets should also incorporate trade reported in the most recent year.

A full methodology for the selection of taxa which meet these selection criteria will be provided in the outputs submitted to the Animals and Plants Committees.

[1] *To facilitate this requirement, an excel version of the summary will be produced and will be available in electronic format*

Annex 3 Principles for the development of Recommendations for the Review of Significant Trade Process

Introduction

This Annex provides general principles that should be followed when developing recommendations for the Review of Significant Trade process.

Recommendations can include short-term actions that are considered to be relatively rapid to implement (e.g., interim quotas or size restrictions for export), or longer-term actions that are recognized to be more complex, resource-intensive, and time-consuming to implement. The intent of short-term actions is to provide relatively rapid means to address issues of immediate concern; however, longer-term actions may promote the development of longer-lasting solutions towards implementation of Article IV. Depending on the situation, one or both types may be appropriate. The end-point for the interim export quota or other short-term recommendations should normally be no later than the date of fulfillment of the longer-term recommendations.

In the course of the Review of Significant Trade recommendations formulated may be directed to range States, to the Standing Committee or to other Parties. As such, recommendations should clearly indicate to whom the recommendation is directed.

Principles for making Recommendations

Recommendations to range States as part of the Review of Significant Trade should adhere to all of the following principles.

A recommendation should be:

1. Time-bound

   Each recommendation should have a specified end-date for implementation. This end-date should not normally be less than 90 days after the date of transmission to the range State. Where possible, the end-dates for recommendations made at a Committee meeting should be aligned.

2. Feasible

   a) A recommendation should be designed so that it will be possible to implement it in the time frame specified, in consideration of the range State's capacity.

   b) More than one recommendation can be used but care should be taken to ensure the feasibility of the implementation of all recommendations within the given time frames.

3. Measureable

   The recommendation should have a definitive indicator of completion that can be objectively measured.

4. Proportionate with the nature and severity of the risks

   a) A recommendation should specifically address the problem related to the implementation of Article IV 2(a), 3 or 6(a) that has been identified through the review process.

   b) A recommendation should be proportional to the severity of the risks to the species. Evaluation of risks should be undertaken in consideration of both the species' susceptibility to intrinsic or extrinsic factors that increase the risk of extinction, and the mitigating factors, such as management measures, that decrease the risk of extinction.

5. Transparent

   The relevant Committee should outline how its choice of recommendation is proportionate to the nature of and severity of the risks with reference to the consultant's report as applicable.

6. Aimed at building the capacity of the range State

   A recommendation should contribute to building of the long-term capacity of the range State to effectively implement Article IV of the Convention.

Recommendations directed to the Standing Committee or other Parties

Recommendations directed to the Standing Committee should also adhere to the principles of being time-bound, feasible, measurable, and proportionate with the nature and severity of the risks, transparent and aimed at building the capacity of the range State.