



**CONVENTION ON
MIGRATORY
SPECIES**

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**REPORT ON THE IMPLEMENTATION OF THE
CONCERTED ACTION
FOR THE
MOBULID RAYS (MOBULIDAE)**

Summary:

The Manta Trust and Wildlife Conservation Society have submitted the attached report on the implementation of the Concerted Action for the Mobulid Rays (*Mobulidae*), UNEP/CMS/Concerted Action 12.6

**REPORT ON THE IMPLEMENTATION OF THE
CONCERTED ACTION
FOR THE
MOBULID RAYS (MOBULIDAE)**

UNEP/CMS/ CONCERTED ACTION 12.6

1. CONCERTED ACTION

Title: Concerted Action for the Mobulid Rays (*Mobulidae*)

Document number: UNEP/CMS/Concerted Action 12.6

2. REPORTING ORGANIZATIONS - THE MANTA TRUST AND WILDLIFE CONSERVATION SOCIETY

The Manta Trust is an international organization that takes a multidisciplinary approach to the conservation of mobulid rays (*Mobula* spp.) and their habitat through conducting robust science and research, raising awareness and educating the general public and community stakeholders. The Manta Trust network extends across the globe, including collaborations and affiliated projects in over 25 countries and mobulid Range States. The Manta Trust is a Cooperating Partner to the CMS Sharks MOU.

The Wildlife Conservation Society is an international conservation organization working to save wildlife and wild places worldwide through science, conservation action, education, and inspiring people to value nature. WCS works across the globe in more than 60 countries, and the WCS Marine Conservation Program works in more than 20 countries to protect key marine habitats and wildlife, end overfishing, and protect key species, including sharks and rays. WCS is a founding partner of the Global Sharks and Rays Initiative (GSRI), which is implementing a global ten-year strategy that aims to: save shark and ray species from extinction; transition shark and ray fisheries to sustainability; effectively control international trade in shark and ray parts and products; and reduce consumption of shark and ray products from illegal or unsustainable sources. WCS is a Cooperating Partner to CMS Sharks MOU.

3. TARGET SPECIES

Class: Chondrichthyes

Order: Rajiformes

Family: Mobulidae (all species)

4. PROGRESS IN ACTIVITIES

Activity 1: Implement global conservation strategy for mobulid rays

The Manta Trust released the Global Strategy and Action Plan for mobulid rays (Ender *et al.*, 2018) providing a comprehensive overview of the status quo and future work required to conserve mobulid rays. The strategy includes priority actions and focus areas and incorporates actions from Lawson *et al.* (2017).

Stewart *et al.* (2018) published a comprehensive review with recommendations on research priorities for mobulid rays. This information is incorporated in the Global Strategy and Action Plan, which is the key reference for this Concerted Action.

Manta Trust published a comprehensive 144-page field guide “Guide to Manta and Devil Rays of the World” which includes detailed information on the identification, characteristics, threats and distribution for each of the species within this family of rays. It is an essential resource for fisheries management, international trade enforcement, and for anyone wanting to support ongoing efforts to research and conserve this threatened family of rays.

Activity 2: Drive collaborative and community-based conservation and management

The Manta Trust and Mobula Project Indonesia developed a scientific baseline for the shark and ray fishery in a key fishing location in Java, Indonesia. We conducted regular monitoring of the elasmobranch fishery over 14 months. This provides the most comprehensive dataset on the fishery in this location, supported by socio-economic information gathered through fisher interviews. We presented the scientific data on Javanese shark and ray fishery at a national symposium, and are launching the second phase of this research in October 2019.

In partnership with Blue Resources, comprehensive data on the shark and ray fishery in Sri Lanka was collected. This included socio-economic information from fishing communities country-wide. A total of 42 shark species were recorded, 4 which are listed on the CITES Appendix II and 7 listed on the CMS Appendices, while a total of 41 ray species were recorded, of which five are listed on the CITES Appendix II and 11 on the CMS Appendices.

In Peru, we gathered socio-economic insights on livelihood diversification options among fisher communities. We conducted a study to assess livelihoods options for fishers, in order to identify alternatives apart from mobulid tourism, which is proving tricky to implement. Results will allow us to develop opportunities for communities besides collecting fisheries or sightings data.

Activity 3: Reduce mobulid target and incidental catch

The Indian Ocean Tuna Commission (IOTC) passed a resolution for improving data collection on mobulid rays, and implementing bycatch mitigation measures following scientific recommendations summarized by the Manta Trust. This is the second Regional Fisheries Management Organization after the Inter-American Tropical Tuna Commission (IATTC) to adopt a resolution for mitigating bycatch and improving scientific knowledge on the species.

With no real information about whether or how mobulid rays survive after being released from purse-seine fishing nets in the Eastern Pacific, Dr. Stewart and Dr. Hall have begun a project to train fishery observers to assess the impact of this fishery on these by-catch species and to create best-practice release guidelines to improve the survival rate of the rays.

Using new genetic tools to find out which species of mobulids are caught as by-catch in the tuna purse-seine fishery in the Eastern Pacific, Dr Croll and his team are working with the Inter-American Tropical Tuna Commission to turn the tide for these poorly understood and highly threatened rays. Finally, a PhD study conducting a global analysis of species structure was completed by Dr Hosegood in 2019. Genetics are a powerful tool for conservation, and genetic analyses help us to correctly identify species and discover which populations are most in trouble.

Activity 4: Monitor, evaluate and adapt conservation and management strategies

Mobula birostris was added to the protected species list in the United States of America, and conservation management plans are being created to better protect this species. The US National Oceanic and Atmospheric Administration (NOAA) are focusing research efforts on this species, and have built collaborations with manta ray researchers across *M. birostris* migratory route both in Mexico and Peru.

Together with Wildlife Conservation Society and Misool Foundation, funded by Shark Conservation Fund, the Manta Trust will continue their work in Indonesia to develop and implement science-based management reforms. The goal is to support the Government of Indonesia to effectively implement CITES for mobulid rays, leading to reduced mortality of mobulids in gillnet fisheries. We will identify practical solutions for reducing mobulid bycatch and implementing CITES, which can be built into fisheries management plans and policies for CITES implementation. We will also support stakeholders to enhance and implement policy frameworks at national, provincial and local-levels, advocacy-driven research.

5. CHANGES TO THE ORIGINAL CONCERTED ACTION (IF ANY)

The Concerted Actions activities have been edited to align with the Manta Trust Global Strategy and Action Plan, which now represents the key reference document.

The original Activity 1 action to review the global strategy by Lawson *et al.* (2017) has been removed as this information is incorporated in the Manta Trust Global Strategy and Action Plan.

The species list and distribution ranges have been updated to reflect the most up-to-date knowledge in line with the Guide to Manta and Devil Rays of the World (Stevens *et al.*, 2018).

6. REFERENCES (if any)

IOTC resolution on mobulid rays

Global Strategy and Action Plan for conserving mobulid rays

Research priorities to support effective manta and devil ray conservation

7. ACTION

It is recommended that the Concerted Action is renewed (see revised Concerted Action proposal which is presented in Annex 1 to this document). As activities were not yet completed and have been updated, the Concerted Action should be extended for the following triennium.

CONCERTED ACTION FOR THE MOBULID RAYS (*MOBULIDAE*)

Adopted by the Conference of the Parties at its 12th Meeting (Manila, October 2017)

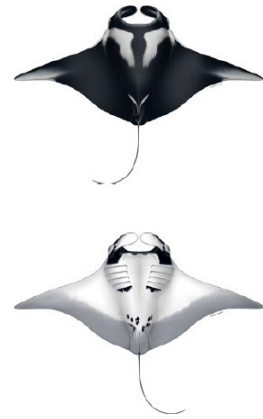
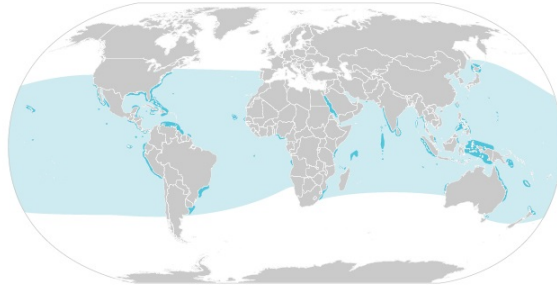
<p>Proponent</p>	<p>The Manta Trust The Manta Trust is an international organisation that takes a multidisciplinary approach to the worldwide conservation of Manta spp. and Mobula spp. (mobulid rays) (<u>Mobula spp.</u>) and their habitat through conducting robust science and research, while-raising awareness and providing education to-educating the general public and community stakeholders. The Manta Trust network extends across the globe and includes, <u>including</u> collaborations and affiliated projects in 22 over 25 countries and mobulid Range States. The Manta Trust is a Cooperating Partner to the CMS Sharks MOU.</p> <p>Wildlife Conservation Society (WCS) The Wildlife Conservation Society is an international conservation organization working to save wildlife and wild places worldwide through science, conservation action, education, and inspiring people to value nature. WCS works across the globe in more than 60 countries, and the WCS Marine Conservation Program works in more than 20 countries to protect key marine habitats and wildlife, end overfishing, and protect key species, including sharks and rays. WCS is a founding partner of the Global Sharks and Rays Initiative (GSRI), which is implementing a global ten-year strategy that aims to: save shark and ray species from extinction; transition shark and ray fisheries to sustainability; effectively control international trade in shark and ray parts and products; and reduce consumption of shark and ray products from illegal or unsustainable sources. WCS is a cooperating <u>Cooperating</u> Partner to CMS Sharks MoU.</p>
<p>Target species, lower taxon or population, or group of taxa with needs in common</p>	<p>Class: Chondrichthyes Order: Rajiformes Family: Mobulidae Species: Manta <u>Mobula alfredi</u> – Reef Manta Ray Manta <u>Mobula birostris</u> – Oceanic Manta Ray Mobula mobular – Giant Devil Ray Mobula japonica – Spinetail Mobula <u>Devil Ray</u> Mobula thurstoni – Bentfin Devil Ray Mobula tarapacana – Chilean– <u>Sicklefin Devil Ray</u> <u>Mobula kuhlii</u> - Shorthorned Pygmy Devil Ray Mobula eregoodootenkee – <u>Longhorned Pygmy Devil Ray</u> Mobula hypostoma – <u>West Atlantic Pygmy Devil Ray</u> Mobula rochebrunei – Lesser Guinean– <u>East Atlantic Pygmy Devil Ray</u> <u>Mobula munkiana</u> – Munk’s <u>Pygmy Devil Ray</u></p>
<p>Geographical range</p>	<p>Mobulid rays have worldwide distributions in the tropical and temperate waters of the Pacific, Atlantic and Indian Oceans (Clark <i>et al.</i>, 2006; White <i>et al.</i>, 2006a; Couturier <i>et al.</i>, 2012; Bustamante <i>et al.</i>, 2012). Within this broad range, populations are sparsely distributed and highly fragmented (Clark <i>et al.</i>, 2006; White <i>et al.</i>, 2006a), likely due to their resource and habitat needs.</p>

(note from the Secretariat: *Figures removed from document - Range Waters, Lawson et al. (2017). Figures added to document: Range Waters, Stevens et al. (2018)*)

OCEANIC MANTA RAY - *Mobula birostris*

Disc width: average 400-500cm (13-16.5ft)

IUCN Red List: Vulnerable



REEF MANTA RAY - *Mobula alfredi*

Disc width: average 300-350cm (10-11.5ft)

IUCN Red List: Vulnerable



SPINETAIL DEVIL RAY

Mobula mobular

Disc width: average 180-280cm (5.9-9.2ft)

IUCN Red List: Near Threatened

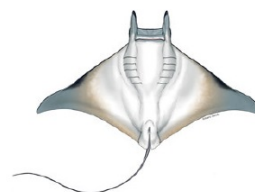


BENTFIN DEVIL RAY

Mobula thurstoni

Disc width: average 135cm (4.5ft)

IUCN Red List: Near Threatened

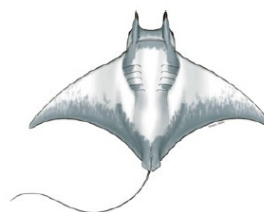
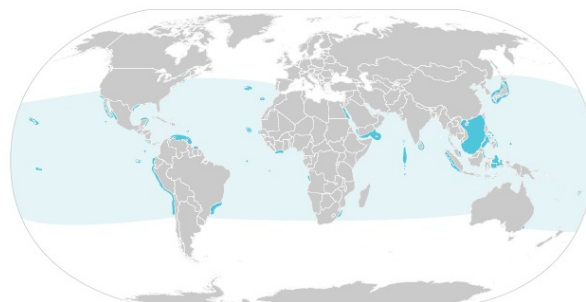


SICKLEFIN DEVIL RAY

Mobula tarapacana

Disc width: average 200-270cm (6.6-8.8ft)

IUCN Red List: Vulnerable



SHORTHORNED PYGMY DEVIL RAY

Mobula kuhlii

Disc width: average 100cm (3.3ft)

IUCN Red List: Data Deficient



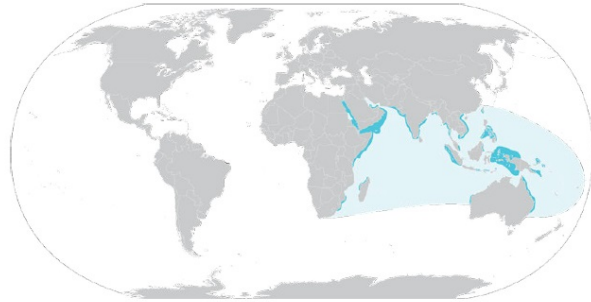


LONGHORNED PYGMY DEVIL RAY

Mobula eregoodootenkee

Disc width: average 110cm (3.6ft)

IUCN Red List: Near Threatened



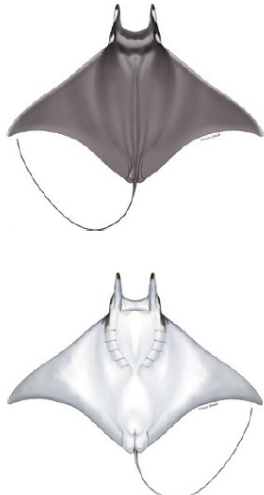



WEST ATLANTIC PYGMY DEVIL RAY

Mobula hypostoma

Disc width: average 110cm (3.6ft)

IUCN Red List: Data Deficient



	<div style="text-align: center;">  <p>MUNK'S PYGMY DEVIL RAY <i>Mobula munkiana</i> Disc width: average 89-100cm (2.9-3.3ft) IUCN Red List: Near Threatened</p>  </div> <hr/> <div style="text-align: center;">  <p>EAST ATLANTIC PYGMY DEVIL RAY <i>Mobula rochebrunei</i> Disc width: average 113cm (3.7ft) IUCN Red List: Vulnerable</p>  </div>
	<p>Figure by Stevens <i>et al.</i> (2018). Distribution maps for manta and devil ray species (light blue = expected range, dark blue = confirmed range).</p> <p>Figure by Lawson <i>et al.</i> (2017). Distribution maps for manta and devil ray species. Extent of Occurrence (EOO) and Area of Occupancy (AOO) maps for all nine species of devil ray and both species of manta ray.</p> <p>Species are as follows: (A) <i>Mobula japonica</i>; (B) <i>Mobula mobular</i>; (C) <i>Mobula thurstoni</i>; (D) <i>Mobula tarapacana</i>; (E) <i>Mobula eregoodootenkee</i>; (F) <i>Mobula kuhlii</i>; (G) <i>Mobula hypostoma</i>; (H) <i>Mobula rochebrunei</i>; (I) <i>Manta birostris</i>; (J) <i>Manta alfredi</i>; (K) <i>Mobula munkiana</i>.</p>
<p>Activities and expected outcomes</p>	<p>A comprehensive approach and strategic approach is required plan are crucial to ensure the long-term conservation and sustainable management of mobulid rays. <u>The Global Strategy & Action Plan for Conserving Mobulid Rays (Ender <i>et al.</i>, 2018) provides clear guidance to Parties on strategic objectives and actions to take to achieve conservation outcomes. The Concerted Action objectives align with the Global Strategy & Action Plan.</u></p>

	<p>CMS calls for effective national protections for mobulid rays. Some Parties have already declared national protection. Legislative changes and international obligations inevitably affect coastal communities that are dependent on mobulid fisheries and these impacts need to be addressed. Including coastal communities when designing conservation measures to ensure the interventions are effective, practical, and informed by stakeholders is of particular importance at this juncture in the work to protect mobulid rays.</p> <p>Empowering coastal communities and ensuring long term support for transition away from a dependence on unsustainable fishing practices and new income sources suitable for their context is needed. It is those who often have the least ability to absorb major regulatory changes that are most impacted by poorly implemented conservation measures. This also undermines the long term success of protection strategies for the species. To effectively achieve SDG 1 (No Poverty) and SDG 14 (Life below water), protection of mobulids and supporting alternative livelihoods of fishers will need to be simultaneously addressed.</p> <p>To ensure effective implementation of conservation strategies for mobulids that are also socially and culturally appropriate and ethical, we urge Parties to include community stakeholders fully in the process and assist affected communities in their transition away from mobulid catch to new income opportunities.</p> <p>It is proposed that Parties (see Table in Annex 1)</p> <ol style="list-style-type: none"> 1: Implement the Global Conservation Strategy for mobulid rays (Lawson <i>et al.</i> 2017), which provides a framework for and prioritizes conservation interventions for mobulid rays (<i>Manta spp.</i>; <i>Mobula spp.</i>) throughout their entire range 2: Drive collaborative and community-based conservation and management for mobulid rays 3: Reduce mobulid target and incidental catch 4: <u>Monitor, evaluate, and adapt conservation and management strategies</u>
<p>Associated benefits</p>	<p>It is the intention that the activities proposed in this document serve as a catalyst to deliver effective conservation for mobulid rays and assist Parties in the implementation of their obligations under international treaties (e.g., CITES and CMS). It is also intended that these activities serve as an opportunity for Parties to collaborate, share, and propagate conservation knowledge, generate coordinating actions, and monitor progress that will be applicable to other marine species.</p> <p>Many coastal communities that catch mobulid rays often also land other at-risk shark and ray species listed under CMS that will require protection. Understanding and documenting these fisheries and livelihood options in affected communities will also support coordinated, effective, and socially just management and conservation of marine resources. Support for diversified income opportunities will help alleviate pressure on marine resource and ensure long term economic sustainability.</p>
<p>Timeframe</p>	<p><u>Ongoing to be initiated as soon as possible.</u></p> <p>Action 1: Open ended to be initiated asap.</p>

	<p>Action 2: Activities 2.1, 2.2, and 2.3 undertaken at a minimum 6 months before implementation. Activity 2.4 requires long term commitment and support in place for affected communities.</p> <p>Action 3: Activities to be conducted during 2017 and 2018.</p> <p>Action 4: Open ended and ongoing once Action 2 has begun.</p>
<p>Relationship to other CMS actions</p>	<p>All <i>Manta spp.</i> and <i>Mobula spp.</i> are listed on Appendix I and II of CMS. Parties that are a Range State to a migratory species listed in Appendix I shall endeavour to strictly protect them by: prohibiting the taking of such species, with very restricted scope for exceptions; conserving and where appropriate restoring their habitats; preventing, removing or mitigating obstacles to their migration and controlling other factors that might endanger them.</p> <p>The Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) is the specialized agreement for chondrichthyan species in accordance with Article IV 1 of the Convention. It aims to guide international cooperation to maintain and achieve a sustainable conservation status for migratory sharks and rays included in its Annex 1 to this document.</p> <p>Mobulid rays have been included in Annex 1 of the Sharks MOU, which means they benefit from the agreed measures and actions under the MOU and its Conservation Plan as well as from technical guidance for its conservation, provided by the MOU's Advisory Committee and Conservation Working Group.</p> <p>The proposed concerted actions would support the implementation of the Sharks MOU and the aim of species listed under CMS Appendices and II. In particular, with regards to encouraging Sharks MOU Signatories that are also CMS Parties to ensure that national, legally binding regulations are in place to prohibit targeting, retaining, landing, transshipping, selling, etc. of mobulid rays, in line with CMS Appendix I obligations, whilst safeguarding the livelihoods of Parties' coastal communities that are dependent on mobulid ray fishery... In addition, the proposed concerted actions would be in alignment with SDGs 1 and 14 (eliminating poverty and life below water).</p> <p>The CMS Scientific Council Bycatch Working Group reviews existing measures to mitigate or reduce bycatch of CMS species and aims to ensure that recommended measure benefit all taxa. The results of this proposed Concerted Action would also contribute to this work.</p>
<p>Conservation priority</p>	<p>The greatest threat to mobulid rays is excessive targeted and incidental take in fisheries. As a result of overfishing, some mobulid populations in Southeast Asia, the Indian Ocean, and Africa exhibit regional declines of over 80%. Of particular concern is exploitation of mobulids in critical habitats, where entire aggregations of animals can be captured relatively low fishing effort. For such intrinsically vulnerable species (low fecundity, small size of sub-populations, migratory and aggregating behaviour behaviour), localized negative impacts are likely to have severe consequences for global population survival.</p> <p>Mobulids have been reported as bycatch in 21 small-scale fisheries in 15 countries and in nine industrial scale fisheries in 11 countries (Croll <i>et al.</i>, 2015). A recent study estimates global bycatch in tuna purse seine fish-</p>

	<p>eries of ~ 13,000 mobulids annually (Croll <i>et al.</i>, 2015). Escalating demand for dried mobulid gill plates for use in Chinese medicine, as well as meat and cartilage, has also led to targeting of these vulnerable species through fisheries that are largely unregulated and unmonitored. Significant catch declines have been observed in a number of locations in the Indo-Pacific, Eastern Pacific, and Indian Ocean regions, often despite evidence of increased fishing effort. Population declines are likely occurring in other locations, but have gone unnoticed.</p> <p>Historically, subsistence fishing for mobulid rays occurred in isolated locations with simple gear, limiting the distance and time fishermen could travel to hunt. In recent years, however, fishers have begun targeting these rays with modern fishing gear and expanding their fishing range and season. (Dewar, 2002; White <i>et al.</i>, 2006b; Rajapackiam <i>et al.</i>, 2007; White and Kyne, 2010; Heinrichs <i>et al.</i>, 2011; Lewis <i>et al.</i>, 2015; Fernando and Stevens, 2011). Artisanal fisheries also target mobulids for food and local products (Ayala, 2014).</p> <p>For fishing communities, especially small-scale fishers, mobulid rays may represent a significant portion of their income. Mobulid rays are often caught with non-selective gear as part of multispecies fisheries. Small scale fishing communities are often in the poorest sector of their countries and have little capacity to absorb sudden income loss. Without working with affected communities as partners and ensuring support is in place before conservation strategies are implemented, said strategies are often not effective.</p> <p>At the core of alternative, sustainable livelihood initiatives is the focus on working in partnership, co-management, and recognition of local expertise to develop alternative means of making a living that reduce pressure on a particular element of biodiversity. Over the last decade, research into this field has greatly advanced. By working together with social scientists and experts, common errors can be avoided and the paths towards developing alternative incomes for communities can be smoothed. Livelihoods analysis provides a means by which to better understand the nature of small-scale fishery production systems, and helps to identify appropriate entry-points for development intervention or policy support for poverty reduction in fishing communities (Allison and Ellis, 2001).</p> <p>A systematic review and community consultation should be conducted before beginning investments (Roe <i>et al.</i>, 2015). Such a review can then inform both the decision to proceed as well as the nature of the initiative and investment.</p> <p>The review should be focused not only on the specific intervention planned, but also on understanding the system within which it operates and the role of the activities that they are attempting to substitute for within the livelihood strategy. The work should be constructed in an adaptive management framework that allows testing and learning (Roe <i>et al.</i>, 2015).</p>
<p>Relevance</p>	<p>Parties that are Range States of mobulid rays, which are listed on CMS Appendix I and II, agree, under CMS, to endeavour to strictly protect them by prohibiting the taking of such species, with very restricted scope for exceptions. However, public and fisher awareness of mobulid rays' threatened status and the existence of protective measures in range states is generally poor. Moreover, support for assisting communities in</p>

	<p>developing alternative livelihoods is lacking even in locations where protective measures have been established, which therefore questions the effectiveness of and compliance with those measures.</p> <p>Any national conservation initiatives intended to prevent mobulid rays from being driven further towards extinction is unlikely to be successful if the animals are not protected during their seasonal migrations into, and through other Range States' waters as well as areas beyond national jurisdiction. By agreeing to a listing on CMS, Range States also agree to endeavour conserving and where appropriate restoring their habitats; preventing, removing or mitigating obstacles to their migration and controlling other factors that might endanger them. Therefore, Parties need to work together in developing effective implementation measures, which incorporate considering the effect on coastal communities and engaging relevant development agencies as appropriate to develop alternative livelihoods.</p>
<p>Absence of better remedies</p>	<p>The CMS Network is the ideal platform for improving awareness and driving implementation of the Global Conservation Strategy for Devil and Manta Rays under this Concerted Action. A strategic and collaborative approach is needed to take the next steps for conserving migratory species, such as mobulid rays, and for this purpose it is essential that Parties work together on developing and implementing activities.</p> <p>In addition, all species in the genera <i>Mobula</i> and <i>Manta</i> are now included on CITES Appendix II, thereby requiring that all international trade in their parts and products be both legal and sustainable. Cooperation through CMS will greatly enhance the ability of CMS Parties to implement their CITES obligations.</p> <p>The partners to CMS, such as engaged NGOs and researchers, are able to support these actions once governments decide to go forward and adopt them, through the existing linkages that CMS has created.</p>
<p>Readiness and feasibility</p>	<p>A Devil and Manta Ray Conservation Network is already established and enabling effective sharing of data and information, sharing and propagating conservation knowledge, generating coordinating actions, and monitoring progress. The Network has published the comprehensive <u>A Global Devil and Manta Ray Conservation Strategy to and Action Plan for conserving mobulid rays has been published and support countries in planning and implementation for implementing of conservation and management of mobulid rays measures.</u></p> <p>There are engaged NGOs, researchers, and community organizations ready to support Range States to develop, fund and implement collaborative work. With the support of the partners involved in the Devil and Manta Ray Conservation Network, there is a very strong foundation from which Range States can implement the activities proposed. Furthermore, support will be requested from the Sharks MOU and Cooperating Partners, to support the development and implementation of the action plans. Some Range States have already implemented national protection for mobulid species, including the Philippines, Peru, Indonesia and others, and there is already collaborative work with NGOs and scientists on the ground to support affected communities and implementation. The groundwork exists, but further understanding, planning, and support from</p>

	<p>these Range States is needed to assist communities to transition away from mobulid fisheries.</p>
<p>Likelihood of success</p>	<p>The Devil <u>Global Strategy and Manta Ray Conservation Network</u> has provided the Action Plan for conserving mobulid rays provides clear guidance and action steps, and the <u>The</u> proposed activities are supported by engaged NGOs, researchers and community organisations. Approaching the livelihood challenge through the concerted action steps will pave the way for successful implementation of initiatives and incorporate communities as partners to ensure sustainability. No risk factors were identified that have the potential to significantly jeopardize the success of the proposed activities.</p>
<p>Magnitude of likely impact</p>	<p>The engagement of communities in co-management and planning activities for implementation helps to ensure that protection strategies will be effective and realistic. This is of benefit to all Range States where coastal communities depend on mobulid fisheries.</p> <p>The actions proposed here will also increase understanding and scientific data from the community level about catch and species information.</p>
<p>Cost-effectiveness</p>	<p>Costs for reviewing the Strategy and identifying objectives and activities that can be implemented by Parties are minimal. Cost of conducting socio-economic surveys and developing alternative income opportunities with communities will vary depending on location. However, the benefits far outweigh the costs of implementing initiatives that are not effective. Costs for sharing the learning through proposed Action 4 are minimal if activities are linked with regional or national fora and conferences.</p> <p>Resources required are funding to conduct the socio-economic baseline studies advised by experts, and to develop and pilot new sustainable alternative livelihood opportunities with affected communities. Funding will also be required for building capacities of community members to assist the transition towards alternative livelihoods. Access to long term capital, grants, or loans to support the new alternative income opportunities is also needed.</p>
<p>References</p>	<p>Allison E, Ellis F. 2001. The Livelihoods Approach and Management of Small-Scale Fisheries. <i>Marine Policy</i>, 25, 377-388.</p> <p>Ayala. 2014. First assessment of Mobulid rays fishery in Peru. Asociación Peruana para La Conservación de la Naturaleza (APECO). Final Project Report to the Save Our Seas Foundation.</p> <p>Bustamante C, Couturier L, Bennett M. 2012. First record of <i>Mobula japonica</i> (Rajiformes: Myliobatidae) from the south-eastern Pacific Ocean. <i>Marine Biodiversity Records</i>; Volume 5; e48; 4 pages.</p> <p>Clark TB, Smith WD, Bizzarro JJ. 2006. <i>Mobula tarapacana</i>. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>.</p> <p>Couturier LIE, Marshall AD, Jaine FRA, Kashiwagi T, Pierce SJ, Townsend KA, Weeks SJ, Bennet MB, Richardson AJ. 2012. Biology, Ecology and Conservation of the Mobulidae. <i>Journal of Fish Biology</i>, 80: 1075-1119.</p> <p>Dewar H. 2002. Preliminary report: Manta harvest in Lamakera. p. 3 p.</p>

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Annex 1. Concerted Actions for Conservation of Manta and Devil Rays (Family Mobulidae) under the Convention for the Conservation of Migratory Species of Wild Animals (CMS)

Activity	Output/Outcome	Timeframe	Responsibility	Funding
1. Implement global conservation strategy for Reduce target and incidental catch of mobulid rays				
1.1. <u>Review the Global Conservation Strategy (Lawson <i>et al.</i> 2017) Develop and implement priority actions. legislation that supports mobulid conservation.</u>	<u>Strategy provides guidance to Parties. Protective policies exist on local, national or regional scale that decrease or eliminate mobulid mortality.</u>	2017-2018 2019 - 2023	Party-Range States. <u>State Parties may invite the following to support with implementation:</u> <u>Sharks MOU Signatories, CMS Sharks MoU Advisory Committee (AC), Sharks MOU Cooperating Partners, NGOs, Fishing Countries, Transit and Consumer State Parties, RFBs, RFMOs.</u>	<u>As required on a case by case basis. by Parties</u>
2. Drive collaborative and community-based conservation and management				
1.2. <u>Build capacities for policy enforcement and monitor their effectiveness (e.g. CITES).</u>	<u>Effective enforcement at all levels reduces illegal catch, strengthens compliance, supports responsible fisheries management, and rewards responsible fishing communities.</u>	<u>2019 - 2020</u>	<u>Range State Parties, Fishing Countries, Transit and Consumer State Parties, RFBs, RFMOs.</u>	<u>As required on a case by case basis</u>
2.1. <u>Engage with local communities and fisheries sector to gather socio-economic information on mobulid catch, share information and develop collaborative conservation and management strategies.</u> 1.3. <u>Support research that improves knowledge on target and incidental mobulid catch.</u>	<u>Collaborative Latest scientific knowledge informs Parties on appropriate protective measures and informed management drives effective decision making and implementation of legislation.</u>	<u>2017-2020 - 2023</u>	Party Range States, NGOs. <u>Parties may invite the following to support with implementation:</u> <u>Sharks MOU Signatories, CMS Sharks MoU-MOU Cooperating Partners, NGOs, research bodies.</u>	<u>As required on a case by case basis. research projects</u>

Activity	Output/Outcome	Timeframe	Responsibility	Funding
<p>2.2. Build capacities within local communities to support a transition towards alternative livelihoods.</p> <p>1.4. <u>Provide affordable selective gear to fishers to reduce mobulid bycatch (e.g. gear swap programs, subsidies programs).</u></p>	<p><u>Communities are able Fisheries use selective gear that reduces incidental catch and willing to move away from mortality of mobulid fishing rays.</u></p>	<p>2017-2020 - 2021</p>	<p><u>Party Range States, NGOs, Research Bodies, RFBs, RFMOs.</u></p> <p>Parties may invite the following to support with implementation:</p> <p>Sharks MOU Signatories, CMS Sharks MOU-Cooperating Partners, NGOs.</p>	<p>As required on a case by case basis. <u>by Parties</u></p>
<p>2.3. Consult and collaborate with communities and fisheries sector to design and plan for regulatory or legislative changes prior to implementation.</p> <p>1.5. <u>Educate fishers on mobulid bycatch safe release methods (see IOTC resolution on the conservation of mobulid rays IOTC-2019-S23-PropI[E]).</u></p>	<p><u>Communities are prepared for legislative changes, and legislation is appropriate for local conditions. Safe release methods are employed for all mobulid bycatch.</u></p>	<p>2017-2020 -2022</p>	<p><u>Party Range States, NGOs, Research Bodies, RFBs, RFMOs.</u></p> <p>Parties may invite the following to support with implementation:</p> <p>Sharks MOU Signatories, CMS Sharks MOU-Cooperating Partners, NGOs.</p>	<p>As required on a case by case basis.</p>
<p>3. Reduce mobulid target and incidental catch</p>				
<p>1.6 <u>Establish temporal or spatial restrictions on mobulid fishing for critical habitats.</u></p>	<p><u>Effective temporal or spatial fishing restrictions exist based on knowledge about mobulid movement and habitat use.</u></p>	<p>2019 - 2023</p>	<p><u>Party Range States, NGOs, Research Bodies, RFBs, RFMOs.</u></p> <p>Parties may invite the following to support with implementation:</p> <p>Sharks MOU Signatories, CMS Sharks MOU-Cooperating Partners.</p>	<p>As required on a case by case basis.</p>

Activity	Output/Outcome	Timeframe	Responsibility	Funding
<p>3.1. Conduct participatory community research to improve knowledge on target and incidental mobulid catches and the distribution and occurrence of mobulid rays within Range States.</p> <p><u>1.7. Limit ghost fishing by identifying hotspots and mitigation measures for fishers.</u></p>	<p>Improved knowledge that informs Parties on appropriate legislation and management practices are in place that reduce ghost fishing.</p>	<p>2017-2020 <u>2019 - 2023</u></p>	<p>Party Range States, NGOs, Research Bodies, RFBs, RFMOs.</p> <p>Parties may invite the following to support with implementation:</p> <p>Sharks MOU Signatories, CMS Sharks MOU Cooperating Partners, NGOs, research bodies.</p>	<p>As required on a case by case basis.</p>
<p>3.2. Develop, disseminate, and support implementation of best practice approaches to reduce incidental catches of mobulid rays and for safe handling and release to minimize post capture mortality.</p>	<p>Increased capacity of fisheries sector and management bodies to reduce incidental fisheries catches and mortality of mobulid rays.</p>	<p>2017-2020</p>	<p>Party Range States, NGOs, Research Bodies, RFBs, RFMOs.</p> <p>Parties may invite the following to support with implementation:</p> <p>Sharks MOU Signatories, CMS Sharks MOU Cooperating Partners.</p>	<p>As required on a case by case basis.</p>
<p><u>2. Drive collaborative community-based management</u></p>				
<p>3.3. Collaborate and coordinate research and management implementation with both local stakeholders and neighboring Range States, recognizing the need to address shared stocks conservation through coordinated approaches – e.g. via RFMOs and RFBs.</p>	<p>Coordinated actions drive the conservation of shared stocks. <u>Informed management drives appropriate and effective decision making and implementation of legislation.</u></p>	<p>2017-2020 <u>2019 - 2021</u></p>	<p>Party Range States, NGOs, RFBs, RFMOs.</p> <p>Parties may invite the following to support with implementation:</p> <p>Sharks MOU Signatories, CMS Sharks MOU <u>MoU</u> Cooperating Partners, <u>NGOs, research bodies.</u></p>	<p>As required on a case by case basis.</p>

Activity	Output/Outcome	Timeframe	Responsibility	Funding
<p><u>2.1 Gather socio-economic information on mobulid catch from fishing communities. Consult with communities to design for regulatory or legislative changes prior to implementation.</u></p>				
<p>3.4. Ensure effective implementation of complementary CITES requirements and regulations particularly if no strict national protection for mobulids exists.</p> <p><u>1.3. Support the development of alternative livelihood programs (e.g. farming, aquaculture) through collaborative planning with communities.</u></p>	<p>CITES requirements are incorporated into national legislation and effectively implemented in Range and consumer States.</p> <p><u>Engaged and informed communities are willing to move away from mobulid fishing, and prepared for changes.</u></p>	<p>2017-2018 2019 - 2023</p>	<p>Party Range States, NGOs, RFBs, RFMOs.</p> <p><u>Parties may invite the following to support with implementation:</u> Sharks MOU Signatories, CMS Sharks MOU MoU Co-operating Partners, Consumer State Parties NGOs.</p>	<p>As required on a case by case basis.</p>
<p>3.5 Expand enforcement against illegal fishing and illegal trade</p> <p><u>2.3 Build community capacity to transition away from mobulid fishing.</u></p>	<p>Effective enforcement at all levels, including prosecutions, reduces illegal directed and incidental catches, strengthens compliance with regulations, supports responsible fisheries management, and rewards responsible fishing communities.</p> <p><u>Engaged and informed communities have the skills and knowledge to transition away from mobulid fishing.</u></p>	<p>2017-2020</p>	<p><u>Party Range State States, NGOs.</u></p> <p>Parties, Fishing Countries, Transit and Consumer State Parties, RFBs, RFMOs may invite the following to support with implementation:</p> <p><u>Sharks MOU Signatories, CMS Sharks MOU Cooperating Partners, NGOs.</u></p>	<p>As required on a case by case basis.</p>
<p>43. Monitor, evaluate, impact and adapt conservation and management strategies</p>				
<p><u>43.1 Develop a plan to monitor Monitor and evaluate the effec-</u></p>	<p>Data and evidence collected ensures conservation and informs manage-</p>	<p>2017-2020 2023</p>	<p>Party Range States, NGOs.</p> <p>Parties may invite the follow-</p>	<p>As required on a case by case basis.</p>

Activity	Output/Outcome	Timeframe	Responsibility	Funding
<p>tiveness of interventions to reduce the socio-economic impact of protection <u>new protective measures.</u></p>	<p>ment strategies are being implemented, approach to ensure the communities' economic well-being is maintained or improved.</p>		<p>ing to support with implementation: CMS Sharks MOU Signatories, Cooperating Partners, NGOs, research bodies.</p>	
<p>43.2 Develop an <u>Monitor and assess the ecological monitoring plan for impact of protective measures on mobulid rays to determine, and re-assess approach dependent on effectiveness of conservation and management measures.</u></p>	<p>Data and evidence collected ensures conservation and management strategies are having intended mortality reduction effects. Management is informed of the effectiveness of protective measures and adapts its direction if needed.</p>	<p>2017-2020 <u>2023</u></p>	<p>Party Range States, NGOs. Parties may invite the following to support with implementation: CMS Sharks MOU Signatories, Cooperating Partners, NGOs, research bodies.</p>	<p>As required on a case by case basis.</p>
<p>43.3 Collate and share findings and best practices at national and regional workshops.</p>	<p>Lessons learned and best practice can be shared across Range States and strategies can be adapted where needed.</p>	<p>2017-2020 <u>2023</u></p>	<p>Party Range States with support from the CMS Secretariat, CMS Sharks MOU Signatories, Cooperating Partners, NGOs, research bodies.</p>	<p>As required on a case by case basis.</p>

Annex 2: Table by Lawson Ender *et al.* (2017 2018). International, national, and territory/state protections currently in place for devil and manta rays. International, national, territorial, and state legal protection that restricts fishing and/or trade of a single or multiple species of devil (*Mobula spp.*) and/or manta (*Manta spp.*) ray. The term legal protection is used here to refer to protection obligation, legal or otherwise, and does not examine protection implementation success or effectiveness. The date that this legal protection was passed is included in brackets.]

(Note from the Secretariat - *Tables by Lawson et al. (2017) removed from document: International, national, and territory/state protections currently in place for devil and manta rays. Tables by Ender et al. (2018) added to document: 'Protective legislation' including international, national, and territory/state protections currently in place for devil and manta rays*)

PROTECTIVE LEGISLATION

While international, regional, and national protective legislation has improved in recent years, there is still a need for greater protection throughout the range of all manta and devil ray species globally.

LOCATION	SPECIES	LEGAL PROTECTION MEASURE
INTERNATIONAL		
CITES Appendix II	All mobulid species	Listing of the genus <i>Manta</i> (2013) and <i>Mobula</i> (2016) on Appendix II of the Convention on International Trade in Endangered Species (CITES).
CMS Signatories	All mobulid species	Convention on the Conservation of Migratory Species of Wild Animals (CMS), Appendix I and II; <i>M. birostris</i> (2011), all other mobulid species (2014).
Inter-American Tropical Tuna Commission (IATTC)	All mobulid species	Resolution C-15-04 on the Conservation of Mobulid Rays Caught in Association with Fisheries in the IATTC Convention Area.
REGIONAL		
Barcelona & Bern Conventions	<i>M. mobular</i>	Added to the Annex II 'list of strictly protected fauna species' of the Bern Convention and the Annex II 'List of endangered or threatened species' to the Protocol concerning Special Protected Areas and Biological Diversity in the Mediterranean of the Barcelona Convention, which came into force in 2001.
European Union member countries	All mobulid species	Council Regulation (EU) 2015/2014 amending Regulation (EU) No 43/2014 and repealing Regulation (EU) No 779/2014.
NATIONAL		
Australia	All mobulid species	Environment Protection and Biodiversity Conservation Act (added as protected species 2012).
Brazil	All mobulid species	Inter-ministerial Normative Instruction No. 2 of 14/3/2013.
Croatia	<i>M. mobular</i>	Law of the Wild Taxa 2006 Strictly prohibited.
Ecuador	<i>M. birostris</i> , <i>M. mobular</i> , <i>M. thurstoni</i> , <i>M. munkiana</i> & <i>M. tarapacana</i>	Ecuador Official Policy 093, 2010.
Indonesia	<i>M. birostris</i> & <i>M. alfredi</i>	KepMen National Protective Legislation, 2014.
Israel	All ray species	All sharks and all fully protected in Israel since 2005. They may not be captured, harmed, traded or kept, without a specific permit from the Israel Nature and Parks Authority (INPA).

LOCATION	SPECIES	LEGAL PROTECTION MEASURE
NATIONAL		
Maldives	All ray species	Exports of all ray products banned 1995. Environment Protection Agency rule - illegal to capture, keep or harm any type of ray; Batoidea Maldives Protection Gazette No. (JUL) 438-ECAS/438/2014/81.
Malta	<i>M. mobular</i>	Sch. VI Absolute protection.
Mexico	<i>M. birostris</i> , <i>M. mobular</i> , <i>M. thurstoni</i> , <i>M. munkiana</i> , <i>M. hyostoma</i> & <i>M. tarapacana</i>	NOM-029-PESC-2006 Prohibits harvest and sale.
New Zealand	<i>M. birostris</i> & <i>M. mobular</i>	Wildlife Act 1953 Schedule 7A (absolute protection).
Peru	<i>M. birostris</i>	Article 2 of Resolution 441-2015-PRODUCE, Jan 2016.
Philippines	<i>M. birostris</i> & <i>M. alfredi</i>	FAO 193 1998 Whale Shark and Manta Ray Ban.
United Arab Emirates (UAE)	<i>M. birostris</i> & <i>M. alfredi</i>	Fully protected in UAE waters (2014).
STATE		
Christmas Island and Cocos (Keeling) Islands, Australian Indian Ocean Territories	All ray species	Protected species. Dept. of Fisheries Western Australia 2010.
Commonwealth of the Northern Mariana Islands, USA Territory	All ray species	Public Law No. 15-124.
Florida, USA	<i>Manta</i> spp.	FL Admin Code 68B-44.008 - no harvest.
Guam, USA Territory	All ray species	Bill 44-31 prohibiting possession/sale/trade in ray parts 2011.
Hawaii, USA	<i>Manta</i> spp.	H.B. 366 2009 - no harvest or trade.
West Manggarai/Komodo	<i>Manta</i> spp.	Shark and Manta Ray Sanctuary Bupati Decree 2013.
Raja Ampat Regency, Indonesia	All ray species	PERDA (Provincial Law) Hiu No. 9 Raja Ampat 2012.
Yap (Federated States of Micronesia)	<i>Manta</i> spp.	Manta Ray Sanctuary and Protection Act 2008.