

## Shark and Ray Fisheries in Cambodia: A Review of National Management Activities

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*Whale shark caught in a *Stomberomorus* gill net (Mong Trey Beka) about 4 km from the beach on the outer side of Koh Kong island in 1998*

### Introduction

In recent years, there have been increasing international concerns about the sustainability of shark fisheries. The demand for shark and ray products, such as fins, cartilage, skin, meat, oil and liver, has been increasing. Several countries have tried to place certain species on the CITES appendices in order to prevent, or at least control, the international trade in products of these species. However, only in February 2003 were three species of sharks approved for listing in Appendices II and III. The major problems faced by those wanting to include sharks in the CITES appendices have been the difficulty in identifying the products of individual species after they have been processed, and the general lack of biological and trade data. No shark species is known to be in immediate danger of global extinction, but because of their long life spans and slow reproduction, careful management of shark fisheries is essential.

The United Nations Convention on the Law of Sea (UNCLOS) and its agreement on management of fish stocks, and the FAO Code of Conduct for Responsible Fisheries (CCRF) both recommend that member states

of FAO and CITES develop a framework and regulations for conservation and management of sharks and rays for the sustainable use of these resources. CITES is also collaborating with FAO on the implementation of the International Plan of Action for Sharks (IPOA-SHARKS). Yet very few countries have so far taken steps towards implementation.

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In documents pertaining to IPOA-SHARKS, the term ‘shark’ means all species of sharks, skates, rays and chimaeras in the class Chondrichthyes; and the term ‘shark catch’ includes directed, by-catch, commercial, recreational and other forms of taking sharks. The term ‘shark’ used in this article differs from that used in IPOA-SHARKS. Here, sharks and rays, including skates, are treated separately, whereas the term ‘shark catch’ is the same as in IPOA-SHARKS.

**“Cambodia is both a signatory party to CITES and a member of FAO, and thus is required to implement a national plan of action for the conservation and sustainable use of shark and ray resources”**

Cambodia is both a signatory party to CITES and a member of FAO, and thus is required to implement a national plan of action for the conservation and sustainable use of shark and ray resources. But at the national level many questions about shark and ray issues are asked, including questions about the need to conserve sharks and rays, and the importance of sharks and rays fisheries. This article reviews background information that may be useful in answering these questions.

## Shark and ray fisheries

In Cambodia, marine living resources, including sharks and rays, have not yet been studied in detail. According to recent literature 20 species of sharks and 22 species of rays are found in Cambodian waters.

The whale shark is rare in Cambodia. In 1973, a whale shark weighing between 600 and 800 kg was shot by a soldier in Koh Kapi, Koh Kong province. On 12 October 1998, another whale shark was caught in a Scomberomorus gill net (Khmer name *Mong Trey Beka*) some four km from the beach on the outer side of Koh Kong Island. The

five-meter long whale shark (pictured on the left) weighed between 800 and 1000 kg. Although some local people were afraid to eat it, fearing the powerful spirit of such a large creature, it was eventually eaten by less superstitious folks.

Most Cambodian sharks and rays are small, demersal species found in a wide variety of habitats from open oceans to brackish water, including both inshore estuaries and bays, and freshwater rivers and lakes. In 1999, fishers in Prey Veng province caught a freshwater stingray (*Himantura chaophraya*) weighing about 18 kg.

No.	Scientific name: (Species)	Vernacular name	Local name
	<b>Rhincodontidae</b>		
1	<i>Rhincodon typus</i> (Smith, 1828)	Whale shark	Chlarm Yaak
	<b>Hemiscylliidae</b>		
2	<i>Chiloscyllium indicum</i> (Gmelin, 1789)	Longtail Carpet Sharks	Chlarm sangha
3	<i>Chiloscyllium griseum</i> (Muller & Henle, 1839)	Slender bamboo shark	Chlarm russey
4	<i>Chiloscyllium punctatum</i> Muller & Henle, 1818	Grey bamboo shark	Chlarm Chkuot
5	<i>Chiloscyllium plagiosum</i> (Bennett, 1830)	Brown-banded cat shark	Chlarm Chkuot
	<b>Stegostomatidae</b>		
6	<i>Stegostoma varium</i> (Seba, 1761)	Zebra Sharks	Chlarm Chkuot
7	<i>Stegostoma fasciatum</i> (Hermann, 1783)	Leopard shark	Chlarm Chkuot
	<b>Ginglymostomatidae</b>		
8	<i>Nelusetta ferruginea</i> (Lesson, 1830)	Nurse sharks	Chlarm
	<b>Lamnidae</b>		
9	<i>Isurus oxyrinchus</i> (Rafinesque, 1809)	Tawny nurse shark	Chlarm
	<b>Scyliorhinidae</b>		
10	<i>Cephaloscyllium fasciatum</i> (Chen, 1966)	Mackerel sharks	Chlarm
	<b>Carcharhinidae</b>		
11	<i>Isurus paucus</i> (Péron & Lesueur, 1822)	Shortfin mako	Chlarm
12	<i>Scoliodon laticaudus</i> (Muller & Henle, 1838)	Cat Sharks	Chlarm Chkuot
13	<i>Scoliodon walbeehni</i> (Bleeker, 1856)	Reticulated swell shark	Chlarm Chkuot
14	<i>Carcharhinus limbatus</i> (Valenciennes, 1839)	Ground or Requiem Sharks	Chlarm
15	<i>Carcharhinus sorrah</i> (Valenciennes, 1839)	Tiger shark	Chlarm och kantuy
	<b>Triakidae</b>		
16	<i>Mustelus griseus</i> (Pietzschmann, 1908)	Spadnose shark	Chlarm
17	<i>Paragaleus tengi</i> (Chen, 1963)	Blacktail reef shark	Chlarm
	<b>Sphyrnidae</b>		
18	<i>Sphyrna zygaena</i> (Linnaeus, 1758)	Blacktip shark	Chlarm Ek
19	<i>S. lewini</i> (Griffith & Smith, 1834)	Smooth hammerhead shark	Chlarm Ek
	<b>Rhinobatidae</b>		
20	<i>Rhinobatos typus</i> (Bennett, 1830)	Scalloped hammerhead	Chlarm Truoch
21	<i>Aplocheilichthys</i> sp.?	Giant shovelnose ray	Chlarm Truoch
	<b>Rhynchobatidae</b>		
22	<i>Rhynchobatus djiddensis</i> (Forsskål, 1775)	Spotted shovelnose ray	Chlarm Truoch Och Sar Bobel
	<b>Dasyatidae</b>		
23	<i>Dasyatis akejei</i> ?	White-spotted shovelnose ray	Chlarm Truoch Och Sar Bobel
24	<i>Dasyatis kuhlii</i> (Muller & Henle, 1841)	Ray	
25	<i>Dasyatis uarnak</i> (Forsskål, 1775)	Blue-spotted stingray	
26	<i>Dasyatis zugei</i> (Muller & Henle, 1841)		
27	<i>Dasyatis leylandi</i> (Last, 1987)	Brown reticulated stingray	Bobel Spoa
28	<i>Dasyatis bennetti</i> (Muller & Henle, 1841)		
29	<i>Himantura toshi</i> (Whitley, 1939)	Black-spotted stingray	
30	<i>Himantura undulata</i> (Bleeker, 1852)	Leopard whipray	
31	<i>Pastinachus sephen</i> (Forsskål, 1775)	Cowtail stingray	
32	<i>Taeniura melanospila</i> (Bleeker, 1853)		
33	<i>Taeniura lymma</i> (Forsskål, 1775)	Blue-spotted fantail stingray	Bobel Khla
34	<i>Urolophus flavomaculatus</i> (Last & Gomon, 1987)	Patchwork stingray	
	<b>Gymnuridae</b>		
35	<i>Gymnura australis</i> (Ramsay & Ogilby, 1886)	Rat-tailed ray	
	<b>Myliobatidae</b>		
36	<i>Aetomyxus nichofii</i> (Bloch & Schneider, 1801)	Barbless eagle ray	
37	<i>A. milvus</i> (Muller & Henle, 1841)		
38	<i>Aetobatus narinari</i> (Euphrasen, 1790)	Spotted eagle ray	
39	<i>Myliobatis tobijei</i> ?		
40	<i>Rhinoptera javanica</i> (Muller & Henle, 1841)	Spotted eagle ray	Bobel Ork
	<b>Mobulidae</b>		
41	<i>Manta birostris</i> (Donndorff, 1798)	Manta ray	

*Shark and ray species occurring in Cambodian waters*

In December 2002, another freshwater stingray of the same species was caught by fishers using a bottom trawl (*yang kav*) at Peam Chhor in Prey Veng province. This fish was 4.2 m in length, 2.1m in diameter, and weighed 180 kg.

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## Data collection on shark fisheries

Preliminary data indicate that at least five large joint venture vessels are operating in Cambodian waters, buying and loading marine products to be landed and marketed in Thailand. The owners of these large vessels are Thai fishers who have obtained a license to operate in a trawl boat in Cambodian waters by “mixed-commission” from the provincial authorities on Koh Kong. Cambodian trawlers have agreements to transfer

their catch maybe four times a month. There are also some pair trawlers from Thailand with licenses to operate in the overlap zone of Thai and Cambodian EEZs. Pair trawlers can catch upwards of 300 kg sharks per month.

There are no shark data for small-scale fishing with hooked lines (*santouch trey ka ok*). However, it is estimated that lines with 3,000 hooks can catch 30-50 kg per day. Based on preliminary estimates, the total catch of shark can be calculated to be in the range of 837 – 1,117 t per year. Recent studies have shown that most of the sharks caught are small, weighing at most two kg per head.

Cambodia has not yet developed any collaborative mechanism with commercial or large-scale industries to collect data and information about sharks. Official statistics from the Department of Fisheries do not have a separate category for sharks. There is however a separate category for rays, although species are not distinguished, due to the difficulty in doing so. For these fish, data from the Department of Fisheries show that capture averages 412 t per year, and appears to be decreasing. These figures are less than actual capture, as fishers sell small fish and species with no commercial value mixed with the trash fish. Rays included in the statistics are the edible species and those that the fishers can process.

## Fishing gear used for capturing sharks and rays

In Cambodia, sharks and rays are caught as by-catch with several types of fishing gear, including long-lines, gill net, grouper trap and demersal or bottom trawls

### For further reading, see for example:

SEAFDEC (2002). Proceedings of the ASEAN-SEAFDEC Regional Meeting on Fish Trade and Environment, Southeast Asian Fisheries Development Center, Bangkok, Thailand.

FAO (1998). The International Plan of Action for Conservation and Management of Sharks. Consultation on Management of Fishing Capacity, Shark Fisheries and Incidental Catch of Seabirds in Longline Fisheries. Food and Agriculture Organization of the United Nations, Rome, Italy.



*Freshwater stingray (Himantura chaophraya) caught by bottom trawl (yang kav) at Peam Chhor, Prey Veng Province, in December 2002 (Photo: Nicolaas van Zalinge).*

operated by boats with engines from 200 hp working in-shore and off-shore waters. Large sharks are only caught in off-shore waters. There is no fishing gear in Cambodia that is specifically designed for catching sharks.

### Marketing of sharks and rays

In Cambodia, fresh shark products such as meat and fins are consumed locally in coastal areas and in cities. The consumer market price of fresh shark meat is about 3,000 to 4,000 riels per kg (about US\$ 1) in coastal areas. Only big rays are sold in local markets at a price of about 1,000 to 2,000 riels per kg. Small rays are sold mixed with trash fish to fishmeal factories. Fishers may land sharks directly in Thailand because they can obtain a higher price than at Cambodian landing sites. There are no figures for the import or export of fresh shark products in Cambodia. Some processed shark is imported from Vietnam to Kampot province, but no exact figures exist. The market price for this is 2.5-3 US\$ per kg. There is no export of processed shark products from Cambodia.

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Fish traders collect shark from fishers individually to sell, either at market or to restaurants. Shark fin is more expensive than other shark parts; middlemen usually cut off the fins before selling them in the local markets. According to market vendors in Sihanoukville, they buy most shark from fishers who use fish and crab gill nets and

hooked lines. The Department of Fisheries plans to collect more detailed data about shark fisheries in the future, in collaboration with the SEAFDEC Ad Hoc Study on Shark Fisheries in the ASEAN Region.

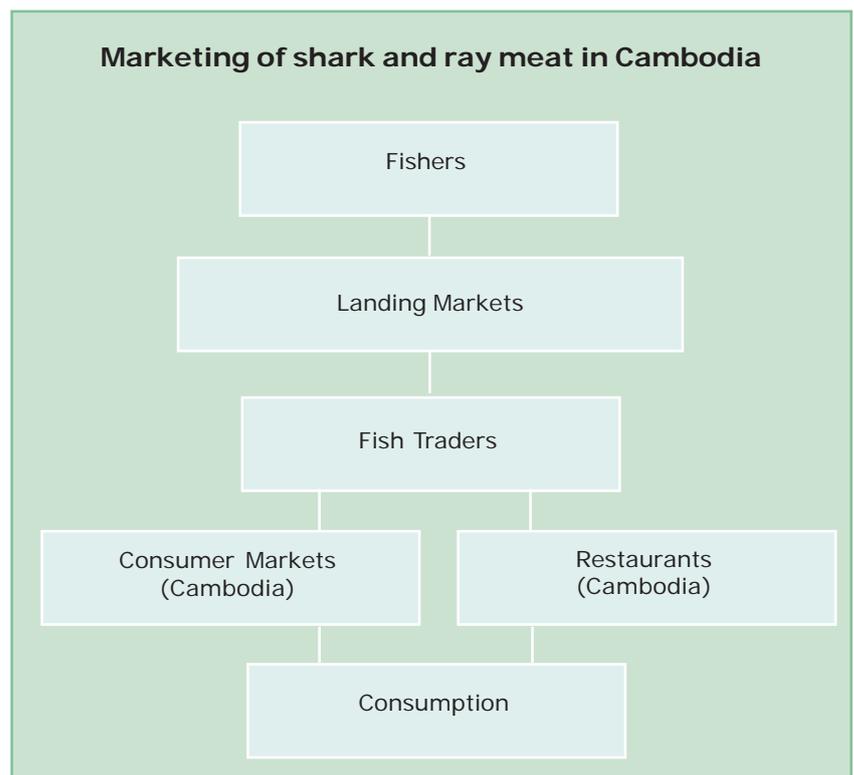


*Live-shark ready for sale and distribution, at Sihanoukville, Cambodia*

### Utilization of sharks and rays

In Cambodian markets, after fins and liver oil have been removed, fresh shark meat is sold as food. Fresh shark soup has become a popular dish in Cambodia since 2000, especially in Sihanoukville. In 2003, there were perhaps 10

specialized fresh shark soup restaurants in Sihanoukville, two in Koh Kong province, two in Kampot province, two in Siem Reap province and six in Phnom Penh. These restaurants obtain fresh shark meat from local fishers.



Sharks have been utilized in Asia for centuries. In Chinese culture, the serving of shark fin has come to symbolize honour and respect, and shark fin soup is now widely consumed around the world. The soup is expensive, and is believed to provide a range of medical benefits, such as strengthening the kidneys and muscles, reducing blood fat levels, and reducing risks from coronary heart disease, hypertension and arteriosclerosis.

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Shark meat is consumed in many countries, and its quality varies from species to species. For species with lower quality meat, skin and cartilage are used in fishmeal or fertilizer production. In the past, sharkskin has been used as an abrasive to polish objects and as a strong upholstery fabric.

**“Sharks’ cartilage is thought to be useful for the treatment of a great variety of diseases”**

Sharks’ cartilage is thought to be useful for the treatment of a great variety of diseases, including arthritis, psoriasis, colitis, acne, enteritis, phlebitis, rheumatism, peptic ulcers, haemorrhoids, herpes simplex, melanoma, cancer, and recently also AIDS. For the most part, these popular beliefs have yet to be

medically proven. Shark liver oil is mainly used in the textile and tanning industries, and in the production of cosmetics, pharmaceutical products and lubricants.

### **Conservation and management of sharks: Regional concerns**

In 2002, the Sharks Conference in Taipei, Taiwan concluded that conservation and management measures on sharks should be focused on those areas where shark stocks had been declining. Measures needed to include scientific research to substantiate the decline as well as the endangered status of shark species. At the same time, Taiwan declared that although it is not a member of the United Nations, in the spirit of responsible fisheries, and as a responsible member of the international community, Taiwan is willing to follow fisheries management measures adopted internationally, and to manage sharks in their water. Moreover, Taiwan is also willing to share with other countries its experience in shark research, and

resources management and utilization. The Taiwanese government plans to draft a National Plan of Action for implementation, to ensure the sustainability of shark resources.

**“...conservation and management measures on sharks should be focused on those areas where shark stocks had been declining”**



*Shark and shark fin sold separately at market*



After the CITES COP 10 meeting, ASEAN-SEAFDEC Members Countries recommended that the ASEAN-SEAFDEC Fisheries Consultative Group should be used as the mechanism to develop a common position on sustainable fisheries and sustainable trade in fish and fishery products at international fora such as WTO, CITES and FAO. SEAFDEC could assist Member Countries in compiling various national and regional studies on important fisheries issues, including sharks, and the CCRF, and collaborate with FAO to accommodate the regional specificities into the global framework.

The regional technical consultation on Fish Trade in the ASEAN Region in 2001 recommended that Member Countries should be proactive in developing a regional mechanism to coordinate their efforts in dealing with CITES issues, starting with the issue of shark fisheries. Member Countries should take appropriate action to implement the IPOA-SHARKS.

At the Senior Official Meeting (SOM) of the 23<sup>rd</sup> Meeting of the ASEAN Ministers on Agriculture and Forestry (AMAF) in October 2001, it was decided that the ASEAN common positions on the management of commercial fisheries, including shark fisheries, should come under the purview of FAO and the CCRF, and not CITES (SEAFDEC, 2003).

At the second meeting of the ASEAN Experts Group on CITES in August 2002 in Kuala Lumpur, Malaysia, it was reported that the International Plan of Action for the Conservation and Management of Sharks (IPOA-SHARKS) has made little progress, and the National Plans of Action of Sharks (NPOA-SHARKS) have had only limited implementation. It was also recommended that the CITES authorities in Member Countries should be encouraged to obtain information on IPOA-SHARKS implementation from their national fisheries departments and report progress to the Animal Committee (Harjanti, 2003).

Before the CITES COP12 meeting, a Regional Meeting on Fish Trade and Environment was organized under the purview of ASEAN-SEAFDEC. Held in October 2002 in Bangkok, Thailand, this regional meeting discussed shark issues and set up a regional proposal to review shark fisheries in Southeast Asia. The meeting also adopted a common position on



*Shark soup made from fresh shark meat served in a restaurant in Sihanoukville.*



## Conservation and Management of Sharks: Global Concerns

The issue of sharks was first taken up for consideration and discussion in 1994 at the Ninth Conference of Contracting Parties of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which adopted a Resolution on the Biological and Trade Status of Sharks (Conf. 9.17). This resolution urged parties to submit species-specific data on landings, trade, and biological status if available. Furthermore, collaboration with FAO and other international fisheries management organizations for collecting data was encouraged.

Two major steps forward were taken in 1997: (1) CITES COP 10 approved several Decisions concerning reporting of shark landings and trade, and (2) the FAO Committee of Fisheries (COFI) requested FAO to develop guidelines leading to a plan of action. The International Plan of Action for the Conservation and Management of Sharks (IPOA-SHARKS) was finally adopted in 1999. The objective of the IPOA-SHARKS is to ensure the conservation and management of sharks and their long-term sustainable use. The IPOA-SHARKS is voluntary, and is related to other international instruments such as CITES. All concerned states are encouraged to implement it. The IPOA-SHARKS requested states that have vessels conducting directed shark fisheries or regularly taking sharks in non-directed fisheries to prepare a National Plan of Action for the Conservation and Management of Shark (NPOA-Sharks). However, very few states have so far implemented this.

During the CITES COP 11 meeting in 2000, Resolution Conf. 9.17 was repealed, as its aims had largely been implemented. Two new Decisions were adopted instead: Decision 11.94 was to continue the collaboration between CITES and FAO to implement the IPOA-SHARKS; Decision 11.151 was to collaborate with the World Customs Organization to promote the establishment and use of specific headings within the Harmonized System of Standard Tariff Classifications, in order to discriminate between various shark products, such as meat, fins, leather and cartilage. Proposals to list three shark species in Appendices I or II were rejected.

The NPOA-SHARKS & IPOA-SHARKS have been progressing very slowly in all FAO member states; by the 24th session of FAO-COFI in February 2001, only 29 of the 113 of FAO member states had reported shark landings, and only five of 29 FAO states had made shark assessment reports or NPOA-SHARKS available.

At the CITES COP 12 in 2002, it was proposed that two shark species be added to CITES lists, namely the whale shark *Rhincodon typus* and the basking shark *Cetorhinus maximus*. However, again the proposal was rejected. After submission of additional scientific information by India and the Philippines, both species have subsequently been added to Appendix II.



## What should be the aims of national or regional plans of action for sharks?

*The shark plan should aim to:*

- Ensure that shark catches from directed and non-directed fisheries are sustainable;
- Assess threats to shark populations, determine and protect critical habitats, and implement harvesting strategies consistent with the principles of biological sustainability and national long-term economic use;
- Identify and provide special attention to vulnerable or threatened shark stocks in particular;
- Improve and develop frameworks for establishing and coordinating effective consultation involving all stakeholders in research, management and educational initiatives within and between states;
- Minimize unutilized incidental catches of sharks;
- Contribute to the protection of biodiversity and ecosystem structure and function;
- Minimize waste and discards from shark catches;
- Encourage full use of dead sharks;
- Facilitate improved species-specific catch and landings data and monitoring of shark catches; and
- Facilitate the identification and reporting of species-specific biological and trade data.

fisheries management, trade and improvement of the management of shark fisheries in the region for ASEAN-SEAFDEC Member Countries (SEAFDEC, 2003).

## National response

In response to international and regional concerns, the Department of Fisheries of the Kingdom of Cambodia needs to initiate more detailed studies on species composition, habitats and the status of each species with the aim of formulating a National Plan of Action for the conservation and management of sharks. All shark and ray species caught in Cambodia are common species, and the fishers do not target sharks, rays and skates species. Market prices are also low for all these species compared to other commercial fish, shrimp and crab, and with the exception of the Thai-Cambodian joint venture fishery, they are not exported to any countries around the world.

Marine fisheries are important both for the national economy and for improving local standards of living in coastal areas, and also contribute to national food security. As the Department of Fisheries has no quantitative data and scientific information, it cannot set up any legal instruments for protecting sharks, rays and skates. In order to achieve such protection, the Department needs assistance from other agencies or donors to support studies on these animals in Cambodia. Some efforts are currently being made in collaboration with SEAFDEC to fill the gap and ensure the sustainability of our fisheries.

## National framework

All marine fisheries in Cambodia are under the responsibility of the Department of Fisheries, under the Ministry of Agriculture, Forestry and Fisheries, as regulated in the Fisheries Law. This is currently being redrafted; the new law will include sections on conservation and sustainable use of marine resources. Cambodia also has a Wildlife Protection Law, but this does not currently cover fish. Cambodia has a CITES authority which collaborates with Ministry of Agriculture, Forestry and Fisheries, and has FAO support for several projects in the fisheries sector. However, there is a need for increasing public awareness

about the conservation of marine resources, including sharks and rays. Fisheries statistics are collected by provincial fisheries authorities, and these offices need serious strengthening to ensure more reliable data. Statistics should ideally show separate listings for sharks, if possible by species. In addition, there is a need for research to study habitats and spawning grounds of sharks and rays in Cambodia.

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