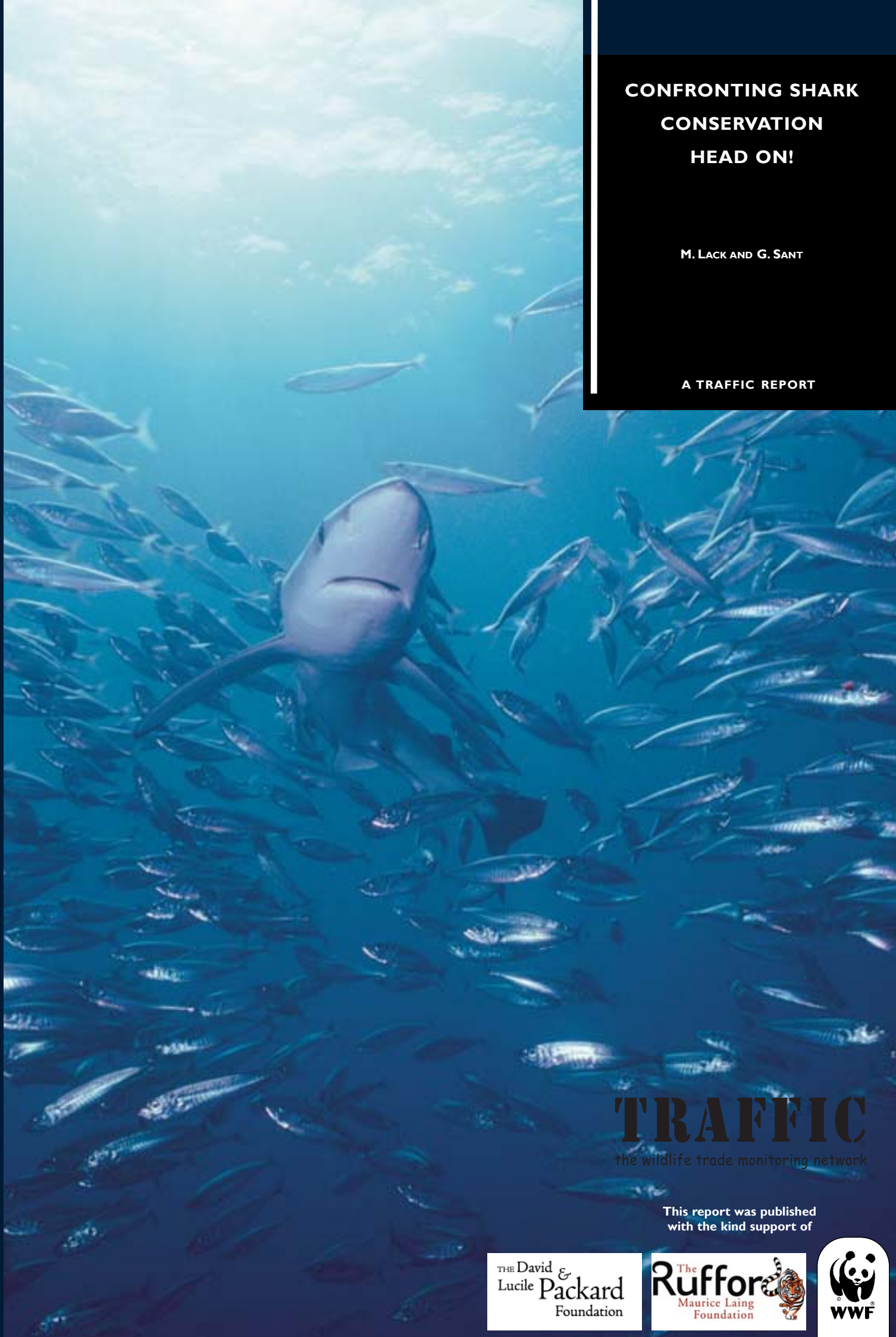

CONFRONTING SHARK CONSERVATION HEAD ON!

M. Lack and G. Sant

A TRAFFIC REPORT

TRAFFIC
the wildlife trade monitoring network

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Front cover photograph: Blue Shark *Prionace glauca* with schooling mackerel *Trachurus* sp., San Diego, California, East Pacific Ocean

Photograph credit: © Richard Herrmann SeaPics.com

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CONFRONTING SHARK CONSERVATION HEAD ON!

by M. Lack and G. Sant[¤]

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Credit: WWF-Canon/Hélène Petit

By-catch of Silky Shark *Carcharhinus falciformis*, Indian Ocean

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INTRODUCTION

Sharks[1] are targeted and taken as by-catch in many fisheries under the jurisdiction of coastal States and regional fisheries management organizations (RFMOs). Sharks are widely recognized as being vulnerable to overfishing because they grow slowly, are late to mature and produce relatively few young. These characteristics are particularly prominent in deep-water sharks which are, therefore, relatively more vulnerable. Most sharks also play an important role as top predators in the ecosystem and significant reductions in their numbers are likely to have impacts on other elements of those ecosystems. The extent and nature of those impacts are largely unknown. These features, together with a lack of information about many shark species and their exploitation, should elicit a precautionary management response. However, despite repeated calls for improved conservation and management, the response has been slow and piecemeal.

Concern for the status of shark stocks worldwide has been increasing since the early 1990s. Since that time, the Conference of the Parties (CoP) to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), members of the Food and Agriculture Organization of the United Nations (FAO) and the United Nations General Assembly (UNGA) have called for increased monitoring, research and management of shark stocks.

The development of the International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks) (FAO, 2000a) reflected the concern of the international community for the vulnerability and deteriorating status of shark stocks. However, implementation of the Plan by States and RFMOs is voluntary and its adoption has been patchy, with relatively few States and no RFMOs making concerted attempts to implement its provisions fully.

By and large, the repeated calls, and the guidance provided, for improved conservation and management of sharks have been ignored. By 2006, three shark species (Basking Shark *Cetorhinus maximus*, Whale Shark *Rhincodon typus* and Great White Shark *Carcharodon carcharias*) were listed in Appendix II of CITES and IUCN - The World Conservation Union considered that 20% of the 547 species of sharks on its Red List were threatened with extinction (IUCN, 2006). In recent years there has been vocal support for the implementation of the IPOA-Sharks and an apparent flurry of activity with respect to the introduction of controls on shark finning. However, there is little evidence of a concerted attempt to implement the provisions of the IPOA-Sharks and concern is mounting that shark stocks will continue to deteriorate. There is now an urgent need for action by national and regional management authorities to address this problem.

This paper identifies the main players in the catch and trade of shark products, examines the progress of these States/entities and RFMOs in implementing the IPOA-Sharks and makes recommendations for the adoption of best practice approaches to shark conservation and management.

OBLIGATIONS TO MANAGE AND CONSERVE SHARKS

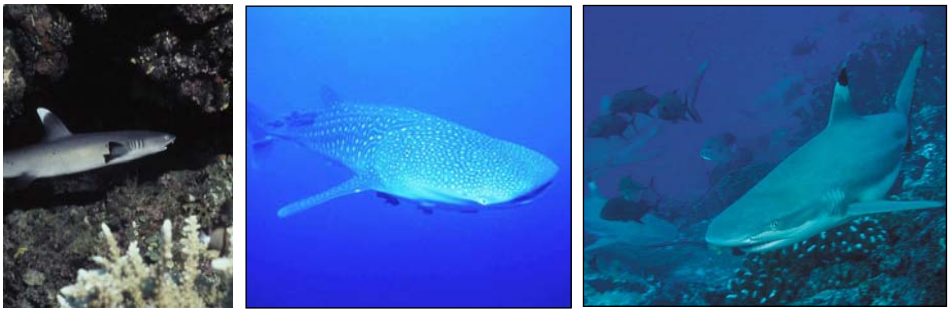
The obligation to manage shark stocks sustainably derives from international law, namely the United Nations Convention on the Law of the Sea (UNCLOS) and the United Nations Fish Stocks Agreement (UNFSA) and from internationally agreed standards and protocols such as the *Code of Conduct for Responsible Fisheries* (FAO, 1995) and the IPOA-Sharks which seek to guide implementation of these legal obligations. In addition, national legislation and policy and the conventions establishing RFMOs impose varying levels of management responsibilities for sharks.

UNCLOS requires, among other things, States to co-operate to:

- conserve the living resources of the high seas;
- take measures to maintain or restore populations of harvested species at levels which can produce the maximum sustainable yield; and
- take into consideration the effects on species associated with or dependent upon harvested species with a view to maintaining or restoring populations of these species above levels at which their reproduction may become seriously threatened

UNCLOS identifies oceanic sharks (Bluntnose Sixgill Shark *Hexanchus griseus*; Basking Shark; Family Alopiidae; Whale Shark; Family Carcharhinidae; Family Sphyrnidae; Family Isurida[2]) as highly migratory species. As a result, the UNFSA applies directly to management of these species.

Credit: WWF-Canon (centre): Javier Ordóñez; (left and right.): Cat Holloway



L. to R.: **Oceanic sharks: Whitetip Reef Shark *Triaenodon obesus*; Whale Shark *Rhincodon typus* and Blacktip Reef Shark *Carcharhinus melanopterus***

The UNFSA reinforces the requirements of UNCLOS and elaborates on how they should be implemented. In particular, the UNFSA requires that its signatories, individually and collectively through RFMOs:

- apply the precautionary approach to management of both target and non-target species;
- implement management strategies that seek to maintain or restore populations of target and non-target species at levels consistent with previously agreed precautionary reference points;

- where the status of target or non-target stocks is of concern, implement enhanced monitoring of those stocks in order to determine the effectiveness of conservation and management measures; and
- develop data collection and research programmes to assess the impact of fishing on non-target species.

The *Code of Conduct for Responsible Fisheries* (FAO, 1995) provides further guidance on implementation of the provisions of the UNFSA. Of particular relevance to shark fisheries is the provision for the minimization of waste and discards. The IPOA-Sharks and the FAO Technical Guidelines on conservation and management of sharks (FAO, 2000b) provide specific guidance on how to ensure sustainable shark fisheries. The IPOA-Sharks encompasses both target and non-target catches of shark and calls for, among other things:

- States to carry out regular assessments of the status of shark stocks;
- States to adopt national plans of action (NPOAs) for the conservation and management of shark stocks and present those plans to the FAO's Committee on Fisheries (COFI) in 2001[3];
- States, within the framework of their respective competencies and consistent with international law, to co-operate through regional and subregional fisheries organizations or arrangements, and other forms of co-operation, to ensure the sustainability of shark stocks, including, where appropriate, the development of subregional or regional shark plans;
- NPOAs that recognize the nutritional and socio-economic importance of shark catches in some regions and promote the full use of shark catches through the use of finning bans;
- NPOAs to be reviewed every four years;
- international collaboration on data collection and data-sharing systems for stock assessments in relation to transboundary, straddling, highly migratory and high seas shark stocks; and
- management and conservation strategies that aim to keep total fishing mortality for each stock within sustainable levels through application of the precautionary approach.

Sharks are taken as target or by-catch (retained or discarded) species in fisheries under the jurisdiction of coastal States and in fisheries on the high seas. As a result, the provisions of international law relating to 'harvested' species and 'associated or dependent species' and to management by individual States and by RFMOs apply.

Regardless of whether sharks are highly migratory or not and whether they are taken as target or by-catch species, international laws and standards impose a responsibility on States and RFMOs to manage shark stocks sustainably. There is an abundance of guidance available to assist in the effective discharge of this responsibility. To various extents, RFMOs also have obligations under their conventions to manage sharks. These obligations arise because the convention specifically includes some shark species in the management mandate and/or requires the RFMO to ensure the sustainability of non-target and associated or dependent species. While the management mandate for sharks of individual RFMOs may vary, this need not restrict the introduction of such management if the collective will of the members is sufficient to do so.

There is a clear onus on coastal and fishing States to act individually and through RFMOs to manage shark species. Despite this, the level of commitment to management of shark catch and by-catch remains low. Apart from management of some target shark fisheries in a small number of coastal States, examples of effective and dedicated measures to ensure the conservation of shark species are limited.

WORLD SHARK CATCH AND TRADE

Catch

Shark catch falls into one of the following categories:

- Targeted fishing for sharks for fins and/or for meat
- Targeted fishing for other species that results in an incidental catch of shark which is then either:
    - retained for fins with the trunk discarded (if permitted); or
    - retained for fins with the trunk landed (if required); or
    - discarded, dead or alive.

Credit: WWF-Canon/Hélène Petit

By-catch of Whale Shark: French tuna purse-seine fishery in the Atlantic ocean, 1995.

The critical factor in conservation and management of sharks is mortality incurred by fishing. Each of the actions identified above, apart from discarding, necessarily incurs mortality. The level of mortality arising from discards will vary according to species, the method of fishing and the way in which the catch is handled prior to release.

Despite increasing recognition of the need to manage shark stocks and rebuild depleted populations, the trend in world shark catch is upwards. According to the FAO Fisheries Department in 2006, reported global shark catch peaked in 2003 at 880 000 t, an increase of 17% over the level recorded just a decade earlier. Reported catch declined in 2004 to 810 000 t[4]. Over the last 15 years for which global data are available, around 80% of the annual reported catch has been taken by 20 countries and territories. The top 20 group over the period 1990-2004 and the top 20 group in 2004 are listed in **Table 1**. There is considerable stability in this group. There were only two countries represented in the top 20 line-up in 2004 that are not represented in the top 20 group over the 1990-2004 period.

Table 1

Major shark catching countries and territories

1990-2004			2004	
Rank and country/territory		% global catch	Rank and country/territory	Catch ('000 t) (% global catch)
1.	Indonesia	12.3	1. Indonesia	122 (15.0)
2.	India	9.1	2. India	61 (7.6)
3.	Taiwan	6.3	3. Spain	51 (6.3)
4.	Pakistan	5.8	4. Taiwan	44 (5.4)
5.	Spain	5.7	5. Mexico	32 (4.0)
6.	Mexico	4.8	6. Argentina	32 (4.0)
7.	USA	4.6	7. USA	31 (3.8)
8.	Japan	3.9	8. Thailand	28 (3.5)
9.	Argentina	3.3	9. Pakistan	27 (3.4)
10.	Sri Lanka	3.1	10. Japan	27 (3.4)
11.	France	2.9	11. Malaysia	25 (3.1)
12.	Malaysia	2.9	12. France	22 (2.7)
13.	UK	2.5	13. Brazil	20 (2.5)
14.	Brazil	2.4	14. Sri Lanka	20 (2.4)
15.	Thailand	2.3	15. Iran, Islamic Rep. of	18 (2.3)
16.	Portugal	2.1	16. New Zealand	17 (2.1)
17.	New Zealand	2.0	17. UK	16 (2.0)
18.	Korea, Rep. of	1.9	18. Nigeria	14 (1.7)
19.	Nigeria	1.4	19. Portugal	13 (1.6)
20.	Peru	1.3	20. Yemen	13 (1.6)

Source: FAO Fisheries Department, Fishery Information, Data and Statistics Unit (2000).

The available FAO data on global shark catch underestimate actual mortality considerably since they do not include discards. Comparisons of FAO shark trade and catch data suggest that there is also considerable under-reporting of shark catch by individual countries (see, for example, Lack and Sant (2006)). Recent fishery-independent estimates of global shark catch for the shark fin trade (Clarke *et al.*, 2006) indicate that shark biomass in the fin trade alone is three to four times higher than the total shark catch figures reported to FAO.

In addition to the uncertainties about actual catch and mortality levels, there is limited reporting of shark catch on a species basis. Only 15% of the FAO catch data is recorded by species (Lack and Sant, 2006). This precludes identification and analysis of worldwide trends in species that may be of special interest owing to their heightened vulnerability or poor stock status.

Trade

Like catch, trade in shark products has continued to increase. Exports of shark products peaked at nearly 90 000 t in 2004. Ten exporters accounted for nearly 70% of these exports (see **Table 2**).

Table 2

Top 10 shark product exporters, 2004

Exporter	Exports (t)	% world exports
Taiwan	16 329	18.1
Spain	11 670	13.0
Japan	5046	5.6
Panama	5002	5.6
UK	4596	5.1
Canada	4142	4.6
Costa Rica	4132	4.6
Ireland	3793	4.2
Chile	3286	3.7
Namibia	2997	3.3

Source: FAO Fisheries Department, Fishery Information, Data and Statistics Unit (2000).

As with catch data, lack of product specification by species and by product type creates problems for meaningful analysis of trade in shark products.

There are some apparent anomalies in the catch and trade data. For example, the top two catching countries, Indonesia and India, do not appear in the top 10 exporters. There are a number of possible explanations for this. One is that there are high levels of domestic consumption of shark products in these countries. Alternatively, or in addition, the lack of shark-specific trade codes in these countries may be disguising exports of shark products which are recorded under more generic fish trade codes.

THE IPOA-SHARKS

The IPOA-Sharks specifies the following principles for effective monitoring and management of shark species:

- 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 rational long-term economic use;
- Identify and provide special attention, in particular to vulnerable or threatened shark stocks;
- Improve and develop frameworks for establishing and co-ordinating 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 in accordance with article 7.2.2 (g) of the *Code of Conduct for Responsible Fisheries* (for example, requiring the retention of sharks from which fins are removed);

- Encourage full use of dead sharks;
- Facilitate improved species-specific catch and landings data and monitoring of shark catches;
- Facilitate the identification and reporting of species-specific biological and trade data.

The implementation of the IPOA by States and RFMOs is discussed below.

States

In March 2005, FAO's Committee on Fisheries (FAO, 2005a) reported that only around 11% of members had developed and implemented an NPOA. The failure to develop and/or implement an NPOA does not necessarily mean that there is no management in place for shark species.

Table 3

Development of NPOAs by the top 20 catching countries and territories

Country/Territory	NPOA
1. Indonesia	Drafted in 2004. Not known whether it has been implemented
2. India	No (Under development as at October 2004)
3. Spain	No (EU prepared a status report in 2003 and was reported in 2003 to be drafting an NPOA)[7]
4. Taiwan	Yes (Adopted in June 2006. Expected to come into force in October 2006)
5. Mexico	Developed but implementation blocked by stakeholders (as at October 2004)
6. Argentina	No. (Under development as at October 2004)
7. USA	Yes
8. Thailand	Reported to be entering implementation phase (March 2006)
9. Pakistan	No (Under development as at October 2004)
10. Japan	Yes
11. Malaysia	Draft released in 2005. Reported, in early 2006, to be entering implementation phase.
12. France	No (EU prepared a status report in 2003 and was reported in 2003 to be drafting an NPOA)
13. Brazil	No (Under Development as at October 2004)
14. Sri Lanka	Unknown
15. Iran, Islamic Rep. of	Unknown
16. New Zealand	No (Will release draft for comment in 2006)
17. UK	Yes (for coastal waters). (EU prepared a status report in 2003 and was reported in 2003 to be drafting an NPOA)
18. Nigeria	No (As at October 2004)
19. Portugal	No (EU prepared a status report in 2003 and was reported in 2003 to be drafting an NPOA)
20. Yemen	Unknown

Sources: UNGA (2005); Commission for the Conservation of Southern Bluefin Tuna (CCSBT) (2006); CITES (2004); Southeast Asian Fisheries Development Center (SEAFDEC) (2006); Indian Ocean Tuna Commission (IOTC) (2006).

However, in the absence of a publicly available shark assessment report it is difficult to judge the extent or effectiveness of that management. A summary of the progress with development of Shark Plans in the top 20 catching group in 2004 is presented in **Table 3**[5]. Only three of those countries and territories have developed and implemented a Shark Plan. No attempt has been made here to determine the extent to which those Plans meet the requirements of the IPOA.

RFMOs

None of the RFMOs has developed a regional plan of action as proposed by the IPOA. However, various measures, consistent with some of the principles of the IPOA have been implemented to initiate or improve data collection and shark stock assessment processes, raise awareness of shark vulnerability by fishers, improve shark identification and to encourage the release of live sharks. Since 2002, six RFMOs have introduced bans on shark finning (i.e. the practice of removing the fins and discarding the shark carcass at sea[6]). In a small number of cases RFMOs have implemented measures for individual species. However, the most significant action by any RFMO in relation to shark conservation and management was taken in November 2006 by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). CCAMLR's members agreed to ban the targeting of vulnerable sharks in the Southern Ocean until the effects of fishing them are assessed. Members also agreed to encourage the release of sharks caught incidentally as by-catch, however CCAMLR did not adopt controls on shark finning.

Credit: Elizabeth Hayes

A fisherman fins sharks at sea in waters off Western Australia

Management measures in RFMOs

A summary of the specific shark conservation and management measures in place in RFMOs is provided in **Appendix 1**. In 2004, the International Commission for the Conservation of Atlantic Tunas (ICCAT) adopted a resolution on conservation and management of sharks. The main elements of that resolution are:

- The collection of data on shark catch from contracting and non-contracting co-operating parties (CPCs)
- Providing assistance to developing CPCs for the collection of data
- The introduction of controls on finning and prohibitions on the retention, transhipment and landing of fins harvested in contravention of the bans
- Encouraging the release of live sharks, especially juveniles, that are taken as by-catch
- Encouraging research into selective gears and nursery areas

Since that time the ICCAT resolution has become something of a 'generic' approach that has been progressively adopted by a further five RFMOs (the Inter-American Tropical Tuna Commission (IATTC), the Indian Ocean Tuna Commission (IOTC), the General Fisheries Commission for the Mediterranean (GFCM), the Northwest Atlantic Fisheries Organization (NAFO) and the South East Atlantic Fisheries Organization (SEAFO)[8]. In some RFMOs the elements of the ICCAT resolution are complemented by measures including:

- requirements that, to the extent practicable, all sharks and rays caught by purse seine be returned to the water unharmed (IATTC)
- commitments to undertake preliminary assessment of 'key' shark stocks and to develop timetables for comprehensive assessments of these stocks (IATTC, IOTC)
- commitments to undertake research aimed at facilitating release of sharks, determining the survival rates of released sharks and identifying areas where sharks are most likely to be caught (IATTC)
- species-specific measures (for example, for Thorny Skate *Amblyraja radiata* in NAFO).

It should be noted that many of the elements of the 'generic' resolution are not regulatory. For example, the provisions relating to research into more selective fishing gears and shark nursery areas are couched in terms of "where possible". There is no research plan endorsed by these Commissions to ensure that such research is conducted or that the results are adopted. Further, the provision relating to the release of live sharks taken as by-catch requires CPCs to "encourage' such release rather than to implement and enforce such a provision. There is no guarantee that these provisions will deliver any benefits to shark conservation.

In other RFMOs, mandatory measures to reduce effort on or catch of shark species include:

- a prohibition on the targeting of sharks in CCAMLR waters (CCAMLR)
- limits on deep-sea fishing effort which may reduce the by-catch of deep-sea shark species (the North East Atlantic Fisheries Commission—NEAFC)
- species-specific measures—for example, NEAFC has introduced an interim conservation measure which prohibits directed fishing for Basking Shark in 2006 and 2007 (NEAFC, 2006a and 2006c) and ICCAT adopted a binding recommendation in 2005 calling for a reduction in fishing mortality of North Atlantic Shortfin Mako Shark *Isurus oxyrinchus*[9].

Objectives of shark management measures

The objectives that RFMOs are pursuing through resolutions and recommendations on the conservation and management for sharks can be summarised as follows:

- To implement the recommendation of the IPOA-Sharks for members of RFMOs to co-operate to ensure the sustainability of shark stocks and to adopt a NPOA for the conservation and management of sharks (see for example, NAFO (2005); ICCAT (2004); IOTC (2005); IATTC (2005); SEAFO (2006); WCPFC (2005))

- To collect data on catch, effort, discards and trade as well as information on the biological parameters of shark species (ICCAT (2004); IOTC (2005); IATTC (2005); SEAFO (2006); WCPFC (2005))
- To take actions consistent with other RFMOs (NAFO (2005); WCPFC (2005))
- To respond to the UNGA resolutions calling on members to ban shark fin fisheries and encourage measures to reduce waste and fully utilize sharks (NAFO (2005))
- To respond to the CITES call for RFMOs to develop, adopt and implement regional agreements for the conservation and management of sharks (NAFO (2005))

Given that many of the conservation and management measures have been agreed over the last two years there are few empirical data by which to determine their effectiveness. However, it should be noted that some of the measures implemented have not reflected the scientific advice available. For example, in NAFO, the scientific advice called for a quota of 11 000 t for Thorny Skate but the quota was set at 13 500 t (NAFO, 2006). Under such circumstances it is questionable whether the measures implemented will deliver positive conservation outcomes. The following analysis provides an assessment of the likely effectiveness of the current measures by exploring the potential contribution that the measures might make to achievement of each of the objectives outlined above, and identifying the possible impediments to realising that potential.

Implementation of the IPOA-Sharks

The first principle of the IPOA-Sharks requires managers to "ensure that shark catches from directed and non-directed fisheries are sustainable". Confidence about sustainability requires knowledge about the species and about total fishing mortality on that species and the implementation of management measures that effectively control mortality to levels consistent with sustainability. In the absence of the required knowledge, a precautionary approach to management of the species, that reflects this uncertainty, should be adopted. However, in RFMOs today:

Credit: WWF-UK/J. Stafford-Deitsch

Blue Shark *Prionace glauca*

- there are relatively few shark species for which stock assessments have been conducted; some exceptions include ICCAT's assessments for Blue Shark *Prionace glauca* and Shortfin Mako Shark and assessments by the International Council for the Exploration of the Sea of Porbeagle *Lamna nasus;*
- many RFMOs have only recently required the submission of shark catch data by their members and little is known about survival rates of discards, therefore the information on mortality is generally lacking;
- there are very few examples of species-specific shark management; and
- there are very few examples of the application of a precautionary approach to management of shark species. CCAMLR's recent prohibition on targeting of sharks is the best example.

The following points can be made in relation to implementation of the other principles of the IPOA-Sharks by RFMOs:

- A number of RFMOs have sought to improve shark catch data collection but compliance by members with data collection provisions is known to be poor in many RFMOs. The quality and timeliness of catch data for target species submitted by RFMO member States is commonly cited by scientists as a major impediment to meaningful assessment of trends in catch and stock status. There is no reason to expect that shark catch data will not suffer from the same deficiencies. In addition, given that much shark catch is taken as by-catch, which has not traditionally been the focus of data collection processes, and that accurate species identification is a well recognised problem for the collection of shark catch data, the data may well be even less accurate than those for other species.
- Few RFMOs have assessed, or are in the process of assessing, the threats to shark populations or of identifying or protecting critical habitats. Some have committed to stock assessments and research on key species and some encourage research by Parties to identify critical habitat.
- There are limited examples of actions taken by RFMOs to protect specific species of vulnerable or threatened shark stocks.
- While some RFMOs encourage research into more selective gear, none has adopted gear restrictions or area restrictions that specifically seek to minimize by-catch of shark species.
- So-called 'finning bans' have been implemented by six RFMOs and are under consideration in another two. In line with the IPOA-Sharks, these bans seek to minimize waste and discards from shark catches and to promote full use of dead sharks.

The commercial value of many shark species derives from their fins rather than the meat. The practice of 'finning' the shark—removing the fins and discarding the trunk—has become commonplace. Not only is finning wasteful but it renders attempts to identify the catch of sharks by species largely impossible and exacerbates the lack of species-specific catch data. Finning also results in increased mortality of sharks since fins alone occupy far less hold capacity than retention of the shark carcass and this provides an incentive to keep fishing for sharks. In terms of overall conservation of sharks these issues have overshadowed the key problem, which is that the demand for, and high commercial value of, shark fins is resulting in an unsustainable level of mortality on some shark species. Effective management measures will

Credit: WWF-Canon/Jürgen Freund

Shark fins drying in the Philippines

Credit: WWF-Canon/Meg Gawler

Dried shark fins on sale in a specialist shop in Beijing, China

ensure that fishing-induced mortality of individual shark species is kept within sustainable limits. To date, the so-called 'finning bans' are the key feature of most conservation and management resolutions taken in respect of sharks by RFMOs. The 'bans', at least in their current form, serve primarily to reduce waste and to provide an immediate stop-gap measure to restrict mortality, but alone they do not constitute effective management.

The objectives apparently sought to be achieved by bans on finning are:

- sustainable management of sharks
- minimization of waste
- enhancement of species identification and data collection

The extent to which finning bans will achieve these objectives depends on how they are applied. The key element of the bans is the requirement to land both the trunk and the fins. However, there are a number of ways (see **Box 1**) in which this requirement can be applied. The method of application has a significant impact on the achievement of the above objectives. Most RFMOs and some coastal and fishing States, have applied finning bans in line with option 5 in **Box 1**, relying on a ratio of fin-to-body weight. Clearly, of the options identified, this provides the least contribution to data collection and creates difficulties for enforcement. To maximize effectiveness with respect to these objectives, finning bans need to be applied in accordance with options 2 or 3 as a minimum.

Finning bans can contribute to conservation and management of sharks by reducing the incentive to target sharks or retain fins from otherwise discarded sharks. Retention of the trunk, which is often of very low or zero value, takes up scarce hold capacity, incurs refrigeration costs and allows the possibility of contamination of higher valued finfish by the high ammonia content of shark meat. All of these may provide a disincentive to catch and/or retain sharks for fins. However, these factors may also encourage 'high grading' whereby lower valued fins and carcasses are discarded in favour of higher value fins and carcasses or of higher value finfish.

Where sharks are taken in non-target fisheries, finning bans may simply result in the discarding of the entire shark and therefore may not reduce overall mortality and may increase waste since even the fins are not used. The bans may, however, reduce non-target mortalities of shark if the shark has a good survival rate and can be returned to the sea alive or if the ban provides the incentive for the development of more selective gear or other changes to fishing patterns in order to reduce incidental catch of shark. In addition, it is possible that finning bans may prevent non-target fisheries moving into targeting of shark. To that extent, they may prevent an increase in shark mortality over time. There is relatively little information on the survival rates of discarded shark, and mortality will vary across species, fishing methods and release and handling techniques.

Whether finning bans reduce waste depends on the extent to which a market exists for the trunks when they are landed. Given the relatively low value of the meat of many shark species, it is possible that trunks may simply be discarded after landing.

Box 1: Application of shark 'finning bans'	
Options	**Impact**
1. Sharks to be landed intact	Maximum contribution to shark identification, scientific data, weight of catch and enforcement. However generally not considered feasible since gutting and gilling is required as soon as practicable after capture to avoid degrading the quality of the meat and other products.
2. Sharks to be landed as headed and gutted with skins, fins, claspers, dorsal spines (where applicable) attached[9]	Maximizes product quality and makes a significant contribution to shark species identification, quantification of weight of catch and enforcement.
3. Sharks to be landed as headed and gutted with skins, claspers, dorsal spines (where applicable) attached but with fins removed and fin sets kept together and procedures adopted that allow for fins sets and trunks to be matched (e.g. matching labels)	As long as the fins and the trunk can be matched this option should make a contribution equivalent to option 2.
4. Sharks to be landed as headed, gutted and skinned with fins removed and retained separately to the trunk but number of sets of fins must match the number of trunks	Reduces contribution to shark identification through removal of skin and difficulty in matching fins to trunks, but can be effective from an enforcement perspective.
5. Sharks to be landed as headed, gutted and skinned with fins removed and retained separately to the trunk but fin weight[10] must represent a specified proportion of trunk weight	Reduces contribution to shark identification through removal of skin and difficulty in matching fins to trunks. Depending on how well the application of the ratio is specified it can leave the way open for loopholes and be difficult to enforce.

Finning bans can contribute to better species identification of shark catch (see **Box 1**). This contribution is maximized if fins are required to remain attached to the trunk until landing. In addition, requiring that carcasses be landed with fins attached enables maximum extraction of scientific data from landings, maximizes fin and carcass quality and value, promotes standardized data collection and reporting of official catch statistics, and eliminates potential enforcement loopholes (IUCN, 2003). However, the finning bans currently in place in the RFMOs suggest that there is a strong perception that requiring fins to remain attached to the trunk is not a feasible option for most high seas fishing operations where the trunk needs to be

frozen. It remains unclear whether this perception is valid. Where fins and trunks are required to be retained but fins can be removed from the trunk this adds only slightly to shark species identification since the trunk and the fins are usually retained separately. In any case the contribution of shark finning to improved species identification and scientific data collection relies on an in-port inspection programme sampling and identifying fins and species taken. The extent to which such programmes are in place is unknown; they do not appear to be a requirement of any RFMO programme.

The appropriateness of the ratio of fins to body weight adopted is a key determinant of the effectiveness of the shark finning bans currently in place. Several RFMOs have sought advice from their advisory bodies regarding the appropriateness of the ratios adopted and a number of concerns have been raised by the IATTC Working Group on Stock Assessment, ICCAT's Standing Committee on Research and Statistics (SCRS) and the IOTC's Working Party on Bycatch. All have expressed serious reservations about the formulation of the bans and the general application of a 5% ratio. ICCAT's SCRS noted the following:

> "…owing to the different species of sharks that may be caught or targeted by the different fisheries of the world, which are likely to have different fin-to-body weight ratios, and the varying fish preparation and utilization criteria on board the different fleets, it would not appear to be advisable to establish universal fin-to-body weight ratios. Consequently to be effective, these regulations [to reduce finning practices] must take into account the species of sharks and the fleet behavior.…the accuracy of conversion factors is vital for estimating catches …. Fin-to-body-weight ratios can significantly affect the catch estimation and ultimately influence assessment results….The SCRS thus recommends that conversion factors between the fins and body weights be developed and implemented on a species-and/or fleet specific basis." (ICCAT, 2006)

IATTC's Working Group on Stock Assessment (IATTC, 2006) identified several problems with the use of a 5% ratio of fins to body weight:

- it is not specified if the standard applies to the wet or dry weight of the fins or to the whole fin or just what is sold on the market;
- it is not specified if the standard applies to the dressed weight or to whole weight of the shark.

The Group also noted significant differences between studies on ratios of fin-to-body weight and identified the following explanations for these:

- the number of fins included in the analyses
- how fins were cut (L or straight cut)
- the state of the shark carcasses (dressed or round)
- the length of the trip (which determines how dry the fins are)
- the sizes of the sharks.

The group suggested that it would be better and easier to match the number of fins to the number of carcasses rather than matching weights.

Similarly, IOTC's Working Party on Bycatch (IOTC, 2006) noted that "the fin-to-body weight ratio for sharks varied widely depending on species, fin-set and finning techniques, and generally agreed that using ratios for particular species and/or fleets might be needed, although difficult to implement."

The issues identified by these advisory bodies will need to be addressed if the contribution of finning bans to conservation and management of sharks is to be maximized. In particular, the appropriate fin-to-body weight ratio has been the subject of considerable debate and this needs to be resolved. In this respect, IUCN has concluded, based on studies conducted by the US National Marine Fisheries Service and the University of Florida Commercial Shark Fishery Program, that the "use of 5% as a target figure in shark fishery management plans already allows considerable flexibility for species-specific variation in fin-carcass weights and should not be exceeded. An appropriate regulation should therefore contemplate either ratios of 2% fin:live (whole body) weight or of 5% fin:dressed carcass weight, as both are suitable for most large-finned species." (IUCN, 2003). This conclusion is supported by recent work by Cortes and Neer (2006) who found that "If species-specific management is not feasible, the available data suggest that the aggregated 5% ratio is not inappropriate when using the primary fin set in the calculations."

Credit: WWF-Canon/Cat Holloway

Smooth Hammerhead *Sphyrna zygaena*

Further, whether finning bans contribute to any of the above objectives relies largely on the level of compliance with the bans. The level and effectiveness of enforcement is therefore critical. In-port inspections to enforce finning ratios, restrictions on transhipment and the requirement to land fins and carcasses simultaneously are central to the effectiveness of the bans.

Despite all of the issues identified above the imposition of controls on finning should be an integral component of overall shark conservation and management. However, much needs to be done in order to maximize the contribution of these controls to this objective.

Improved data collection

The 'generic' shark resolution adopted by a number of RFMOs refers to the need to collect data on catch, effort, discards and trade as well as information on the biological parameters of shark species. While each of these RFMOs has specified the need for CPCs to provide shark catch data it is unclear whether the data include discards and the extent to which they must be reported

on a species basis. There is no explicit reference to collection of effort data in relation to shark catch, despite acknowledgement by some RFMOs that targeted shark fisheries exist in waters under their jurisdiction. Nor is any attempt made to collect trade data or to improve the value of trade data by requiring Parties to implement shark specific trade codes[12]. Most RFMOs do not operate data verification schemes such as independent observer programmes or port sampling programmes. They rely heavily on the integrity of the data supplied to them by member States. The quality and accuracy of these data vary considerably. In the absence of reliable and comprehensive catch data, trade data may represent a more reliable means of establishing actual catch levels. However, as noted above, trade data also suffer from deficiencies such as the lack of trade codes specific to shark products. One option that RFMOs may wish to consider to overcome these problems is the use of catch documentation schemes that require all catch landed to be accompanied by specific documentation relating to species and area of catch.

Consistency with other RFMOs

Credit: WWF-Canon/Cat Holloway

Whitetip Reef Sharks, Kiribati

Collaboration between, and implementation of consistent regulations by RFMOs are worthy objectives. However, it is critical that RFMOs consider the specific nature of shark fishing under their jurisdiction and implement measures that address their needs rather than adopt a generic response. The adoption of the ICCAT resolution, virtually unaltered, by five other RFMOs without any assessment of the nature and extent of their shark fisheries or of the relative vulnerability of shark species taken, suggests expediency rather than effective management.

Response to UNGA resolutions

In 2005, the UNGA called upon States working through RFMOs to:

> "collect scientific data regarding shark catches and to consider adopting conservation and management measures, particularly where shark catches from directed and non-directed fisheries have a significant impact on vulnerable or threatened shark stocks, in order to ensure the conservation and management of sharks and their long-term sustainable use, including by banning directed shark fisheries conducted solely for the purpose of harvesting shark fins and by taking measures for other fisheries to minimize waste and discards from shark catches and to encourage the full use of dead sharks."

While the shark finning bans introduced by many RFMOs may reduce waste and promote full use of sharks, although this is by no means proven, they do not equate to a ban on directed (target) shark fin fisheries as called for by the UNGA.

Credit: WWF-Canon/Cat Holloway

Grey Reef Sharks *Carcharhinus amblyrhynchos*

Effective high seas management of sharks will require management of all mortalities arising from both target and by-catch fisheries. It is imperative that RFMOs do not allow any uncertainty about their mandate to manage these fisheries to delay the introduction of conservation and management measures for shark species. As noted earlier in this report, the decisions of RFMOs are a reflection of their members. As a priority, members of RFMOs must acknowledge, collectively, the urgent need for action on shark management and act on this need. To date, many RFMOs have failed to adopt, or apply, an ecosystem-based approach to management. This failure can lead to unintentional impacts of conservation and management measures for one species on ecologically related species. For example, measures introduced to reduce dolphin mortality arising from dolphin-associated sets in the purse seine sector of the IATTC have resulted in increased sets on fish aggregating devices, with a consequent and unforeseen increase in the by-catch of, for example Silky Shark *Carcharhinus falciformis* and manta rays *Manta* spp. (IATTC, 2006). RFMOs and coastal States must ensure that they develop management measures in a holistic way in order to minimize the potential for such unintended consequences. Equally, management measures for sharks must be formulated so as to minimize detrimental impacts on other species.

Response to CITES

In 2002, the 12th meeting of the Conference of the Parties to CITES urged RFMOs "to take steps to undertake the research, training, data collection, data analysis and shark management plan development outlined by the FAO as necessary to implement the IPOA-Sharks."

As noted above while some of the actions taken by RFMOs have been consistent with elements of the IPOA, none of the RFMOs has implemented a regional plan of action or otherwise implemented conservation and management measures that fully reflect the principles of the IPOA.

CONCLUSIONS AND RECOMMENDATIONS

The key to sustainable shark fisheries is to understand and manage the level of mortality incurred by fishing. Effective management requires reliable, species- (or stock-) specific information on biology and total mortality (landings and discards) and precautionary limits in the face of uncertainty. While all shark species are relatively more vulnerable to overfishing than most other marine fishes, within the shark category the level of vulnerability varies considerably. There is an urgent need to improve our understanding of shark mortality on a species basis and it is important therefore that information is collected on this basis and that risk-based management measures are adopted for individual species where necessary.

It is now seven years since the development of the IPOA and the rate of implementation of the Plan by States is low. An expert consultation on the implementation of the IPOA-Sharks (FAO, 2005b) found that "While the IPOA-Sharks appears well accepted at national political and policy levels, concrete operational activities have been meagre and unsatisfactory." The analysis in this report supports that finding. While many groups including COFI, the CITES CoP and the UNGA have urged coastal and fishing States to implement the Plan, and many RFMOs have encouraged their CPCs to develop NPOAs, few have done so. At both national and regional levels there has been strong articulation of support for the IPOA but this has not translated into action to implement it.

The FAO expert consultation on implementation of the IPOA-Sharks noted that there was a need for "greater recognition of the potential of regional fisheries management organizations (RFMOs) to contribute to management of elasmobranchs, their support and involvement addressing this problem should be sought." (FAO, 2005b). Given the lack of action at a national level, RFMOs must now take on a greater responsibility for ensuring that the principles of the IPOA are implemented for shark stocks under their jurisdiction. RFMOs are well placed to contribute to the collection of accurate, species-specific information on shark catches and discards and to drive sound management approaches on the high seas that will have flow-on effects for management of at least highly migratory and straddling sharks in waters under the national jurisdiction of members. Coastal States, particularly those which are Parties to the UNFSA, retain a high level of responsibility for conservation and management of sharks. These States retain a significant responsibility for management of coastal sharks, for ensuring, where appropriate, that complementary management measures are implemented to support measures adopted by RFMOs and for meeting their obligations to RFMOs to which they are a Party. This in itself may facilitate improved management and monitoring of coastal shark species.

Recommendations are made below as to how coastal States and RFMOs can contribute effectively to the conservation and management of sharks.

Coastal and fishing States/entities

1. Coastal and fishing States/entities should, by the end of 2007, have conducted an assessment of the fisheries in which shark is taken as a target or a by-catch species and made

an informed decision as to whether an NPOA is required. This assessment should reflect the recommendations of the IPOA-Sharks and should include an audit of shark mortality, by fishing method and, to the extent possible, by species. This will provide a baseline from which decisions about the need for management can be made and against which the effectiveness of management can be assessed.

2. Where deemed necessary, an NPOA, in line with the recommendations of the IPOA-Sharks, should be developed and implemented by end 2008. In particular, based on the audit proposed above, targets should be established for reductions in catch and programmes implemented to monitor progress against these targets.
3. Coastal and fishing States that are signatories to the UNFSA should make a concerted effort in the RFMOs to which they are a Party to reach agreement to implement the principles of the IPOA-Sharks.
4. Coastal and fishing State Parties/co-operating non-Parties to RFMOs should ensure that any conservation and management measures, including the submission of data, implemented by the RFMOs are enforced in relation to their flag vessels.
5. Coastal States/entities should ensure that the results of research and development including, for example, the results of by-catch mitigation trials, are made available to RFMOs to which they are a Party.
6. Where States/entitites have introduced, or are considering introducing, controls on finning as part of an overall management strategy for sharks, they should:
    a) clearly define the objectives of the controls and assess their role in the overall strategy for conservation and management of sharks;
    b) assess the feasibility of requiring that sharks are landed as headed and gutted and with skin, fins, claspers and, where applicable, dorsal spines attached;
    c) if (b) is demonstrated not to be feasible, require that sharks are landed as headed and gutted and with skin, claspers and, where applicable, dorsal spines attached with fins removed but require that procedures be implemented to enable fin sets and trunks to be matched;
    d) if fins are permitted to be removed from the trunk and a ratio of fin weight to carcass weight is applied,
        i) develop, where possible and where it is considered feasible to monitor and enforce these provisions, species-specific ratios based on the primary fin set for the most vulnerable shark species in the catch and apply generic ratios for the remainder;
        ii) generic ratios should not exceed 5% (based on the wet weight of the primary fin set) of the dressed weight or 2% whole weight;
        iii) ensure that the management measure specifies:
            - the weight of shark that the ratio applies to (i.e. dressed weight or liveweight)
            - the weight of the fins that the ratio applies to (i.e., wet or dry and whether the weight applies to the whole fin or just the marketed component)
            - that fins and carcasses must be landed together;
        iv) establish sampling regimes to extend the application of species-specific ratios and to validate existing ratios;

e) cease the use of the misleading term 'shark finning bans' to describe these measures and adopt more accurate descriptions such as 'shark finning controls'.

7. States should seek to strengthen the UNGA's resolution on conservation and management of sharks by ensuring that the resolution reflects the recommendations of this report.

RFMOs

8. RFMOs should ensure that any decisions relating to conservation and management of 'sharks' clearly specify that those decisions relate to all species of the Class *Chondrichthyes*.
9. RFMOs should, as a priority, agree to implement the IPOA-Sharks comprehensively, noting that the IPOA calls on States to adopt an NPOA, and "within the framework of their respective competencies and consistent with international law, to co-operate through regional fisheries organizations with a view to ensuring the sustainability of shark stocks, including, where appropriate, the development of subregional or regional shark plans" (FAO, 2000a).
10. RFMOs should, by the end of 2007, have conducted an assessment of the fisheries in which shark is taken as a target or a by-catch species and have made an informed decision as to whether a regional plan of action is required. That assessment should identify, clearly and separately, fisheries in which sharks are taken as target catch, by-catch (retained) and by-catch (discarded) in order to determine the factors influencing mortality and to facilitate the development of appropriate management responses. The assessment should also include an audit of shark mortality, by fishing method and, to the extent possible, by species. This will provide a baseline from which decisions about the need for management can be made and against which the effectiveness of management can be assessed.
11. In the interim, RFMOs should adopt a precautionary approach to management of shark species and introduce measures to reduce the impact of fishing on these species and to improve the information base underpinning management. These measures might include:

    a) The submission of validated data on the landings and discards of sharks on a species basis
    b) In the absence of species-specific post-release survival rates, a precautionary approach to estimation of fishing mortality by including all discarded sharks in mortalities
    c) The initiation of programmes to determine post-release survival rates by species and fishing gear, drawing where possible on existing research and rates adopted by other management agencies
    d) Programmes to improve the identification of shark species
    e) Prohibitions on the targeting of shark species until the status of target stocks has been assessed and management measures implemented where appropriate
    f) Catch limits (total or trip limits)
    g) Reduction of fishing effort
    h) Implementation of measures to validate catches for example, the use of catch or trade documentation schemes, trade monitoring etc

i) Introduction of by-catch mitigation measures (for example, the banning of the use of wire traces in longline fisheries) drawing on the experience available with the use of such measures in coastal states and other RFMOs

j) The use of observers to monitor the effectiveness of by-catch mitigation measures

k) Area closures

l) Implementation of measures to enforce compliance, for example, restrictions on transhipment and, use of VMS where appropriate

m) More rigorous controls on finning

12. In particular, where deep-water shark species are known to be taken, RFMOs should immediately introduce interim, precautionary moratoria aimed at providing protection to these species until sustainable catch levels can be determined and longer-term measures implemented to ensure their conservation.

13. Where RFMOs have introduced, or are considering introducing, controls on finning as part of an overall management strategy for sharks, they should:

a) clearly define the objectives of the controls and assess their role in the overall strategy for conservation and management of sharks

b) assess the feasibility of requiring that sharks are landed as headed and gutted and with skin, fins, claspers and, where applicable, dorsal spines attached

c) if (b) is demonstrated not to be feasible, require that sharks are landed as headed and gutted and with skin, claspers and, where applicable, dorsal spines attached with fins removed but require that procedures be implemented to enable fin sets and trunks to be matched.

d) if fins are permitted to be removed from the trunk and a ratio of fin weight to carcass weight is applied,

   i) develop, where possible and where it is considered feasible to monitor and enforce these provisions, species-specific ratios based on the primary fin set for the most vulnerable shark species in the catch and apply generic ratios for the remainder

   ii) generic ratios should not exceed 5% (based on the wet weight of the primary fin set) of the dressed weight or 2% whole weight

   iii) ensure that the management measure specifies:

      - the weight of shark that the ratio applies to (i.e. dressed weight or liveweight)
      - the weight of the fins that the ratio applies to (i.e. wet or dry and whether the weight applies to the whole fin or just the marketed component)
      - that fins and carcasses must be landed together

   iv) establish sampling regimes to extend the application of species specific ratios and to validate existing ratios

e) cease the use of the misleading term ‘shark finning bans’ to describe these measures and adopt more accurate descriptions such as ‘shark finning controls’.

14. RFMOs should, in line with the requirements of the UNFSA, ensure that developing country CPCs are provided with assistance where necessary to implement conservation and management measures for sharks.

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ACRONYMS

CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CITES	Convention for the International Trade in Endangered Species of Wild Fauna and Flora
COFI	FAO Committee on Fisheries
CoP	Conference of the Parties to CITES
CPCs	Contracting and Co-operating non-Contracting parties to an RFMO
FAO	Food and Agriculture Organization of the United Nations
GFCM	General Fisheries Commission of the Mediterranean
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
IOTC	Indian Ocean Tuna Commission
IPOA-Sharks	International Plan of Action for the Conservation and Management of Sharks
IUCN	The World Conservation Union
NAFO	Northwest Atlantic Fisheries Organization
NPOA	National Plan of Action
RFMO	Regional Fisheries Management Organization
SEAFDEC	Southeast Asian Fisheries Development Center
SEAFO	South East Atlantic Fisheries Organization
TAC	Total Allowable Catch
UNCLOS	United Nations Convention on the Law of the Sea
UNFSA	Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (the UN Fish Stocks Agreement).
UNGA	United Nations General Assembly
WCPFC	Western and Central Pacific Fisheries Commission

APPENDIX 1: Shark Conservation and Management Measures of RFMOs

RFMO	Measures in Place
IATTC	
(2000)	Fishers on purse-seine vessels to promptly release unharmed, to the extent practicable, all sharks and rays (and other non-target species)
(2002 and 2006)	IATTC to: • Develop techniques and/or equipment to facilitate the release of sharks and rays from the deck or from the net • Seek the necessary funding for experiments to determine the survival rates of released sharks and rays • Define areas and periods in which these species are most likely to be caught.
(2005)	Parties/Co-operating non-Parties/co-operating fishing entities/regional economic integration organizations (CPCs) should implement a National Plan of Action in accordance with the IPOA-Sharks In relation to sharks caught in association with fisheries managed by the IATTC: • The IATTC will provide preliminary advice on stock status of key shark species and propose a research plan to comprehensively assesses those stocks in 2006 • All parts of any retained sharks, except head guts and skin, must be retained to the first point of landing • Vessels may not have onboard fins that total more than 5% of the weight of the sharks onboard at the first point of landing • CPCs to ensure compliance with the measure through certification, monitoring by an observer or other appropriate measures • retention, transhipment, landing or trading of fins harvested in contravention of the measure is prohibited • CPCs to encourage the release of live shark, especially juveniles, taken as bycatch and are not used for food and/or subsistence • CPCs encouraged to research selective gears and identify nursery areas. • CPCs to report annually data for catches, effort by gear type, landing and trade of sharks by species, where possible • CPCs shall provide an annual comprehensive report on the implementation of this resolution

RFMO	Measures in Place
ICCAT (2004)	• Contracting parties shall report data for all catches of sharks • All parts of the shark, except head guts and skin, must be retained to the first point of landing • Vessels may not have onboard fins that total more than 5% of the weight of the sharks onboard at the first point of landing • CPCs to ensure compliance with the measure through certification, monitoring by an observer or other appropriate measures • retention, transhipment or landing of fins harvested in contravention of the measure is prohibited • CPCs to encourage the release of live shark, especially juveniles, taken as bycatch and are not used for food and/or subsistence • CPCs encouraged to research selective gears and identify nursery areas. • The commission shall consider appropriate assistance to developing CPCs for the collection of data on shark catches
IOTC (2005)	Contracting Parties/Co-operating non-Contracting Parties (CPCs) shall report annually data for catches of sharks In 2006 the Scientific Committee will provide preliminary advice on the stock status of key shark species and propose a research plan and timeline for a comprehensive assessment of these stocks. In relation to sharks caught in association with fisheries managed by the IOTC: • All parts of the shark, except head guts and skin, must be retained to the first point of landing • Vessels may not have onboard fins that total more than 5% of the weight of the sharks onboard at the first point of landing • CPCs to ensure compliance with the measure through certification, monitoring by an observer or other appropriate measures • retention, transhipment or landing of fins harvested in contravention of the measure is prohibited • CPCs to encourage the release of live shark, especially juveniles, taken as bycatch and are not used for food and/or subsistence • CPCs encouraged to research selective gears and identify nursery areas. • Commission shall consider appropriate assistance to developing CPCs for the collection of data on their catches • Applies without prejudice to many artisanal fisheries which traditionally do not discards carcasses

RFMO	Measures in Place
NAFO (2005) (2006)	• Contracting parties shall report data for all catches of sharks • All parts of the shark, except head, guts and skin, must be retained to the first point of landing • Vessels may not have onboard fins that total more than 5% of the weight of the sharks onboard at the first point of landing • CPCs to ensure compliance with the measure through certification, monitoring by an observer or other appropriate measures • retention, transhipment or landing of fins harvested in contravention of the measure is prohibited • CPCs to encourage the release of live shark, especially juveniles, taken as bycatch and are not used for food and/or subsistence • CPCs encouraged to research selective gears and identify nursery areas. • Contracting parties shall improve training in identification and reporting of elasmobranch catches, expand the list of individually identified elasmobranch species if species lacking codes are encountered, and ensure that national authorities submit elasmobranch catch statistics with a maximum degree of detail. This information is particularly desired for Black Dogfish and Greenland shark. Progress should be reported for consideration at the 2007 NAFO annual Meeting.
GFCM (2005)	• Contracting parties shall report data for all catches of sharks • All parts of the shark, except head, guts and skin, must be retained to the first point of landing • Vessels may not have onboard fins that total more than 5% of the weight of the sharks onboard at the first point of landing • CPCs to ensure compliance with the measure through certification, monitoring by an observer or other appropriate measures • retention, transhipment or landing of fins harvested in contravention of the measure is prohibited • CPCs to encourage the release of live shark, especially juveniles, taken as bycatch and are not used for food and/or subsistence • CPCs encouraged to research selective gears and identify nursery areas.
SEAFO (October 2006)	Banned shark finning in fisheries for species covered by the SEAFO convention ~ all parts of the shark, except head guts and skin, must be retained to the first point of landing ~ vessels may not have onboard fins that total more than 5% of the weight of the sharks onboard at the first point of landing ~ retention, transhipment or landing of fins harvested in contravention of the measure is prohibited

RFMO	Measures in Place
	Contracting parties to ensure compliance with the measure through certification, monitoring by an observer or other appropriate measures ~ contracting parties to encourage the release of live shark, especially juveniles, taken as bycatch ~ contracting parties to report annually data for shark catch ~ contracting parties encouraged to research selective gears (eg avoiding use of wire traces) and identify nursery areas. ~ the Commission shall consider appropriate assistance to Developing States, Parties to the convention, for the collection of data on their shark catches
CCAMLR (November 2006)	Ban on targeting of vulnerable sharks in the Southern Ocean until the effects of fishing them are assessed. The release of sharks caught incidentally as bycatch is encouraged
NEAFC	The June 2006 Working Group on Deep-Sea Species proposed that : Contracting parties to limit effort on deep-sea species to 70% of the highest level in previous years Fishing for deep sea species to be prohibited in specified areas • All parts of the shark, except head guts and skin, must be retained to the first point of landing • Vessels may not have onboard fins that total more than 5% of the weight of the sharks onboard at the first point of landing • Contracting parties to ensure compliance with the measure through certification, monitoring by an observer or other appropriate measures (NEAFC, 2006b) The proposal was considered by the annual Commission meeting in November 2006. Reported outcomes of the meeting include the adoption of a ban on finning of sharks (NEAFC, 2006c) but do not provide details of the decision.
CCSBT	None. The 2006 meeting of the Ecologically Related Species Working Group considered a draft proposal for measures for the conservation and sustainable utilization of sharks taken in SBT fisheries. The Group aims to finalise a recommendation for the Commission's consideration in 2007.
WCPFC	The 2004 meeting of the Commission resolved to adopt in 2005 mitigation measures to address the mortality of non-target species including sharks. The 2005 meeting agreed to defer consideration of a draft proposal on shark conservation until the December 2006 meeting of the Commission.

NOTES:

[1] For the purposes of this paper the term shark" is taken to include all species of sharks, skates, rays and chimaeras (Class *Chondrichthyes*).

[2] Family Isurida is now more commonly known as Lamnidae (Fowler, 2005)

[3] The FAO Technical Guidelines (FAO, 2000b) also called upon RFMOs to meet this deadline.

[4] Trends in catch may be influenced by a range of factors including abundance, market demand, the impact of fisheries management and conservation measures and changes in the accuracy, timeliness and species breakdown of reporting.

[5] In preparing this paper no attempt was made to contact States in order to confirm the current status of development of NPOAs. Table 3 is based on the most recent, publicly available information.

[6] So called "bans on finning" imposed by RFMOs and many coastal States do not in fact prevent the removal or retention of fins from sharks. They ban the practice of retaining only the fins and discarding the rest of the carcass.

[7] In September 2006 the European Parliament called on the Commission to present to the Parliament by 30 June 2007 a Community Plan of Action for the conservation of sharks.

[8] NEAFC adopted a ban on finning of sharks at its annual Commission meeting in November 2006. (NEAFC, 2006c) but details of the decision are not yet available. The Western and Central Pacific Fisheries Commission (WCPFC) will consider a proposal along similar lines at its meeting in December 2006.

[9] The impact of this recommendation is unclear since the wording is ambiguous.

[10] Recommended by FAO (2000b).

[11] For the purposes of this document fin weight refers to the wet weight of the primary fin set, i.e., the dorsal fin, both pectoral fins and the lower lobe of the caudal fin. In some fisheries, however, fin sets comprise additional fins including, for example, the whole caudal fin.

[12] The 12th meeting of the Conference of the Parties to CITES requested that Parties expand their Customs classification system to allow for the collection of detailed data on shark trade by products and species (*Resolution Conf. 12.6).*

TRAFFIC, the wildlife trade monitoring network, works to ensure that trade in wild plants and animals is not a threat to the conservation of nature. It has offices covering most parts of the world and works in close co-operation with the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

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