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Report of the

TECHNICAL WORKSHOP ON THE STATUS, LIMITATIONS AND OPPORTUNITIES FOR IMPROVING THE MONITORING OF SHARK FISHERIES AND TRADE

Rome, 3–6 November 2008

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Rome, 3–6 November 2008

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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PREPARATION OF THIS DOCUMENT

This report documents the discussions and conclusions of the Technical Workshop that was held to evaluate the current limitations in the monitoring of shark fisheries and the trade in shark products and to recommend strategies for improving the situation. The Technical Workshop was held in Rome from 3 to 6 November 2008 and was funded by the Japan-funded Trust Fund Project on "CITES and commercially-exploited aquatic species, including the evaluation of listing proposals".

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ABSTRACT

The Technical Workshop on the Status, Limitations and Opportunities for Improving the Monitoring of Shark Fisheries and Trade considered global and country specific information on shark fisheries and trade to identify limitations and strategies for improving their monitoring. Reports from a selected number of main shark fishing and trading nations described the status of shark fisheries and the efforts towards the development of a National Plan of Action for Sharks. The workshop recommended actions to promote the implementation of National Plans of Action for Sharks and to address specific problems affecting catch and trade monitoring, including lack specificity in data, underestimated catch volumes, and limitations in the customs codes used in trade monitoring.

CONTENTS

BACKGROUND AND OBJECTIVES OF THE WORKSHOP

Concerns about the expanding catches of sharks[1] and their potential negative impacts on shark populations have led to an increased level of international attention to the management of shark fisheries, particularly during the last decade. FAO developed the International Plan of Action for Conservation and Management of Sharks (IPOA–Sharks) in 1999 with the objective to ensure the conservation and long-term sustainable use of sharks, including species that are target and non-target of fisheries. Central to the objective of the IPOA–Sharks is the effective implementation of National Plans of Action by States which conduct direct fisheries for sharks or that regularly catch sharks in non-directed fisheries.

In 2005, FAO organized an Expert Consultation[2] that evaluated progress in the implementation of the IPOA–Sharks. The consultation concluded that few countries had had a successful record of conservation and management of elasmobranch resources and that the problem of depleted and threatened stocks and species continued to increase. A number of possible reasons for that were identified, including:

- the low economic importance of shark fisheries in many countries, and the correspondingly low priority they receive in the allocation of management resources (funds and experts);
- the weak or lack of political will to address the problems of elasmobranch population within management jurisdictions;
- the lack of expertise needed to determine which management actions are required and to rank their importance and expedite their implementation;
- insufficient funding and/or human resources to address the problems posed by the management requirements of national elasmobranch resources;
- the dependency of national initiatives on funds provided by donors.

Other particular concerns identified as factors hampering the implementation of effective management of elasmobranch fisheries included:

- the lack of appropriate taxonomic guides to identify species;
- the lack or insufficient information on the population biology of elasmobranch species, both targeted and bycatch species;
- scarce or lacking data, particularly for catch and fishing effort, to inform management decision making.

The twenty-seventh session of COFI in 2007 concurred that despite efforts by some countries to implement the IPOA–Sharks, further intensive work was required. The most recent information available to FAO at the live of the workshop indicated that of the 31 top shark fishing nations (accounting for 90 percent of world elasmobranch catches) only ten had developed National Plans of Action for Sharks.

International trade in shark products (including fins and meat) has been recognized as a major driver for the exploitation of some shark species. Increased concerns about the threatened status of shark species targeted for international trade has led to proposals for listing shark species in the Appendices of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). The whale shark, *Rhincodon typus*, and the basking shark, *Cetorhinus maximus*, were included in CITES Appendix II (controlled trade) in 2002. The white shark, *Carcharodon carcharias*, was included in CITES Appendix II in 2004. All species of sawfishes (Family Pristidae) were included in CITES Appendix I (no trade allowed) in 2007.[3] In addition, two proposals concerning important commercially-exploited sharks (*Squalus acanthias* and *Lamna nasus*) were proposed but rejected by CITES Parties in 2007.

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[1] For the purposes of this document, the term "shark" is taken to include all species of sharks, skates, rays and chimaeras (class Chondrichtyes).

[2] FAO. 2006. Report of the FAO Expert Consultation on the Implementation of the FAO International Plan of Action for the Conservation and Management of Sharks. Rome, 6–8 December 2005. FAO Fisheries Report. No. 795. FAO, Rome. 24p.

[3] The only exception being *Pristis microdon,* listed in Appendix II.

Informed by the results of the FAO Expert Consultation, and based on the work of the Sharks Working Group of the CITES Animals Committee, the Animals Committee elaborated draft decisions concerning future activities of CITES on sharks which were revised and adopted at the fourteenth Meeting of the Conference of the Parties (The Hague, June 2007). With regards to the IPOA–Sharks,[4] Parties were strongly encouraged to identify opportunities to:

- improve, in cooperation with FAO and relevant fishery management bodies, the monitoring and reporting of catch, bycatch, discards, market and international trade data, at the species level where possible;
- establish systems to provide verification of catch information; and
- implement the FAO IPOA–Sharks as a matter of priority, where they have not done so.

In addition, Parties that are members of a regional fishery management organization were strongly encouraged to request through FAO and regional fishing management organizations, where appropriate, that these organizations develop and implement regional shark plans and associated measures to assist in species identification and monitoring, as called for in the IPOA–Sharks, by mid-2009 in order to report at the fifteenth meeting of the Conference of Parties.

The need for improving information on shark fisheries and trade

One of the primary goals of quantifying the volume of species of fish taken in commercial fishing activities is to obtain the information required to develop and monitor the implementation of fishery management plans. Information about the status of commercially-harvested species provides an important indicator of the sustainability of a fishery. This information can come from different sources, including the monitoring of the fishing activity (e.g. landing, catch and effort data), biological surveys and information from resource users. Often the only data available to infer the status of a fishery resource in a particular location are the landings or catches in weight or number of the targeted species.

It has been noted that while there are major concerns about the conservation, species diversity and the potential local extinction of shark species, the quality of the landings statistics in many countries is insufficient to confidently monitor or measure changes in taxonomic composition of the catch at an appropriate level.[5,6] According to the 2006 data compiled by FAO from country submissions and other sources, only approximately 30 percent of the world shark catches are reported at the species or genus level and another 13 percent at the family level.

Illegal, unreported and unregulated (IUU) fishing further complicates the ability of States to properly monitor the status of shark resources. A recent analysis of the global shark fin trade indicated, for instance, that the estimated shark biomass in the fin trade can be three to four times higher than shark catch figures reported in FAO fisheries statistics database.[7] The difference may be attributable to factors such as unrecorded shark landings, shark catches recorded in non-chondrichthyan-specific categories (e.g. marine fish nei), and/or a high frequency of shark finning and carcass disposal at sea, a practice that is prohibited in several countries and regional fisheries management organizations (RFMOs).

Considering the importance of international trade as a driver for the exploitation of many shark species, accurate information on the volume of trade in shark products is also crucial to determine the relative importance of trade as a threat to sharks species and to examine the potential role of trade regulation (e.g. CITES) as a complementary measure for the conservation and sustainable use of sharks. In cases where species are mainly harvested for international trade, trade volumes can also be an auxiliary indicator of the scale of shark catches. Estimating the volume and trend of international trade in shark species is complicated by different factors, such as discrepancies between data sources (e.g. production, exports and imports), lack

[4] Decisions 14.115 and 14.116 (available at www.cites.org/eng/dec/valid14/14_101–117.shtml).

[5] Shotton, R. (ed.). 1999. Case studies on the management of elasmobranch fisheries. FAO Fisheries Technical Paper. 378/1. Rome. FAO.

[6] FAO. 2006. FAO Expert Consultation on the Implementation of the FAO International Plan of Action for the Conservation and Management of Sharks. Rome, 6–8 December 2005. FAO Fisheries Report. No. 795. Rome, FAO. 24p.

[7] Clarke *et al*. 2006. Global estimates of shark catches using trade records from commercial markets. Ecology Letters 9: 1115–1126.

of accuracy and species breakdown of reporting, and most importantly, by the lack of species-specific reporting codes.

It is clear that the improvement of the monitoring of shark fisheries and trade can make a considerable contribution to the successful implementation of national, regional and international efforts to promote shark conservation and sustainable use.

The Technical Workshop on Status, Limitations and Opportunities for Improving the Monitoring of Shark Fisheries and Trade was held at FAO headquarters in Rome, from 3 to 6 November 2008, with the objective to obtain a better understanding of the current situation and the limitations in the monitoring of shark fisheries and trade in selected fishing nations, and based on that, to identify opportunities for future improvement. The workshop was sponsored by the Japan-funded Project on "CITES and commercially-exploited aquatic species including the evaluation of listing proposals".

PARTICIPATING COUNTRIES

Fisheries experts from a selected number of countries were invited to participate in the workshop. Countries were selected based on their importance as the main shark fishing or trading nations, the level of development of NPOA–sharks and geographical representation. Participants from Argentina, China, Hong Kong Special Administrative Region (China, Hong Kong SAR), Ghana, Indonesia, Iran (Islamic Republic of), Italy, Japan, Panama, Senegal, Spain, Sri Lanka and the United States of America attended the workshop. Although participants from Nigeria, Pakistan and Singapore confirmed their attendance, they were unable to attend due to reasons beyond their control.

In addition, the workshop was attended by representatives of the Permanent Secretariat of the Subregional Fisheries Commission (SRFC), CITES Secretariat, World Wide Fund for Nature (WWF) and Traffic International. The list of participants can be found in Appendix 2.

OPENING

Mr Ichiro Nomura, Assistant Director-General, FAO Fisheries and Aquaculture Department, and Dr K. Cochrane, Chief, FAO Fisheries Management and Conservation Service, welcomed participants to FAO headquarters and stressed the importance of the meeting in identifying a strategy to improve the information on the catches of sharks and on the trade in shark products. It was noted that such improvement was essential to the successful implementation of the IPOA–Sharks and of other instruments aimed at the conservation and management of sharks. It was also noted that despite the progress in the implementation of NPOAs made in recent years by some countries, intensive work was still required to improve the overall level of implementation of the programme. The technical workshop was viewed as an important step towards this goal. The text of Mr Nomura's statement is reproduced in Appendix 3.

Mr John Carlson was elected Chair of the workshop and Mr Hideki Moronuki was elected Vice-Chair. The adopted agenda of the meeting is reproduced in Appendix 1.

WORKSHOP PROGRAMME

Presentations by FAO on the first day of the workshop provided an overview of the components of the IPOA–Sharks and reviewed the status of global statistics on shark catches and trade reported to FAO. Common problems in the reported shark statistics were identified, including the lack of specificity in data and the uncertainties about the actual volume caught and traded. Despite the growing awareness on the need for better shark data raised by the IPOA–Sharks and the improvements in the species breakdown by some countries, it was concluded that significant improvements in data collection and reporting were still needed to make the management of shark fisheries effective. See Appendix 6 for detailed information on shark statistics in the FAO capture database.

Country reports presented by participants provided background information on the shark fisheries in their respective countries and highlighted the main limitations of the fishery and trade monitoring systems. Country reports are included in Appendix 7 of this report. In addition a presentation by the representative of

the Subregional Fisheries Commission (SRFC) highlighted the main outcomes of a project to strengthen the Sub-Regional Plan of Action for Sharks (Appendix 8). Discussions following the presentations centred on three themes:

- Impediments to the implementation of National Plan of Action for Sharks.
- Limitations and strategies for improving the level of reporting and monitoring of shark catches.
- Limitations and strategies for improving the reporting and monitoring of international trade in shark products.

Discussions held on these themes led to a series of conclusions about the limiting factors that are hampering the proper monitoring of shark fisheries and trade and to recommendations to improve the situation, which are reported in the following section.

CONCLUSIONS AND RECOMMENDATIONS

After reviewing the global and country specific situation, the Workshop agreed on the following issues and approaches to improve the monitoring on catches and trade of sharks:

National Plan of Action for Sharks (NPOA–Sharks)

The workshop reconfirmed that the slow progress in the development and implementation of NPOA for sharks was a major impediment to the improvement of management and monitoring of shark fisheries in some of the main shark fishing nations. Several common obstacles were identified in developing and implementing of NPOA–Sharks among different settings:

– Shark management requires good coordination and collaboration between agencies responsible for fisheries management and species conservation. However, the communication and collaboration between different national agencies are often inadequate. Some NPOA–Sharks have been developed by agencies responsible for species conservation with no or very limited consultation and communication with agencies responsible for fisheries management. In such cases, the resulting plans may not reflect the actual fishery situation and be hard to implement in the context of fishery management.

– The consultations with and participation of key stakeholders in the development process of the NPOAs were also limited. Adequate understandings on the objectives and planned actions among all stakeholders are essential for the NPOAs to be effective. Although managers, fishers, processors, dealers and traders are considered as primary stakeholders, sharks also have a considerable value for many other sectors, including tourism, recreational fisheries and general public. It was noted the need to sensitize managers and all stakeholders on the importance of establishing management and conservation efforts for sharks. These efforts should be developed in a participatory manner.

– In general, sharks represent only a low proportion of the total catch, are often caught as bycatch and have low commercial value, except for their fins. These characteristics make it difficult to get appropriate management attention as well as adequate resources and funds for their monitoring. Nevertheless, their life history characteristics coupled with the importance of international trade as a driver for the exploitation of some species, are compelling reasons for countries to develop NPOAs for sharks. In addition, itt was highlighted that through the adoption of the Code of Conduct for Responsible Fisheries and the IPOA–Sharks, countries have already committed to develop sustainable management plans for its fisheries resources, including sharks.

– The requirements outlined in the IPOA–Sharks and in the FAO guidelines for its implementation[8] were considered complex and demanding, and for this reason many countries were unable to fully meet all requirements in the IPOA at the same time. While recognizing that the ultimate goal for countries involved in the capture of sharks would be to cover all the elements of the IPOA–Sharks, the implementation of the programme could be facilitated if a more pragmatic, step by step, approach towards the ultimate goal was adopted.

[8] FAO Marine Resources Service. Fisheries management. 1. Conservation and management of sharks. *FAO Technical Guidelines for Responsible Fisheries.* No. 4, Suppl. 1. Rome, FAO. 2000. 37p.

In the context of developing and implementing the NPOAs, the Workshop recommended that countries:

– improve communication among different agencies, especially between those responsible for fishery management and for species conservation;

– ensure key stakeholders are well sensitized on the importance of shark management through improved communication;

– utilize a participatory approach with the involvement of all stakeholders, as broad as practical; and

– make plans as realistic and achievable as possible, including taking a step by step approach towards their full implementation.

The workshop identified that the first priority step towards an NPOA, especially for those countries which struggle with low monitoring and management capacity, is to improve information about catches and life history parameters on a limited number of their primary shark species. Those primary species should be identified based on: their quantity taken as capture (i.e. contribution to food security), their socio-economic importance to fishing communities, and other specific needs such as conservation concerns, including those species listed in the Appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). A preliminary list of such species was developed during the workshop and is included in Appendix 4. It was suggested that a working group be formed during the twenty-eighth session of COFI in 2009 to refine the preliminary list included in this report. All countries should make every effort to monitor and collect catch and trade information for their agreed list of primary species, as appropriate.

The workshop considered that the above-mentioned step is a minimum initial requirement. Countries with better monitoring and management capacity should take further steps towards developing and implementing an NPOA in the full context of IPOA–Sharks, including the identification of main weaknesses in monitoring of shark fisheries and trade and the adoption of actions to overcome these limitations to realize the full monitoring of catch, bycatch, discards, and trade, both in terms of quantity and species composition.

The workshop recommended FAO to encourage countries fishing for sharks to take the above steps towards the development of NPOAs and to report on progress made at the twenty-ninth session of COFI in 2011. The workshop also recommended FAO to contact those countries who have initiated shark fisheries or trade after the adoption of the IPOA–sharks in 1999, to ensure that all relevant countries are developing and implementing NPOAs. It was noted that some countries have already developed management plans without developing NPOAs. In these cases countries could adapt their management plans into NPOAs.

The workshop noted that regional coordination could play a critical role in the monitoring and management of shark fisheries and trade, especially in those areas where fishers can easily migrate and land their catches in neighbouring countries. Countries already participating in regional fishery bodies (RFBs) are encouraged to provide information on shark catches and to develop regional coordination and collaboration for the monitoring and management of sharks through the relevant RFBs. In the cases of no existing RFBs, such coordination should be sought in consultation with FAO.

The workshop recognized the need for additional resources, especially trained personnel and funds. It indicated that the capacity building, especially in shark identification, should be recognized as a priority area for international aid to shark fishing nations with low monitoring and management capacity. The need to create incentives to foster the development of NPOAs for sharks was discussed. Such incentive could include the need to ensure sustainability of resources and the need to avoid the loss of consumer confidence.

Lack of specificity in data

Most of the data on catch and trade of elasmobranchs reported to FAO were in highly taxonomically aggregated categories (e.g. “sharks and rays”). The Workshop agreed that aggregation as well as misidentification of species causes critical obstacles for monitoring of shark fisheries and trade. In principle, efforts should be made to obtain data at the highest taxonomic resolution possible. It is however recognized that there are too many species of sharks being caught and that it will be impossible in many instance for

inspectors, observers, port samplers and fishers to be able to identify and monitor the totality of shark species in addition to the more commercially important species. As a starting point to move forward, the Workshop recommended that countries should identify a list of primary species requiring special attention for monitoring and management purposes (see Appendix 4 as an example).

It was noted that in many cases the data available in national databases have a higher taxonomic resolution than the data reported to and available in the FAO database. It was clarified that the FAO request for data indicated clearly for countries to provide data with the most detailed species breakdown. FAO also stressed that it accepts any format in reporting to avoid restricting the level of aggregation of data reporting. However, the workshop recommended FAO to further communicate with countries to ensure the most detailed best quality data to be stored in the FAO global database.

Many participants reported the lack of appropriate taxonomic lists, field guides and other identification tools for sharks. The tools include not only those for identification of whole animals but also for the identification of species from parts and products, from the capture to the final commercialization. In order to assist in identifying existing gaps and priority areas that need particular attention, participants listed field guides and other available tools in their respective countries, organizations and regions (Appendix 5). As a matter of priority, the workshop recommended FAO to finalize and disseminate Volumes 1 and 2 of the species synopsis for sharks as well as to develop additional synopsis for batoids and chimaeras.[9]

The monitoring of fisheries should include the collection of biological information, such as length, sex and reproductive condition, as well as the collection of samples required for biological studies, in addition to the total quantity and species composition of the catch. Such information is often used as a basis to establish appropriate management measures, e.g. introduction of size limits of catch, setting closed area and season, and gear regulations. It was noted that fishery independent surveys as well as observer programmes would be additional important sources of such biological information. Considering the overall lack of biological information on shark species, the workshop strongly encouraged countries to include sharks as priority research areas for academic and fishery research institutes.

The lack of compatibility of the taxonomic resolution across the market chain, from catches to exports, was considered a limiting factor to allow the verification of catch and trade information. Similarly, the lack of capacity of fishery and customs officers to identify species was recognized as an important limitation. In this regard, countries should encourage the participation of the majority of the stakeholders in capacity building workshops for species identification. It was noted these training workshops should be done on a regular basis.

Volume of catches

The workshop felt that the volume of reported shark catches would very often underestimate the actual amount of removals. First, the capture monitoring generally focuses on landings and does not incorporate the portion discarded at sea. Also, even at landing sites, bycatch species with low commercial value tends to get less attention and be underreported.

Despite the adoption of no-finning regulations, the practice of discarding carcasses is considered to still exist especially when shark meat has no commercial value or use. With rare exceptions, the discarded component of catches remains unreported or underestimated. Strategies that have been used to obtain the information about discards include:

– monitoring by onboard observers adequately trained to identify shark species;

[9] Compagno, L.J.V. (In preparation a). Sharks of the world. An annotated and illustrated catalogue of the shark species known to date. Volume 1. Hexanchiformes, Squaliformes, Squatiniformes and Pristiophoriformes. *FAO Species Catalogue for Fisheries Purposes.* No.1, Vol.1. Rome. FAO.
Compagno, L.J.V. (In preparation b). Sharks of the world. An annotated and illustrated catalogue of the shark species known to date. Volume 3. Carcharhiniformes. *FAO Species Catalogue for Fisheries Purposes* No.1. Vol.3. Rome. FAO.
Species Identification and Data Programme (SIDP), Fisheries and Aquaculture Department, FAO. (In preparation). Catalogue of batoids of the world. Rome. FAO.

– regulations to prevent discards (e.g. mandatory landing of both carcass and fins);
– mandatory reporting of discards, including introduction of special logbooks on discarded sharks (that require independent evaluation of reports); and
– estimates of species compositions from fishery independent surveys.

All of those procedures should be applied, where appropriate, to enhance knowledge on the discarded portion of shark catches. In addition, countries are also encouraged to use or develop gears and regulation that minimize the bycatch of sharks, including time/area closures. It was recognized that further work is needed to better define conversion factors from body parts to the live equivalent body weight. Countries are encouraged to examine existing materials in this regard.

Trade limitation

The main limitation in monitoring trade was the codes used at customs that aggregate all shark species and lack clear separation of processed commodities. This indicated that even when catches were monitored at species level, such information would be lost once entering trade.

The existing global Harmonized System (HS) has no specific code for rays, no separate code for cured shark products and no way to separate shark fins from other shark products. Participants were informed that FAO has currently tabled a proposal to the World Customs Organization (WCO) to establish separate codes for shark fins by four different product types: fresh, frozen, dried and cured. This proposal would be discussed at the forthcoming WCO meeting on 18 and 19 November 2008. Participants were urged to communicate with their national responsible agencies to support this proposal.

Regardless of the conclusion taken by the WCO, the Workshop recommended CITES and FAO to encourage countries to amend their national codes to enable clear separation of shark fins and shark meat as a minimum initial step to improve monitoring capability and traceability of shark products in trade. When appropriate and feasible, it also encouraged countries to incorporate codes to separate different type of shark fin products, e.g. dried, wet, and cured, with corresponding conversion factor to live-equivalent weight. Countries were requested to report to FAO the amended national codes, together with the corresponding data, whenever such amendments would be incorporated.

Caution was raised in interpreting shark fin trade quantities in terms of production estimates, recognizing that fins were transferred among multiple countries through processing over multi-years. It was suggested that additional data on product types would improve traceability in the whole process.

Illegal, unreported and unregulated (IUU) fishing

The workshop did not agree on any specific measures under this issue. Feasibility and effectiveness of licensing for shark fin traders and export certificates were briefly discussed. Although both measures may have potential in improving monitoring of shark fin trade, the Workshop recognized that the feasibility of implementation would vary widely according to national legislation systems. Also, such measures may cause difficulties in application if considered to induce trade barriers, unless they are based on international agreements (e.g. CITES). However, countries could implement such measures voluntarily.

APPENDIX 1

Agenda

Monday 3 November. Introduction and Country Reports.	
08.30 – 09.00	**Registration**
09.00 – 10.00	1. Opening of the Workshop 2. Adoption of agenda 3. Workshop background and objectives
10.00 – 10.30	**Coffee break**
10.30 – 11.00	The IPOA-Sharks and the role of fisheries and trade monitoring in the management and conservation of shark resources. M. Vasconcellos.
11.00 – 11.30	Elasmobranch statistics in the FAO capture database. S. Tsuji.
11.30 – 12.00	Elasmobranch trade statistics in the FAO database. S. Vannuccini.
12.00 – 13.30	**Lunch**
13.30 – 16.00	Country reports: Status of shark fisheries and trade.
16.00 – 16.30	**Coffee Break**
16.30 – 18.00	Country reports: Status of shark fisheries and trade.
18.00	**End of day one**
Tuesday 4 November. Status and progress of the NPOA-Sharks	
09.00 – 10.00	Summary of country reports and plenary discussions on the main limitations for the implementation of NPOA-Sharks
10.00 – 10.30	Plenary discussions: continued
10.30 – 11.00	**Coffee break**
11.00 – 12.00	Plenary discussions: continued
12.00 – 13.30	**Lunch**
13.30 – 16.00	Plenary discussions: continued
16.00 – 16.30	**Coffee Break**
16.30 – 18.00	Plenary discussions: continued
18.00	**End of day two**
Wednesday 5 November. Shark fisheries monitoring	
09.00 – 10.00	Summary of country reports and plenary discussions on the main limitations for the monitoring of shark fisheries
10.00 – 10.30	Plenary discussions: continued
10.30 – 11.00	**Coffee break**
11.00 – 12.00	Plenary discussions: continued
12.00 – 13.30	**Lunch**
13.30 – 16.00	Plenary discussions: continued
16.00 – 16.30	**Coffee Break**
16.30 – 18.00	Plenary discussions: continued
18.00	**End of day three**

Thursday 6 November. Monitoring of trade in shark products	
09.00 – 10.00	Summary of country reports and plenary discussions on the main limitations for the monitoring of trade in shark products
10.00 – 10.30	Plenary discussions: continued
10.30 – 11.00	**Coffee break**
11.00 – 12.00	Plenary discussions: continued
12.00 – 13.30	**Lunch**
13.30 – 16.00	Plenary discussions: continued
16.00 – 16.30	**Coffee Break**
16.30 – 17.30	Adoption of workshop conclusions and recommendations
17.30 – 18.00	**Workshop closure**

APPENDIX 2

List of participants

ARGENTINA

Ramiro Pedro SANCHEZ
Director de Planificación Pesquera
Subsecretaría de Pesca y Acuicultura
Paseo Colón 892
Ciudad Autónoma de Buenos Aires
Tel.: +54 11 4349 2590
Fax: +54 11 4349 2594
E-mail: rasanc@mecon.gov.ar
sanchez.ramiro@speedy.com.ar

Elisa CALVO
Fishery Economy Section
Subsecretaría de Pesca y Acuicultura
Paseo Colón 892
Ciudad Autónoma de Buenos Aires
Tel.: +54 11 43492476
Fax: +54 11 434992594
E-mail:elical@mecon.gov.ar

CHINA HONG KONG SPECIAL ADMINISTRATIVE REGION

Alfred K.C. WONG
Agriculture, Fisheries and Conservation Department
6/F., Cheung Sha Wan Government Offices,
303 Cheung Sha Wan Road,
Kowloon, Hong Kong.
Tel.: +852 2150 6982
Fax: +852 23774413
E-mail: alfred_kc_wong@afcd.gov.hk

GHANA

Paul BANNERMAN
Fish Stocks and Statistics Section
Marine Fisheries Research Division (MFRD)
Ministry of Fisheries
PO Box BT 62
Tema
Tel.: +233 22202346
Fax: +233 22206627
E-mail: paulbann@hotmail.com

INDONESIA

FAHMI
Marine Resources Division
Research Centre for Oceanography
Indonesian Institute of Sciences (LIPI)
Jl. Pasir Putih No. 1
Ancol Timur, Jakarta Utara
Tel.: +62 21 64713850 – ext. 210
Fax: +62 21 64711948
E-mail: fahmi@lipi.go.id

IRAN (ISLAMIC REPUBLIC OF)

Tooraj VALINASSAB
Head of Marine Resource Management Division
Iranian Fisheries Research Organization
297, West Fatemi Avenue
PO Box 14155–6116
Tehran
Tel.: +98 21 66945145
Fax: +98 21 66420732
E-mail: t_valinassab@yahoo.com

ITALY

Fabrizio SERENA
ARPAT (Environmental Protection Agency – (Tuscany Region)
Head of Marine Service
Via Marradi 114
57100 Livorno
Tel.: +39–0586–263496
Fax: +39–0586–263477
Mobile: + 39 3204391149
E-mail: f.serena@arpat.toscana.it

JAPAN

Hideki MORONUKI
Assistant Director
Ecosystem Conservation Office
Fisheries Agency
1–2–1 Kasumigaseki, Chiyoda-ku
Tokyo 100–8950
Tel.: +81 3 35028487
Fax: +81 3 35021682
E-mail: hideki_moronuki@nm.maff.go.jp

Hideki NAKANO
Chief, planning and Coordination Section
National Research Institute of Far Seas Fisheries
Project Management Division
5–7–1 Orido Shimizu, Shizuoka 424–8633
Tel.: +81 54 3366013
Fax: +81 54 3359642
E-mail: hnakano@affrc.go.jp

PAKISTAN

Muhammad MOAZZAM KHAN
Director Planning and Statistics
Marine Fisheries Department
Government of Pakistan
Fish Harbour, West Wharf
Karachi
Tel.: +92 21 2316535
Fax: +92 21 2316539
Mobile: 0300 2114066
E-mail: mmoazzamkhan@gmail.com

PANAMA

Yehudi Nafisa RODRÍGUEZ ARRIATTI
Departamento de Ordenamiento de la Dirección
General de Ordenación y Manejo Integral
Vía Simón Bolivar, Transístmica; Edificio paso elevado, segunda Planta
Tel.: +507 5116000 – ext: 115
Fax: +507 5116065
E-mail: yehudi@uabcs.mx

SENEGAL

Lamine MBAYE
Ministère de l'économie maritime
Direction des pêches maritimes
Division Gestion et aménagement des pêches
1, rue Joris, B.P. 289
Dakar
Tel.:+33 821 04 43
Fax: +33 821 47 58
Mobile: +77 558 39 39
E-mail: lemzo67@hotmail.com

SPAIN

Gabriel MOREY
Dirección General de Pesca
Gouvernement des îles Baléares
c/o Foners, 10
07006 Palma de Mallorca
E-mail: gmorey@dgpesca.caib.es

SRI LANKA

Champa AMARASIRI
Director
National Aquatic Resources Research and Development Agency (NARA)
Crow Island - Mattakkuliya
Colombo 15
Tel.: +94 602075087
Fax: +94 112521932
E-mail: champa@nara.ac.lk

UNITED STATES OF AMERICA

John CARLSON
Research Fishery Biologist
NOAA/National Marine Fisheries Service
3500 Delwood Beach Road
Panama City, FL 32408
Tel.: +1 850 2346541 ext. 221
Fax: +1 850 2353559
E-mail: john.carlson@noaa.gov

INTERNATIONAL ORGANIZATIONS

CONVENTION IN INTERNATIONAL TRADE IN ENDANGERED SPECIES (CITES)

Robert BOLJESIC
CITES Secretariat - Maison internationale de l'environnement
11–13, Chemin des Anémones
CH–1219 Châtelaine
Geneva
Switzerland
Tel.: +41 22 9178131
Fax: +41 22 7973417
E-mail: Robert.Boljesic@cites.org

PERMANENT SECRETARIAT OF THE SUBREGIONAL FISHERIES COMMISSION (SRFC)

Mika DIOP
Conseiller
Coordinateur du projet PSRA-Requins
Secrétariat permanent de la Commission sous-régionale des pêches (CSRP)
SICAP, Amitié 3, Villa 4430
BP 25485
Dakar
Senegal
Tel.: +221 33 8640477
Mobile: +221 77 6448218
E-mail: csrp@sentoo.sn
mika_dfr@yahoo.fr

TRAFFIC INTERNATIONAL

Maylynn ENGLER
Research Officer
219a Huntingdon Road
Cambridge, UK
CB3OBL
United Kingdom
Tel.: +44 1223 277427
Fax: +44 1223 277237
E-mail: Maylynn.Engler@traffic.org

WILDLIFE INTERNATIONAL (WWF)

Colman O'CRIODAIN
Wildlife Trade policy Analyst
Species Programme
1196 Gland
Switzerland
Tel.: +41 22 3649111 – direct: 3649251
Fax: +41 22 3646624
E-mail: COCriodain@wwfint.org

FAO
Viale delle Terme di Caracalla
00153 Rome, Italy

Kevern COCHRANE
Chief
Fisheries Management and Conservation Service
Fisheries and Aquaculture Management Division
Fisheries and Aquaculture Department
Tel.: +39–06–570–56109
Fax: +39–06–570–53020
E-mail: Kevern.cochrane@fao.org

Sachiko TSUJI
Senior Fisheries Statistician
Fisheries and Aquaculture Information and Statistics Service
Fisheries and Aquaculture Economics and Policy Division
Fisheries and Aquaculture Department
Tel.: +39 06 570 55318
Fax: +39 06 570 52476
E-mail: sachiko.tsuji@fao.org

Stefania VANNUCCINI
Fishery Statistician (Commodities)
Fisheries and Aquaculture Information and Statistics Service
Fisheries and Aquaculture Economics and Policy Division
Fisheries and Aquaculture Department
Tel.: +39 06 570 54949
Fax: +39 06 570 52476
E-mail: stefania.vannuccini@fao.org

Luca GARIBALDI
Fishery Statistician (Capture Fisheries)
Fisheries and Aquaculture Information and Statistics Service
Fisheries and Aquaculture Economics and Policy Division
Fisheries and Aquaculture Department
Tel.: +39 06 570 53867
Fax: +39 06 570 52476
E-mail: luca.garibaldi@fao.org

Anne VAN LIERDE
Secretariat Assistant
Fisheries Management and Conservation Service
Fisheries and Aquaculture Management Division
Fisheries and Aquaculture Department
Tel.: +39–06–570–56645
Fax: +39–06–570–53020
E-mail: anne.vanlierde@fao.org

Marina MANSUETI
Operations Clerk
Fisheries Management and Conservation Service
Fisheries and Aquaculture Management Division
Fisheries and Aquaculture Department
Tel.: +39–06–570–562159
Fax: +39–06–570–53020
E-mail: marina.mansueti@fao.org

INTERNATIONAL CONSULTANT

Marcelo VASCONCELLOS
Rua Osvaldo Muller Barlem 529
Cassino, Rio Grande, RS Brasil 96207–630
Brazil
Tel.: +55 53 32362735
Mobile: +55 5381144512
E-mail: marcelo.vasconcellos@fao.org

APPENDIX 3

Welcome speech by Mr Ichiro Nomura, Assistant Director-General FAO Fisheries and Aquaculture Department

It is my pleasure to welcome you to this Technical Workshop on Status, Limitations and Opportunities for Improving the Monitoring of Shark Fisheries and Trade.

FAO has been actively involved in efforts to improve the management and conservation of shark resources and this workshop is expected to help us strengthen some key aspects of the FAO International Plan of Action for the Conservation and Management of Sharks (IPOA–Sharks).

The IPOA–Sharks is a voluntary instrument, elaborated within the framework of the Code of Conduct for Responsible Fisheries. It was endorsed by FAO member countries at the twenty third session of COFI held in Rome in 1999. The main objective of the IPOA–Sharks is to ensure the conservation and long-term sustainable use of sharks, including species that are target and non-target of fisheries.

Progress towards the implementation of FAO's IPOAs is regularly reported to COFI. At the twenty-seventh session of COFI, held in 2007, many Members referred to their efforts to develop National Plans of Action (NPOAs) to implement the IPOA–Sharks, including reporting on policies and practices in place to ban the catching of some shark species and other measures prohibiting finning and carcass dumping as a means of promoting sustainability. Despite these initiatives, and the progress made in recent years, the Committee concurred that further intensive work was required to improve the implementation of the IPOA–Sharks.

With this in mind, this technical workshop was organized with the objective to define a strategy to improve one of the most fundamental sources of information for managing shark fisheries: the information about shark catches. As you all know, in many localities the available information is less than adequate to allow the assessment of stocks and to monitor the effect of management interventions. Problems in the identification of species, illegal, unreported and unregulated fishing, all figure as important constrains to the proper monitoring of shark catches. In addition, the monitoring of trade in shark products, also to be discussed in the workshop, is viewed as a key auxiliary source of information about the magnitude of catches of some species targeted for international trade.

It is clear that the improvement of the monitoring of shark fisheries and the trade in shark products can make a considerable contribution to the successful implementation of national, regional and international efforts to shark conservation and sustainable use. International assistance will have an important role to play in improving the current situation. However in order to be effective, assistance will need to be tailored to the specific needs of the shark fishing nations. In this context this workshop will attempt to obtain a better understanding of the current situation and the limitations in the monitoring of sharks fisheries and trade in some of the main shark fishing nations, and based on that, to identify opportunities for future improvement.

You have been selected in your individual capacities, on the basis of your expertise in shark fisheries in your respective countries, and FAO is looking to you to help us in this important meeting. I must also thank the CITES Secretariat, WWF and Traffic for joining us at this meeting.

Finally, I would like to thank you all for giving up your time to help us in this important task and the government of Japan for the financial assistance they have provided that has made this meeting possible.

I wish you a fruitful and enjoyable meeting.

APPENDIX 4

Provisional list of primary species of elasmobranchs for the monitoring of fisheries and trade

TAXON	ENGLISH NAME	COUNTRIES LISTING
Alopias spp.	Thresher sharks	Panama, Sri Lanka, Indonesia
Batoidea	Skates	Spain[1]
Callorhynchus callorhynchus	Elephant fish	Argentina
Carcharhinus spp.		Spain
Carcharhinus dussumieri	Whitecheek shark	Iran, Islamic Republic of
Carcharhinus falciformis	Silky shark	China, Hong Kong SAR[2], Sri Lanka, Indonesia
Carcharhinus limbatus	Blacktip shark	United States of America, West Africa
Carcharhinus longimanus	Oceanic whitetip shark	Panama
Carcharhinus plumbeus	Sandbar shark	China, Hong Kong SAR, United States of America
Carcharhinus sorrah	Spottail shark	Iran, Islamic Republic of
Centrophorus spp.	Gulper Sharks	Sri Lanka
Dipturus chilensis	Yellownose skate	Argentina
Galeocerdo cuvieri	Tiger shark	Ghana
Galeorhinus galeus	Tope, school shark	Argentina
Gymnura altavela	Spiny butterfly ray	West Africa
Himantura gerrardi	Whitespotted whipray	Indonesia
Isurus oxyrhynchus	Shortfin Mako	China, Hong Kong SAR, Spain, United States of America, Japan
Lamna ditropis	Salmon shark	Japan
Lamna nasus	Porbeagle	Spain
Leptocharias smithii	Barbeled houndshark	West Africa
Mustelus mustelus	Common smooth-hound shark	Italy, West Africa
Mustelus schmitti	Narrownose smooth-hound shark	Argentina
Prionace glauca	Blue Shark	China, Hong Kong SAR, Spain, Panama, Ghana, United States of America, Japan
Raja spp.	Skates	Japan, Italy
Pristis pectinata	Smalltooth sawfish	United States of America
Rhinobatos cemiculus	Blackchin guitarfish	West Africa
Rhinobatos irvinei	Spineback guitarfish	West Africa
Rhynchobatus lübberti	African wedgefish	West Africa
Rhinobatos rhinobatos	Common guitarfish	West Africa
Rhizoprionodon acutus	Milk shark	Iran (Islamic Republic of), Ghana, West Africa
Rhynchobatus australie	Whitespotted guitarfish	Indonesia
Scyliorhinus canicula	Small-spotted cat shark	Italy
Sphyrna spp.	Hammerhead sharks	Argentina, China, Hong Kong SAR, Iran (Islamic Republic of), Panama, Sri Lanka, Ghana, Indonesia, West Africa, United States of America
Squalus acanthias	Spiny dogfish	Spain, Argentina, Japan
Squalus blainvillei	Longnose spurdog	Italy
Squatina spp.	Angel sharks	Argentina, Ghana, West Africa

[1] Select genera to be defined.
[2] Listing of China, Hong Kong SAR, species is related to fin trade.

APPENDIX 5

List of available field guides and other identification tools for elasmobranch species

FAO Species Catalogues

Compagno, L.J.V. 1984a. FAO species catalogue.Vol.4. Sharks of the world. An annotated and illustrated catalogue of sharks species known to date. Part 1. Hexanchiformes to Lamniformes (1–249 pp.) and Part 2: Carcharhiniformes (251–655). *FAO Fish. Synop.*, (125) Vol.4

Compagno, L.J.V. 2001. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Vol.2. Bullhead, mackerel, and carpet sharks (Heterodontiformes, Lamniformes and Orectolobiformes). *FAO Species Catalogue for Fishery Purposes*. No.1, Vol.2. Rome, FAO. 269 pp

FAO Field Guides

Bonfil, R. and Abdallah, M. 2004. Field identification guide to the sharks and rays of the Red Sea and Gulf of Aden. *FAO Species Identification Guide for Fishery Purposes*. Rome, FAO, 71 p., 12 colour plates.

Serena, F. 2005. Field identification guide to the sharks and rays of the Mediterranean and Black Sea. *FAO Species Identification Guide for Fishery Purposes.* Rome, FAO, 97 p., 11 colour plates + egg cases.

FAO Species Identification Cards

FAO. 2007. Sharks and rays of the Red Sea and the Gulf of Aden. FAO Species Identification Cards. Rome, FAO. 2007

FAO. 2008. Sharks and rays of the Mediterranean and Black Sea. FAO Species Identification Cards. Rome, FAO.

Publications only on CD-ROM

FAO. 2007. Sharks, rays and chimaeras. Excerpts from FAO Species Identification publications as of 2007. Rome, FAO. 2007

This CD-ROM, in addition to the above cited publications, also contains chapters excerpted from most of the Regional Guides already published by SIDP.

For species listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

http://www.cites.org/eng/resources/species.html
http://www.cites.org/eng/resources/ID/index.php

Argentina (FAO Fishing Area 87)

Guía de campo para la identificación de peces cartilaginosos en el Río de la Plata y su frente marítimo. http://www.sagpya.mecon.gov.ar/

Japan (FAO Fishing Area 61, 71, 77, 81, 87)

Manuals and guidebooks

Identification Manual for Bycatch Species caught in Longline Fisheries. 1994. National Research Institute of Far Seas Fisheries.

Identification Manual for Bycatch Species caught in the Southern Bluefin Tuna Fishing Ground. 1995. National Research Institute of Far Seas Fisheries.

Identification Guidebook for Pelagic Species caught in Longline Fisheries. 2002. National Research Institute of Far Seas Fisheries.

Posters

Sharks caught in Longline Fisheries. 1992. National Research Institute of Far Seas Fisheries.

Shark Species occurring in Pelagic Waters. 2004. Fisheries Agency of Japan, Global Guardian Trust.

Desk pads

Identification Manual for Shark Species caught in Tuna Longline Fisheries. 1995. National Research Institute of Far Seas Fisheries.

Field cards

Shark Species occurring in Pelagic Waters and Coastal Waters. 2004. Fisheries Agency of Japan, National Research Institute of Far Seas Fisheries.

Indonesia (FAO Fishing Area 57 and 71)

White, W.T.; Last, P.R.; Stevens, J.D.; Yearsley, G.K.; Fahmi and Dharmadi. 2006. Economically important sharks and rays of Indonesia. Australian Centre for International Agricultural Research. 338 p.

Last, P.R.; White, W.T.; and Pogonoski, J.J. 2007. Descriptions of new dogfishes of the genus *Squalus* (Squaloidea: Squalidae). CSIRO Marine and Atmospheric Research Paper; 14. 136 p.

Mediterranean Sea (FAO Fishing Area 37)

Serena, F. 2005. Field identification guide to the sharks and rays of the Mediterranean and Black Sea. FAO Species Identification Guide for Fishery Purposes. Rome, FAO. 97p. 11 colour plates + egg cases.

Serena, F. Field Identification Guide to the Rays of the Mediterranean Sea. Guidelines for Data Collection and Analysis. Società Italiana di Biologia Marina. (Comitato Necton e Pesca)

Identification guide for fins

Deynat, P. 2008. in press. Guide d'identification des nageoires de requins: Espèces vulnérables, en danger et en danger critique d'extinction. WWF/TRAFFIC report. Expected to be available in early 2009 at www.traffic.org.

Persian Gulf and Oman Sea (FAO Fishing Area 51)

Carpenter, K.E., Krupp, F., Jones, D.A. and Zajonz, U., 1997. Living marine resources of Kuwait, Eastern Saudi Arabia, Bahrain, Qatar and UAE. FAO Species Identification Field guide for Fishery Purposes. ISBN 92–5–103741–8. 293 p.

Asadi, H. and Dehghani, R. 1998. Fishes of the Persian Gulf and Oman Sea. Iranian **Fisheries Research Organization.**

Fischer, W. and Bianchi, G. 1984. FAO species identification sheets for fishery purposes. Western Indian Ocean (Fishing Area 51). FAO Rome, Vol. 1–5.

United States (FAO Fishing Area 31, 21 and 67)

Schulze-Haugen, M., Corey, T. and Kohler, N.E. 2004. Guide to Sharks, Tunas, and Billfishes of the U.S. Atlantic and Gulf of Mexico. NOAA and Rhode Island Sea Grant, Silver Springs, MD, 118 p.

Ebert, D.A. 2003. The sharks, rays and chimaeras of California. University of California Press, 284 pp. (UC Press).

Stevenson, D.E., Orr, J.W., Hoff, G.R., McEachran, J.D. 2007. Field Guide to Sharks, Skates, and Ratfish of Alaska. Alaska Sea Grant College Program.

Castro, J.I. 1983. The Sharks of North American Waters. Texas A & M University Press.

West Africa (FAO Fishing Area 34)

Seret, B. 2006. Identification guide of the main shark and ray species of the eastern tropical Atlantic, for the purpose of the fishery observers and biologist. IUCN. Programme régional de conservation de zone côtière et marine

APPENDIX 6[1]

Shark statistics in the FAO capture database

The FAO Fisheries and Aquaculture Information and Statistics Service (FIES) collates annual global fishery statistics on capture and aquaculture production, trade, apparent consumption, fishing vessels and fishers. Capture statistics are collected by country, FAO fishing area and species item through national correspondents. The quality of the FAO statistics depends upon the accuracy and reliability of the data collected nationally and provided to FAO.

According to the data included in the FAO capture database, total catches of the "Sharks, rays, chimaeras"[2] species group reached a maximum in 2003 of almost 900 000 tonnes and have been declining in recent years to 758 000 tonnes in 2006, a drop of 15 percent since the peak (see in Figure 1 the complete 1950–2006 trend).

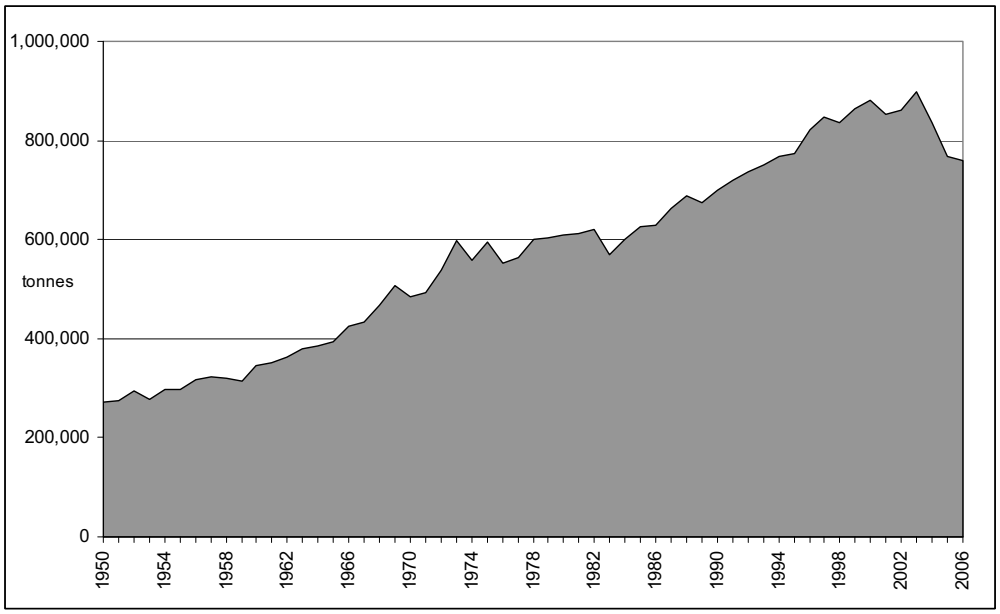


Figure 1: Total catches for "Sharks, rays, chimaeras" in the FAO capture database

When analysing the trend of shark catches in the last decade, it should be taken into account that this species group has been at the centre of the attention of international institutions (e.g. FAO's promoted International Plan of Action on Sharks), regional fishery organizations, as well as the public, and this has helped to improve the reporting of catches for this group although this may alter the trend. To obtain the best possible collation of available shark data, FAO also complements data reported by countries with those collected by the regional tuna bodies. However, collection and reporting of shark data still need to improve significantly as detailed information is needed to make effective management measures.

Initiatives taken by FAO and Regional Bodies, following the invitation of the ninth CITES Conference of the Parties (COP 9, Fort Lauderdale, Florida, USA, 7–18 November, 1994) to improve monitoring of catch and trade of shark species, included addenda listing shark species to STATLANT questionnaires (managed by FAO on behalf of ICES[3], NAFO[4], GFCM[5] and CECAF[6]) and collection of shark statistics by tuna regional commissions (ICCAT[7] and IOTC[8]). Thanks also to the growing awareness on the needs of better shark data

[1] Prepared by the Fisheries and Aquaculture Information and Statistics Service (FIES).
[2]Unless differently specified, in the text of this document the term "shark" is taken to include all species of sharks, rays and chimaeras (class Chondrichthyes).
[3]International Council for the Exploration of the Sea.
[4]Northwest Atlantic Fisheries Organization.
[5]General Fisheries Commission for the Mediterranean. Since 2007, the STATLANT 37 questionnaire is managed by the GFCM Secretariat.
[6]Fishery Committee for the Eastern Central Atlantic.
[7]International Commission for the Conservation of Atlantic Tunas.
[8]Indian Ocean Tuna Commission.

raised by the IPOA-Sharks, a greater number of countries have been reporting shark capture statistics with a good breakdown by species, whereas in the past several countries reported only aggregated data. Table 1 shows the breakdown of shark statistics included in the FAO capture database for the last two years (2005 and 2006) for which catch statistics have been compiled, and subsequently backwards at five-year intervals.

Table 1: Breakdowns of FAO capture statistics for the "Sharks, rays, chimaeras" species group

	1980	1985	1990	1995	2000	2005	2006
Species items*	16	19	38	44	80	115	120
Countries	86	92	102	122	124	132	132
Fishing areas	16	17	17	17	18	18	18
Total number of data series with data	288	304	354	422	575	749	743
Percentage of unidentified catches reported above the family level	67.0%	65.8%	65.0%	67.5%	69.5%	56.6%	57.1%

*Counted as number of species items included in the FAO Yearbook of Fishery Statistics on that year.

The number of shark species items included in the FAO capture database almost doubled between 1995 and 2000, and another 40 species items have been added since then. However, the number of unidentified catches reported above the family level is still very high, although in the last two years it decreased significantly due to data reported at a more detailed level by Indonesia, the global top country for reported shark catches. It should be taken into account that very often data are included for the database through revisions and/or additions (e.g. when the tuna regional bodies make their shark data available) and this may explain the decrease of 2006 total number of data series in comparison with the previous year. Growth pace of the number of "Sharks, rays, chimaeras" species items has been greater than the overall increase in the FAO capture database, as the share of this group on total species items increased 3.6 times during the period examined (see Table 2).

Table 2. Percentage of "Sharks, rays, chimaeras" on total species items in the FAO database

	1980	1985	1990	1995	2000	2005	2006
"Sharks, rays, chimaeras" species items	16	19	38	44	80	115	120
Total species items**	800	840	995	1 080	1 255	1 581	1 640
Percentage of "Sharks, rays, chimaeras" on total species items	2.0%	2.3%	3.8%	4.1%	6.4%	7.3%	7.3%

**Counted as number of species items included in the FAO Yearbook of Fishery Statistics on that year. Until 1996, the FAO Capture Yearbook included also data for aquaculture species.

Besides improvements in the data reported by national authorities, breakdown increases have also been achieved separating from generic groups those catches reported at the genus/species level whenever the information was available and including data from additional sources. The former improvement has been facilitated by the creation of the ASFIS species list[9] that has made codes available for all proper shark species and for most of the rays and chimaeras. The additional sources providing shark statistics have been the ad hoc inquiry for the preparation of the Castro, Woodley and Brudek, FAO Fisheries Technical Paper[10], and the ICCAT and IOTC shark statistics. Only some of the data collected with the ad hoc inquiry have been included in the FAO capture database as they often covered a single or a few years and no other data were reported in the standard submissions for the subsequent years. Data disseminated by ICCAT and IOTC on

[9]Garibaldi, L. and Busilacchi, S. (comps.), 2002. ASFIS list of species for fishery statistics purposes. *ASFIS Reference Series*, No. 15, Rome, FAO, 258 p. Downloadable at www.fao.org/fi/statist/fisoft/asfis/asfis.asp

[10]Castro, J.I., Woodley, C.M. and Brudek, R.L. 1999. A preliminary evaluation of the status of shark species. *FAO Fisheries Technical Paper.* No. 380. Rome, FAO, 72p.

shark catches have been utilized when a given quantity, species or country was not yet included in the FAO database.

Catch statistics on sharks included in the FAO capture database are widely used for trend and production studies. However, data have to be managed carefully as analyses may easily result in being biased by a series of factors. For example, the above mentioned increase of breakdown by species may bias the overall total catches, as quantities earlier reported as "Marine fishes not elsewhere identified" could have later been reported under sharks species or unidentified sharks, and also modify the trend of single data series. The large use of assumptions in some papers (e.g. the proportions assumed by Clarke *et al*. (2006)[11] of proper sharks and of skates, rays, and chimaeras included under "Elasmobranchii" in the FAO database) may undermine the credibility of the final results. In addition, calculations based on raising trade products (e.g. shark fins) to live weight may vary up to 2.5 times depending on the conversion factor applied, a controversial issue for the very different factors considered by conservation groups, scientific studies (e.g. Cortes and Neer, 2006[12]), and the industry. Figures produced raising data from fin trade were compared at an ICCAT meeting with data obtained by a different methodology based on ratios of shark to tuna landings from fleets reporting both to ICCAT. The meeting noted that the methodology estimated the potential catches of the two major shark species in the Atlantic to be half of the amount estimated by the fin trade study (see Figure 2 at page 878 of the Meeting Report[13]).

Efforts to improve the shark catch statistics should definitely continue. However, there still remains little that can be done by FAO-FIES to improve classification, collection, collation, and dissemination of catch data. Fishing countries, which still report unreliable or insufficiently detailed catch statistics, should realize that without continuous data series by species for such basic information like annual catches, effective national fisheries management would remain a "chimaera".

[11]Clarke, S.C., McAllister, M.K., Milner-Gulland, E.J., Kirkwood, G.P., Michielsens, C.G.P, Agnew, D.J., Pikitch, E.K, Nakano, H. and Shivji, M.S. 2006. Global estimates of shark catches using trade records from commercial markets. Ecology Letters, 9: 1115–1126.

[12]Cortes, E. and Neer, J.A. 2006. Preliminary re-assessment of the validity of the 5% fin to carcass ratio for sharks. *Collect. Vol. Sci. Pap. ICCAT*, 59, (3): 1025–1036.

[13]Anonymous. 2005. Report of the Inter-Sessional Meeting of the ICCAT Sub-Committee on Bycatches: Shark Stock Assessment (Tokyo, Japan, 14–18 June 2004). SCRS/2004/014. *Col. Vol. Sci. Pap. ICCAT*, 58 (3): 799–890.

APPENDIX 7

COUNTRY REPORTS

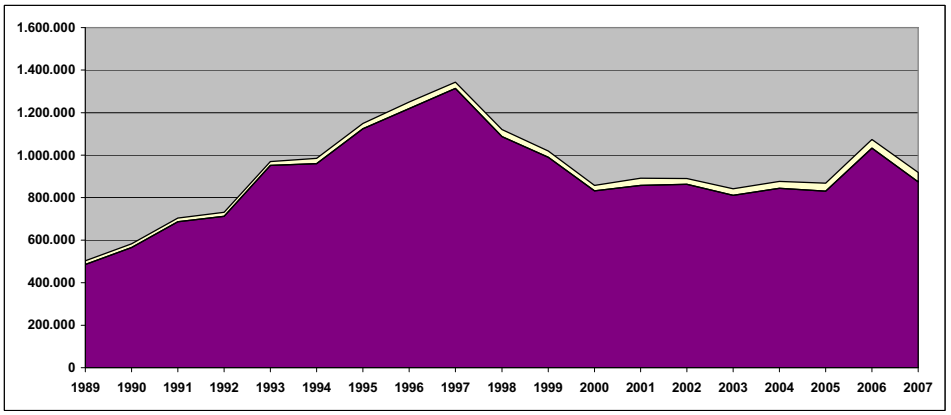
ARGENTINA

Ramiro Sanchez, Elisa Calvo y Gabriela Navarro
Subsecretaría de Pesca y Acuicultura

1. Antecedentes sobre la pesca de condrictios

En el Mar Argentino y Zona Común de Pesca Argentino-Uruguaya, se distribuyen más de 82 especies de condrictios (tiburones, rayas y quimeras), las que son capturadas tanto a partir de pesca dirigida como incidental por las flotas industrial y artesanal y también por la actividad turística y recreativa.

La información estadística pone en evidencia la escasa importancia relativa de este grupo en el total de los desembarques efectuados por la flota comercial durante el período 1989-2007 (Figura 1). En ese lapso los peces cartilaginosos alcanzaron entre un 2 y un 4,8% del total desembarcado. Cabe destacar que este máximo corresponde al año 2007, en el que también se alcanzó el máximo nivel de capturas de este grupo (44 335 toneladas).



Porcentajes

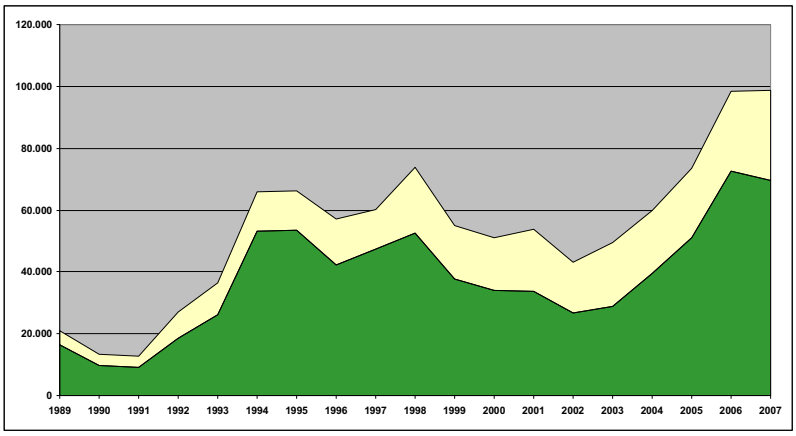
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
CONDRICTIOS	3,4	3,0	2,5	2,6	2,0	2,5	2,2	2,4	2,2	3,0	2,9	3,0	3,6	3,0	3,8	3,7	4,3	3,8	4,8
RESTO	96,6	97,0	97,5	97,4	98,0	97,5	97,8	97,6	97,8	97,0	97,1	97,0	96,4	97,0	96,2	96,3	95,7	96,2	95,2

Figura 1: Participación de los condrictios en las capturas totales

La pesca industrial de estas especies se ha realizado tradicionalmente por arrastre de fondo. Históricamente, las capturas se han originado como resultado de la pesca incidental de los principales recursos demersales de la plataforma argentina: merluza común y recursos de la región costera bonaerense y uruguaya.

A partir de 1999 opera, en forma dirigida, un buque palangrero con autorización explícita para la extracción de rayas en su conjunto, si bien faena mayormente sobre la especie de altura, *Dypturus chilensis,* con unas 1 800 toneladas de cupo anual. Cabe consignar que, de las 23 especies de la Familia Rajidae que se distribuyen sobre la plataforma argentina, 9 pueden considerarse como rayas costeras, encontrándoselas a profundidades menores a los 50 m. El resto se consideran especies de altura (Massa, Hozbor y Colonello, 2004).

En la región costera bonaerense y uruguaya se desarrolla una pesquería multiespecífica[1], que comprende un total de 46 especies, de las cuales 19 son peces cartilaginosos. Si bien tradicionalmente la corvina y la pescadilla han sido las especies predominantes en este conjunto, dados los niveles de sus desembarques, en años recientes y muy particularmente durante el primer trimestre 2008, las rayas costeras[2] se han constituído en el principal recurso capturado en el área, superando el 30 % del total de lo desembarcado. La Figura 2 refleja un crecimiento sostenido de las capturas de condrictios en esta pesquería durante el período 1989-2007. El resto de las especies del conjunto, también han presentado un crecimiento durante el lapso considerado, aunque con mayores altibajos, por lo que la incidencia de los condrictios en la pesquería ha variado entre 19,3% y 41,4%.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
CONDRICTIOS	21,6	28,0	28,1	31,8	28,2	19,5	19,3	26,1	21,5	28,8	31,1	33,6	37,0	38,2	41,4	34,0	30,6	26,4	29,7
RESTO DEL VARIADO COSTERO	78,4	72,0	71,9	68,2	71,8	80,5	80,7	73,9	78,5	71,2	68,9	66,4	63,0	61,8	58,6	66,0	69,4	73,6	70,3

Figura 2: Participación de los condrictios en los desembarques del "Variado Costero"

A fin de evaluar el impacto de la pesca sobre los distintos grupos de peces cartilaginosos y analizar si existe algún indicador de actividad extractiva dirigida sostenida, en lo que tradicionalmente se consideraba una pesquería multiespecífica, o si en cambio se trata *bycatch* en la operatoria de pesca de las especies tradicionalmente predominantes, se ha realizado un análisis para la flota arrastrera, de la participación porcentual, en los desembarques de cada marea, de las capturas correspondientes a cada grupo.

La Figura 3 demuestra que para el conjunto "rayas" los volúmenes de captura que corresponden a mareas en las que la proporción (**p**) de ese grupo superó al 50% de lo capturado, se ha incrementado significativamente en 2007. Esto permite inferir que ha existido actividad dirigida al recurso por parte de esta flota.

[1] Esta pesquería y el área en la que se desarrolla fue definida por el Consejo Federal Pesquero de Argentina como "Variado Costero".
[2] Massa y Hozbor (2003) a partir de muestreos de desembarques en el Puerto de Mar del Plata demostraron que las especies de rayas con mayores volúmenes desembarcados en ese puerto por parte de la flota costera fueron *Sympterigia bonapartii* y *Atlantoraja castelnaui*

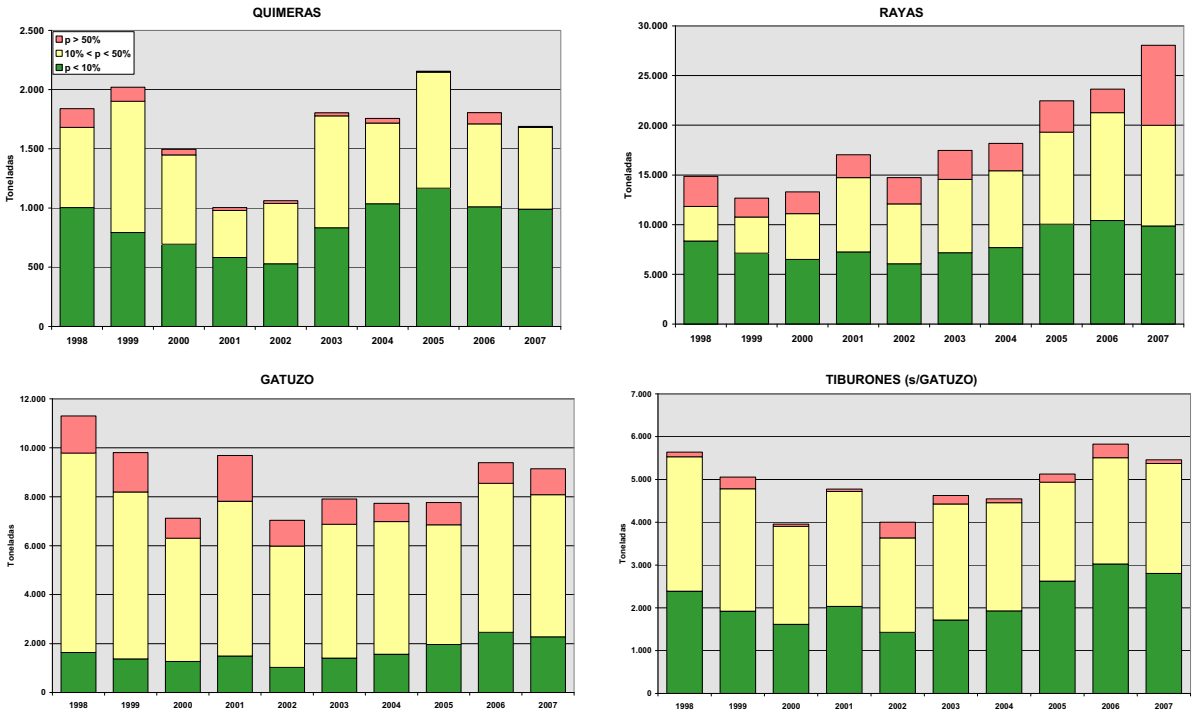


Figura 3: Desembarques de peces cartilaginosos. La codificación indica: en verde la pesca incidental (p<10%), en amarillo la extracción de un conjunto multi-específico (10%<p<50%) y en rojo la actividad presuntamente dirigida (p>50%).

La Figura 4 presenta las áreas de captura de peces cartilaginosos durante 2007, las que se grafican en unidades de información de 5 min x 5 min a partir de datos provenientes de los partes de pesca y del posicionamiento de cada barco, reportado cada hora al sistema de monitoreo satelital.

La Figura I del Anexo, incluye información sobre la localización de los principales puertos y accidentes geográficos mencionados en el texto. El detalle de la incidencia de los desembarques por puerto y por grupo durante el período 1989-2007 se resume en las Figuras II a IV del anexo. Es evidente la fuerte concentración de los desembarques en el puerto de Mar del Plata, particularmente en el caso de tiburones y rayas. En cuanto a los desembarques de pez gallo, se realizan principalmente en tres puertos: Mar del Plata (Prov. Buenos Aires), San Antonio Oeste (Prov. Río Negro) y Comodoro Rivadavia (Prov. Chubut).[3]

[3] Complementando esta información, es preciso mencionar que algunas especies de tiburones con hábitos migratorios se acercan a la costa argentina en diferentes épocas del año (Massa, Hozbor y Colonello, 2004). Un número, aún no precisado, de estos tiburones son capturados durante primavera-verano en áreas cercanas a Mar Chiquita, una albufera natural al norte de Mar del Plata (Lucifora, 2001). La pesca artesanal que opera en la zona de Cabo San Antonio (Provincia de Buenos Aires) comercializa bacota y escalandrún, entre otros peces cartilaginosos (Lagos, 2001). Chiaramonte (1998) menciona una pequeña pesquería operando sobre cazón con red de enmalle en el área costera de Necochea, durante la década de 1990. Caille (1996), registró capturas de gatopardo, tiburón espinoso (= mielga) y cazón, en distintas pesquerías artesanales de la costa patagónica. En el Golfo Nuevo (Chubut), el cazón y el pez gallo, representan el 70% de la captura de la flota artesanal (Rodríguez *et al.,* 2001).

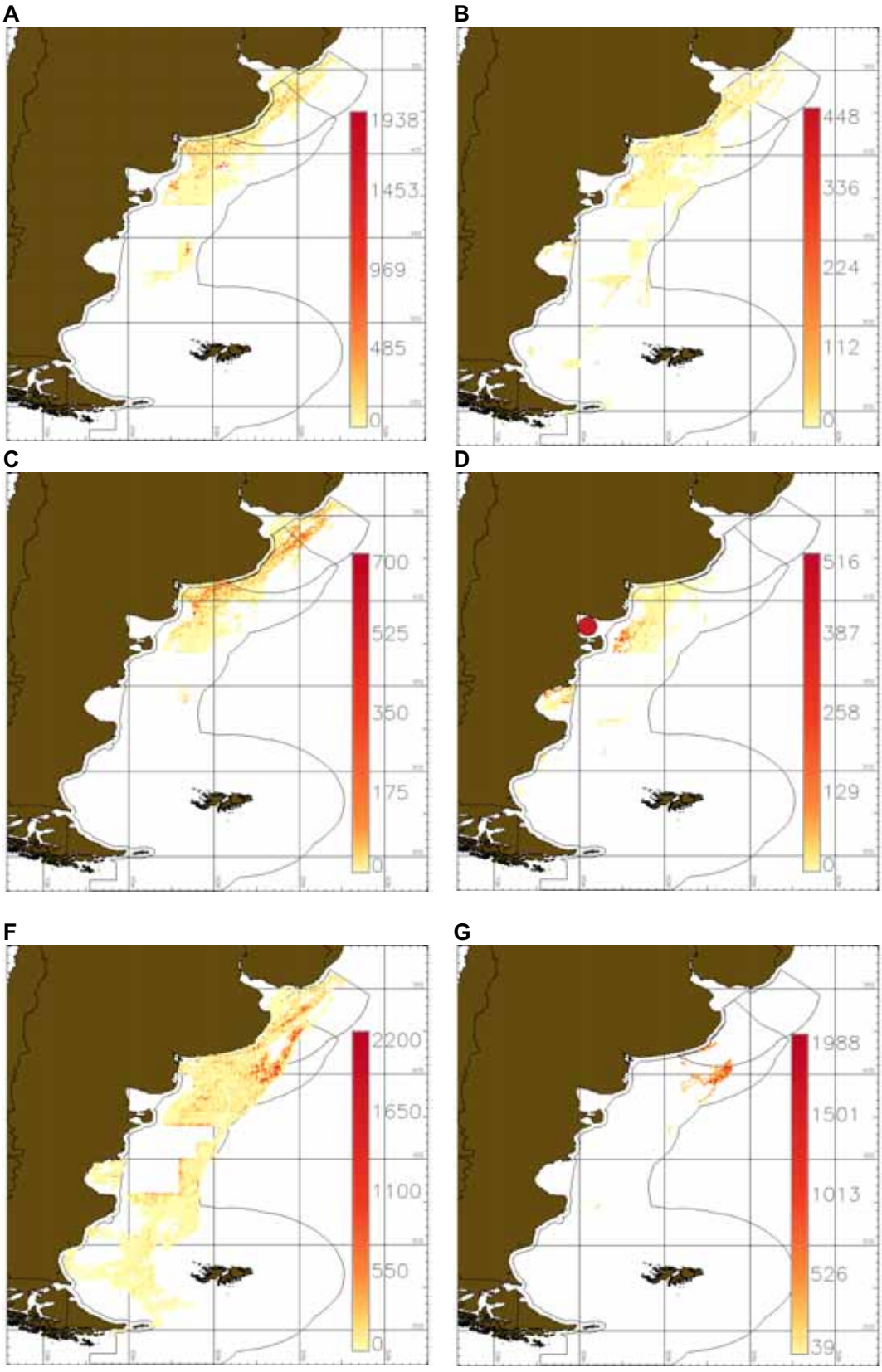


Figura 4: Zonas de pesca de condrictios en 2007. A) Gatuzo; B) Tiburones s/Gatuzo; C) Pez ángel, D) Pez gallo; F) Rayas; y G) Rayas (pesca por palangre). La escala de colores indica capturas en kilogramos por unidad de información.

Para analizar la operatoria de la flota que opera sobre el conjunto de peces cartilaginosos se agruparon las embarcaciones por estratos teniendo en consideración criterios previamente aplicados en análisis de las pesquerías argentinas.[4] La clasificación es la siguiente:

ESTRATO	ESLORA
I	< 19 m
II	19,0 m - 28,25 m
III	28,26 m - 38,95 m
IV	38,96 m - 64,87 m
V	> 64,87 m

Los cuadros 1 y 2 incluyen la información de cantidad de buques y capturas anuales (1998-2007) correspondientes a cada estrato y para cada uno de los grupos de condrictios sobre los que se dispone de información.

Cuadro 1: Número de buques

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Gatuzo										
I	123	147	81	120	140	114	125	116	173	173
II	102	91	91	95	81	84	93	93	103	101
III	42	35	37	31	32	32	39	40	38	32
IV	49	37	28	30	35	37	38	36	34	34
V	12	2	8	7	7	4	5	5	2	
	328	312	245	283	295	271	300	290	350	340
Resto de tiburones										
I	77	92	62	97	112	112	106	106	119	121
II	104	91	96	99	87	85	97	104	102	100
III	41	39	39	39	36	34	39	45	37	35
IV	43	37	26	33	33	37	39	38	41	35
V	13	9	5	11	7	10	7	7	4	6
	278	268	228	279	275	278	288	300	303	297
Rayas										
I	76	83	67	120	126	135	145	157	149	183
II	120	111	117	95	100	100	109	119	118	116
III	84	74	79	60	47	44	44	53	44	43
IV	68	66	61	57	58	60	62	61	60	55
V	33	30	27	25	19	19	18	19	19	21
	381	364	351	357	350	358	378	409	390	418
Quimeras										
I	59	64	50	89	103	108	98	106	94	84
II	93	86	87	94	87	91	102	104	99	104
III	56	49	42	33	17	29	39	47	36	32
IV	19	28	16	18	21	29	36	30	34	24
V	1	2		2	2	3	1	1	2	2
	228	229	195	236	230	260	276	288	265	246

[4] La flota arrastrera que opera sobre el conjunto "variado costero" ha sido estratificada por Fernández Araoz *et al*., 2003. Básicamente, para la determinación de los estratos de flota, los autores utilizaron las esloras de los buques y diferentes índices de capturas. A los fines del presente informe, el estrato I se corresponde parcialmente con el estrato Ia y Ib de esa clasificación. Adicionalmente, para la clasificación de la flota arrastrera de altura se siguió el criterio de Bertolotti *et al.*, 2001, correspondiéndose los estratos II, III y IV del presente informe con los estratos I, II y III de los mencionados autores, quienes basaron la determinación de los mismos en parámetros estructurales e índices de captura. Massa, Lasta y Carozza (2004) realizaron un ejercicio similar de estratificación de la flota que opera sobre el gatuzo. El estrato V incorpora a los buques de mayor porte no incluídos en estratificaciones previas.

Cuadro 2: Capturas en toneladas

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Gatuzo										
I	1 746	2 270	1 483	2 499	1 776	1 694	1 390	1 328	2 447	2 269
II	6 961	5 475	4 215	5 798	4 822	4 888	5 026	5 229	5 799	5 793
III	2 422	1 913	1 302	1 251	316	996	1 016	955	735	879
IV	155	135	102	83	87	308	262	251	410	201
V	14	12	19	58	37	25	37	2	2	
	11 298	9 805	7 122	9 689	7 038	7 910	7 731	7 765	9 392	9 142
Resto de tiburones										
I	1 197	1 684	1 047	1 552	1 429	1 720	1 254	1 311	2 164	1 807
II	3 067	2 465	2 214	2 336	2 140	2 285	2 637	3 078	3 042	3 033
III	1 148	811	658	762	322	522	508	622	501	511
IV	178	77	33	81	91	79	135	111	110	79
V	49	19	7	44	20	21	13	3	12	30
	5 639	5 056	3 958	4 775	4 002	4 627	4 547	5 125	5 828	5 458
Rayas										
I	1 340	2 157	2 600	4 180	3 327	3 028	3 032	3 564	4 649	4 104
II	3 618	3 549	3 920	5 567	5 139	7 074	8 040	10 209	9 602	13 847
III	2 580	1 703	1 888	2 293	1 188	1 735	1 816	2 622	2 598	3 400
IV	4 306	2 532	2 054	2 596	2 624	3 041	3 043	3 906	4 085	4 307
V	1 440	1 108	1 196	869	591	612	462	563	725	640
	13 285	11 050	11 657	15 505	12 869	15 490	16 392	20 863	21 659	26 298
Quimeras										
I	412	343	321	188	273	378	358	529	368	352
II	1 317	1 552	1 091	744	728	1 223	1 022	1 043	1 000	923
III	88	102	82	65	49	147	323	515	408	391
IV	7	22	2	5	10	54	48	68	27	22
V	14	0		1	1	2	3	0	1	0
	1 839	2 019	1 496	1 003	1 061	1 804	1 755	2 155	1 804	1 688

En la figura 5 se representa el número total de personal embarcado involucrado en la pesca de condrictios, según los diferentes estratos de flota. En la actualidad, puede estimarse que más de 1 200 tripulantes están prioritariamente involucrados en la pesca de tiburones, rayas y quimeras con preponderancia de los estratos I y II, los que entre ambos superan los 1 000 tripulantes.

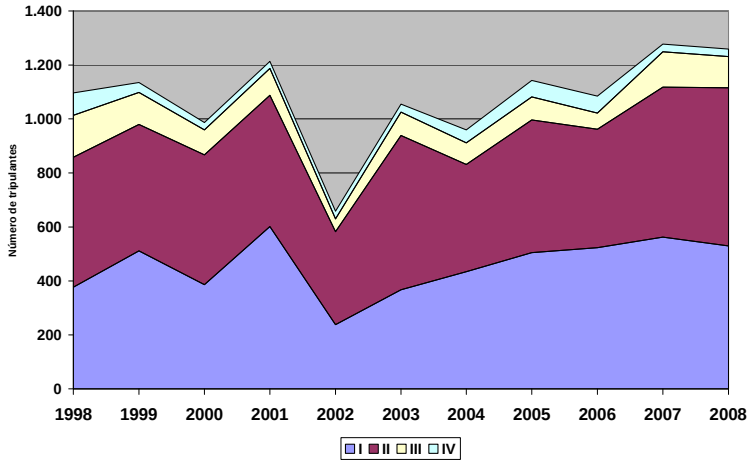


Figura 5: Tripulantes/año empleados en la pesca de tiburones, rayas y quimeras.

En cuanto a la importancia de la pesca marítima (Cuadro 3) y en particular de los condrictios (Cuadro 4) sobre las exportaciones argentinas, debe mencionarse que el sector pesquero de Argentina tiene un sesgo netamente exportador, prácticamente el 90% de los desembarques se destinan a la exportación. Dadas las características de la estructura productiva de la Argentina, con una fuerte base agropecuaria, la participación de los productos pesqueros en las exportaciones es relativamente baja. El total de las exportaciones pesqueras representa, en años recientes, entre el 2% y el 3% del total de las exportaciones argentinas.

Cuadro 3: Participación de las exportaciones pesqueras 2003-2007

Clasificación por grandes rubros	2003		2004		2005		2006		2007	
	Mill. USD	Part.	Mill. USD	Part.	Mill. USD	Part.	Mill. USD	Part.	Mill. USD	Part.
Productos primarios pesqueros	619	2,1%	474	1,4%	439	1,1%	804	1,7%	543	1,0%
MOA (Manufacturas de origen Agropecuario) pesquero	267	0,9%	343	1,0%	372	0,9%	445	1,0%	561	1,0%
Exportaciones totales pesqueras	886	3,0%	817	2,4%	811	2,0%	1 249	2,7%	1 104	2,0%
Exportaciones totales	29 565		34 453		40 106		46 569		55 933	

Con un volumen de productos exportados superior a las 13.800 t, los condrictios alcanzaron el 4,27% del total de las exportaciones pesqueras argentinas de 2007, según el detalle del Cuadro 4.

Cuadro 4: Exportaciones de condrictios - 2007

Especie	**FOB USD**
Gatuzo	4 801 736
Cazón	252 230
Tiburón nep.	1 515 202
Pez angel	2 732 274
Raya	23 321 027
Pez Gallo	668 840
TOTAL	**33 291 309**

La estadística de la pesca marítima en la Argentina data de 1920, año en el que comenzaron a registrarse los volúmenes totales desembarcados en nuestros puertos. A partir de 1935, la estadística nacional incluye información global de los desembarques por especie o grupos de especies y, desde 1989, se pueden identificar los desembarques de cada unidad de la flota pesquera, correspondientes a las especies: gatuzo, cazón, pez ángel, pez gallo y a los agrupamientos genéricos “rayas” y “tiburones”. A partir de 2006 la estadística incluye también a los tiburones: espinoso, bacota y escalandrún y a los chuchos o águilas de mar. Los desembarques por especie, mes y puerto pueden consultarse en la sección PESCA Y ACUICULTURA del portal INTERNET de la Secretaría de Agricultura Ganadería Pesca y Alimentos: www.sagpya.gov.ar/.

Además de lo expuesto, la República Argentina dispone de un importante acerbo de información derivada de campañas científicas a bordo de buques de investigación pesquera, propios e internacionales, realizadas a partir de la década de los sesenta, en aguas de plataforma, talud continental y en menor medida en aguas internacionales adyacentes, las que fueron llevadas a cabo por el Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP) y su predecesor, el Instituto de Biología Marina, de Mar del Plata. Si bien no se realizaron campañas dirigidas específicamente a la evaluación de condrictios, el INIDEP desde su creación, ha publicado estimaciones de las biomasas de las distintas especies o grupos, calculadas a partir de la aplicación del método de área barrida. Desde 1993 las campañas del INIDEP aplicadas a cada recurso adoptan un diseño sistemático que hacen las comparaciones interanuales más confiables. Los cuadros 5 a 8 resumen la información disponible sobre la abundancia de condrictios obtenida durante los últimos 30 años. Las Figuras 6 y 7 presentan parte de esta información en relación con la distribución de los principales recursos dentro de este grupo.

Cuadro 5: Estimación de la abundancia del gatuzo *Mustelus schmitti* a partir de campañas de investigación

Año	Area	Período	ABUNDANCIA (t)
1978	Costera bonaerense y uruguaya 35°-41°S	Primavera[5]	82 000
1994	Costera bonaerense y uruguaya 34°- 41°S	Primavera[6]	184 302
1998	Costera bonaerense y uruguaya 34°- 41°S	Primavera[7]	127 438
1999	Costera bonaerense y uruguaya 34°- 41°S	Primavera[8]	143 530
1999	Plataforma y talud 34°-48°S	Invierno- Primavera[9]	191 722
2003	Costera bonaerense y uruguaya 34°- 41°S	Primavera[10]	88 500

[5] Otero *et al.* (1982).
[6] Massa, Lasta y Carozza (2001).
[7] Massa, Lasta y Carozza (2001).
[8] Massa, Lasta y Carozza (2001).
[9] Massa, Lasta y Carozza (2001).
[10] Massa, Hozbor y Colonello (2004).

Cuadro 6: Estimación de la abundancia de diferentes especies de peces cartilaginosos durante la primavera en la región costera bonaerense y uruguaya a partir de campañas de investigación. Reproducido con modificaciones de Massa, Hozbor y Lasta (2001)

Especies	ABUNDANCIA (t)						
	1978[11]		1994	1998	1999	2003	2005
Callorhynchus callorhynchus	5 400		3 256	184	1 362		
Squalus acanthias			5 000[12]		1 339[13]	1 000[14]	1 000[15]
Atlantoraja castelnaui			16 321	11 467	4 625		
A. cyclophora			2 618	2 191	680		
Discopyge tschudii	12 500		27 136	26 932	3 121		
Galeorhinus galeus	16 000		7 332	17 826	61 090		
Myliobatis goodei	34 600		27 911	42 482	29 480		
Rhinobatos horkelii			2 597	661	91		
Zapteryx brevirostris			10 131	9 176	1406		
Rioraja agassizi			506	8 163	1 319		
Sympterigia acuta			1 027	2 387	621		
S. bonapartii			10 624	8 699	10 533		
Squatina spp.	9 400		27 092	43 351	13 961	23 600[16]	
Rayas nep.	72 300		38 405	40 000		26 500[17]	

[11] Otero *et al.* (1982)
[12] Massa *et al.* (2007)
[13] Massa, Lucifora y Hozbor (2004)
[14] Massa *et al.* (2007)
[15] Massa *et al.* (2007)
[16] Massa, Hozbor y Colonello (2004)
[17] Massa, Hozbor y Colonello (2004)

Cuadro 7: Estimación de la abundancia de diferentes especies de peces cartilaginosos en la región patagónica a partir de campañas de investigación realizadas durante el verano. Reproducido con modificaciones de Marí (2005). Salvo cuando está específicamente indicado, las estimaciones corresponden a la región delimitada entre los 45° y 54°S.

Especies	**ABUNDANCIA (t)**												
	1978[18]	**1992**	**1993**	**1994**	**1995**	**1997**	**1998**	**1999**	**2000**	**2001**	**2003**[19]	**2004**[20]	**2005**[21]
Callorhynchus callorhynchus	9 300 41°-47°S												
Squalus acanthias	58 300 35°-47°S	85 263	37 763	61 316	36 778	40 933	112 312[22] 41°-55°S 76 635	73 427	102 915	127 321	69 000	92 000	75 000
Schoederichthys bivius	21 600 40°-48°S	9 371	16 337	45 514	35 208	67 256	55 867[23] 41°-55°S 60 888	20 118	29 430	20 311			
Bathyraja albomaculata		21 663	10 791	27 926	14 700	13 879	32 040	5 139	8 806				
B. brachyurops		2 470	9 219	14 268	8 008	30 274	60 175	13 186	19 136	2 669			
B. griseocauda		13 934	3 721	11 877		3362	7 010	2 389	3 410				
B. macloviana		19 980	4 341	7 702	14 571	51 614	45 154	13 579	16 273	7 045			
B. magellanica		4 477	3 927	11 937		16 648	13 206	8 122	5 934	5 436			
B. multispinis							4 222		1 143				
B. scaphiops						736	1 002						
Dipturus chilensis		2 758	10 535	33 093	6 759	28 382	40 463	19 763	27 810	14 972			
D. trachydermus		2 326			9 801		12 160						
Sympterygia bonapartii			1 736	32 303	10 475	6 717							
Psammobatis spp.		4 178	5 904	23 632	14 873		41 112	10 903	21 155	66			

[18] Otero *et al.* (1982).
[19] Calculado a partir de Massa *et al.* (2007).
[20] Calculado a partir de Massa *et al.* (2007).
[21] Calculado a partir de Massa *et al.* (2007).
[22] García de la Rosa *et al.* (2004a).
[23] García de la Rosa *et al.* (2004a).

Cuadro 8: Estimación de la abundancia de especies del género *Bathyraja* a partir de campañas de investigación

Especie	ABUNDANCIA (t)					
	Área	Período	Área	Período	Área	Período
	34°- 39°S	Invierno 2003[24]	41°- 48°S	Invierno/ Primavera 2003[25]	48°- 55°S	Verano 2004[26]
B. macloviana		10 049		3 149		11 838
B. brachyurops		6 377		10 163		5 876
B. albomaculata		1 970		3 543		4 230
B. griseocauda		702		503		629
B. scaphiops		484		316		
B. cousseauae		82				
B. magellanica						8 821
B. multispinis				781		174

[24] Ruocco y Massa (2006).
[25] Colonello y Massa (2004).
[26] Massa y Colonello (2004).

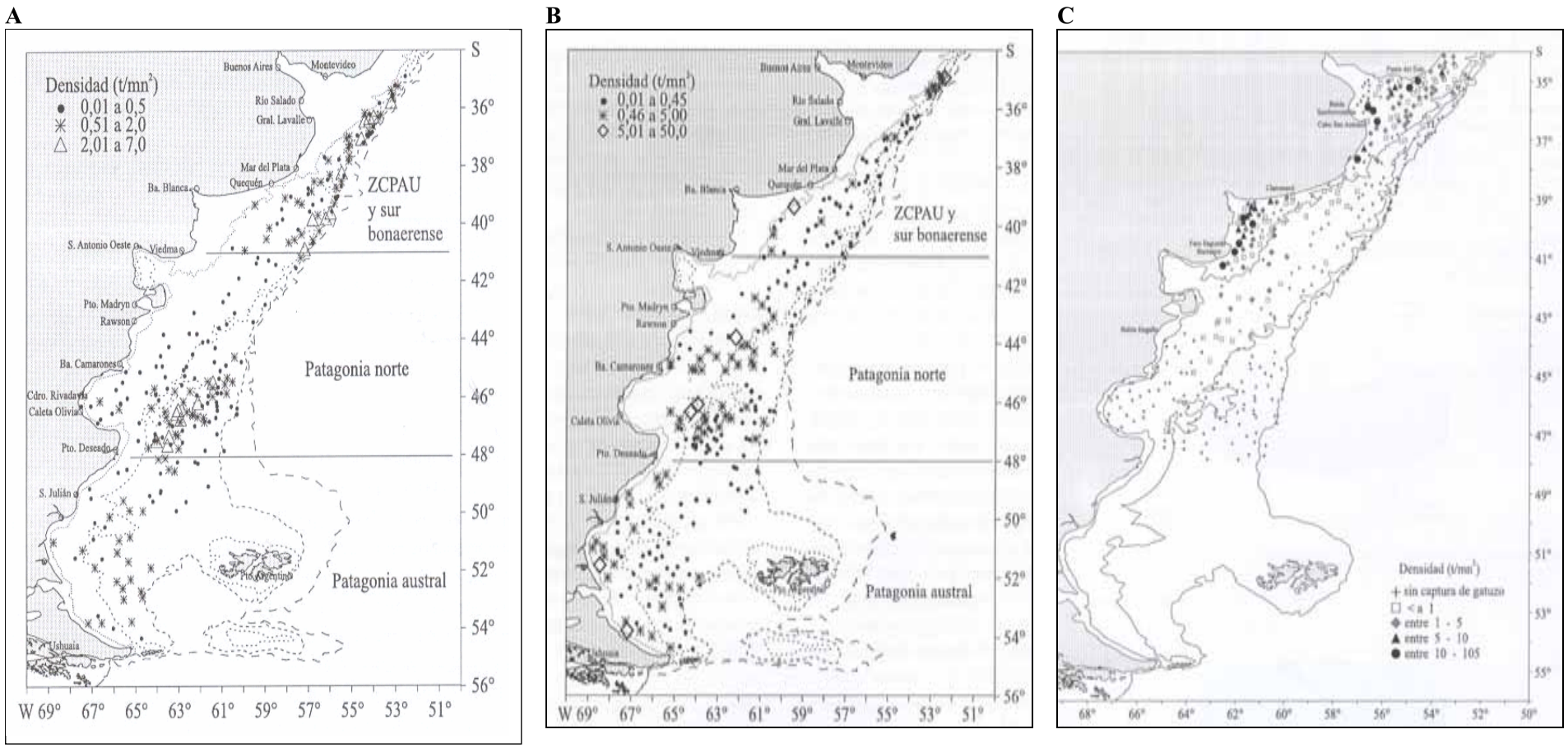


Figura 6: A) Distribución de *Dipturus chilensis* en el Mar Argentino y Zona Común de Pesca Argentino Uruguaya a partir de campañas de investigación de 1998. Reproducido de García de la Rosa *et al*. (2004 b).
B) Distribución de *Squalus acanthias* en el Mar Argentino y Zona Común de Pesca Argentino Uruguaya a partir de campañas de investigación de 1998. Reproducido de García de la Rosa *et al.* (2004 a).
C) Distribución y densidad del gatuzo (*Mustelus schmitti*) durante la primavera (noviembre-diciembre 1999). Reproducido de Massa, Lasta y Carozza (2004).

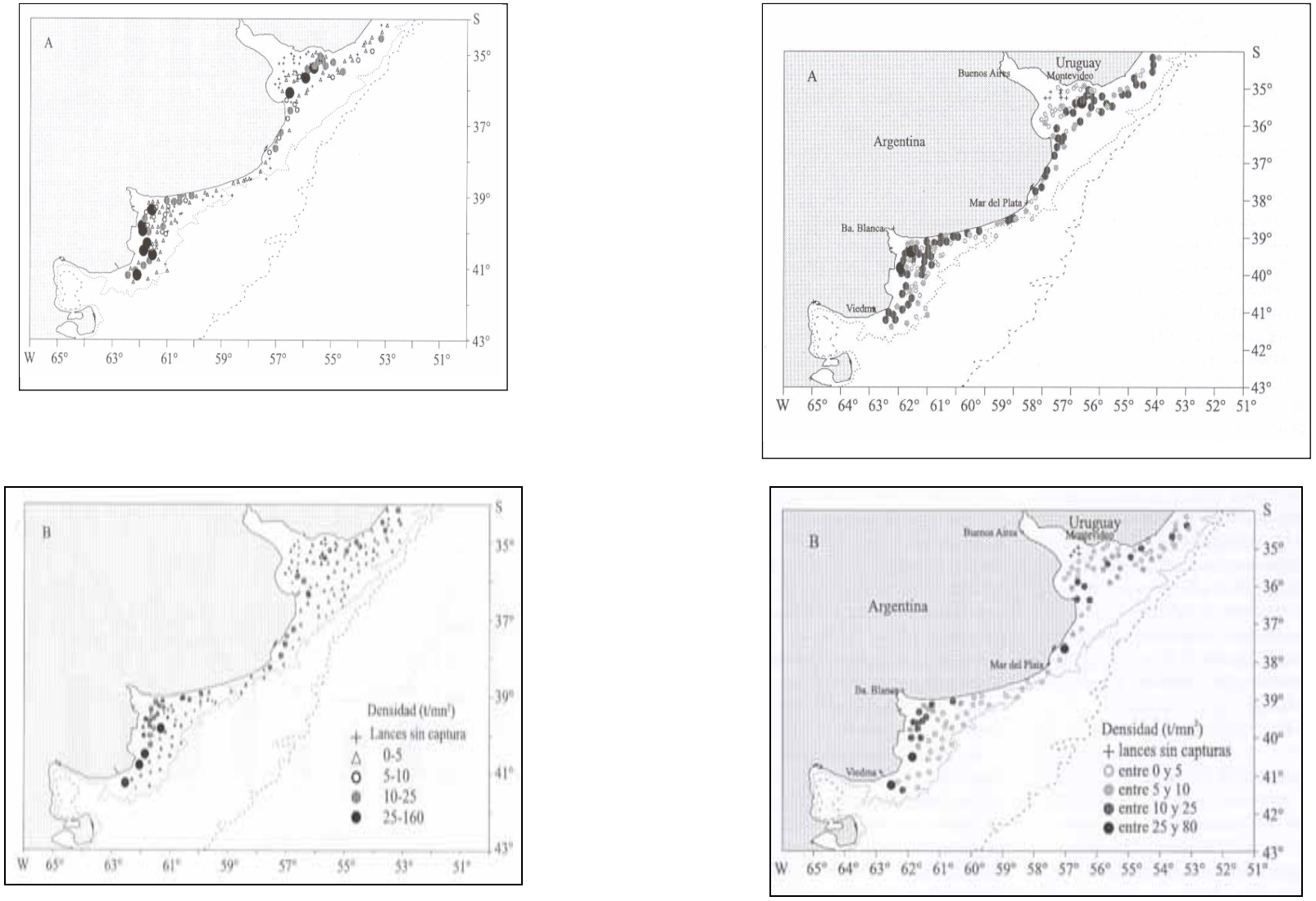


Figura 7: Izquierda - Densidad de gatuzo estimada a partir de las campañas de evaluación pesquera realizadas en las regiones costeras bonaerense y uruguaya en la primavera tardía: A) Noviembre-diciembre de 1994. B) Noviembre-diciembre de 1998 y 1999. Reproducido de Massa, Lasta y Carozza (2004). Derecha - Densidades de los condrictios estimadas durante la primavera. A) 1994. B) 1999. Reproducido de Massa, Lucifora y Hozbor (2004).

La importancia relativa del comercio internacional y del uso doméstico de la captura de tiburones

No existen estudios recientes sobre la participación del mercado interno en la comercialización de los productos pesqueros. La Subsecretaría de Pesca y Acuicultura de la Nación (SSPyA) está tramitando la realización con INFOPESCA de un relevamiento nacional para evaluar el impacto del mercado interno. Cabe mencionar que los estudios puntuales, realizados en la década de los 90 han perdido su vigencia. Durante el período de convertibilidad (1990-2001) en los que un peso argentino equivalía a un dólar estadounidense, los exportadores se reorientaron hacia el mercado interno, ante la baja en la rentabilidad de las ventas al exterior por el efecto cambiario, pero a partir de la presente década la tendencia se ha revertido completamente.

Por otra parte, vale señalar que el producto básico de venta en el mercado interno, es el filete de merluza. Como referencia adicional puede mencionarse que el hipermercado más importante del país, informó una compra para lo que va de 2008 de apenas 120 kg de gatuzo pelado y 1.000 kg de filete de gatuzo. El segundo en importancia informó un volumen comercializado de 54,6 toneladas de gatuzo, en 2008.

El estado de desarrollo y la implementación del Plan Nacional de Acción para los tiburones

En mayo de 2007, a instancias del Consejo Federal Pesquero, se realizó un primer taller nacional con la finalidad de delinear las bases para un futuro Plan de Acción Nacional para la Conservación y Ordenación de Tiburones. La Subsecretaría de Pesca y Acuicultura y la Secretaría de Ambiente y Desarrollo Sustentable de la Nación convocaron a todas las instituciones relacionadas con esta temática (institutos de investigación, organismos de pesca provinciales y nacionales, Cancillería Argentina y ONG's). Se conformaron tres Grupos de Trabajo: Biología y Taxonomía, Pesquerías Evaluación y Manejo y Pesca Deportiva, con la función de relevar la información necesaria a fin de cumplimentar los correspondientes diagnósticos, detectar los vacíos de información y efectuar recomendaciones para el corto y mediano plazo.

En septiembre del 2007 se realizó un segundo taller general. Dada la gran variedad de especies presentes en el Mar Argentino y el distinto grado de conocimiento e importancia comercial y ecológica, para una primera etapa se hizo una priorización de especies a diagnosticar y considerar en las aperturas de las estadísticas de pesca y comercialización. Los criterios de priorización fueron, *inter alia*: vulnerabilidad, importancia comercial y especies con protección internacional. También en 2007 se realizó la primera reunión del Grupo de Trabajo Pesquerías Evaluación y Manejo y se acordó sobre la información pesquera a recopilar en las distintas jurisdicciones para las especies priorizadas en el taller anterior. En abril de 2008 se reunió el Grupo de Trabajo Pesca Deportiva para definir la información a relevar a fin de hacer un diagnóstico de la misma. En junio del 2008 se realizó la Segunda Reunión del Grupo de Trabajo Evaluación y Manejo en el cual se presentaron los diagnósticos de la situación actual de las especies priorizadas, en ámbitos de jurisdicción nacional y también en áreas específicas provinciales (Estuario de Bahía Blanca y Golfo San Matías).

Para fines de octubre de 2008 se ha organizado la realización de la Reunión Plenaria Final donde se presentarán los siguientes productos elaborados por los distintos Grupos de Trabajo: diagnóstico del estado de conocimiento biológico/taxonómico; encuadre legal internacional, marco institucional y cuerpo normativo en relación con la conservación y explotación comercial de tiburones rayas y quimeras, diagnóstico sobre las necesidades de información relacionadas con la evaluación y manejo de las pesquerías y evaluación del impacto de la pesca deportiva y recreativa. Se preparará un análisis FODA con el fin de acordar los lineamientos y enunciar las actividades recomendadas para el desarrollo del Plan de Acción Nacional.

A pesar de que la redacción del documento final a ser puesto a consideración del Consejo Federal Pesquero, todavía no está concluída, ya se ha encarado la solución de algunas de las necesidades más urgentes detectadas durante el desarrollo de las reuniones arriba mencionadas. En este sentido cabe mencionar las modificaciones en la estadística pesquera, la integración de información entre jurisdicciones, la resolución del parte de pesca, la apertura del nomenclador aduanero, la difusión de las cartillas de identificación de especies y la realización de talleres de sensibilización y concientización dirigidos a agentes de la administración pesquera nacional.

Asimismo, durante los últimos años, se ha dictado normativa a nivel provincial, nacional e internacional en relación con la conservación y utilización sustentable de estos recursos. El Cuadro 9 incluye la normativa de carácter general y específica dictada a estos fines en las distintas jurisdicciones.

2. Disponibilidad de datos y sistemas de seguimiento de la industria pesquera

La actividad pesquera en el ámbito nacional se rige por la Ley Nº 24922 (Régimen Federal de Pesca, www.infoleg.gov.ar). A partir de la sanción de la misma, el sector público pesquero queda integrado por un organismo rector con nivel estratégico y federal (Consejo Federal Pesquero), un ente ejecutor táctico y operativo en el orden nacional (Autoridad de Aplicación, Subsecretaría de Pesca y Acuicultura) y administraciones pesqueras en las provincias con litoral marítimo.

La mencionada Ley creó el Consejo Federal Pesquero, órgano integrado por representantes de la Nación y las Provincias con litoral marítimo. Sus funciones principales son: planificar el desarrollo pesquero nacional y establecer la política pesquera nacional así como la de investigación; establecer la Captura Máxima Permisible (CMP) por especie, aprobar los permisos de pesca, establecer los derechos de extracción y fijar cánones para el ejercicio de la pesca, así como reglamentar y fijar las normas del régimen de administración de los recursos por cuotas de captura. Las Actas del Consejo Federal Pesquero y sus decisiones son publicadas en el sitio web del Consejo (www.cfp.gov.ar).

La Autoridad de Aplicación de la Ley es la Secretaría de Agricultura, Ganadería, Pesca y Alimentos (SAGPyA), dependiente del Ministerio de Economía y Producción de la Nación. Dentro de la Secretaría, la Subsecretaría de Pesca y Acuicultura tiene delegadas funciones de Autoridad de Aplicación de la Ley. Dicha Subsecretaría conduce y ejecuta la política pesquera, y tiene a su cargo la administración de la actividad pesquera.

Cada una de las cinco provincias con litoral marítimo cuenta con su propia administración y su legislación pesquera aplicable en el área de ejercicio de su dominio sobre recursos ícticos, conforme la establece el Régimen Federal de Pesca. En el ámbito provincial también se desarrollan actividades de investigación pesquera.

La SAGPyA cuenta, además, con organismos descentralizados aunque dependientes de ella: el Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP) y el Servicio Nacional de Sanidad y Calidad Agroalimentaria (SENASA).

El INIDEP tiene como responsabilidad principal la formulación y ejecución de programas de investigación pura y aplicada relacionada con los recursos pesqueros en los ecosistemas marinos y su explotación racional en el marco de la política de investigación establecida por el Consejo Federal Pesquero. Es quien asesora al Consejo Federal Pesquero en la determinación de las CMP por especie, la pesca experimental, el diseño de planes de ordenación o la aplicación de medidas de ordenación, y coordina sus actividades científicas y técnicas con las provincias con litoral marítimo en lo inherente a la evaluación y conservación de los recursos vivos marinos.

La Prefectura Naval Argentina es el organismo a cargo del otorgamiento del numeral de matrícula asignado a los buques pesqueros que enarbolan el pabellón nacional y del control de los aspectos técnicos relacionados con la seguridad de la vida humana en el mar, la seguridad operacional y la prevención de la contaminación ocasionada por la actividad. Acorde la legislación vigente, ejerce tareas de patrullaje relacionadas con la actividad pesquera, en su calidad de policía auxiliar.

Cuadro 9: Normativa para la conservación de tiburones

NORMATIVA GENERAL		
Res. SAGPyA 265/2000	*Establece una amplia zona de veda total por arrastre en forma permanente, en la región patagónica central de la ZEE argentina (aprox. 180.000 km^2)*	Vigente, con modificaciones desde 09-06-2000
Res. CFP N7/200	*Establece un área de veda para la protección de reproductores y juveniles del variado costero en la zona de El Rincón*	Vigente desde el 1 de noviembre al 28 de febrero de cada año
Res. CFP Nº 1/2008	*Plan de Acción Nacional para prevenir, desalentar y eliminar la pesca ilegal, no declarada, no reglamentada*	Vigente desde enero de 2008
Resolución CTMFM 10/2000	*Establece un área de esfuerzo pesquero restringido para el arrastre de fondo*	Vigente desde 13-12-2000
Resolución CTMFM 09/2007, 02/2008 y 05/2008.	*Establecen áreas de veda estacional para la protección de juveniles de merluza.*	Vigencia estacional
Disposición de la Dirección de Desarrollo Pesquero (Pcia de Bs. As.) 217/07	*Reglamenta la Pesca Deportiva, realizada en la Costa Marítima en ambientes de la Provincia de Buenos Aires*	Vigente desde diciembre de 2007
NORMATIVA ESPECIFICA		
Res. CFP 13/2001	*Establece la Captura Máxima Permisible en 4.000 toneladas para el año 2001 de las siguientes especies: Atlantoraja platana, Dipturus trachyderma, D. chilensis, Amblyraja doellojuradoi, Bathyraja albomaculata, B. brachyurops, B. griseocauda, B. macloviana, B. magellanica, B. multispinis, B. scaphiops, Psammobatis lentiginosa, P. normani, P. rudis*	Vigente hasta el 10/10/2001, fecha en la que por Res. SAGPyA 704/2001 se suspenden las capturas de rayas, por haberse alcanzado la CMP.
Res. CFP 13/2003	*Establece que ejemplares de tiburones mayores a 1,6 m deben ser devueltos al mar*	Vigente desde el 19-06-2003
Resolución CTMFM 08/2007	*Establece un área en la que se prohíbe el arrastre de fondo a fin de proteger las concentraciones de reproductores y juveniles de distintas especies de peces cartilaginosos.*	Vigente desde el 5-12-2007 al 29-02-2008
Disposición de la Dirección de Desarrollo Pesquero (Pcia de Bs. As.) 55/08	*Veda permanente para grandes tiburones costeros (Escalandrún, Bacota, Gatopardo y Cazón)*	Vigente desde junio de 2008

La Subsecretaría de Pesca y Acuicultura (SSPyA) Nacional ha implementado el Sistema Integrado de Control de Actividades Pesqueras (SICAP, Figura 8) conformado por: a) el Sistema de Posicionamiento Satelital de la Flota Pesquera Nacional; b) información satelital de toda la zona donde operan los buques pesqueros extranjeros fuera de la zona económica exclusiva provista por la Comisión Nacional de Actividades Espaciales; y c) la actividad de control y vigilancia ejercida por la Prefectura Naval Argentina y la Armada y la Fuerza Aérea, las que cuentan con unidades de superficie: (guardacostas y corbetas) y unidades aéreas (aviones y helicópteros) para el control de la pesca ilegal. Esta información se complementa con la proveniente del control de las descargas y la información documental de abordo, según se detalla en el apartado 3.

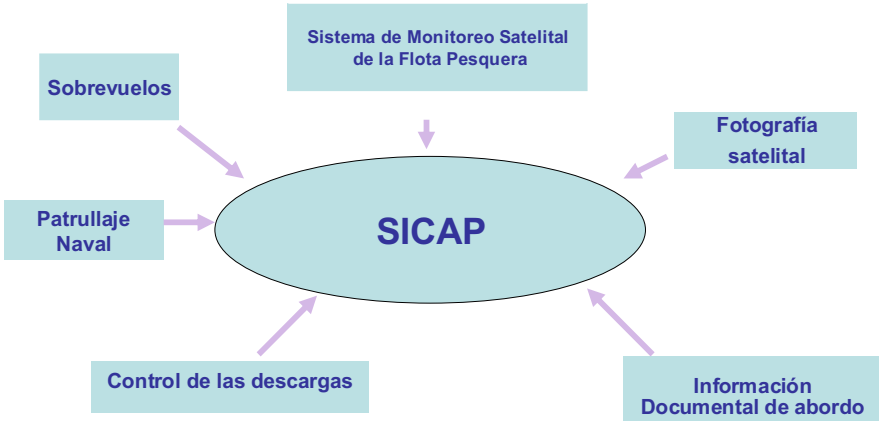


Figura 8: El Sistema Integrado de Control de Actividades Pesqueras

Participación en organizaciones regionales de ordenación pesquera (OROP) de importancia para la gestión y la conservación de los tiburones

La Argentina participa de dos Comisiones Internacionales, relacionadas con la conservación y uso sustentable de los recursos pesqueros: La Comisión Técnica Mixta del Frente Marítimo (CTMFM) del Río de la Plata y su frente marítimo y la Comisión para la Conservación de los Recursos Vivos Marinos Antárticos (CCRVMA=CCAMLR).

La CTMFM es una comisión binacional, que cuenta con competencias relativas a la conservación de los recursos pesqueros en las aguas de la Zona Común de Pesca Argentino-Uruguaya, establecidas en el Tratado del Río de la Plata y su Frente Marítimo, *inter alia*: establecer los volúmenes de capturas por especies, promover la realización de estudios e investigaciones conjuntos, establecer normas y medidas relativas a la explotación racional de las especies en la zona de interés común, *etc*. Existe en particular un grupo de trabajo binacional abocado a la discusión de medidas para la conservación y asesoramiento para la ordenación de las pesquerías de condrictios.

Por otra parte la Argentina como Parte en la CCRVMA implementa las decisiones de la Comisión a través de los mecanismos establecidos por la Ley N°25.263, que fija el Régimen de Recolección de Recursos Vivos Marino, en el Área de Aplicación de la Convención. Dicho régimen prevé un sistema de sanciones en caso de infracción a la Ley. En este marco, la Argentina ha adoptado desde el año 2000, el Sistema de Documentación de Capturas para fiscalizar los desembarques y el comercio internacional de la merluza negra.

Tipo de datos de pesca recogidos y las características del sistema de seguimiento de la pesquería

Evidentemente uno de los mayores problemas, a los fines tanto de la investigación como de la administración pesquera de estos recursos, es la falta de identificación de los mismos en toda la cadena desde la extracción a la comercialización. Ya ha sido dicho que, al presente, son pocos los casos de declaración a nivel específico. Dado que la resolución de esta falencia ha sido reconocida como crucial en la futura implementación del Plan de Acción Nacional ya se han adoptado medidas tendientes a tal fin.

Con el apoyo de Autoridades Nacionales, Institutos de Investigación, Universidades y ONGs se han desarrollado dos cartillas para el reconocimiento de rayas y tiburones presentes en el Mar Argentino. Las mismas se circularon entre alumnos de la Escuela Nacional de Pesca, así como entre observadores e inspectores a bordo y en muelle, y son utilizadas por las ONGs participantes en esta iniciativa a fin de generar mayor concientización entre los pescadores y comunidad en general. Para facilitar su visualización y acceso, esas cartillas se encuentran disponibles en formato digital en el sitio web de la

Subsecretaría de Pesca y Acuicultura. Estas cartillas permiten identificar aproximadamente un 30% del total de las especies de condrictios citadas para el Mar Argentino.[27]

Si bien se aspira a que en el futuro se identifiquen a nivel específico la totalidad de las capturas, en una primera instancia, se aspira a contar con estadística confiable de las especies ilustradas en dichas cartillas.

- **Captura**

1. El principal documento de información pesquera de la Argentina es actualmente el ***Parte de Pesca*** que cada buque presenta al final de cada marea, en el que se detalla la captura realizada por rectángulo de grado por grado, y en el caso de algunas flotas costeras, en cuadrículas de cuarto de grado. En los últimos años, se ha trabajado en conjunto con las provincias para integrar la información de todas las jurisdicciones, lo cual ha permitido contar con una estadística pesquera más completa, inclusive con la incorporación de información histórica.[28]

2. Asimismo gran parte de los desembarques son controlados por inspectores en muelle que emiten un ***Acta de Comprobación de Descarga***. En el caso específico de la merluza y su fauna acompañante estos controles cubren el 90% de los volúmenes desembarcados. Los volúmenes fiscalizados no sólo se utilizan para verificar la veracidad de las declaraciones de capturas, sino que en el caso de hallarse diferencias, se utilizan también para el balance de las autorizaciones de captura emitidas por el CFP.

3. Para algunas especies de alta sensibilidad, se han creado ***Comisiones de Control de Descarga*** de la que participan las cámaras empresarias enviando representantes en carácter de veedores a la descarga de los buques.

4. El ***Sistema de Posicionamiento Satelital*** de la flota, y la actividad de los ***Inspectores a bordo*** se describen en el punto 3.

5. Además de la información generada en sus campañas de investigación el INIDEP provee datos sobre la operatoria de la flota comercial a través de su ***Proyecto de Observadores*** a bordo, lo que permite estimar el efecto de la pesca incidental y descarte de tiburones (Waessle, 2007). Asimismo tanto el INIDEP como las grupos técnicos de las administraciones provinciales, realizan muestreo de desembarque y en planta para la determinación de los parámetros biológicos de las especies capturadas.

En la Argentina no está autorizado el transbordo en el mar de capturas de ningún tipo. Los factores de conversión que se utilizan para estimar el peso vivo a partir de los productos comercializados, se detallan en el Cuadro 13. Cabe consignar que en la Argentina no se realiza "aleteo" de tiburones. El Cuadro 10 presenta los datos de captura de tiburones comunicados a la FAO por la Subsecretaria de Pesca Nacional.

- **El esfuerzo pesquero:**

El Cuadro 11 presenta el esfuerzo nominal por estrato de flota, expresado en días efectivos de pesca. Debe tenerse en cuenta que el esfuerzo aplicado para la captura de estos recursos, proviene en gran medida de pesca no dirigida a los mismos**.** El cotejo entre el total de días empleados para la captura de cada grupo de condrictios, muestra siempre valores menores en 2007, con relación a los del comienzo de la serie analizada. Únicamente para la pesca de tiburones nep y rayas nep por parte del estrato I, los valores al final de la serie superan a los de 1998.

[27] A los fines de la identificación de los condrictios de la región cabe también citar los trabajos de Meneses y Paesch (2003), Cousseau *et al*. (2007), Menni y Lucifora (2007) y Figueroa (ms).

[28] La Resolución SAGPyA 327/2000 estableció la obligatoriedad de presentar parte lance por lance para la flota arrastrera que opera sobre merluza. Si bien, por razones operativas, para los fines generales de la administración pesquera el mismo no ha sido aún integralmente utilizado, la información contenida en ellos es archivada y consultada para controles especiales de la pesca. Se está trabajando en la implementación de un parte de pesca electrónico que permita al sistema incorporar esta información en forma digital, automática y en tiempo real.

Cuadro 10: Actualización de estadística pesquera oficial de la Argentina comunicada oportunamente a la FAO por la Subsecretaría de Pesca Nacional

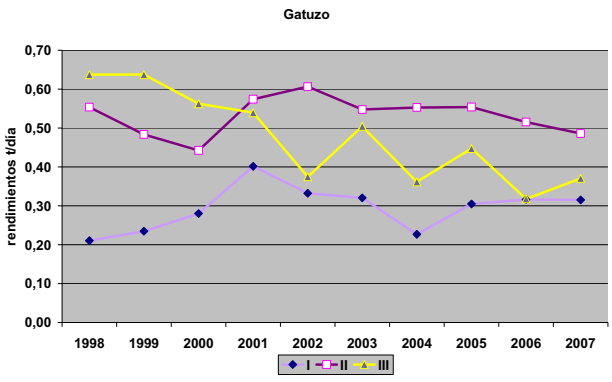
Especie	Área	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Raya de Eaton	Antártico, Pacífico								0	0	0	0	0	0	0	0	1	0	<0,5	
Raya de McCain	Antártico								0	0	0	0	0	0	0	0	<0,5	0	0	
Raya estrellada atlántica	Pacífico, Antártico								0	0	0	0	0	0	0	0	4	0	0	
Rayas, pastinacas, mantas nep.	Atlántico, Antártico								<0,5	0	0	0	0	0	0	0	0	0	0	
Rayas, pastinacas, mantas nep.	Atlántico, sudoccidental	917	468	225	760	920	5 955	6 811	12 479	12 130	14 856	12 670	13 289	17 026	17 724	17 469	18 170	22 451	23 618	28 035
Pez gallo (Pejegallo)		901	1.061	785	492	730	1 166	931	822	1 392	1 839	2 019	1 496	1 003	1 061	1 804	1 755	2 155	1 804	1 688
Chucho (Águilas de mar nep.)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	11
Cazón		41	97	106	60	230	77	105	93	106	101	91	113	90	72	68	89	161	152	128
Gatuzo		8 357	7 881	8 723	10 360	11 334	11 738	11 033	10 245	9 962	11 298	9 805	7 122	9 689	7 038	7 910	7 731	7 765	9 392	9 142
Pez ángel (Angelote)		3 634	3 345	3 880	3 649	4 080	3 664	3 790	4 281	4 413	4 318	3 807	3 126	3 887	2 828	3 561	3 774	3 878	4 226	4 293
Tiburón espinoso (Mielga)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	113	119
Tiburones nep		3 301	4 513	4 015	4 007	2 087	1 759	2 224	2 251	1 070	1 220	1 159	719	798	1 102	998	684	1 086	1 337	917
Total general		17 151	17 366	17 734	19 327	19 382	24 359	24 894	30 172	29 074	33 631	29 549	25 864	32 493	26 825	31 810	32 204	37 497	40 648	44 335

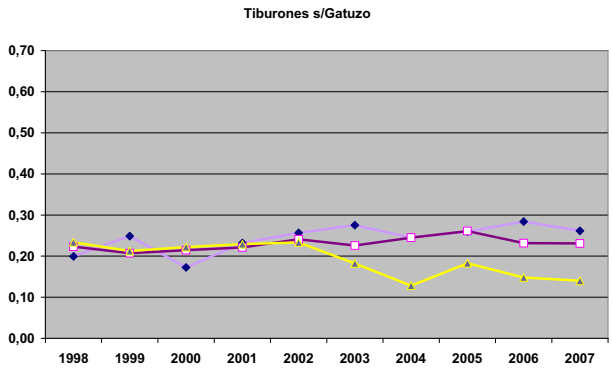
Cuadro 11: Esfuerzo pesquero (días efectivos de pesca)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Gatuzo										
I	8 303	9 670	5 294	6 223	5 344	5 285	6 128	4 356	7 737	7 196
II	12 574	11 321	9 531	10 099	7 952	8 927	9 089	9 437	11 249	11 921
III	3 800	3 002	2 316	2 320	844	1 975	2 809	2 032	2 280	2 373
IV	2 540	1 272	1 202	1 375	1 155	2 622	2 488	1 721	1 460	1 412
V	862	131	998	706	782	1 004	579	436	115	
	28 079	25 396	19 341	20 723	16 077	19 813	21 093	17 982	22 841	22 902
Resto de tiburones										
I	6 002	6 769	6 063	6 691	5 570	6 249	5 123	5 047	7 618	6 908
II	13 755	11 911	10 325	10 553	8 875	10 117	10 761	11 795	13 136	13 138
III	4 914	3 820	2 964	3 323	1 382	2 863	3 962	3 331	3 384	3 649
IV	4 053	2 361	1 121	2 149	2 122	2 020	2 838	2 086	2 386	2 430
V	1 817	450	314	986	969	813	588	368	315	309
	30 541	25 311	20 787	23 702	18 918	22 062	23 272	22 627	26 839	26 434
Rayas										
I	5 710	6 622	7 111	7 703	6 442	7 311	7 426	7 289	10 451	9 088
II	17 681	17 429	16 378	19 178	17 782	17.999	20 169	20 463	21 847	22 467
III	14 290	12 415	11 542	11 418	7 282	7 555	8 481	8 128	8 444	8 000
IV	15 413	11 220	10 204	12 506	13 466	13 833	13 673	12 342	12 906	12 738
V	7 566	5 806	5 824	4 474	4.381	4.895	4 464	4 091	4 606	4 372
	60 660	53 492	51 059	55 279	49 353	51 593	54 213	52 313	58 254	56 665
Quimeras										
I	2 359	2 419	2 081	1 339	1 058	1 673	1 562	1 652	1 097	1 069
II	6 920	6 299	5 288	3 594	3 284	4 761	6 221	5 638	4 872	5 582
III	2 615	2 103	2 142	1 606	517	1 216	2 617	1 867	1 908	2 041
IV	745	1 037	391	436	448	1 171	1 468	864	684	666
V	54	122		212	156	322	47	43	108	158
	12 693	11 980	9 902	7 187	5 463	9 143	11 915	10 064	8 669	9 516

- **Los indicadores de la abundancia**

En el anexo se incluye como Cuadro 1 los resultados del cálculo de rendimientos expresados en toneladas/día efectivo de pesca, que surgen de relacionar los Cuadros 2 y 10 de este informe. Como puede observarse en la Figura 9, sólo en el caso del gatuzo y para un estrato de flota los rendimientos muestran una marcada tendencia decreciente. En cuanto a las rayas los tres estratos analizados muestran tendencias claramente crecientes.





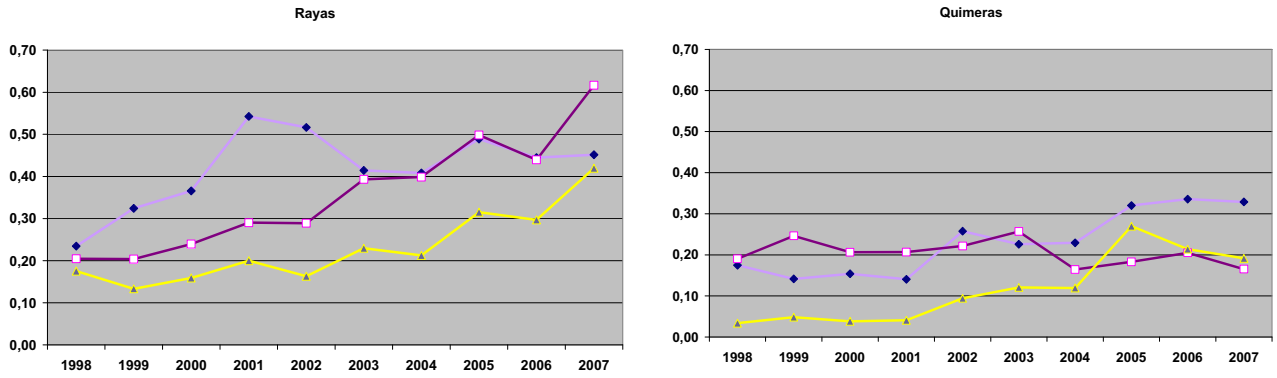


Figura 9: Rendimientos, expresados en toneladas/días efectivos de pesca en la última década

Sistemas de gestión de datos

En la Administración Nacional existe un Sistema informático que integra los datos de las declaraciones de capturas, actas de desembarque, la información de registro de las embarcaciones pesqueras autorizadas a operar, la información suministrada por la Prefectura Naval Argentina en relación con la zarpada y arribo de las embarcaciones, sanciones y actuaciones judiciales y el detalle de los derechos de extracción.

Esta información se complementa con el intercambio de datos provenientes de las administraciones provinciales, sobre sus respectivas flotas.

En el sitio web de la Subsecretaría se actualiza semanalmente la información sobre capturas por especie, puerto y tipo de flota.

Los principales problemas que afectan el adecuado seguimiento de la pesca del tiburón

La Argentina ya ha aprobado su Plan Nacional de Acción para Pesca Ilegal, No-declarada y no Reglamentada (PAN-INDNR), en enero de 2008. Tal como se ha descripto anteriormente la administración pesquera nacional cuenta con instrumentos y recursos aplicables al combate de la pesca ilegal, no declarada y no reglamentada. Por otra parte, ya se han señalado las deficiencias reconocidas en la identificación de las capturas y de los productos pesqueros exportados, cuya solución está siendo implementada. También se ha destacado la falta de información proveniente de campañas de investigación científica, específicamente diseñadas para abordar temas relacionados con la conservación y asesoramiento para la explotación sustentable de condrictios.

Recientemente el INIDEP ha reconocido la necesidad de respaldar estas investigaciones, creando el Subproyecto Peces Cartilaginosos, dentro del marco de actividades prioritarias de esa institución.

Como se ha dicho, la Argentina se encuentra en las últimas etapas de desarrollo de su Plan de Acción Nacional que incluye una completa identificación de las debilidades y amenazas (incluyendo limitaciones de recursos humanos y financieros) que afectan la ordenación de estas pesquerías.

Proyectos o actividades en curso, destinados a mejorar el seguimiento de la pesca de tiburones

Investigaciones realizadas fundamentalmente por el INIDEP,[29] en referencia a tiburones y rayas, así como por el Instituto de Biología Marina y Pesquera Almte. Storni[30] de la Provincia de Río Negro en relación con el pez gallo, han avanzado recientemente en el estudio y determinación de parámetros poblacionales básicos (tales como tasas de crecimiento, edad de primera madurez, fecundidad, supervivencia específica por edad, etc.) de algunas de las principales especies de condrictios. Estos parámetros aplicados a modelos

[29] En 2007, el INIDEP ha establecido como prioritaria la invetigación científica de peces cartilaginosos a través de la creación del Programa Pesquería de Condrictios.
[30] El Instituto Storni ha creado el grupo CONDROS para el estudio de peces cartilaginosos, con profesionales de la Universidad Nacional del Comahue y del Ministerio de Producción del Gobierno de la Provincia de Río Negro.

demográficos permitirán realizar evaluaciones y recomendaciones de capturas, para estas especies, superando de este modo las actuales deficiencias en la estadística pesquera y la falta de campañas de investigación específicas.

Asimismo se ha mejorado la resolución espacial de los partes de pesca, y se ha iniciado la capacitación del sector para mejorar la identificación de estas especies.

3. Seguimiento del comercio de los productos derivados del tiburón

Las dos organizaciones responsables del control y seguimiento del comercio internacional de productos alimentarios son el SENASA y la Dirección General de Aduanas.

El SENASA es el organismo sanitario cuyo objetivo principal es la fiscalización y certificación de los productos y subproductos de origen animal y vegetal, como así también sus insumos. Realiza tareas de prevención, erradicación y control de enfermedades animales, incluyendo las transmisibles al hombre. Elabora normas y controla su cumplimiento, asegurando la aplicación del Código Alimentario Argentino, dentro de las normas internacionales exigidas. Registra, habilita y fiscaliza los buques procesadores y las plantas en tierra de procesamiento y acondicionamiento, el transporte y comercialización de los productos pesqueros y de acuicultura, además de controlar el Tráfico Federal, las importaciones y exportaciones de los productos, subproductos y derivados de origen pesquero o de cultivo.

La Dirección General de Aduanas es un órgano que integra la Administración Federal de Ingresos Públicos (AFIP) y tiene a su cargo la aplicación de la legislación relativa a la importación y exportación de mercaderías, como así también el control del tráfico de los bienes que ingresan o egresan en el territorio aduanero. Su función principal es valorar, clasificar, verificar y controlar la entrada y salida de mercaderías, como así también los medios en que son transportadas, asegurando el cumplimiento de las disposiciones vigentes.

Las funciones específicas de estos organismos en relación con el comercio de productos pesqueros se detallan en el apartado III.

Puntos principales de control

I. Previo a la zarpada

1. ***Despacho a la pesca***. Control de zarpada realizado por la Prefectura Naval Argentina, a través del documento denominado ***Declaración de Salida*** donde figura fecha y hora de la zarpada del buque, todas las características del mismo, vigencias de los certificados, rol de la tripulación, que el buque no cuente con ningún impedimento para zarpar, que cuente con permiso de pesca correspondiente y especie objetivo, que el equipo de monitoreo satelital se encuentre en buen funcionamiento y que el inspector de pesca se encuentra habilitado para cumplir con dicha función por la Autoridad competente.

II. Durante la marea

2. ***Monitoreo satelital durante la marea:*** acorde lo establecido en la Disposición de la. SSPyA N° 02/2003[31], todos los buques pesqueros deben contar con el equipo de monitoreo satelital a bordo, en perfecto estado de funcionamiento. El sistema debe informar la posición del buque cada hora. En el supuesto de que el buque deje de emitir su señal por un espacio superior a dos horas se ordena el inmediato regreso a puerto. Independientemente la Oficina de control de la SSPyA, puede realizar consultas individuales especiales (***polling***) cuando lo desee ante cualquier duda respecto del posicionamiento del buque. En la actualidad toda la flota comercial de más de 13 m de eslora, que opera en aguas nacionales, posee sistema de monitoreo satelital. Esto hace un total de 554 buques pesqueros con equipo a bordo, con una operatividad promedio diaria que entre 225 y 300 buques en navegación aproximadamente. Dos veces al día se actualiza la información

[31] http://infoleg.mecon.gov.ar/infolegInternet/anexos/85000-89999/87371/norma.htm

del sistema en el sitio web de la Subsecretaría (Figura 8). Nótese la existencia de áreas de veda coincidentes con las zonas de mayor abundancia descriptas en las Figuras 5 y 6.

3. ***Inspecciones a bordo***. El Inspector prepara un ***Informe de Control de Marea*** y labra las ***Actas*** si corresponde.

4. ***Parte de Pesca,*** declaración jurada de capturas por especie y área de pesca firmada por el Capitán del barco. El capitán prepara una declaración con la información correspondiente a cada lance (***parte lance x lance***) y otra declaración con la información de toda la marea (***parte final de marea***). Ambos documentos se entregan al finalizar la marea, cuando el buque arriba a puerto.

III. A la finalización de la marea

5. ***Declaración de entrada***. Control de ingreso a puerto realizado por la Prefectura Naval Argentina, a través del documento denominado ***Declaración de Entrada***

6. ***Control*** y ***Acta de Comprobación de Descarga*** realizados por inspectores de muelle de la Subsecretaría de Pesca Nacional.

7. ***Control del traslado e ingreso a planta*** (Mar del Plata). Con el propósito de verificar el destino de las mercaderías que circulan en el puerto de Mar del Plata hasta su ingreso a planta, además de fiscalizar las correspondientes certificaciones sanitarias emitidas desde el puesto unificado se creó el Centro Integrado Control de Actividades Pesquera (CINCOPE), integrado por agentes de la Subsecretarías de Pesca de Nación y Provincia de Buenos Aires, de la Prefectura Naval Argentina, de la Municipalidad de Mar del Plata, del SENASA y de la AFIP. El CINCOPE, controla y valida el ***Remito*** preparado por la empresa y presentado por el camionero que transporta la mercadería a planta. La validación la realiza el agente de la Municipalidad o SENASA según corresponda.

8. ***Auditoria de libros de planta***. Cada planta registra en ***libros foliados*** los ingresos y egresos de mercadería a procesar. Los libros de planta son auditados por un veterinario de la Municipalidad o del SENASA según corresponda.

9. ***Control del egreso de planta***. Para el egreso de mercadería de planta debe prepararse una ***Guía de Tránsito*** que según el destino de la misma tendrá carácter ***restringido*** o ***federal***.

10. ***Control de las exportaciones***. La mercadería para exportación debe estar acompañada de un ***Certificado Sanitario de Exportación*** expedido por SENASA y un ***Manifiesto de Exportación (Permiso de Embarque)*** expedido por la AFIP. **Los principales tipos de productos en el comercio (Cuadros 12 y 13).**

Cuadro 12: Exportaciones de los principales productos de tiburón

Año	Tiburones frescos		Tiburones congelados		Aletas de tiburón secas	
	t.	USD	t.	USD	t.	USD
1996	12	31 502	1 208	2 177 543		
1997	10	20 707	572	922 632		
1998	20	18 154	172	290 251		
1999	74	37 185	95	126 622		
2000	50	37 125	194	365 975		
2001	26	48 354	277	486 859		
2002	52	48 870	166	233 133	4	73 808
2003	39	97 381	489	944 188	4	144 932
2004	51	107 217	567	988 928	4	132 856
2005	37	77 966	646	1 187 621	9	504 638
2006	17	38 045	666	1 140 370	9	656 456

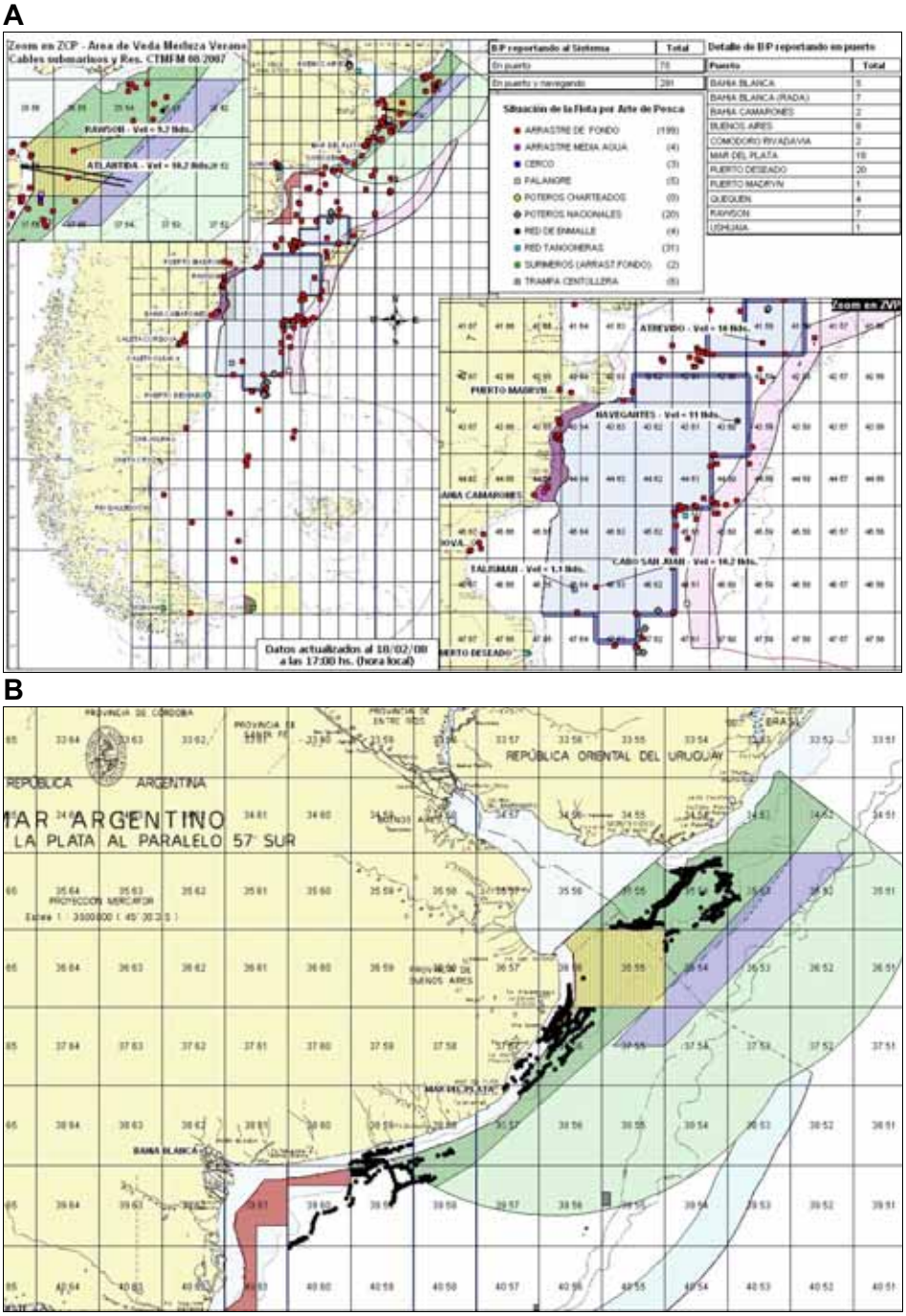


Figura 8: **A** Visualización de los datos de posicionamiento satelital de la flota pesquera argentina, con indicación del arte de pesca, áreas de veda y zona de esfuerzo restringido.
B Posición de la flota operando sobre condrictios en el verano de 2008.

Cuadro 13: Exportaciones y desembarques de los principales productos en 2007

Especie	Producto	Tipo	FOB	t.	Coef.	Peso vivo	Captura	Dif	% Mer. Int.
Gatuzo	Aletas secas		2 132 712	93					
	Carnes congeladas	Alas/collares	64 720	19					
		Otros	31 584	5					
	Cartílago seco		137 820	8					
	Entero	Congelado	334 414	121	1	121			
	Filetes congelados	Sin piel y poca espina	1 398 712	576	0,286	2 015			
		Sin piel y sin espinas	617 492	274	0,286	957			
	Filetes frescos	Sin piel y sin espinas	948	0	0,286	1			
	H&G	Congelado	83 333	54	0,541	99			
Total gatuzo			**4 801 736**	**1 149**		**3 193**	**9 142**	**5 949**	**65%**
Cazón	Carnes congeladas	Alas/collares	10 842	2					
	Colas secas		14 900	1					
	Filetes congelados	Sin piel y poca espina	139 180	60	0,37	162			
		Sin piel y sin espinas	25 037	11	0,37	29			
	H&G	Congelado	62 270	31	0,541	57			
Total cazón			**252 230**	**104**		**248**	**128**	**-120**	**-94%**[32]
Pez gallo	Aletas secas		31 551	1					
	Carnes congeladas	Alas/collares	179 460	48					
	Entero	Congelado	14	0	1	0			
	Filetes congelados	Sin piel y poca espina	366 733	165	0,282	585			
		Sin piel y sin espinas	86 953	42	0,282	151			
	H&G	Congelado	4 129	4	2,3	9			
Total pez gallo			**668 840**	**260**		**745**	**1 688**	**944**	**56%**
Raya	Carnes congeladas	Alas/collares	15 723 068	6 995	0,30	23 316			
		Cachete	219 104	65					
		Filetes	871 546	178					
	Cartílago seco		1 121 292	62					
	Entero	Congelado	5 323 672	3 780	1	3 780			
	Filetes congelados	Sin piel y p/esp. desg.	25	0					
		Sin piel y sin espinas	62 320	11					
Total raya			**23 321 027**	**11 090**		**27 035**	**28 035**	**1 000**	**4%**
Tiburón	Aletas secas		502 597	11					
	Cartílago		789 598	46					
	Colas secas		13 328	0					
	Filetes congelados	Sin piel y sin espinas	41 488	17					
	H&G	Congelado	168 192	139	0,542	256			
Total tiburón			**1 515 202**	**212**		**256**	**1 037**		
Pez ángel	Carnes congeladas	Alas/collares	183 882	87					
		Otros	24 846	5					
		Porciones de filete	33 902	15					
	Cartílago seco		206 888	13					
	Colas secas		190 955	8					
	Entero	Congelado	1	0	1	0			
	Filetes congelados	Sin piel y poca espina	1 125 144	490					
		Sin piel y sin espinas	703 292	291					
	H&G	Congelado	231 238	102					
	Otros secos, sal. s/ahum		32 126	1					
Total pez ángel			**2 732 274**	**1 013**		**0**	**4 294**		

[32] Las exportaciones de cazón pueden incluir capturas referenciadas como “Tiburón nep”.

Principales países de importación y exportación (Cuadro 14)

Cuadro 14: Destino de las exportaciones en 2007

Especie	Destino	t.	FOB
Cazón	Brasil	62	146 125
	Italia	17	34 187
	Australia	14	32 062
	China, RAE de Hong Kong	2	16 389
	Uruguay	3	6 182
	España	5	5 685
	Indonesia	1	5 074
	Singapur	0	3 875
	Tailandia	1	2 248
	Chile	0	404
Total cazón		104	252 230
Gatuzo	China, RAE de Hong Kong	79	1 560 160
	Brasil	594	1 437 129
	Italia	164	406 445
	Singapur	14	335 600
	Indonesia	18	301 308
	Tailandia	103	249 716
	México	93	190 218
	Japón	8	137 820
	Federación de Rusia	17	35 556
	Canadá	5	31 584
	Australia	10	25 211
	Uruguay	9	24 647
	Bulgaria	9	20 021
	Francia	8	15 026
	Malta	4	8 961
	Ucrania	4	8 778
	Moldava	2	4 851
	Malasia	2	4 100
	China	4	2 316
	Rumania	0	1 063
	España	1	813
	Chile	0	364
	Alemania	0	47
Total gatuzo		1 149	4 801 736
Pez gallo	Brasil	100	247 119
	China, RAE de Hong Kong	40	143 640
	España	44	67 447
	Bulgaria	21	44 504
	Singapur	5	35 549
	Indonesia	4	31 522
	Italia	11	30 944
	Federación de Rusia	17	30 773
	Ucrania	16	30 261
	Uruguay	1	3 140
	Australia	1	2 202
	Chile	1	1 300
	Perú	0	288
	Portugal	0	84
	Lituania	0	53
	Alemania	0	14
Total pez gallo		260	668 840

Especie	Destino	t.	FOB
Raya	República de Corea	7 310	14 464 576
	Francia	2 382	5 967 748
	Japón	62	1 121 302
	España	387	590 480
	Bélgica	163	428 784
	República Popular Democrátíca de Corea	198	325 901
	China	494	234 956
	Estados Unidos de América	22	59 380
	Italia	22	58 659
	Argelia	27	50 934
	Lituania	18	11 283
	Portugal	3	4 006
	Bulgaria	1	1 848
	Belarús	2	874
	Perú	0	290
	China, RAE de Hong Kong	0	6
Total raya		11 090	23 321 027
Tiburón	Estados Unidos de America	29	505 930
	Singapur	5	303 097
	China, RAE de Hong Kong	6	212 827
	Italia	131	155 392
	Bélgica	13	143 888
	Reino Unido	7	124 100
	Francia	21	45 300
	Chile	1	22 668
	Uruguay	0	2 000
Total tiburón		212	1 515 202
Pez ángel	Brasil	811	1 886 632
	Federación de Rusia	97	221 818
	Japón	13	206 888
	Singapur	7	169 105
	Estados Unidos de América	32	67 922
	China, RAE de Hong Kong	2	52 180
	Belarús	21	48 645
	Bulgaria	9	19 594
	Ucrania	7	15 644
	Canadá	2	13 968
	Indonesia	3	12 674
	Suecia	3	8 222
	México	3	6 907
	Tailandia	1	1 983
	España	0	92
Total pez ángel		1 013	2 732 274

En cuanto a las importaciones de condrictios (Cuadro 15), las mismas corresponden a la posición arancelaria 0303 75.00 (Escualos congelados) la que incluye las siguientes especies: gatuzo, cazón y tiburón espinoso. Las importaciones de rayas no pueden ser determinadas dada la ausencia de apertura en el nomenclador común MERCOSUR.

Cuadro 15: Importaciones de condrictios

Período	Toneladas	USD
1998	1	2 600
2004	5,5	11 000
2006	15	18 000

Arancel de importación para las especies de tiburones (Cuadro 16)

Cuadro 16: Derechos de importación

Posición	Descripción	Arancel
Pescado fresco		**DIEZ***
0302.65.00	Escualos	10%
0302.65.00.110	Gatuzo en envases de contenido neto inferior o igual a 1 kg	10%
0302.65.00.120	Cazón en envases de contenido neto inferior o igual a 1 kg	10%
0302.65.00.130	Tiburón espinoso en envases de contenido neto inferior o igual a 1 kg	10%
0302.65.00.910	Otros envases de gatuzo	10%
Posición	**Descripción**	**Arancel**
0302.65.00.920	Otros envases de cazón	10%
0302.65.00.930	Otros envases de tiburones espinosos	10%
Pescado congelado		
0303.75.00	Escualos	10%
0303.75.00.110	Gatuzo en envases de contenido neto inferior o igual a 1 kg	10%
0303.75.00.120	Cazón en envases de contenido neto inferior o igual a 1 kg	10%
0303.75.00.130	Tiburón espinoso en envases de contenido neto inferior o igual a 1 kg	10%
0303.75.00.910	Otros envases de gatuzo	10%
0303.75.00.920	Otros envases de cazón	10%
0303.75.00.930	Otros envases de tiburones espinosos	10%
Pescado seco, incluso salado, sin ahumar		
0305.59.20	Aletas de tiburón	0%
0305.59.20.100	Aletas de gatuzo	0%
0305.59.20.200	Aletas de cazón	0%
0305.59.20.300	Aletas de tiburón espinoso	0%
0305.59.90	Otros pescado secos, incluso salados, sin ahumar	10%
0305.59.90.110	Otros productos de gatuzo	10%
0305.59.90.120	Otros productos de cazón	10%
0305.59.90.130	Otros productos de tiburón espinoso	10%
0305.59.90.200	Raya	10%

El arancel del diez por ciento corresponde al derecho de importación que deben pagar los productos procedentes de países no pertenecientes al MERCOSUR.

Otras informaciones

- Si bien en la Argentina se han certificado algunas pesquerías y se ha adoptado un sistema de documentación de capturas para merluza negra, este tipo de certificaciones no se aplican a estas pesquerías, a la fecha.

- La Argentina no está involucrada en el comercio de las espécies de tiburones actualmente incluídas en los Apéndices de la CITES.

Medidas necesarias para mejorar el seguimiento del comercio de productos derivados del tiburón

La Argentina está abocada al desarrollo de un sistema de trazabilidad de los productos pesqueros a fin de asegurar la cadena de custodia de los desembarques. Debe encarar restricciones de carácter presupuestario y la necesidad de capacitar personal en los distintos estamentos involucrados.

- Dificultades en la identificación de las especies en comercio
- Comercio ilegal y no declarado
- La falta de capacidad técnica de los funcionarios de aduanas

Estos puntos ya han sido tratados en el documento y forman parte de las dificultades internacionalmente reconocidas que han originado la necesidad del desarrollo e implementación de los planes de acción nacional.

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ANEXOS

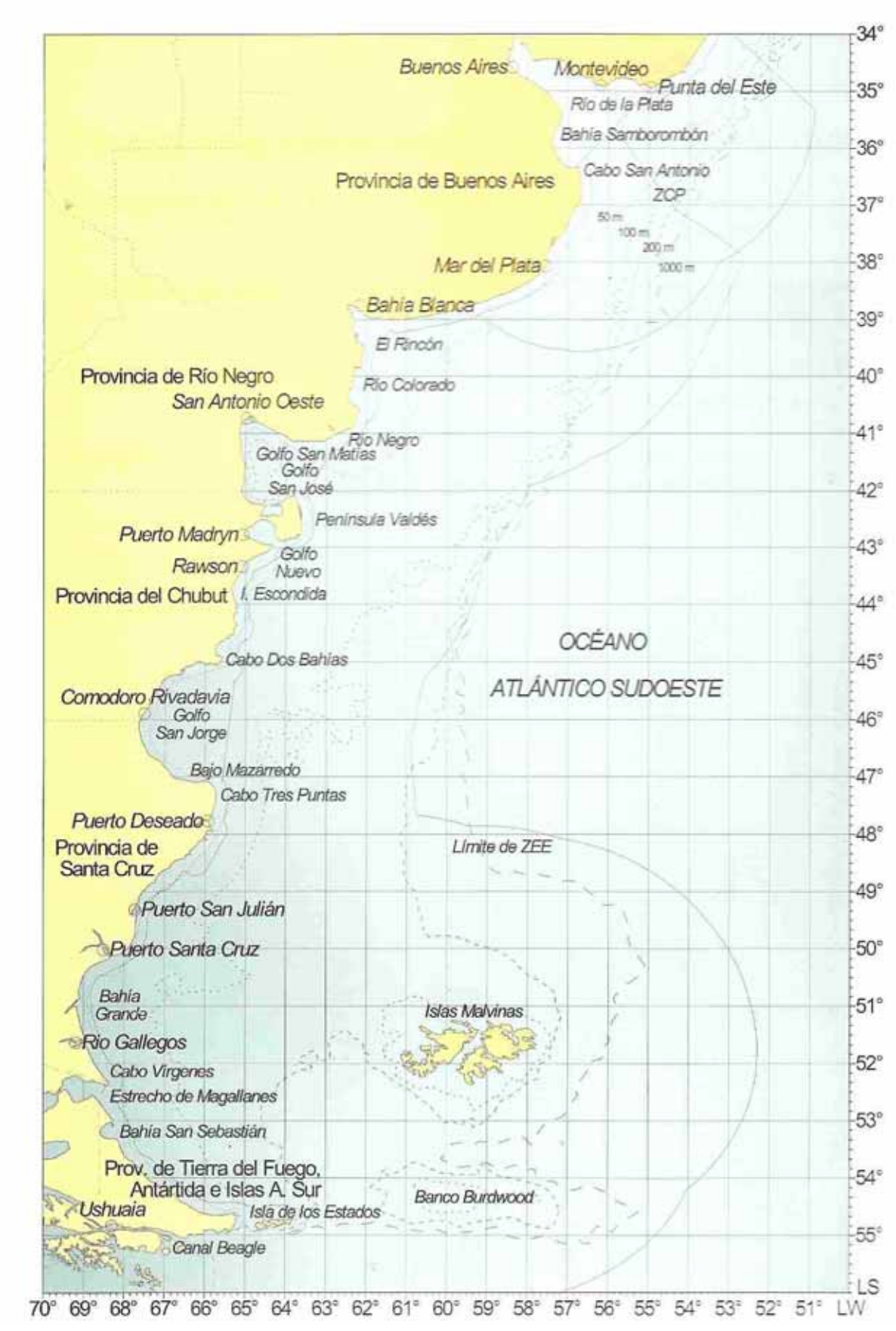
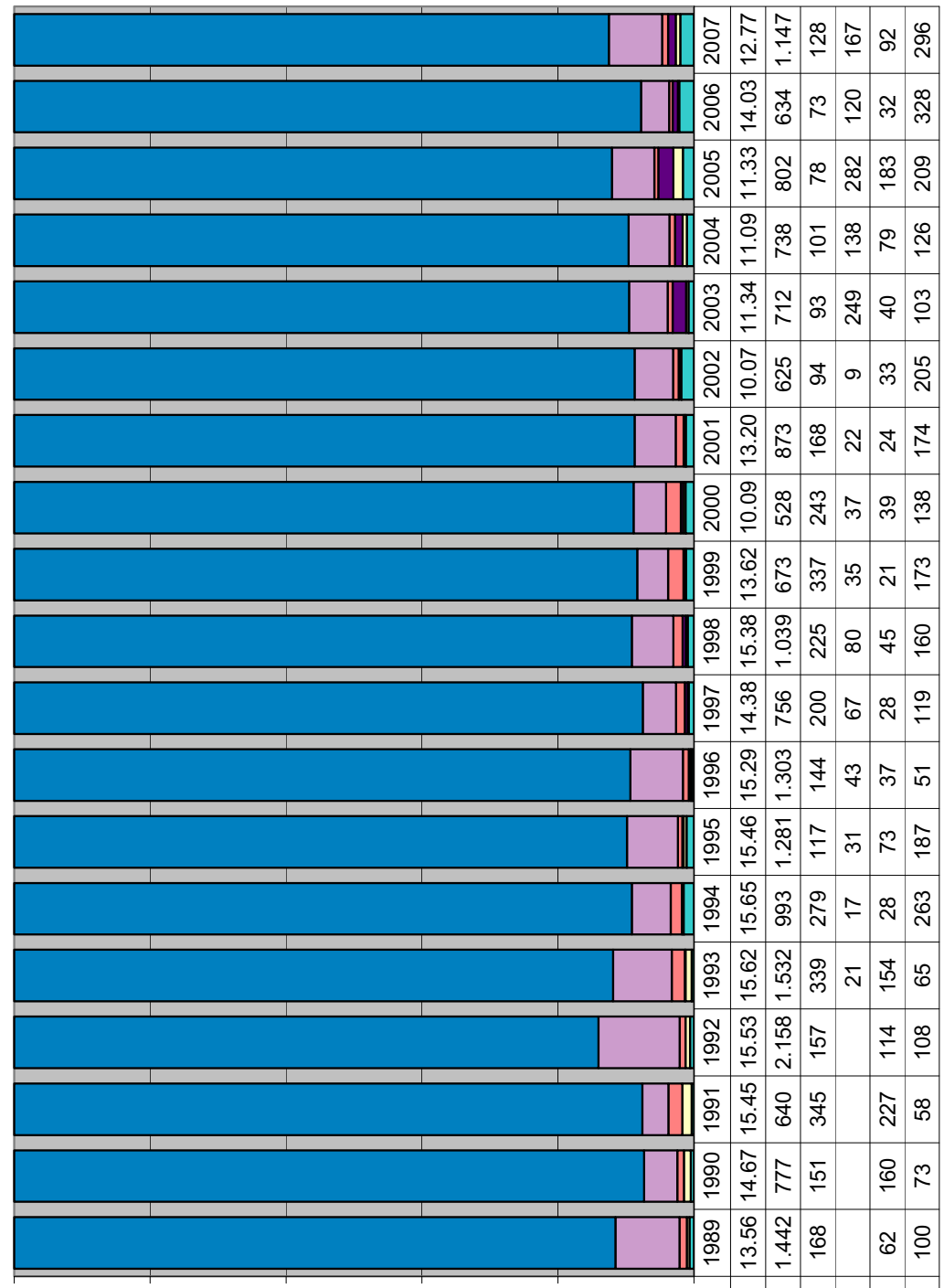
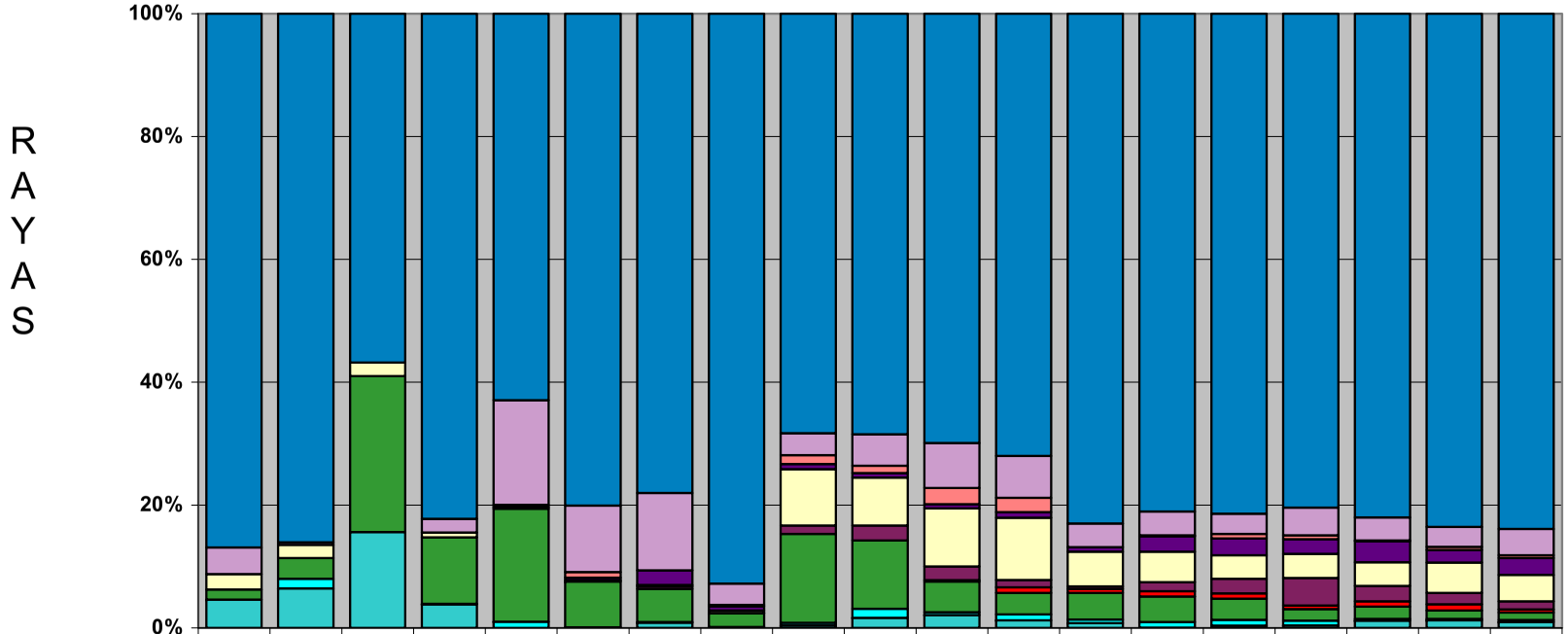


Figura I: Litoral de la República Argentina y región marítima adyacente



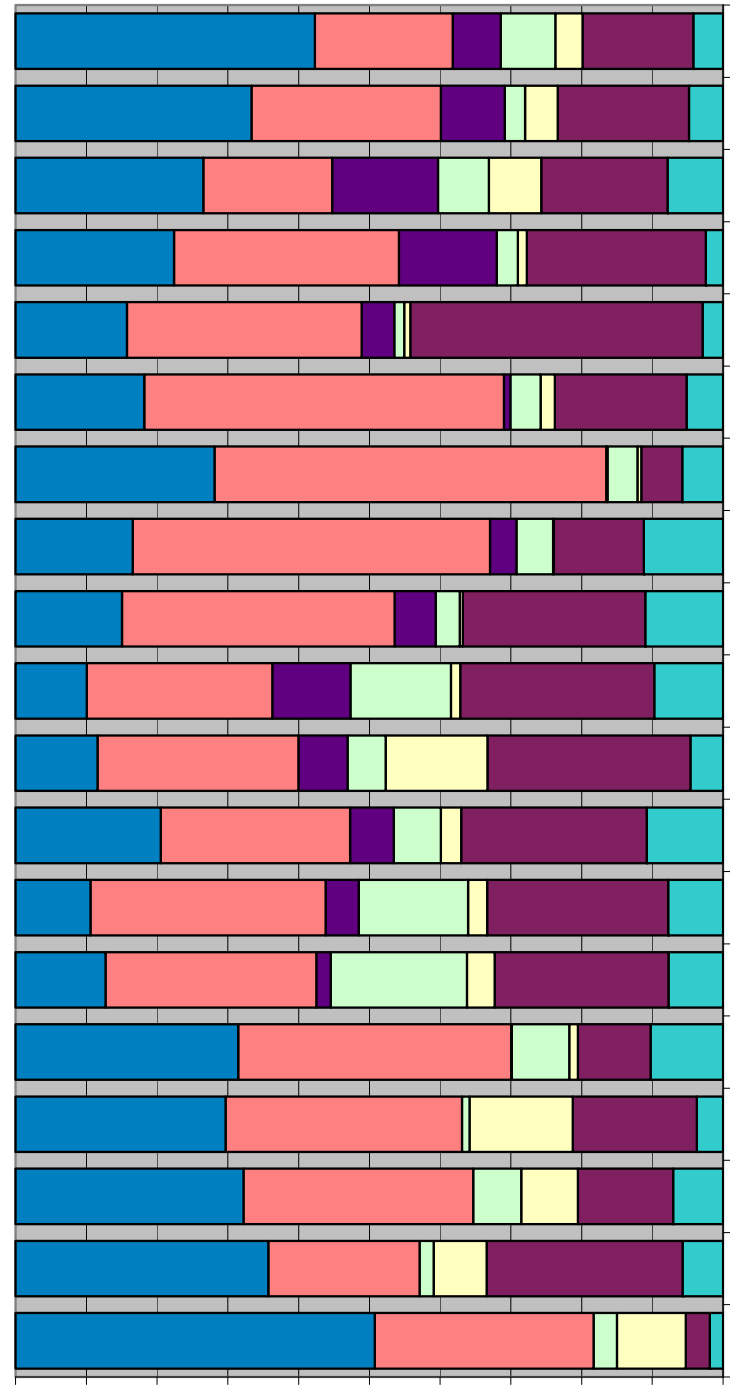
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
MAR DEL PLATA	13.56	14.67	15.45	15.53	15.62	15.65	15.46	15.29	14.38	15.38	13.62	10.09	13.20	10.07	11.34	11.09	11.33	14.03	12.77
NECOCHEA/QUEQUEN	1.442	777	640	2.158	1.532	993	1.281	1.303	756	1.039	673	528	873	625	712	738	802	634	1.147
SAN ANTONIO OESTE	168	151	345	157	339	279	117	144	200	225	337	243	168	94	93	101	78	73	128
SAN ANTONIO ESTE					21	17	31	43	67	80	35	37	22	9	249	138	282	120	167
MADRYN	62	160	227	114	154	28	73	37	28	45	21	39	24	33	40	79	183	32	92
OTROS PUERTOS	100	73	58	108	65	263	187	51	119	160	173	138	174	205	103	126	209	328	296

Figura II: Principales puertos de desembarque de tiburones



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
MAR DEL PLATA	797	403	128	626	579	4.771	5.316	11.577	8.286	10.173	8.855	9.567	14.136	11.937	14.220	14.615	18.410	19.735	23.530
NECOCHEA/QUEQUEN	40	2		17	157	642	858	435	430	764	928	906	649	566	576	815	845	774	1.200
SAN ANTONIO OESTE						56		31	178	175	337	313	3	23	131	122	28	113	125
SAN ANTONIO ESTE					4	26	163	82	98	110	83	118	123	366	477	431	769	482	770
MADRYN	23	10	5	6	2	12	13	47	1.115	1.160	1.199	1.346	964	734	667	712	862	1.172	1.207
COMODORO RIVADAVIA						2	31	10	166	360	286	162	73	216	418	809	565	443	373
CALETA OLIVIA/PAULA										1	27	122	107	129	149	108	192	238	134
PTO. DESEADO	15	16	57	82	169	442	367	283	1.756	1.653	631	467	738	609	597	339	455	322	352
USHUAIA		7		1	9	0	4	6	50	217	57	125	104	133	168	143	62	49	82
OTROS PUERTOS	42	30	35	29	0	6	60	9	50	243	266	163	130	10	65	76	262	294	274

Figura III: Principales puertos de desembarque de rayas



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
MAR DEL PLATA	458	379	253	146	230	148	99	169	161	185	303	248	282	193	284	393	572	602	714
SAN ANTONIO OESTE	279	227	255	164	282	347	310	220	395	483	779	755	555	539	598	559	392	483	329
SAN ANTONIO ESTE					1	24	44	51	97	202	117	55	2	9	84	242	323	163	115
RAWSON	30	21	53	5	59	224	144	55	75	262	68	78	43	46	25	53	155	51	130
MADRYN	88	79	63	72	9	46	25	23	200	24	9	2	5	21	16	23	159	83	65
COMODORO RIVADAVIA	31	294	106	86	75	286	238	216	399	505	521	190	58	198	745	444	385	335	264
OTROS PUERTOS	17	61	55	18	75	90	72	89	64	179	222	167	58	55	52	43	169	87	71

Figura IV: Principales puertos de desembarque de quimeras

Cuadro 1: Rendimientos en toneladas por día

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Gatuzo										
I	0,21	0,23	0,28	0,40	0,33	0,32	0,23	0,30	0,32	0,32
II	0,55	0,48	0,44	0,57	0,61	0,55	0,55	0,55	0,52	0,49
III	0,64	0,64	0,56	0,54	0,37	0,50	0,36	0,47	0,32	0,37
IV	0,06	0,11	0,08	0,06	0,08	0,12	0,11	0,15	0,28	0,14
V	0,02	0,09	0,02	0,08	0,05	0,02	0,06	0,00	0,02	
Resto de tiburones										
I	0,20	0,25	0,17	0,23	0,26	0,28	0,24	0,26	0,28	0,26
II	0,22	0,21	0,21	0,22	0,24	0,23	0,25	0,26	0,23	0,23
III	0,23	0,21	0,22	0,23	0,23	0,18	0,13	0,19	0,15	0,14
IV	0,04	0,03	0,03	0,04	0,04	0,04	0,05	0,05	0,05	0,03
V	0,03	0,04	0,02	0,04	0,02	0,03	0,02	0,01	0,04	0,10
Rayas										
I	0,23	0,33	0,37	0,54	0,52	0,41	0,41	0,49	0,44	0,45
II	0,20	0,20	0,24	0,29	0,29	0,39	0,40	0,50	0,44	0,62
III	0,18	0,14	0,16	0,20	0,16	0,23	0,21	0,32	0,31	0,43
IV	0,28	0,23	0,20	0,21	0,19	0,22	0,22	0,32	0,32	0,34
V	0,19	0,19	0,21	0,19	0,13	0,12	0,10	0,14	0,16	0,15
Quimeras										
I	0,17	0,14	0,15	0,14	0,26	0,23	0,23	0,32	0,34	0,33
II	0,19	0,25	0,21	0,21	0,22	0,26	0,16	0,19	0,21	0,17
III	0,03	0,05	0,04	0,04	0,09	0,12	0,12	0,28	0,21	0,19
IV	0,01	0,02	0,00	0,01	0,02	0,05	0,03	0,08	0,04	0,03
V	0,26	0,00		0,00	0,01	0,01	0,06	0,01	0,01	0,00

Listado de siglas utilizados en el texto

AFIP	Administración Federal de Ingresos Públicos
CCRVMA=CCAMLR	Comisión para la Conservación de los Recursos Vivos Marinos Antárticos
CFP	Consejo Federal Pesquero
CINCOPE	Centro Integrado Control de Actividades Pesqueras
CMP	Captura Máxima Permisible
CPUE	Captura por unidad de esfuerzo
CTMFM	Comisión Técnica Mixta del Frente Marítimo
FODA	Análisis de Fortalezas, Oportunidades, Debilidades y Amenazas
INIDEP	Instituto Nacional de Investigación y Desarrollo Pesquero
MERCOSUR	Mercado Común del Sur
MOA	Manufacturas de Origen Agropecuario
SAGPyA	Secretaría de Agricultura, Ganadería, Pesca y Alimentos
SENASA	Servicio Nacional de Sanidad y Calidad Agroalimentaria
SICAP	Sistema Integrado de Control de Actividades Pesqueras
SSPyA	Subsecretaría de Pesca y Acuicultura

GHANA

Paul Bannerman
Marine Fisheries Research Division, Ministry of Fisheries

1. BACKGROUND INFORMATION ABOUT THE SHARK FISHERIES

The shark fishery in Ghana is normally dominated by the artisanal fishers although trawlers do land the species occasionally as bycatch or incidental catches. The artisanal sector of the industry accounts for over 70% of marine fish production annually and has dominated the Ghanaian fishing industry over the decades. This sector of the economy, with over ten thousand canoes, of which approximately half are motorized by low powered out-board engines, has over one hundred thousand fishers. Various methods of fishing are carried out by this sector creating employment in the coastal rural communities, as well as providing a cheap but rich source of protein.

The main types of fishing gears used by the artisanal fishers (namely encircling nets, beach seines, set nets, line and drift gillnets) have different geographical distributions along the coast. The dominance of a particular type of gear in a particular area is influenced by the target species sought. The beach seine is widely used in the Volta Region, particularly around the mouth of the Volta River and other estuarine areas, to exploit juveniles of fish species whilst drift gillnets are predominant in the western and central regions exploiting large pelagics, sharks and tuna-like species.

Main types of shark fishery in Ghana
The main types of shark fisheries (direct and bycatch fisheries), including fishing methods, gear types, and the location of the main fishing grounds are:

- Small drifting gillnets (more specific fishery)
- Bottom trawls (bycatch or incidental)
- Fixed set nets (occasional)
- Purse seines (bycatch or incidental)

Drifting gillnet fishery: Small drift-gillnets operators in the Central and particularly the Western coast of Ghana have exploited these off shore species since 1974 including the large pelagics (tunas). These nets operate on the surface or at certain distances below it, and drift freely with the current. They vary in length between 180–650 m and often between 2–50 m in depth. Usually they are operated by 10–12 fishers with an out-board driven canoe. These nets are set anytime after sunset and hauled several times during the night. Meshes range from 45–50 mm.

Bottom trawling: Industrial bottom trawling vessels occasionally catch sharks but their quantities are not clearly known as the majority are cut into pieces and some parts thrown back after fins are removed.

Purse seiners: Tuna purse-seiners using encircling nets of depths 200 m with lengths up to 1.5 km encounter schools of fish whilst pursing them up to be hauled.

The main fishing grounds are generally off the Western shelf of the coast of Ghana (Latitude 5N–2 S; Longitude 1E–1W). Other fishing grounds cover parts of the central and western shelf of the coast, but specifically off Kpone and Tema, Apam and Saltpond, Shama, Discove and Akim. Approximately 18 000 people (inclusive of fishers, their dependants, processors and buyers) are involved in the fishery (Table 1).

Table 1: Number of people involved in each fisheries category and district. Information from the Canoe Frame survey 2004– Amador et al 2006 43pp MFRD Information report No. 34. *Information on Dependants from personal communication with fishermen

DISTRICT	Fishing villages	Landing beach	Drifting net	Canoes	Fishers	% DGN canoes	No of fishers DGN	*No of dependents	Total fishers/ dependants
Volta region	29	63	3	736	17 382	0.41	18	90	108
Greater Accra Region	48	68	81	2 781	35 168	2.91	486	2 430	2916
Central Region	43	103	63	6 345	44 747	0.99	378	1 890	2 268
Western region	75	100	373	3 157	27 366	11.82	2 238	11 190	13 428
Mean no. of fishers per canoe 6									
Dependants per fisherman 5 (1 Wife +4 children minimum)									

The contribution of shark fisheries to the National economy is unknown but presumed to be low. However, the contribution to local economy can be significant (see Box 1).

BOX 1

Contribution of shark fishing to local economies in Ghana

"Shark fins bring us fast money, it is good business, my brother," fisherman Nii Attoh, 42, explained. "We need money to acquire new fishing gear, our canoes are leaking, we have been using these same old fishing nets for years, our outboard motors are old, and we need quick cash which herrings and anchovies cannot provide readily." Sharks are a valuable fishery for their fins, a delicacy in Asia.

Though the shark fin business has been going on for years in Ghana, it was limited to a small number of fishermen who cut off the fins of sharks caught accidentally while they pursued other species. Now, exploitation of sharks for their fins is big business and widespread in Ghana. There is an influx of dozens of expert Ghanaian shark fishermen who once lived in Sierra Leone and operated in the waters there. Fleeing from that war torn country, these fishermen, who have been running after sharks for decades, are back in Ghana. Not only have they swelled the number of fishermen hunting sharks in Ghanaian waters, they are recruiting more fishermen and offering them free tutorials on "effective shark hunting techniques," said one fisherman

Source: Shark Exploitation in Ghana -Hastens Global Collapse, ACCRA, Ghana, August 27, 2001 (ENS).

Table 2 lists the main species of sharks exploited in Ghanaian coastal waters, including their frequency of occurrence, types of fisheries and uses. Shark fins are traded within this sub-region and with Asian markets. The meat is eaten locally by fishers.

Table 2: Main species of sharks being exploited in Ghana. Mean occurrence of common shark species per month (1–2 individuals occasional, but could be 0 for 6 months; 3–10 common; very common >10–30) (compiled by D.W. Ofori-Adu, Taxonomist/Retired Chief Technical Officer Ministry of Fisheries).

English name	Scientific name	Occurrence	Fishing method	Common size	Use
Milk shark	*Rhizoprionodon acutus*	Very common; occurs mostly in coastal waters, 10–50 m depth	Bottom trawls, Lines and Set nets.	20–60 cm	Marketed locally in fresh, smoked and dried salted form
Blue shark	*Prionace glauca*	Very common species, occurring mostly offshore	Drifting and fixed gillnets	100–200 cm	Marketed fresh, smoked and fried salted
Common guitar fish	*Rhinobatos rhinobatos*	Common species; occurs mostly in inshore waters	Bottom trawls and set nets	10–50 cm	Mostly smoked, sometimes dried salted
Smooth hound shark	*Mustelus mustelus*	Common species; occurs mostly inshore, 10–50 m depth.	Bottom trawls, set nest and Purse seines	15–60 cm	Mostly smoked.
Smooth-back angel Shark	*Squatina aculata*	Common species; occurs inshore and offshore waters (20–50 m depth)	Bottom trawls and bottom set nets.	20–50 cm	Marketed dried salted
White-spotted guitar fish	*Rhinobatos albomaculatus*	Common species; occurs mostly inshore 20–50 m depth	Bottom trawls, set nets and sometimes purse seines	15–60 cm	Mostly smoked
Saw-back angel shark	*Squatina aculeate*	Common species, mostly inshore 10–50 m depth	Bottom trawls and lines	15–60 cm	Mostly smoked
Thresher shark	*Alopias superciliosus*	Common species; occurs inshore and offshore	Bottom trawls, lines, drifting gillnets and set nets	10–120 cm	Dried salted, smoked
Small-tooth saw fish	*Pristis pectinata*	Common species in shallow coastal waters	Drifting gillnets, long line and bottom trawls	–	Fresh and smoked

Tiger shark	*Galeocerdo cuvier*	Common species in inshore and offshore waters	Drifting and fixed gillnets, lines and set nets	100–200 cm	Marketed smoked and fried salted
Large tooth saw fish	*Pristis microdon*	Common species in shallow coastal waters	Drifting gillnets, purse seines and set nets	100–200 cm	Marketed fresh and smoked
Common saw fish	*Pristis pristis*	Occasional species, occurs in shallow coastal waters	Longline and bottom trawls	100–250 cm	Marketed fresh and smoked
African saw-tail cat shark	*Galeus polli*	Occasional species, occurs in shallow coastal waters	Bottom trawls	20–40 cm	Marketed smoked, dried salted
Angel shark	*Squatina squatina*	Occasional species in inshore and offshore waters	Bottom trawls and lines	50–70 cm	–
African wedge fish	*Rhynchobatus luebberti*	Occasional species in shallow coastal waters	Bottom trawls	80 cm	–
Low fin gulper shark	*Centrophorus lucitanica*	Occasional species in offshore deep waters	Drifting gillnets and set nets	50–90 cm	Marketed dried salted and smoked
Velvet-belly shark	*Etmopterus spinax*	Occasional species in offshore waters	Drifting gillnets	20–30 cm	Marketed dried salted and smoked
West African cat shark	*Segliorhinus carvigoni*	Occasional species in inshore and offshore waters, mostly 40–50 m	Bottom trawls and set nets	30–50 cm	
Whale shark	*Rhiniodon typus*	Occasional species in coastal waters and open sea	Purse seine	500–700 cm	Marketed dried slated; low patronage by locals.

Despite the available information on species being caught, for catch records and statistics in Ghana, all sharks are grouped as “sharks” and not separated by species.

The status of shark resources is unknown. Table 3 and figures 1 and 2 show a declining trend in CPUE of sharks and an increase in effort of the artisanal drift gillnet fishery in Ghana between 1999 and 2007.

A National Plan of Action for Sharks is yet to be developed and implemented in Ghana.

Table 3: Catch and effort trends of sharks from the artisanal drift gillnet fishery in Ghana

Year	Catch (tonnes)	Effort (No. of trips)
1996	1 106	27 723
1997	709	43 211
1998	1 764	32 199
1999	3 998	23 168
2000	1 670	28 833
2001	2 092	29 872
2002	2 451	34 221
2003	1 308	35 926
2004	1 170	89 935
2005	4 292	76 033
2006	974	106 693
2007	702	112 376

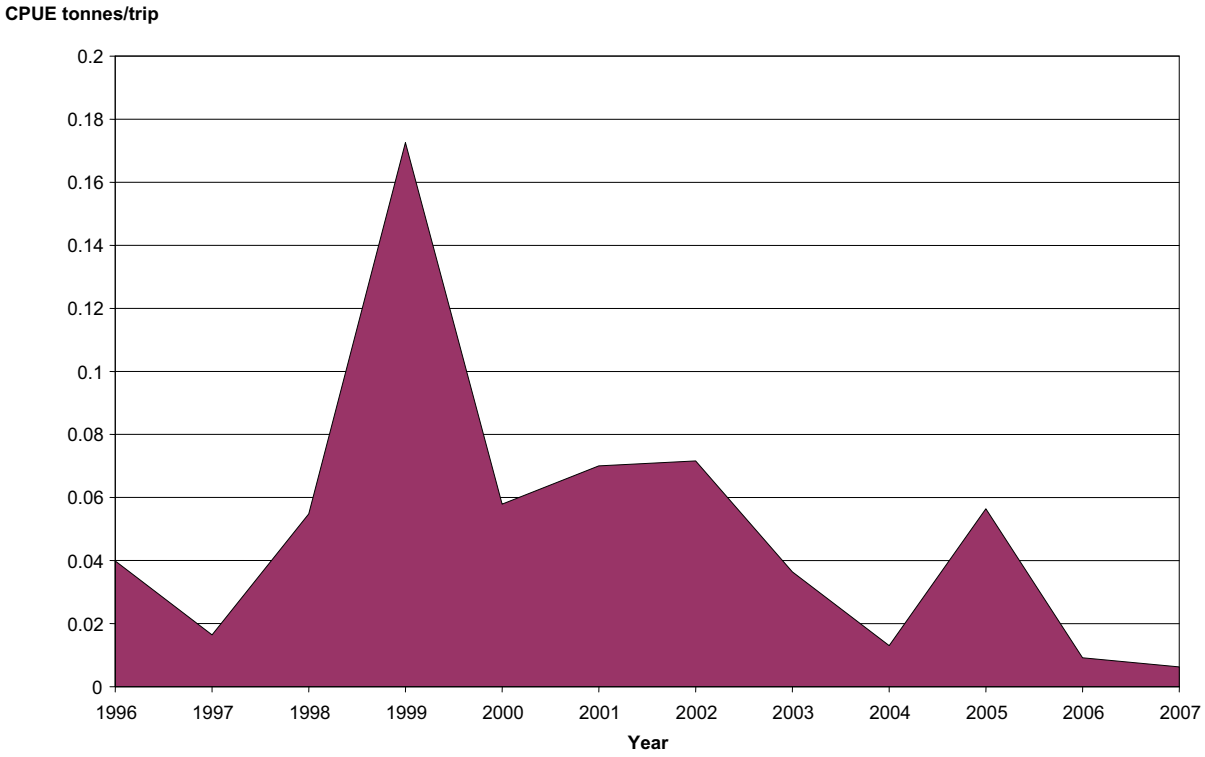


Figure 1: Trend in CPUE (tonnes/trip) of the drift gillnet fishery

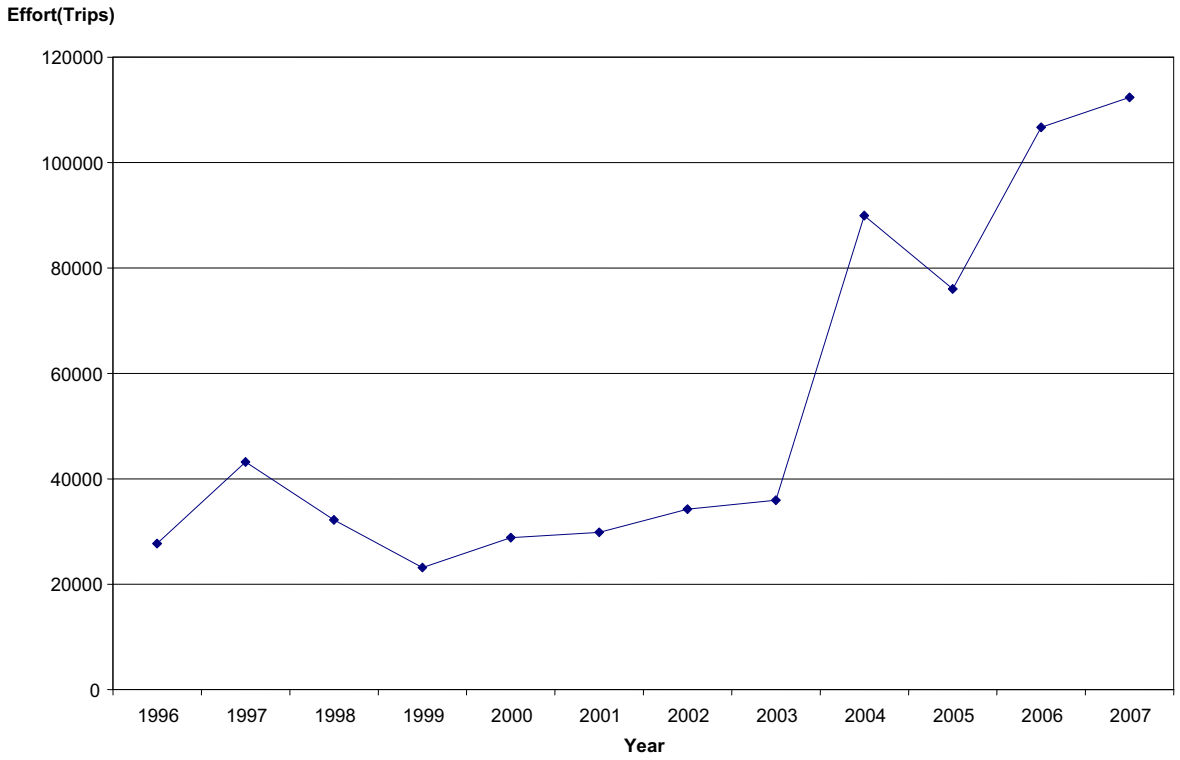


Figure 2: Trend in effort (no. trips) of the drift gillnet fishery

2. DATA AVAILABILITY AND FISHERY MONITORING SYSTEM

Agencies/organizations responsible for the monitoring of shark fisheries

- Ministry of Fisheries, through its Research Division, is responsible for monitoring shark fisheries especially catch and effort trends.
- The Department of Oceanography and Fisheries (University of Ghana) and the Department of Biological Sciences (University of Cape Coast) often assign project work on sharks for students at the Masters level.

Participation in regional fisheries management organizations

Ghana's participation in RFMO's regarding shark conservation and management on the high seas has been low. Stock levels are unknown as there has been no concerted effort at initiating a plan of action on conserving migratory endangered sharks.

Ghana participated in a recent meeting of the UNEP Convention on the Conservation of Migratory Stocks (CMS), held in Mahe, Seychelles, 11–13 December 2007, with the objective to elaborate an option for international cooperation for the conservation of and management of migratory sharks. The recommendations of Ghana at the meeting were focused on:

- Creation of a database on shark by species; (catch effort time series).
- Collaboration with local universities and other institutions to strengthen the research base on sharks.
- The need to define a clear list of species and a binding instrument to cover all types of shark species (migratory, endangered, endemic, overexploited, etc.).

Fishery data collection systems

No clear distinct manual is used for the identification of shark species. Only a field guide to fishes in general[1] has been used to identify common sharks such as the common features of the family Carcharhinidae, the blue shark and milk shark which are common in Ghanaian coastal waters.

Also, ICCAT is developing plastic species identification forms for contracting parties, as recommended in SCI–055/08 in 2007.

The fishery data collected includes catch, effort (trips), CPUE, price. The method used in the statistical sampling program is described below.

Methods for the statistical sampling of shark catches

The collection of landing statistics is, therefore, carried out by sampling rather than total coverage or census. For this reason, canoe frame surveys are conducted periodically to form the basis for estimating artisanal catches. For instance, the results of the Canoe Frame Survey conducted in 2004 have shown that there were 11 213 canoes operating different gears from 195 fishing villages with a total of 334 landing beaches along 550 km of coastline. Of these, 520 canoes were operating the drift gillnet from 17 coastal districts (Amador *et al.,* 2004). The statistical sampling for fish species, including sharks, is part of the statistical sampling programme for the artisanal fleet landings by the Marine Fisheries Research Division (MFRD) of the Ministry of Fisheries. The sampling protocol, described by Koranteng (1989), is summarized as follows:

A three stage sampling survey system is used. The coastline is divided into four strata which corresponded to the country's four coastal administrative regions.

- First Stage Sampling or Primary Sampling Units (PSU): Sampling sites
- Second Stage Sampling or Sampling Units (SSU): Sampling Days
- Third Stage Sampling or Tertiary Sampling Units: (TSU) Canoes

Selection of Canoes for Sampling based on the numbers of canoes that actually operate at the centre on the sampling day. A table of random numbers guides the selection of the canoes to be examined. For a selected drift net canoe, the following data are recorded: catch of species, weight of species, effort (duration of absence), number of crew, value of the catch and the number of canoes that landed on the sampling day.

Estimation of catch

For each sampling site, the catch for the month is estimated based on the number of days on which samples were obtained. The figure obtained is then divided by the number of units (canoes operating the DGN) at the recording centre, to provide a mean catch for the DGN canoes at the centre. The mean for all centres in the region where the same gear is sampled are then combined to provide an overall mean for the region. This is then multiplied by the number of similar units (canoes) in the region as recorded in the frame survey. A national estimate is obtained by combining the regional estimates. It should be noted that all these mathematical processes are incorporated in the FAO ARTFISH (Stamatopoulos, 2002).

Main problems affecting the ability to adequately monitor shark fisheries

- Lack of a field guide specific for shark species in Ghana
- Lack of information on the current status of the resource base from independent surveys
- Limited coordination with the Universities and the Export Promotion Council on data sharing, e.g. shark fin export statistics
- Lack of adequate trained staff in taxonomy
- Lack of financial resources to undertake DNA samples and other biological studies
- Incidence of bycatch from other fisheries not reported e.g. hook and line and trawl
- Incidence of IUU activities and some transshipment

[1] Kwei E.A. & Ofori-Adu D.W. 2005. Fishes in the coastal waters of Ghana.

- Inadequate data on landings, catches and effort for sharks
- Little coordination on the collection of information on transboundary, straddling, highly migratory and high seas stocks of sharks

The current state of knowledge of sharks and the practices employed in shark fisheries cause problems in the conservation and management of sharks due to lack of available catch, effort, landings and trade data, as well as limited information on the biological parameters of many species and their identification. In order to improve knowledge on the state of shark stocks and facilitate the collection of the necessary information, adequate funds are required for research and management.

Ongoing projects or activities aimed at improving the monitoring of sharks fisheries country

There are no projects from the Ministry aimed to improve the monitoring of this specific fishery.

ICCAT supports the training of personnel and provides funds under foundations affiliated to tuna and billfish research which goes to supplement national efforts at collection and analysis of data for the sustenance of the fisheries

3. MONITORING OF TRADE IN SHARK PRODUCTS

Exports of all fish and fishery products from Ghana, including shark exports, must obtain export permits and health certificates prior to consignments being exported. The Ministry of Fisheries, Export Promotion Council, Standards Board and Port Health issues permits, which are applied for.

The Ministry, but more often the Export Promotion Council and Standards Board, makes an inspection of the products for certification based on quality, hygiene and packaging. Once satisfied, an export permit is issued to the exporter. The Department of Health also conducts an inspection of the products for the issuance of health certificates.

Based on the FOB value of the products the value of the consignment is indicated on the export permit. On the basis of this value, Customs and Excise charges are issued and documentation is completed for shipping. Shark fins is the main type of product in trade. The main export destination is Ivory Coast, Republic of Korea and the European Union.

The main problems affecting the ability to monitor the trade in shark products are:

- difficulties in identifying the species in trade
- illegal and unreported trade (Middlemen)
- lack of technical capacity of customs officers
- Other issues, considered particularly relevant for the shark trade between Gambia and Ghana include:

  – *Credit repayment problems:* Importers in Ghana encounter credit repayment problems. Products supplied to wholesalers are sometimes not paid for in good time or not paid for at all. This often leads to conflicts. It is recommended that wholesalers should of necessity belong to a co-operative organization, to which they should be financially committed. Such an organization should act as a guarantor for products supplied on credit;

  – *Single market problems:* The only reported destination for dried shark of Gambian origin is Ghana. The need for market diversification is imperative as policy changes in the destination market may adversely affect trade. Product diversification and taste-preference research should be conducted prior to test marketing in other target markets. This exercise should involve traders on sub-regional basis.

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CHINA, HONG KONG SPECIAL ADMINISTRATIVE REGION (SAR)

Agriculture, Fisheries and Conservation Department

1. BACKGROUND INFORMATION ABOUT THE SHARK FISHERIES

China, Hong Kong SAR's fishing fleet comprises some 4 000 vessels, almost all are mechanized. About 34 per cent of the vessels are over 15 metres in length. They are mainly trawlers, liners and gillnetters engaged in fishing mainly outside China, Hong Kong SAR waters along the northern continental shelf of the South China Sea. The remaining 66 per cent of the vessels are mainly gill netters, liners, purse seiners and cage trappers operating mainly in China, Hong Kong SAR's 1 600 km^2 territorial waters. In 2007, the total capture fisheries production was about 154 000 tonnes, valued at US$ 197 million.

China, Hong Kong SAR has no fishery targeting on sharks. Only very small quantities of sharks are caught as by-catch by long-liners and trawlers. The catches and landings of sharks by China, Hong Kong SAR fishing fleet between 1997 and 2007 are listed in Table 1. Shark production contributes less than 0.5 percent of the total production of China, Hong Kong SAR fishing fleet. As indicated in Table 1, only part of the shark catch was landed in China, Hong Kong SAR with the remaining landed in Mainland China.

Table 1: Shark production and landing by China, Hong Kong SAR fishing fleet between 1997 and 2007

Year	Shark Production (tonnes)	Shark Landing in China, Hong Kong SAR (tonnes)	Value of Shark Landing US$ ('000)
1997	420	211.4	269.4
1998	382	209.5	281.6
1999	300	115.7	143.9
2000	330	49.4	51.3
2001	370	28.6	31.6
2002	350	22.6	27.9
2003	320	17.8	27.6
2004	345	7.1	11.7
2005	330	26.7	58.7
2006	310	51.7	93.4
2007	no data	10.5	24.5

Sharks landed locally are mainly caught in Mainland China's waters. China, Hong Kong SAR fishing vessels operating in the waters of Mainland China are regulated by the fisheries authorities of Mainland China through a permit system.

The majority of sharks landed are small (less than 3 kg) but a few large sharks (over 50 kg) are caught occasionally. Small sharks caught are retained and sold as whole. Larger individuals are finned and the remaining parts are sold separately. Sharks are fully utilized in China, Hong Kong SAR fisheries. There is no problem with finning and discarding of shark at sea.

2. DATA AVAILABILITY AND FISHERY MONITORING SYSTEMS

In China, Hong Kong SAR, the Agriculture, Fisheries and Conservation Department monitors the operation and production of local fishing vessels mainly through a fishers interview programme, supplemented by other surveys such as patrol and fishing surveys. Under the programme, operators of fishing vessels of different types and lengths are interviewed to collect information about their recent fishing operations (e.g., fishing area, method and effort) and production (e.g. weight and value of fish catches) in and outside China, Hong Kong SAR waters. Besides, landings of fish, in terms of weight

and value are also collected, at wholesale fish markets are also collected to generate necessary statistics for monitoring purpose. Due to the small volume of landings and the difficulties in identifying species of sharks, however, no separate statistics are kept on the shark species caught and landed.

3. MONITORING OF TRADE IN SHARK PRODUCTS

Monitoring of international trade

In China, Hong Kong SAR, the overall import/export control, including commodity such as shark products, is administered by the Customs and Excise Department. There are also other agencies responsible for their specific aspects of concern, such as health and hygiene, endangered species, etc.

There are two main control points for international trade, namely the China, Hong Kong SAR International Airport and Kwai Chung Container Terminal. China, Hong Kong SAR is a free port and does not levy any tariff on the import of shark products. The vast majority of the products in trade are fins. In the past 10 years (1997–2007), Spain, Mainland China, Chinese Taipei and Singapore are the main places of import for shark products, while Mainland China, Japan, Chinese Taipei and Singapore are the main destination for re-export from China, Hong Kong SAR. A summary of trade data is provided in Table 2.

Under the Import and Export (Registration) Regulations, the Laws of China, Hong Kong SAR, every person who imports or exports any article other than an exempted article is required to lodge an accurate and complete import/export declaration to the Customs and Excise Department within 14 days after the importation/exportation of the article. Commodity details as required in the declaration including origin country, goods description, commodity code and quantity, are useful in identifying the source and types of the shark products in trade. Commodity codes in relation to sharks in the current China, Hong Kong SAR Imports and Exports Classification List (Harmonized System) are summarized in Table 3. Trade statistics compiled from import/export declaration are maintained by the Census and Statistic Department.

The import/export of CITES listed species is controlled in China, Hong Kong SAR and is administered by the Agriculture, Fisheries and Conservation Department

Table 3: Commodity codes in relation to sharks in the current China, Hong Kong SAR Imports and exports classification list (harmonized system)

Commodity code	Description
03026500	Dogfish and other sharks, excluding fillets, livers and roes, fresh or chilled
03037500	Dogfish and other sharks, excluding fillets, livers and roes, frozen
03055950	Sharks' fins (with or without skin), with cartilage, dried, whether or not salted but not smoked
03055960	Sharks' fins (with or without skin), without cartilage, dried, whether or not salted but not smoked
03056930	Sharks' fins (with or without skin), with cartilage, salted or in brine, but not dried or smoked
03056940	Sharks' fins (with or without skin), without cartilage, salted or in brine, but not dried or smoked
16042011	Sharks' fins, prepared or preserved, canned
16042091	Sharks' fins, prepared or preserved, not canned

Control of CITES species

The China, Hong Kong SAR Special Administrative Region implements CITES through the domestic legislation, the Protection of Endangered Species of Animals and Plants Ordinance, which fully complies with CITES provisions. The Ordinance stipulates that the international trade in CITES listed species shall be conducted under a permit system in accordance with CITES and that consignments shall be inspected by authorized officers on landing. The existing control and monitoring system for CITES species is effective and China, Hong Kong SAR does not have any particular difficulties in fulfilling the requirements of CITES in respect with the 3 listed shark species.

Addressing the limitations

Specimens of whale shark, basking shark and white shark in trade are easily recognizable due to their large fin size and/or distinctive pattern. However, the bulk of shark products in trade involves some twenty species other than these three species listed in CITES. On import, fins taken from various positions of a shark and from several shark species are usually found mixed in a single consignment. Moreover, quite a large portion of specimens in trade are parts or derivatives that have undergone treatment and lost their characteristic features. It is generally agreed that the identification of shark products to the species level would be difficult. Identification manuals which are targeted to non-experts and detailing the characteristics of the commonly traded species and commodities would be helpful. Dissemination of identification manual and training would enhance the technical capacity of frontline enforcement officers.

While DNA identification tools are recently being put forward as an aid to import/export control, they are still considered as being time consuming and having relatively high technical requirements. The time needed to give a positive result may make it impracticable in actual enforcement operations which usually require reasonable *prima facie* evidence to make a prompt decision on detaining a suspected consignment or not.

For the better control of CITES species, a cross field liaison group was established in China, Hong Kong SAR among relevant enforcement agencies within the government. The concerted effort of this liaison group has contributed to streamlining the exchange of intelligence and effective enforcement operations. The sharing of identification materials and training of frontline enforcement officers are also facilitated.

As the CITES Management Authority of China, Hong Kong SAR, the Agriculture, Fisheries and Conservation Department maintain close communication with the trade in shark fins and marine products. Through the network of trade association, importers, exporters, whole-seller and retailer in the field are well aware of the need for the control of international trade in CITES species and the regulations required under the domestic legislation. The trade also shows readiness to cooperate with enforcement agencies in implementing measures as required under the law. With a view to maintain the trade in a sustainable way and keep abreast of the latest international control of shark products, representatives from the trade in several occasions participated in CITES meetings.

From time to time, China, Hong Kong SAR has provided assistance to various authorities in investigating suspected illegal and unreported trade. We believe that the exchange of intelligence and bilateral cooperation could be essential to combat illegal and unreported trade. For as much as what we can do within the remit of local legislation, China, Hong Kong SAR would stand ready to cooperate with concerned authorities in combating illegal and unreported trade in shark products.

Table 2: The volume of trade (in tonnes) in shark products in China, Hong Kong SAR from 1997 to 2007

Commodity	Trade flow	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Shark fins, dried, whether or not salted but not smoked	Import	6 459	5 977	6 427	7 161	6 313	6 429	6 968	6 756	5 776	4 538	4 693
	Re-export	3 808	3 813	4 379	4 836	3 463	4 302	5 116	5 431	3 921	3 214	2 985
	Export	7	--	--	--	--	--	--	--	--	--	--
Shark fins, salted or in brine, but not dried or smoked	Import	2 211	2 347	2 531	4 289	4 149	4 510	5 384	4 285	4 753	4 824	5 490
	Re-export	1 954	2 360	2 475	3 710	3 068	4 625	3 997	3 128	3 213	2 744	2 685
	Export	1	--	--	--	--	--	--	--	--	3	--
Dogfish or other sharks, fresh or chilled	Re-export	--	--	1	--	--	--	--	--	--	--	--
Dogfish or other sharks, frozen	Import	30	--	25	11	85	3	45	5	--	--	--
	Re-export	--	--	--	11	29	--	20	--	--	--	--
Shark fins, prepared or preserved	Import	--	--	--	--	--	--	--	--	--	7	46
	Re-export	--	--	--	--	--	--	--	--	--	1	14

INDONESIA

Fhami
Indonesian Institute of Science

1. BACKGROUND INFORMATION ABOUT THE SHARK FISHERIES

Elasmobranch fishing in Indonesia, especially for sharks, has occurred since the 1970s as bycatch of tuna longline fisheries. This activity became more popular with the increasing price of fins in the world market in 1988, and sharks became the main targets of fishing at several landing sites in Indonesia, mostly in artisanal fisheries (Anung and Widodo, 2002). In less than a decade, the trend in shark fishing has developed from small-scale longline shark fishing to commercial fishing and from bycatch to target fisheries for some valuable species such as guitarfishes and squaloids. Nowadays sharks are usually caught locally as target fisheries and also as bycatch. Target fisheries use a variety of fishing methods, such as gill and tangle nets, long lines and harpoons (Dharmadi and Fahmi, 2003). Sharks are caught as bycatch in tuna long lines, trawls, seine nets, trammel nets, hand lines and other bottom gear. These fisheries involve various sizes of fishing boats. For instance, a fishery at Tanjung Luar Lombok, West Nusa Tenggara is one of Indonesian artisanal fisheries targeting sharks using bottom and pelagic long lines. The most common species being caught from this fishery are squaloids, carcharhinids (*Carcharhinus falciformis, C. sorrah, C. limbatus, C. brevipinna, C. amblyrhynchos, C. obscurus, Prionace glauca*), and sphyrnid, *Sphyrna lewini.* In commercial tuna long line fisheries, some carcharhinids and mako sharks are commonly caught as bycatch. They were usually landed without fins. While in the tuna gillnet fishery operating in south of Java, thresher and blue sharks are the most common sharks in the bycatch. Catch composition varies according to the fishing areas. Large sharks are usually caught from south of Indonesia (Indian Ocean), from west Sumatra to south of Nusa Tenggara, while batoids are commonly caught from the Java Sea to the South China Sea.

Studies conducted since 2001 indicated that some carcharhinids and stingrays became the commonest species caught in shark and ray fisheries in Indonesia (Table 1).

Table 1: Main shark and ray species caught in Indonesian waters

Species name	Common name	Fishing area
Himantura gerrardi	Whitespotted whipray	Java Sea, South China Sea, Karimata Strait, Makassar Strait, Malaka Strait
Pastinachus sephen	Cowtail stingray	Java Sea, South China Sea, Karimata Strait, Makassar Strait
Rhynchobatus spp.	Whitespotted guitarfishes	Java Sea, South China Sea, Arafura Sea, Karimata Strait
Carcharhinus falciformis	Silky shark	Indian Ocean, Makassar Strait, South China Sea, Sulawesi Sea, Banda Sea
Carcharhinus sorrah	Spottail shark	Indian Ocean, Makassar Strait, South China Sea, Sulawesi Sea, Banda Sea
Prionace glauca	Blue shark	Indian Ocean, Makassar Strait, Sulawesi Sea, Banda Sea
Sphyrna lewini	Scalloped hammerhead	Indian Ocean, Makassar Strait, South China Sea, Sulawesi Sea, Banda Sea, Java Sea
Alopias pelagicus	Pelagic thresher	Indian Ocean
Isurus oxyrinchus	Shortfin mako	Indian Ocean

Many people are dependent on the elasmobranch resource, and in some areas shark fisheries are the main source of livelihood. The fishery not only involves men as fishers and local traders, but women also take part. In several areas of Indonesia such as North Sumatra, Banten and West Java Provinces, women even become the main players in the commerce of shark products. This means that socio-economically sharks have become a very important commodity in some areas of the country, raising regional income and increasing local prosperity. This commodity has raised regional incomes and increased local prosperities.

For instance, some local traders in Indramayu, West Java, who had been dealing in the local trade of salted shark meat before 1986, started collecting and selling shark fins. Within just a few years, they earned enough to purchase longline fishing boats **(**Suzuki, 2002). Exporters of shark fin and ray skin exporters give capital and loans for local fishers to increase their productivity, changing a traditional fishing system into an industry.

In general, there was a slight decrease in the fishing activities in Indonesia in the last two years. Many artisanal fishers were unable to go fishing due to the increase of fuel price and operational costs. On the other hand, it is getting harder to catch enough fish in the areas close to the shore due to the number of fishing vessels operating in this area and the decrease in the stock. Fishers have to go much further from shore to catch large fishes. Consequently, only large fishing companies can survive from that situation; the remaining fishers are catching other fishes as an alternative. For instance, even though sharks are the bycatch in the tuna long line and drift gillnet fisheries operating from Cilacap, Central Java sometimes fishers deliberately catch sharks before they catch tuna to add value to their total catches and to cover their operational costs. Consequently, shark catches are increasing in this area. According to the catch data in 2007, the contribution of sharks to the total catch of tuna gillnet fishery operating from Cilacap was about 3%. It was higher than the record in 2002 (1%) (Dharmadi, Widodo and Widodo, 2002).

Up to present, the growth in the shark and ray fishery in Indonesia has outstripped its effective management. There are few or even no management strategies aimed at protecting elasmobranch resources in Indonesia. Moreover, most fishers and fishing practitioners in Indonesia do not understand the relationship between the biology of sharks and their vulnerability to overfishing. Basic knowledge about biology of elasmobranchs such as species identification, size composition, size at maturity and reproduction is fundamental for rational exploitation and implementing elasmobranch fisheries management (Seki et al., 1998; Stevens et al., 2000), yet these data are lacking for Indonesian stocks. The published records of elasmobranch diversity, size composition, and the distribution of sharks in Indonesia are still very scarce.

Therefore, since 2001, some elasmobranch studies have been conducted in Indonesia through market surveys at several fish landing sites in Sumatra, Java and Kalimantan. The purpose of those studies was to find out the main species being caught and to identify which species should be considered a concern because of exploitation in Indonesia. The Indonesian National Plan of Action (NPOA) for Sharks was drafted in 2004 and finalized in October 2008. The NPOA covers five themes: 1) reviewing fisheries status of sharks in Indonesia; 2) improving management measures to sustain shark fisheries; 3) developing better research and human resource capacity to study sharks study; 4) raising awareness for shark conservation; and 5) making a better coordination and consultation at national and regional levels.

Indonesia is engaged in regional cooperation of relevance to sharks management and conservation with countries such as Australia, Malaysia and the Philippines. For instance, Indonesia and Australia have been collaborating in elasmobranch studies since 2001, especially to provide information to manage shared stocks on a sustainable basis, develop a National Plan of Action for Sharks, and enhance capabilities and capacities of Indonesian fisheries officers in fisheries management, stock assessment and monitoring illegal fishing in each other's exclusive economic zones (EEZ). The collaboration with Malaysia and the Philippines are established under SEAFDEC (Southeast Asian Fisheries Development Centre) and SSME (Sulu-Sulawesi Marine Ecoregion) with the purpose to maintain marine resources and coordinating management and conservation in the region. These collaborations are being instrumental to improve the management of Indonesian fisheries.

2. DATA AVAILABILITY AND FISHERY MONITORING SYSTEMS

The Directorate General of Capture Fisheries (DGCF) of the Ministry of Marine Affairs and Fisheries (MMAF) is the main institution responsible for fisheries development and management in Indonesia. It is assisted by Fisheries Service Offices in each province and district. The Directorate of Living Resources Management in the DGCF is a unit that deals specifically with fisheries management. Data and information used for management purposes comes from various sources in DGCF and other relevant institutions such as the Statistical and Licensing Units, Provincial Fisheries Offices, Fisheries Research Institutions, and in some cases Fishers' Associations. In enforcing rules and regulations, the DGCF is assisted by the Police and the Navy. The Police is responsible for enforcing rules and regulations in the archipelagic waters, while the

Navy is responsible for fisheries enforcement in the Indonesian EEZ. The Directorate of Living Resources Management also has a unit responsible for enforcing fisheries regulations.

The DGCF is responsible to report annual landings by quantity and value for marine fishes by publishing the annual marine and fisheries statistic data. Data is collected from reports from each province and district with collection method as follows:

- According to the Research Center for Capture Fisheries, aggregation of fisheries data collection occurs at five levels. The aggregation starts with the collection of selected village samples on the numbers of boats per gear and the catch per fish category. Field workers or enumerators record the fish landed or caught every Wednesday in selected public landing places or auctions in each district. Afterwards, enumerators estimate the total monthly catch in each district through the following three steps:

    (a) total catches in all landing sites on Wednesday sampling is estimated by raising the sample catch collected in selected landing center to the whole public landing centers;
    (b) total weekly catches in each district is estimated by raising the factor of catch to the whole week catch;
    (c) the global monthly catches in each district is computed by adding and adjusting the weekly catch statistics.

- Catch and number of fishing boats are investigated in selected small-scale artisanal fishing village in each quarter. The total quarterly district catch is estimated by raising the sample of quarterly catch to the whole fish landings in a district using the numbers of boat registered. Then the district fisheries office publishes a district fisheries statistics and also sends the data to the province.

- Each province fisheries office accumulates fisheries data from all districts and summarizes the data into a provincial fisheries statistics. Finally, province fisheries offices send their fisheries statistics to the DGCF, which makes the annual national fisheries statistics.

The characteristic of marine capture fisheries in Indonesia is multi-gear and multi-species, which means that each fishing vessel has various fishing gear and catches a range of different species depending on the seasonal availability of a particular resource. Therefore, there is a difficulty to get accurate fisheries data from each province. In the Indonesian fisheries statistics, shark and ray species were grouped into two large groups because most fisheries simply did not report shark landings by species. They usually lump together all shark species and often all elasmobranches are included together. However, since 2005, the catch data for elasmobranchs were divided into seven main groups i.e. thresher sharks, requiem sharks, mackerel sharks, hammerhead sharks, dogfish sharks, stingrays, devilrays, eaglerays, shovelnose rays and white-spotted wedgefishes.

The annual elasmobranch fisheries production in Indonesia has shown an increasing trend from the 1980s to 2004 and it shows a slight decline in the past two years (2005–2006) (Figure 1). Nevertheless, many authors doubt the accuracy of fisheries data in Indonesia and suggest that Indonesian fishery statistics are unreliable (Dudley and Harris, 1987; Bonfil, 2002).

The inaccuracy of the total elasmobranch production is problematic, but the data from each district can still be used to determine trends in fishing. The more accurate catch and effort data can be found in the auction or landing areas. Basically, the local reports of elasmobranch landings from many landing sites are reliable. However, because Indonesia has thousands of landing places spread out of the country, not all of them are monitored by fisheries officers. Therefore, the catch data from some remote areas are often unable to be recorded. The problem in the inaccuracy data arises at the district level (Kabupaten) when they have to compile all reports from each landing site but not all landing sites report their local productions. The district fisheries office only estimates the total catch using sample data from several landing sites. In some districts where there are no local fisheries officers in villages/landing sites, catch is estimated prior to be sent to the provincial level. The estimated catches can either overestimate or underestimate the real situation in the field.

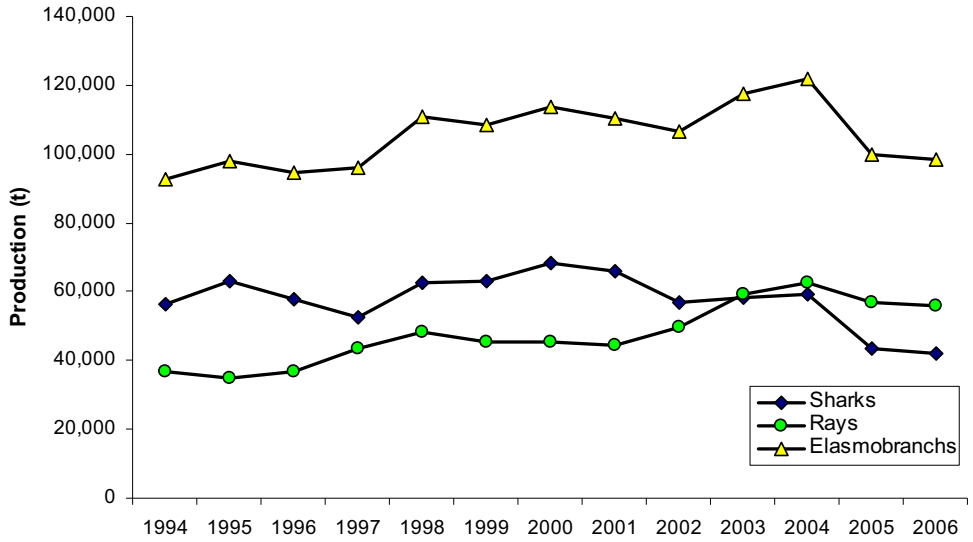

Figure 1: Total reported catches of elasmobranches (tonnes) in Indonesia from 1994–2006

A similar problem to the districts is also met by the province level fisheries officers when they receive incomplete reports from districts under their jurisdiction. Finally, the marine and fisheries department (DGCF) will accumulate all data reports from all provinces to be used for annual fisheries statistics of Indonesia. Dudley and Harris (1987) identified three main problems affecting the vagueness data of fishery statistics in Indonesia, which are the wrong sampling technique, misrepresented sample size, and human errors in recording and calculating data.

The unavailability of representative elasmobranch catch data at species level in the Indonesian fisheries statistics is due to the lack of capability in sampling methods, inaccuracy in reporting data and lack of ability to identify species by field data collectors. Inaccurate fisheries data will influence the data reported to FAO. For instance, the separation of fishing area between Indian Ocean and Western Central Pacific was only based on the provincial catch data and those data were divided according to the geography of each province, not by the actual fishing areas. This information can lead to misinterpretation of stock status in a particular area.

Therefore, lack of human resources (fishery officers) to collect data in artisanal fisheries and inadequately trained personnel and field staffs became one of main limitations facing in the monitoring of shark and ray fisheries in Indonesia. Moreover, most fishery officers in Indonesia are unable to identify sharks and rays into species or genus level. On the other hand, sharks and rays sometimes represent only a small proportion of the total marine fish production in particular areas, and because of that they are often ignored in fisheries monitoring. This limitation influences the lack of monitoring and recording of shark fisheries in those particular areas. Other limitations such as limited facilities and funds/budgets for shark monitoring and lack of ability and awareness on knowing the status and biology of elasmobranchs (by fishers, traders, exporters and fishery officers), also became main problems in this fishery.

The lack of awareness of stakeholders at various levels on shark conservation is influenced by the lack of knowledge on species identification, biology and conservation status. This problem could be solved if there were more educational programmes and trainings for local communities and all governmental levels to raise their awareness for elasmobranch conservation. A field guide book of sharks and rays of Indonesia has been published in 2006 (White *et al.*, 2006) and also some identification guides for sharks and rays have been published by LIPI in 2006 to facilitate sharks identification in Indonesia. Yet, the lack of programmes to transfer this knowledge to stakeholders is still a main constrain. Therefore, the Indonesian Government needs to adjust their management system to grass root levels before implementing any policies for managing and controlling elasmobranch exploitation. This step requires a lot of funds and takes time to be implemented due to the large area to be covered. Furthermore, the dissemination and implementation of the Indonesian NPOA for Sharks will hopefully improve the management of shark fisheries in the future.

3. MONITORING OF TRADE IN SHARK PRODUCTS

Almost all parts of the elasmobranch body are utilized. Common products utilized are meat, fins, skin, cartilage, liver, gill plates and guts. Meats and fins are commonly utilized for foods, skins for leather industries, and liver oil and cartilages for medicines. Internal organs and the rest of the unused body of elasmobranch fishes, such as the head are utilized as fertilizer, animal food and sometimes for the production of crackers. Utilization of elasmobranch products were conducted by local people from almost all landing sites in western and southern Indonesia. In some areas, the elasmobranch products were used only for local consumptions but in other areas they were produced and distributed either nationally or internationally.

The Directorate General of Fisheries Processing and Marketing (DGFPM) is an agency under the Ministry of Marine Affairs and Fisheries (MMAF) that is responsible for the monitoring all trade in fishery products in Indonesia, both nationally and internationally. All international trade in fishery products are monitored and controlled by DGFPM, while the export-import data for fishery products are gathered by the Center of Data Statistics and Information (PUSDATIN-DGFPM), in collaboration with Statistics Indonesia (BPS). All compiled data are based on documents of export-import declaration issued by Custom and Excise Offices. Export statistics are based on general trade system which covers all Indonesian geographical areas.

The main type of shark products exported from Indonesia is dried shark fins, including the guitarfish and shovelnose ray fins. One set of fins consists of a first dorsal fin, two pectoral fins and the lower lobe of the caudal fin. In the Indonesian export statistics of fishery commodities data published annually, only shark fins are formally recorded. Ray skins, gill rakers and cartilages are grouped into other marine fisheries products, while shark oil is grouped together with other fish oil. In fact, shark oil (squalene) is commonly exported to almost Asian countries (Blaber, 2006). The dried shark fins are commonly exported to Asian countries such as Japan, China, Hong Kong SAR, Singapore, China, Malaysia and Taiwan, Province of China. Shark fillets are known to be exported to Singapore through Belitung Island. Other shark products such as the salted and dried shark meat are usually traded either locally or exported especially to Bangladesh and Sri Lanka. However, those data have not been recorded specifically yet in the Indonesian export statistic of fishery commodities data. According to available statistics, total export of dried and salted shark fins from Indonesia in 2005 and 2006 were 829 162 and 485 092 kg, respectively. About a half of the total Indonesian shark fin products was exported to Japan, followed by China Hong Kong SAR, Singapore and Malaysia (Figure 2). The East Java Province is known as the largest shark fin exporter in Indonesia followed by Jakarta, South Sulawesi, North Sumatra and Riau Provinces. Surabaya (the capital city of East Java) is the place where some large shark fin collectors export their products. In fact, shark fins exported from Surabaya originally come from other areas in Indonesia such as Nusa Tenggara, Bali and Kalimantan. Local shark fin collectors usually send shark fin products from other areas to Surabaya as the centre of shark fin export.

The identification of shark fins are based on the quality and size of the fins, not based on the species name. For instance, the dried rhynchobatid fins with size about 40 cm (measured from the fin base to its apex) are the most expensive shark fins and categorized in super class shark fins valued up to US$ 170–210 per kg, while carcharhinid fins in the similar size are valued up to US$ 165 per kg.

The monitoring of shark trade in Indonesia is still problematic. Species identification and awareness are the main issues that are need to be fixed. Misidentification and mislabeling often occur in some fisheries reports. For instance, the data reported to FAO as “sharks nei frozen” and “sharks, rays, skates, fresh or chilled nei groups” were only based on the frozen and fresh dogfishes data, respectively, as recorded in the Indonesian export and import statistics of fishery commodities.

The lack of monitoring and controlling of the trade in elasmobranch products, especially the shark fin trade, is not only due to the lack of ability to identify shark species by customs and excise officers or fishery officers but also because of the lack of regulations in place to control and identify the source of shark products in trade. The only regulation and law enforcement from Indonesian government related to shark fisheries and products was for sawfish (SK Mentan No. 716/KPTS/Um/10/1980 and Peraturan Pemerintah No.7 Tahun, 1999**)** but the implementation of the regulations was only applied for monitoring and banning the rostrum trade (the saw like) rather than to other parts of the body due to the lack of ability to identify the species.

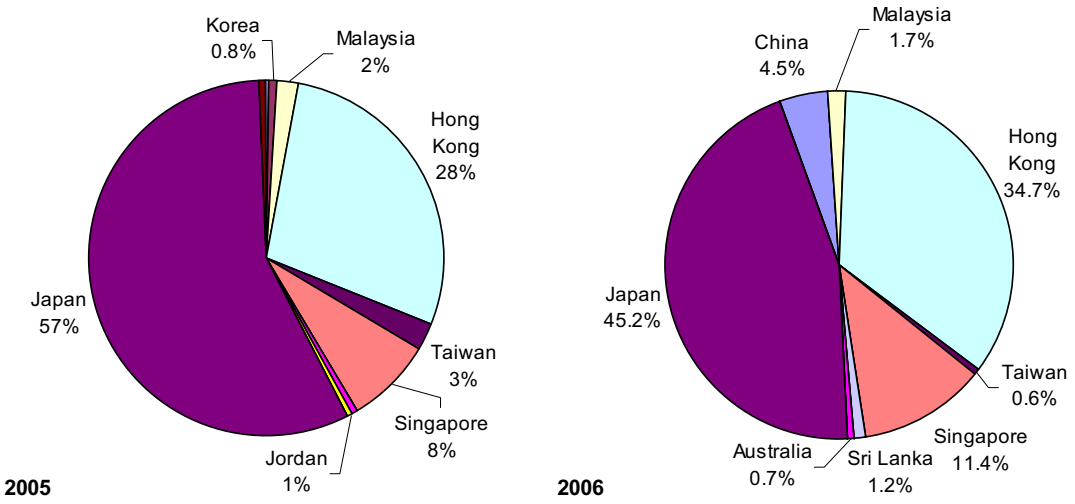

Figure 2: Proportion of total dried shark fins being exported from Indonesia to other countries in 2005 and 2006 (Source: Indonesian Export Statistics of Fishery Commodities Data; MMAF, 2006, 2007).

As a Party to CITES, Indonesia is also obligated to monitor and control all trade related to species that are currently listed in the Appendices of CITES. The only shark species that is listed in CITES and known to occur in Indonesian waters is the whale shark, *Rhyncodon typus*. Most fishers and local communities are able to identify the whale shark and know about the conservation status of the species. However, this species is occasionally caught accidentally by the gillnetters or washed ashore. The latest news said that an eight meter whale shark was tangled and dead in a gillnet operated in East Java in early September 2008. Due to the lack of law enforcement, monitoring and awareness about the conservation status of the species by the fishery officers, fishers often do not release the whale shark when it is caught. Thus, the fins were often traded and mixed with other shark fins. Moreover, there is still no exact quota for exporting or trading whale shark products from Indonesia.

Therefore, raising capabilities, abilities and awareness to identify shark species and their products are essential for fisheries monitoring in various levels. Local fisheries and custom officers should be trained to identify the species and status of important or concerned species, both in the landings and in trade. Even though DNA barcoding was an option to identify shark products by custom offices, the lack of technology and capacity to conduct the method make this option inapplicable. Therefore, better resources to local fisheries and custom officers and also adequate law enforcement are required to minimize the illegal and unreported shark fishing and trading in Indonesia.

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IRAN (Islamic Republic of)

Tooraj Valinassab
Iranian Fisheries Research Organization

1. BACKGROUND INFORMATION ABOUT THE SHARK FISHERIES

The waters of Persian Gulf and Oman Sea are environmentally unique with an unusual faunal assemblage (Carpenter, *et al.*, 1997). The Persian Gulf is a semi-closed water body connected to the Oman Sea through Strait of Hormuz, which is 56 km wide at its narrowest point. The maximum width is 640 km with the average depth of 35 m (Reynolds, 1993). The study area is restricted to the Iranian waters of the Persian Gulf and Oman Sea, between longitudes 48º 30´E and 61º 25´E (Figure 1).

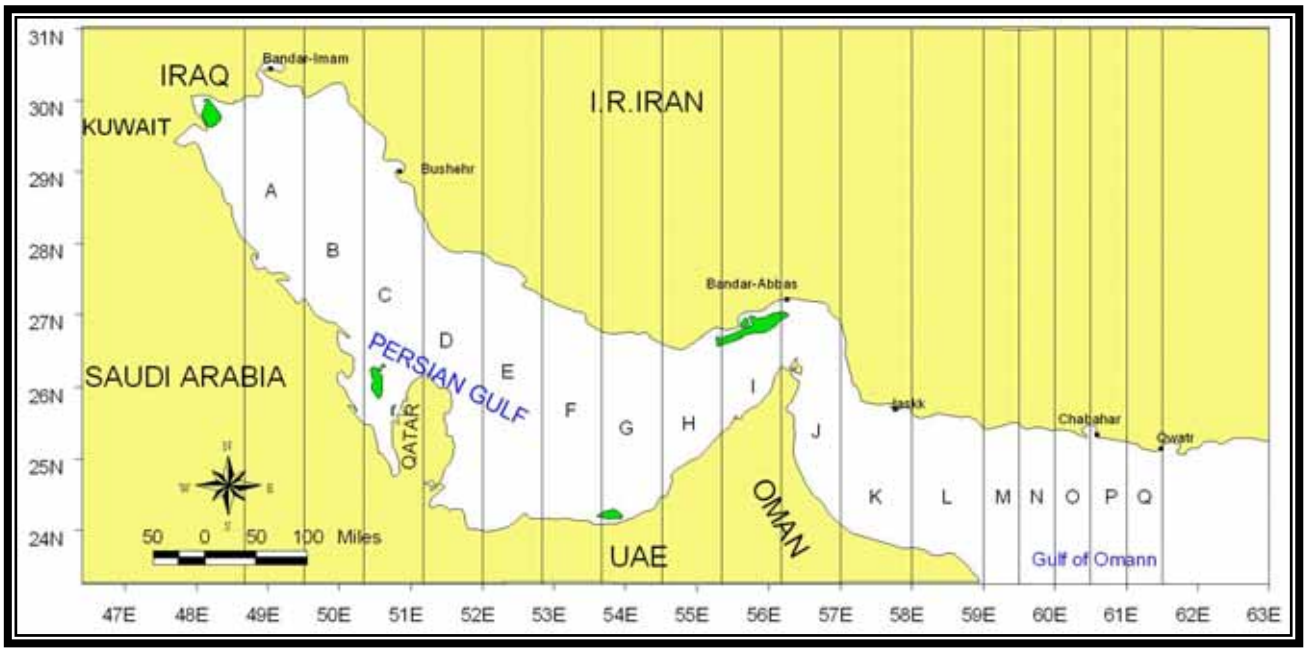

Figure 1: The Persian Gulf and the Oman Sea

The Oman Sea has an area of 94 000 km^2, and a depth reaching 3 200 m. It connects the Persian Gulf to the Indian Ocean through the Arabian Sea. The Persian Gulf and Oman Sea are in the subtropical zone lying almost entirely between the latitudes of 24° and 30°N and longitudes of 49° to 61° 25′E (Figure 1).

The dominant large-scale current is a counter-clockwise movement with less saline (and less dense) water entering the Strait of Hormuz at the surface level and more saline (and denser) water leaving the area at the bottom layers of the water column (Hunter, 1983). The bottom topography is mostly flat and featureless, dominated by soft sediments and a few rocky substrates in the Oman Sea.

Next to oil, fisheries represent the second most important natural resource, and the most important renewable natural resource (Carpenter *et al.*, 1997). A review of catch statistics shows an increasing trend of fishing effort in the Persian Gulf and Oman Sea during the last decade. For instance the number of fishers has increased from 70 729 in 1993 to 109 601 in 2002. Demersal fishes are one of the main targets of both artisanal and industrial fisheries and their catch data show a noticeable descending trend in recent years, between 2002 and 2003 catches decreased by 21% from 110 000 tonnes to 87 240 tonnes (Valinassab *et al.*, 2003). Therefore this ecological group of fish is classified as overexploited in the region.

Sharks are caught with different fishing methods, consisting mainly of:
– Gillnet (bottom & drift gillnets)
– Bottom trawl (as bycatch)
– Trolling (very few in use)
– Longline (very few in use).

Shark species

According to different studies and investigations, about 42 species of sharks are found in the area (Table 1).

Table 1: List of shark species of the Persian Gulf and Oman Sea. (Main species are highlighted in bold).

Family	Scientific name	English name
CARCHARHINIDAE	*Carcharhinus albimarginatus* (Rüppell, 1837)	Silvertip shark
CARCHARHINIDAE	*Carcharhinus amblyrhynchoides* (Whitley, 1934)	Graceful shark
CARCHARHINIDAE	*Carcharhinus amboinensis* (Müller & Henle, 1839)	Pig eye shark
CARCHARHINIDAE	*Carcharhinus brevipinna* (Müller & Henle, 1839)	Spinner shark
CARCHARHINIDAE	***Carcharhinus dussumieri* (Valenciennes, 1839)**	**Whitecheek shark**
CARCHARHINIDAE	*Carcharhinus hemiodon* (Valenciennes, 1839)	Pondicherry shark
CARCHARHINIDAE	*Carcharhinus leucas* (Valenciennes, 1839)	Bull shark
CARCHARHINIDAE	*Carcharhinus limbatus* (Valenciennes, 1839)	Blacktip shark
CARCHARHINIDAE	*Carcharhinus macloti* (Müller & Henle, 1839)	Hardnose shark
CARCHARHINIDAE	*Carcharhinus melanopterus* (Quoy & Gaimard, 1824)	Blacktip reef shark
CARCHARHINIDAE	*Carcharhinus plumbeus* (Nardo, 1827)	Sandbar shark
CARCHARHINIDAE	*Carcharhinus sealei* (Pietschmann, 1916)	Blackspot shark
CARCHARHINIDAE	***Carcharhinus sorrah (Valenciennes, 1839)***	**Spottail shark**
CARCHARHINIDAE	*Galeocerdo cuvier* (Peron & LeSueur, 1822)	Tiger shark
CARCHARHINIDAE	*Glyphis gangeticus* (Müller & Henle, 1839)	Ganges shark
CARCHARHINIDAE	*Loxodon macrorhinus* Müller & Henle, 1839	Slitey shark
CARCHARHINIDAE	*Negaprion brevirostris* (Poey, 1868)	Lemon shark
CARCHARHINIDAE	***Rhizoprionodon acutus*** (Rüppell, 1837)	**Milk shark**
CARCHARHINIDAE	*Rhizoprionodon oligolinx* (Springer, 1964)	Grey sharpnose shark
CARCHARHINIDAE	*Scoliodon laticaudus* (Müller & Henle, 1838)	Spadenose shark
HEMIGALEIDAE	*Chaenogaleus macrostoma* (Bleeker, 1852)	Hook tooth shark
HEMIGALEIDAE	*Hemipristis elongatus* (Klunzinger, 1871)	Snaggletooth shark
HEMIGALEIDAE	*Paragaleus randalli* (Compagno, Krupp & Carpenter, 1996)	Slender weasel shark
SPHYRNIDAE	*Eusphyra blochii* (Cuvier, 1816)	Wing head shark
SPHYRNIDAE	*Sphyrna lewini* (Griffith & Smith, 1834)	Scalloped hammerhead
SPHYRNIDAE	*Sphyrna mokarran* (Rüppell, 1837)	Great hammerhead
SPHYRNIDAE	*Sphyrna zygaena* (Linnaeus, 1758)	Smooth hammerhead
TRIAKIDAE	*Hypogaleus hyugaensis* (Miyosi, 1939)	Black tip tope
TRIAKIDAE	*Iago omanensis* (Norman, 1939)	Bigeye hound shark
TRIAKIDAE	*Mustelus mosis* (Hemprich & Ehrenberg, 1899)	Arabian smoothhound
ALOPIIDAE	*Alopias pelagicus* (Nakamura, 1936)	Pelagic thresher
ALOPIIDAE	*Alopias vulpinus* (Bonnaterre, 1788)	Thresher shark
LAMNIDAE	*Carcharodon carcharias* (Linnaeus, 1758)	Great white shark
LAMNIDAE	*Isurus oxyrinchus* (Rafinesque, 1810)	Shortfin mako
ODONTASPIDIDAE	*Carcharias taurus* (Rafinesque, 1810)	Sand tiger shark
GINGLYMOSTOMATIDAE	*Nebrius ferrugineus* (Lesson, 1830)	Tawny nurse shark
HEMISCYLLIIDAE	*Chiloscyllium arabicum* (Gubanov, 1980)	Arabian bambooshark
HEMISCYLLIIDAE	*Chiloscyllium griseum* (Müller & Henle, 1839)	Grey bambooshark
HEMISCYLLIIDAE	*Chiloscyllium punctatum* (Müller & Henle, 1839)	Brownbanded bambooshark
RHINCODONTIDAE	*Rhincodon typus* (Smith, 1828)	Whale shark
STEGOSTOMATIDAE	*Stegostoma varium* (Seba, 1758)	Zebra shark
ECHINORHINIDAE	*Echinorhinus brucus* (Bonnaterre, 1788)	Bramble shark

The first studies on stock assessment of demersal and pelagic fishes were carried out between 1976–1979 under a FAO regional project that covered all southern and northern Persian Gulf and Oman Sea waters using 4 research vessels. The total biomass was estimated at more than 120 000 tonnes of which sharks represented about 4 percent (Sivasubramaniam, 1981).

The Catch Statistics Plan started in 1993 covering about 35 landing sites to register and collect catch data on commercially important species including sharks. During the implementation of the plan, all collected data on sharks was registered by technicians as "shark" and unfortunately there is no species separation and identification.

In 1994, since there was no interest amongst people to eat sharks, it was decided to produce byproducts such as Sausage (Khorshidpoor, 1994).

In 1996 the research project of "Biological aspects of 3 dominant sharks' species were carried out in the Persian Gulf by Asadi (1996). The dominant species were *Carcharhinus dussumieri*, *C.sorrah* and *Rhizopriodon acutus*. The reproduction characteristics of them were studied. The stomach contents of these 3 species showed that the main foods are fishes (especially sardines and lizardfish), shrimp and mantis; cephalopods and crab were occasional food items.

The subsequent study on stock assessment of demersal fishes including sharks was carried from 1994 to 1996 covering only Persian Gulf waters. The main objective of the study was to estimate biomass of demersal resources (IFRO Experts Group, 1996).

In 2005, the parasites of *Carcharhinus dussumieri* from the Persian Gulf and host parasitic relation ships were considered (Haseli, 2005). Identified parasites belong to orders Tetraphyllidae (4 species) and Trypanorhyncha (5 species), and also variations of prevalenae, abundance, mean intensity, and indices of diversity, dominance and similarity were taken into consideration.

A comprehensive research project on biomass estimation and distribution pattern of demersal fishes (including sharks) started in 2003 and continues until 2008 covering all northern Persian Gulf and Oman Sea. The Catch per Unit of Area (CPUA) and biomass of all species were estimated and their distribution pattern described (Valinassab, Daryanabard and Dehghani, 2003, and Valinassab *et al*., 2006).

Fisheries Management

The Iran Fishery Organization (IFO) is responsible to implement the fisheries management and control the sustainable exploitation of resources based on results and findings of research projects and advise of Iranian Fisheries Research Organization (IFRO). The most important policies of IFO and IFRO to control the resources and decrease the CPUE and pressure on shark stock are as follow:

1) to establish a 6 months close season for sharks in the area from March to August;
2) to ban the fishing activities of "Fish Bottom Trawlers" in the Persian Gulf since 1993;
3) to collect the catch statistics in all area monthly to find out the trend and changes of fishing effort;
4) to decrease the fishing days of Fish Bottom Trawlers in the Oman Sea from 11 to 8 months and then continues up to 4 and half months(or 135 days) from 1998 up to now;
5) to determine the standard mesh size of gillnets by IFRO to decrease the CPUE and to catch fishes above maturity size (i.e. LM50%);
6) to decrease the number of trawlers from 69 to 38, and consequently to decrease exploitation of demersal stocks.

2. FISHERY MONITORING SYSTEM AND CATCH STATISTICS

As it was mentioned, the Catch Statistics Plan is carried out in the Persian Gulf and Oman Sea with about 35 sampling stations in selected landings of 4 different provinces , covering 2 000 km of coastline.

Catch data is collected for 51 main species, genera or species group and are classified into 3 different categories:
1) Demersal fishes (including sharks)
2) Large pelagic fishes (Tuna and Tuna-like fishes)
3) Small pelagic fishes (Sardines and Anchovies)

The amount of catch (in tonnes) during the last 10 years is presented in Table 2 and figure 2 and 3. It is important to note that the increasing trend in catches is due to an increase of tuna fishing in the EEZ and offshore waters in the same period. have been tabulated in Table 2.

Table 2: Fisheries catches (tonnes) in the northern Persian Gulf and Oman Sea, including sharks and other demersal fish (Source: Planning and Programming Department)

Year	Sharks	Total demersal fishes	Total catch of all species group
1998	8 221	128 726	226 500
1999	7 920	119 430	234 200
2000	9 005	115 150	260 500
2001	8 976	110 060	262 805
2002	8 071	105 839	269 000
2003	11 689	106 596	299 128
2004	13 298	106 230	314 165
2005	14 086	119 725	343 492
2006	13 516	116 811	374 447
2007	11 821	113 226	329 571

Figure 3 shows a slight descending trend in shark catches between 2005 and 2007 (4% decrease between 2005 and 2006 and 12.5% decrease between 2006 and 2007). On the other hand, results of the comprehensive project on "Biomass estimation and distribution pattern of demersal fishes (including sharks)" carried out between 2003 and 2008 (Valinassab *et al.*, 2006) indicated that sharks are distributed throughout the region, with a higher biomass (2.12% of the total fish biomass) in the Persian Gulf than in the Oman Sea (1.1% of the total biomass). The higher biomass in the Persian Gulf could be a result of the fishery management policy that banned the activity of trawlers in 1993. In the Oman Sea trawlers are allowed to operate for about 5 months a year.

3. TRADE OF SHARKS IN THE REGION

The collected specimens of sharks are processed in different ways, namely:

1. Processed as fillets for domestic consumption
2. Dried and salted mostly in the east of Oman Sea in Sistan-o-Baluchestan province (borderline with Pakistan) to be exported to Pakistan by traditional fishermen without any regular control
3. To be used by some fish meal factories as raw material
4. The dried fins are transported to other countries mainly United Arab Emirates by fishers. This trade is directly done by fishers without any control and can be considered as an illegal trade

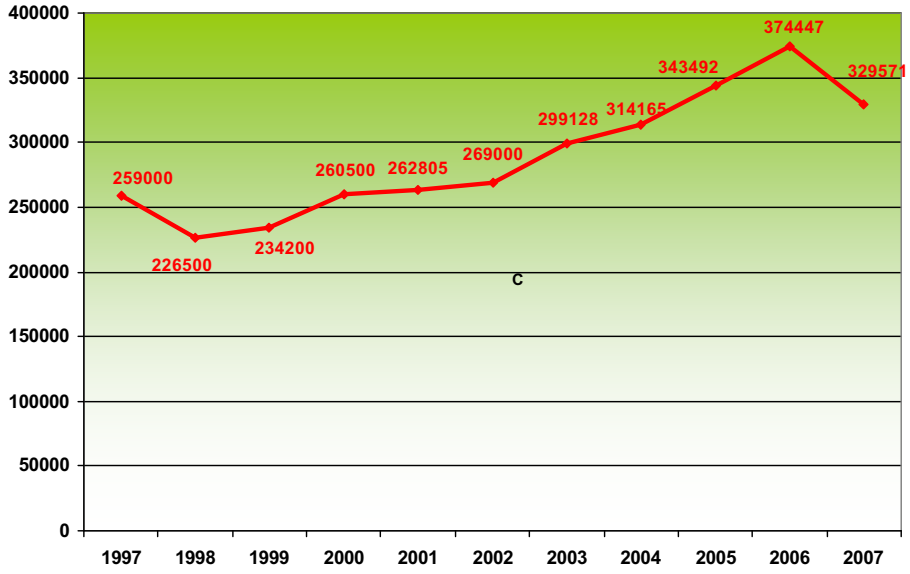

Figure 2: The trend of total catches (tonnes) in the Persian Gulf and Oman Sea

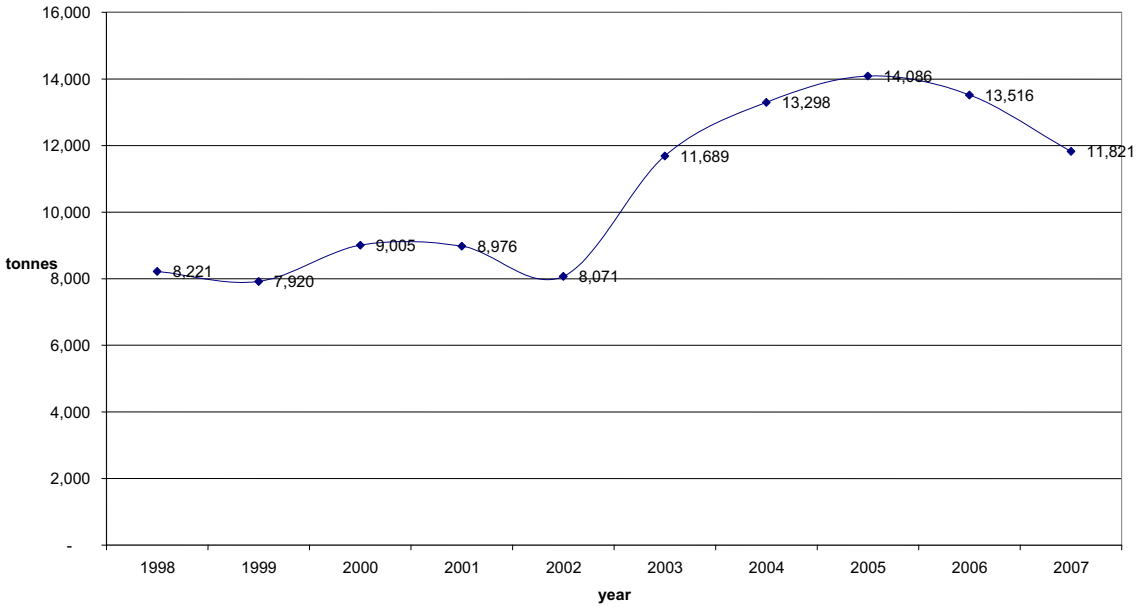

Figure 3: Shark catches (tonnes) in the Persian Gulf and Oman Sea

The price of fins ranges from US$ 4.0 to 40.0 per kilo, depending on size of fish and size of fins. The normal price of whole sharks without any processing is around US$ 1.5–2.0 per kilo. The packed fillets of sharks are sold at about US$ 3.0–3.5 in special shops with good quality. There is no available information about price of salted sharks transported abroad.

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ITALY

F. Serena, R.T. Baino, C. Mancusi, M. Barone, M. Ria, A.J. Abella, A. Volani
ARPAT – Environmental Protection Agency – Tuscany Region

1. BACKGROUND INFORMATION ABOUT THE SHARK FISHERIES

Main types of shark fisheries

In the Italian fisheries, elasmobranchs catches represent less than the 2 percent of total yield (Shotton, 1999). Smoothhounds and skates (Rajidae) represent about 50 percent (4 463 t/yr) and 38 percent (3 340 t/yr) respectively of the total elasmobranch landings. Most smoothhounds proceed from the Adriatic Sea, where catches have increased since 1978, with a peak in 1985.

In the Mediterranean, and particularly in Italy, almost no elasmobranchs are subject to directed fisheries, but elasmobranchs constitute part of the bycatch in most local artisanal fisheries.

The Italian catches of elasmobranchs primarily derive from two different fisheries: the pelagic artisanal fishery with longlines and gillnets, where smoothhounds are the most common group, and the demersal trawl fishery, where rays and catsharks constitute the main groups among elasmobranchs. In both cases elasmobranchs represent only a bycatch, being the longline fishery directed to swordfish or tunas and the trawl fishery to various assemblages of finfish and cephalopods.

In the northern Adriatic Sea, during spring and winter, gillnet fisheries catch smoothhounds (*Mustelus mustelus* and *M. punctulatus*), spurdog (*Squalus acanthias*), greater-spotted catshark (*Scyliorhinus stellaris*), eagle ray (*Myliobatis aquila*) and tope shark (*Galeorhinus galeus*) (Costantini *et al*., 2000). Starry ray (*Raja asterias*) is commonly caught in trawl fisheries, especially along the Tyrrhenian coasts (Abella *et al.*, 2008). The capture of this species occurs mainly with a modified beam-trawl that target flatfish, i.e. *Solea* spp.

Bottom trawl fisheries operating on the continental shelf and slope along the western and south coast of Italy capture various elasmobranch species such as th blackmouth catshark (*Galeus melastomus*), lesserspotted catshark (*Scyliorhinus. canicula*), velvet belly (*Etmopterus spinax*) and various skates, mostly *Raja clavata* (Relini *et al*. 1999).

Even though they represent a marginal yield compared to fisheries described above, trammel nets set near the bottom may also catch individuals of large sized sharks (Serena and Vacchi, 1997). In the Adriatic Sea, the bycatch of trammel nets includes several demersal species including spiny dogfish (*Squalus acanthias*), smoothhounds (*Mustelus* spp.), skates (*Raja* spp.), electric rays (*Torpedo* spp.), catsharks (*Scyliorhinus* spp.), topes (*Galeorhinus galeus*) as well as occasionally thresher shark (*Alopias vulpinus*) and juvenile sandbar shark (*Carcharhinus plumbeus*).

Many shark species are taken as the bycatch in the Italian deep-water fisheries. The most frequently caught species are the blackmouth catshark (*Galeus melastomus*), smallspotted catshark (*Scyliorhinus canicula*), gulper shark (*Centrophorus granulosus*), velvet belly (*Etmopterus spinax*) and most rarely Portuguese dogfish (*Centroscymnus coelolepis*), kitefin shark (*Dalatias licha*), and longnose spurdog (*Squalus blainvillei*). Blackmouth catshark and smallspotted catshark are by far the most abundant species and have a relatively greater commercial value; other species may often be discarded.

Italian deep-water trawl fisheries, targeting red shrimps, Norway lobster and Mediterranean hake also land blackmouth catshark. The longnose skate (*Dipturus oxyrhinchus*) was formerly a relatively common species in the north Tyrrhenian Sea and in other Italian areas. There is a relatively high abundance of thornback ray (*Raja clavata*) in some deep-water grounds (Serena and Abella, 1999; Abella *et al.*, 2008). Bottom-set longlines targeting Mediterranean hake also take as bycatch the six-gill shark, especially in the Ligurian Sea (Aldebert, 1997) and along the southern Italian coasts, as well as blackmouth catshark and gulper shark.

There are no Italian pelagic fisheries targeting migratory oceanic sharks but these species constitute a component of the bycatch in tuna and swordfish fisheries operating in coastal and offshore waters using longlines, driftnets and occasionally purse seines. No finning activity is reported for the Italian waters.

The fixed tuna traps represent the fishing activities that historically had a major impact on cartilaginous fishes, catching large pelagic sharks and other demersal elasmobranchs. These structures were distributed throughout the Italian coast along the most important tuna migration routes towards the rich areas of the Ligurian-Provencal basin. Today the number of these gears is greatly reduced because of reduction of yields and is confined to few cases in the major Italian islands (Cushing, 1988). The main species of elasmobranch fishes traditionally caught as bycatch in these traps were large specimens of common thresher (*Alopias vulpinus*), basking shark (*Cetorhinus maximus*), blue shark (*Prionace glauca*), devil ray (*Mobula mobular*) and sometimes the great white shark (*Carcharodon carcharias*) (Boero and Carli, 1979; Vacchi *et al.*, 2002). Nowadays these catches are irrelevant for any consideration regarding management or conservation purposes.

Surface longline fisheries that target tuna and swordfish also catch blue shark, pelagic or violet stingray (*Pteryplatotrygon violacea*) and most rarely common thresher (*Alopias vulpinus*), shortfin mako (*Isurus oxyrinchus*), porbeagle (*Lamna nasus*), smooth hammerhead (*Sphyrna zygaena*), sixgill (*Hexanchus griseus*), requiem sharks (*Carcharhinus* spp.), devil ray etc. (De Metrio *et al*., 1999; Orsi-Relini *et al.*, 1999).

A small local artisanal fishery targeting blue shark utilises the so called “stese” (short lines with hooks placed near the surface). This fishery operates mainly in the spring along the Calabria and Apulia southern regions of Italy. Large elasmobranchs are often caught incidentally as bycatch in artisanal fisheries, especially in longline fisheries (Serena and Vacchi, 1997).

Modest catches of blue shark have been landed as bycatch of the surface longline fisheries for swordfish and albacore with mean weight ranging from 3 to 25 kg (De Metrio *et al.*, 1984). A large number of elasmobranch were also caught by large driftnet fisheries, which were once used widely in the Italian waters (De Metrio *et al.*, 1999). The main species caught were blue shark, common thresher, shortfin mako, porbeagle, requiem sharks (*Carcharinus* spp.), basking shark, hammerheads (*Sphyrna* spp.), devil ray and pelagic stingray With the moratorium on drift nets in the Mediterranean, started in January 2002, it is expected that a reduction of the fishing mortality due to this gear will occur, even though there is no direct data available to evaluate this trend.

In the northern Adriatic Sea, gillnets (often set for demersal species) also have a bycatch composed by several pelagic species, with blue shark and common thresher caught mainly during the summer (Costantini *et al.*, 2000). Also basking sharks are incidentally caught with trammel and gillnets, with young individuals caught mainly in shallow waters during spring, because sub-adults and adults are also present in the area. Basking sharks also occur off the coasts of Tuscany and Liguria in spring (Mancusi *et al.*, 2005).

Until now, there have been no detailed statistical data on shark bycatch in Mediterranean pelagic fisheries. In spite of this limitation, in some cases, we have some examples of elasmobranchs, such as pregnant devil ray caught during purse seine activities targeting anchovy (Notarbartolo di Sciara and Serena, 1998); other specimens caught as bycatch in the trammel net and longline fisheries and pelagic stingrays caught as bycatch in the swordfish fishery in the Ligurian Sea (Orsi Relini *et al.*, 2002).

The relative abundance of rays are now fairly well known around Italy due to 20 years series of trawl surveys (Grund and Medits projects, Relini, 1998; Bertrand *et al*., 1997) carried out along the whole continental shelf up to 800 m depth. From the map in Figure 1, reporting the standing stock biomass index of rays from trawl surveys, is quite clear that the Italian rays (around 50 percent of which is represented by *Raja clavata*) are concentrated in Sardinian waters, northern Tyrrhenian and Sicily Straits.

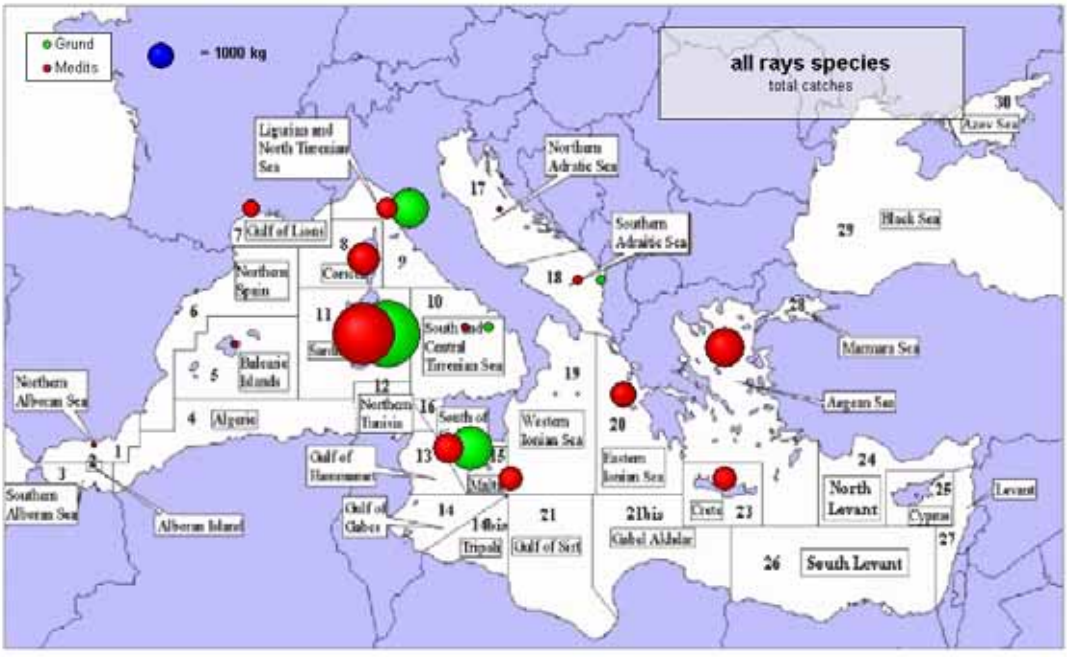

Figure 1: Relative abundance of rays in the Mediterranean Sea derived from trawl surveys

Despite the lack of precise records on elasmobranch bycatch in the Mediterranean pelagic fisheries, a study carried out in the frame of a project financed by the EC (N° 97/50 DG XIV/C1) during 1998–1999, provides data on the bycatch of sharks and discards from the Italian fleets fishing for swordfish and tunas in the grounds shown in Figure 2. According to the assessment of fishing effort related to shark catches by longline fisheries in 1999, effort was mainly located in the Adriatic Sea (2.1 millions hooks) and in the Ionian Sea (1.2 millions hooks), while the efforts in the Sicily Straits (0.05 millions hooks) and in the Tyrrhenian Sea (0.02 millions hooks) were insignificant. Shark species include *Prionace glauca*, *Isurus oxyrinchus*, *Alopias vulpinus* and *Galeorhinus galeus*.

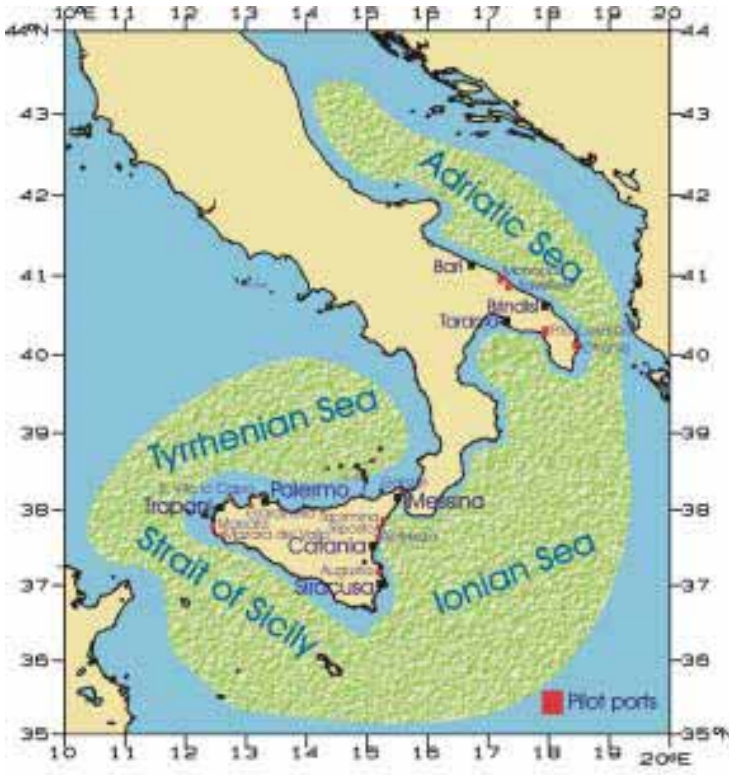

Figure 2: Fishing grounds of the pelagic longline fisheries

Social and economic importance and discarding practices

Discarding depends on the economic value of the fish: where there is a market demand for sharks discards are minor, mainly limited to small sized individuals caught in the trawl fisheries.

The different species of sharks caught in the North Adriatic and South Ionian longline fisheries have a commercial value and therefore are not discarded. The price of shark meat on wholesale markets is quite variable, ranging from Euro 1–2 per kg in different fisheries and seasons.

In the Sicilian fisheries, shark bycatch is usually discarded at sea. This is mainly due to the fact that these boats, fishing for swordfish, make long trips and therefore fishers prefer to leave the available storage space for more valuable species. In the northern Tyrrhenian Sea, the trawl fisheries directed to the Norwegian lobster also capture locally significant number of *E. spinax* and *Galeus melastomus*. Often the largest individuals of the latter are skinned on board and landed.

Main species in catch statistics

Fairly all the catches of sharks, skates and rays are reported as "smoothhounds nei" (60%) and "rays, stingrays and mantas nei" (40%). It should be stressed that these two categories do not correspond to taxonomic groups, at least not for the Italian catches. The reported catches of smoothhounds nei often consist of an aggregation of small-sized demersal sharks including *Mustelus* spp. (the true smoothhounds), *Squalus* spp., *Centrophorus* spp., *Dalatias licha*, *Scyliorhinus* spp. and *Galeus melastomus*. This is due to the fact that these shark species are usually marketed headed, skinned and gutted, and sold under the commercial name of "palombo", the Italian common name of *Mustelus*. In the same way, the FAO category "rays, stingrays and mantas nei" is an aggregation of all batoids; the bulk of these catches taken in Italy consist of three species of skates: *Raja clavata*, *Raja asterias* and *Raja miraletus*.

International trade and domestic use

The international trade of sharks and rays in Italy reflects and is a consequence of the catches both in Mediterranean and in the European countries.

In 2004 the total shark catches in the Mediterranean (FAO data) amounted to 7 000 tonnes, mainly caught in Tunisia (29%) and Egypt (18%). The Italian catches (around 1 000 tonnes), represented only 14% of the catches in Mediterranean. Furthermore, shark catches of the Italian fleet outside the Mediterranean are negligible. The reported catches for the European Union (EU) countries in the same year was around 110 000 tonnes. Spain took the largest share with about 46% of the EU total, followed by France with 20% and United Kingdom with 15%. Other countries with significant catches of sharks are Portugal, Germany, Denmark and Norway. Among the EU countries the Italian catches of elasmobranches represent only 1% of the total.

Because of the bio-ecological features of the seas, the shark production of the eastern Atlantic and the northern seas is more than 10 times larger compared to the Mediterranean Sea.

In this international context is quite obvious that Italy import sharks and rays form the countries with a far larger production, mainly from Germany and Spain. The average import is quite stable along the years, around 10 000 tons a year, mainly (90%) constituted by frozen fish (Vannuccini, 1999). This amount corresponds to a consumption of less than 200 grams a year *per capita* in the Italian population and looks realistic if not an underestimate.

National Plan of Action

The *"Linee guida per la formulazione di un piano d'azione nazionale per la tutela dei pesci cartilaginei"* (Guidelines for the implementation of an action plan for the protection of cartilaginous fish) was firstly elaborated in 2001 and then revised in 2007 by Vacchi and Serena (ICRAM, 2007). The document was prepared for the Environmental Ministry (MATTM) and inserted in the «Objectives 99» of ICRAM with the Deliberation of Administrative Council n° 1/99 on 12 January 1999.

The Plan is aimed at the evaluation of the conservation status of cartilaginous fishes, sharks, rays and chimeras in the Italian seas. The species taken into consideration are the 78 reported by the checklist of the Italian fauna, revised by Relini in 2007.

2. DATA AVAILABILITY AND FISHERY MONITORING SYSTEMS

Organizations involved

The management of fisheries in Italy is primarily due to the Ministry of Agriculture and Forestry (MiPAF), but many aspects can be administered by local authorities such as Region, county (Provincia) or even town (Comune).

The main institutions and research centres involved for decades in fisheries studies in Italy are listed in Table 1, which includes the GFCM Geographical Sub Areas (GSA) for geographical reference, where appropriate. Moreover there are many other public and private bodies with significant importance either on local scale or in very specialized sectors, with some relationship with the fisheries, aquaculture, fish genetics, among others.

Table 1: Main institutions involved in fisheries studies in Italy

Acronym	Institution name	Location	GSA
ARI	Acquastudio Research Institute	Messina	
ARPAT	Environmental Protection Agency-Tuscany Region	Livorno	9
CIBM	Interuniversity Centre of Marine Biology	Livorno	9
CnrAN	ISMAR – Institute for Marine Science	Ancona	
CnrMA	Coastal Marine Environmental Institution-CNR	Mazara del Vallo	16
CnrME	Coastal Marine Environmental Institution-CNR	Messina	10
CnrVE	Institute for Marine Science	Venezia	
COISPA	Technology and Research	Bari	10
CoNISMa	Consorzio Nazionale Interuniversitario per le Scienze del Mare	Rome	
ISPRA	Superior Institute for environmental research (ex ICRAM)	Rome	
LBMB	Provincial Laboratory of Marine Biology	Bari	18
UniBA	Biology Dept. University of Bari	Bari	19
UniBA	Veterinary Dept. University of Bari	Bari	
UniBO	University of Bologna	Fano	17
UniCA	University of Cagliari	Cagliari	11
UniGE	University of Genoa	Genoa	9
UniRO	University of Rome	Rome	9

The Italian Society of Marine Biology (SIBM) coordinates a large number of institutional bodies involved in fisheries data collection along the thousands of kilometres of the country coastline. Mainly because the artisanal fisheries are scattered in hundreds of ports and landing sites, data collection relies on local maritime authorities and on the local research centres. These can be university departments, laboratories of the National Research Council (CNR), Environmental Agencies and other governmental or private institutions. Examples of organizations involved in monitoring of landings in local areas are ARPAT and CIBM in Tuscany, CNR and ICRAM in Sicily.

Most of the economical data on fisheries arise since decades from the IREPA Institute (Istituto di Ricerche Economiche per la Pesca e l'Acquacoltura), while most comprehensive data are available from the ISTAT Institute.

Coordination

Before 1970, most of the research programs aimed at the assessment of fish resources where coordinated by the National Research Council (CNR). Later on in the 80s, the CNR-IRPM of Ancona carried on a wide program aimed at optimising fisheries statistics, including the landings in the main Italian ports. In this framework it was created the Italian Research Institute for Fishery (ICRAP), but soon after this institute changed its target concern, focusing more attention to environmental aspects. Since 1985 the Agriculture Ministry (MiPAF) directly coordinates most of the research programmes on fisheries by giving the running direction firstly to the Operative Units (Universities, Research Centres, Environmental Agencies) and subsequently to the Italian Society of Marine Biology (SIBM) with a coordination unit for each GSA.

The previous programs were generally addressed to biological assessment and technological aspects of the fisheries. Meanwhile, for 30 years, the IREPA, from Salerno, carries on data collection and statistical investigations addressed to the economical, commercial and social aspects of fisheries, including landings estimations. Recently the ministry has transferred the competence on the fishery sector from the ISTAT to IREPA.

In recent years, and in connection with the EU data collections, IREPA has taken the coordinating role in the optimisation of the sampling scheme aimed at a detailed fisheries data collection among the Operative Units along the whole Italian coast.

Type of fishery data

In the last FAO-GFCM SAC Subcommittee on environment and ecosystem (Rome, 2008) a report was presented with an updated bibliographic review of scientific papers on catches and other biological information of elasmobranchs in the Mediterranean collected in the last 15 years. Specifically to Italian waters there were 19 papers with information on the Ligurian and Tyrrhenian seas (GSA 9 and 10), 12 papers on the Ionian sea (GSA 19 and 20), 12 on the Adriatic Sea and 2 on the Sicily Straits.

Most of the available data derives from scientific campaigns, landings monitoring programmes and research projects. On a national scale, the most relevant are Grund (from 1985), Medits (from 1994), Discard (from 2004) and Campbiol (from 2005).

The Mediterranean Large Elasmobranchs Monitoring program (MEDLEM program, Serena, Mancusi and Baroni, 2008) started in 1985 at a national level and its field data sheets have been requested and widely distributed among many Mediterranean research centres. This fact expresses the willingness of many countries and organization to cooperate on this subject and to conform in the collection of data. Also IUCN (International Union for Conservation of Nature and Natural Resources) and EEA (European Elasmobranch Association) endorsed the project showing a great interest and a positive appreciation of the concept. The coordination of this program is carried out by ARPAT (Italy).

The MEDLEM database application is a user-friendly computerized system (Figure 3) designed to facilitate the sharing of data between participants in this programme with a direct access from the FAO site www.gfcm.org

Furthermore, the MEDLEM database provides an updated source of information on large cartilaginous fishes for national and international organizations involved in the management and the conservation of these marine vertebrates in the Mediterranean Sea. The application allows the data entry on catch, sighting, stranding or bibliographic reference, or a search for species, country and gear.

One practical example of the use of the bycatch and incidental catches data stored in the MEDLEM database is to assess the more common species in the Mediterranean basin. Another important aspect of this project is the collection of scientific papers related to elasmobranchs in the Mediterranean area. About 400 bibliographic references are currently listed in the program database.

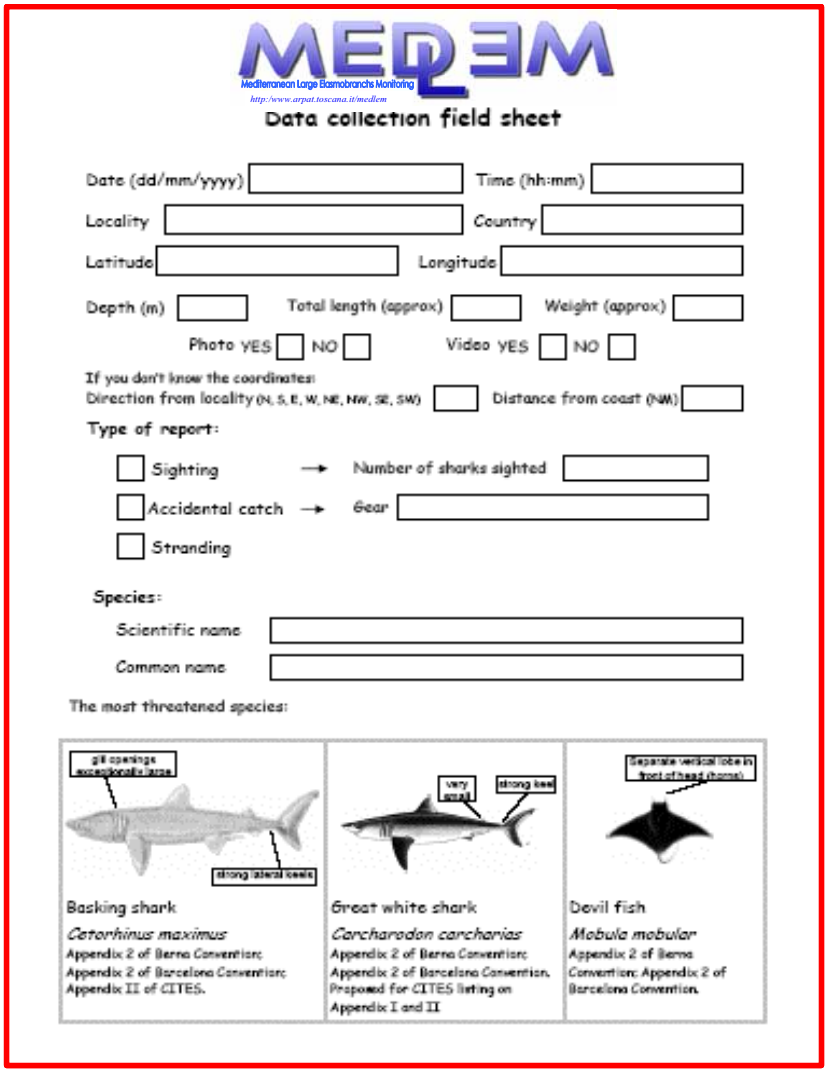

Figure 3: Data entry form of the MEDLEM program

The first data collated by the program (for a great part represented by bibliography information) was from Italy, Croatia, Spain, France, Malta, Tunisia, Greece and Slovenia. Figure 4 shows an updated overview of the database in terms of relative distribution of records by country. Up until now about 1 300 records have been inserted in the database (Figure 5). The largest part of the data (647 records) relates to basking shark, but also bycatch and incidental catches of other species are reported, such as great white shark, *Isurus oxyrinchus, Alopias vulpinus, Hexanchus griseus, Mobula mobular*, among others.

Regional fishery management organization

The General Fisheries Commission for the Mediterranean (GFCM) has been for a long time the main reference point for the fishery assessment and for management advice in the Mediterranean. The area of jurisdiction of the Commission includes many countries (around 25) characterized by different cultures, political situations and environmental settings.

Although some coordination bodies (e.g. related to the Grund and Medits projects) are involved in data management of elasmobranchs, generally in Italy data is managed on a Geographical Sub Areas scheme and on the origin of the data (surveys, landings, observation, etc.). Only in some specific cases (e.g. E.U. Raja project FISH/2004/03–41, coordinated by ARPAT) the data from the different GSAs and sources have been handled together to assess the exploitation status of the main species. Some of these results have been presented in the working group of demersal species of the GFCM-SAC Sub-Committee on Stock Assessment held in Izmir (Turkey), 15–19 September 2008.

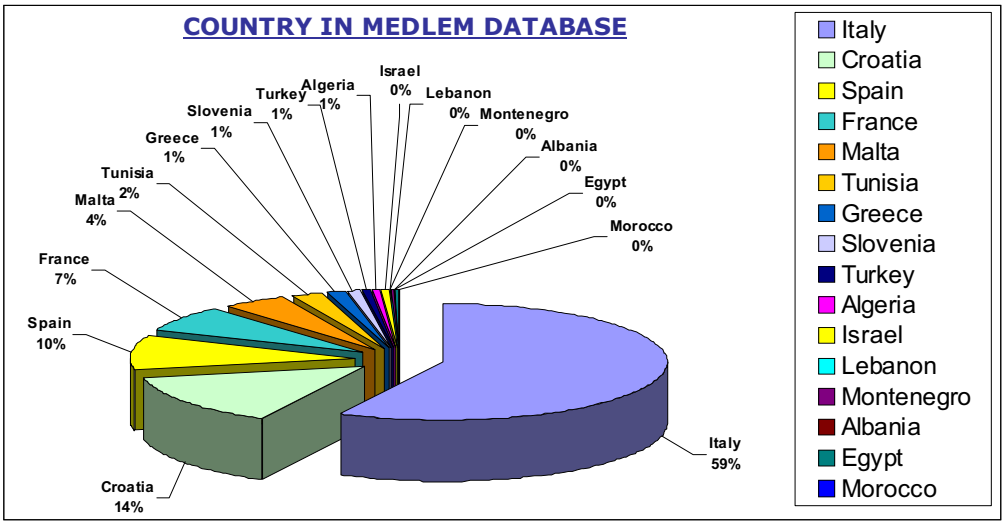

Figure 4: Countries with information in the MEDLEM database.

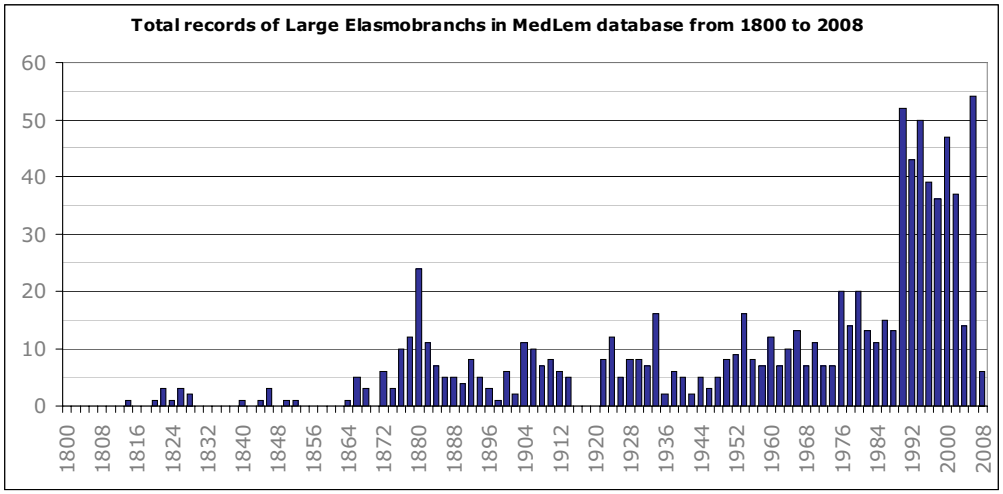

Figure 5: Total records in the MEDLEM database from 1800 to 2008.

FAO catch data

Italian catch reporting of elasmobranchs from the various sources (Eurostat, Fishstat, Istat) are basically coherent but show an inconsistency related to Ionian catches between 1985 and 1995 with values around 12 000 tons/year, which have no likely explanation (Figure 6). It is acceptable that the principal fishing country in the Ionian Sea is Italy, even though from 1998 the Tunisian (and maybe Libyan) catches may have highly increased in the southern part of the FAO GFCM Geographical Area 2.2 (Figure 7).

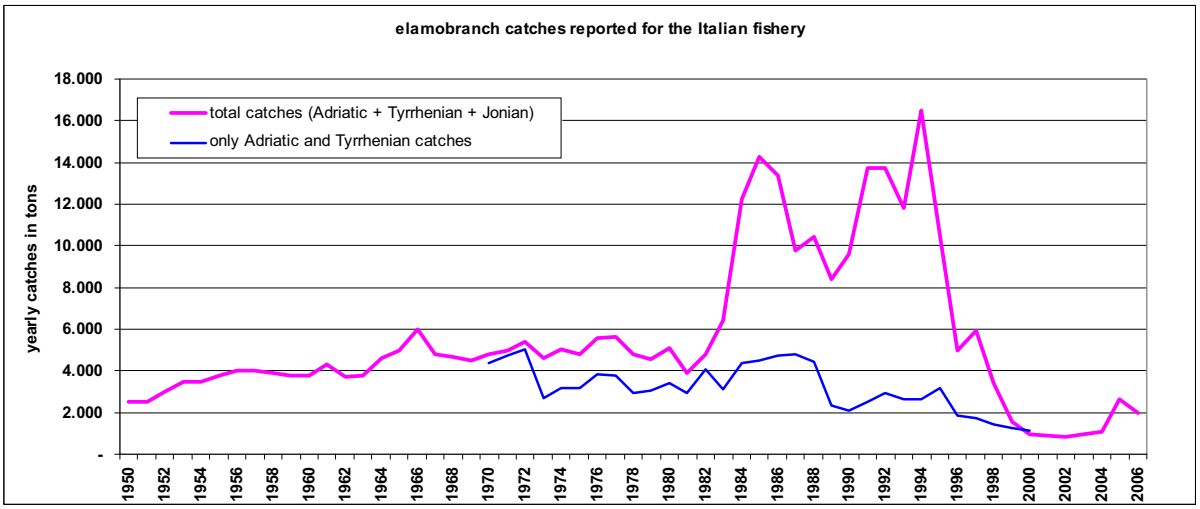

Figure 6: Reported catches (tonnes) of elamosbranchs by Italy (source FAO)

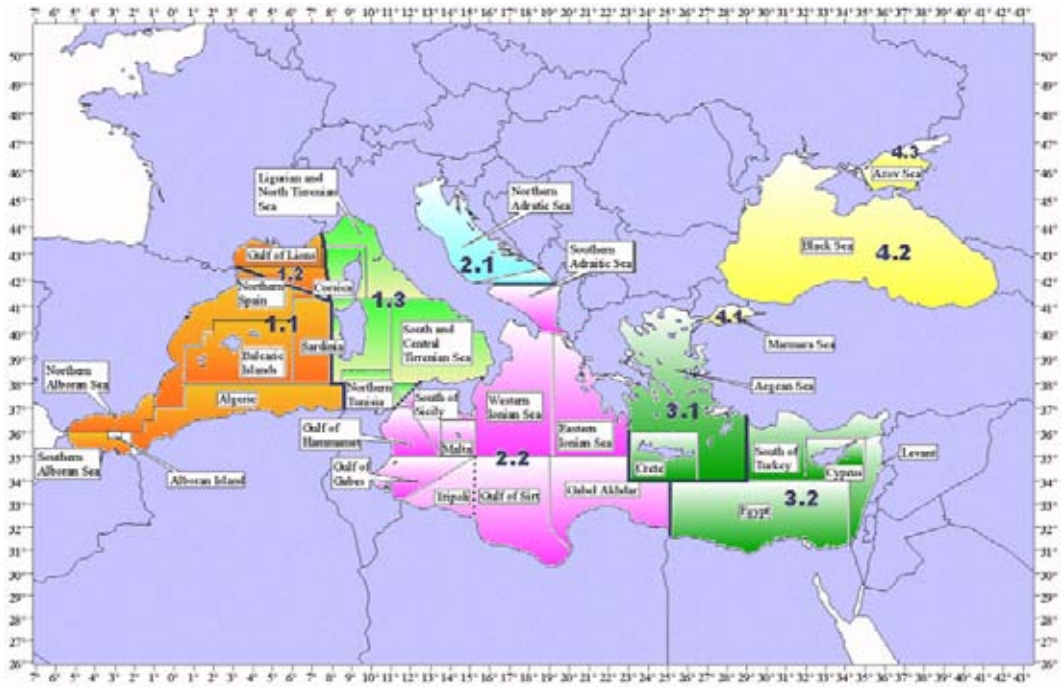

Figure 7: GFCM Geographical Areas

An improvement of the data collection system established in Italy since 1983 (see Bazigos *et al.*, 1984) may explain the increase of the catches of Italy in the Ionian Area. The fast decline of the catches observed since 1995 may be related either to the reduction of the size of the Italian artisanal and bottom trawl fleets or to a possible local depletion of elasmobranch stocks.

Nevertheless, the large amount of catches in the Ionian sea are reported as smoothhounds nei (60%) and rays, stingrays and mantas nei (40%) and this is quite surprising since in the Italian Ionian Sea the rays are very scarce and yearly catches of up to 4 000 tonnes seems unrealistic.

Main problems

In respect to elasmobranchs catches in Italy, the more evident inadequacy consists on the excessive grouping of the species; often catches are reported only in the two categories: “smoothhounds nei” and “rays nei”. Even if this reflect quite well two fisheries types (trawl and longlines) problems arise for instance when trying to discern catshark bycatch in trawl fisheries or the species caught in different environments, i.e. coastal or deep water, demersal or pelagic species.

Another problem is the absence of a single database holding the results of the various research programmes, which hampers the possibility of comparison and validation of different sources of information on catches, landings or standing stock estimates. This problem is due in part to the difficulties of coordinating the data storage from the numerous research structures, integrating biological and economical assessments from different sources and to standardize estimates of units of effort (e.g. swept area, setnets length and hook numbers).

Finally, concerning the approval of the National Plan of Action for Sharks, the procedure is still ongoing because the historical overlapping of competence of the Environmental Ministry (MATTM) and the Agriculture Ministry (MIPAF).

Improvement of monitoring

Some years ago, following a FAO request, a training programme was planned aimed to set a Mediterranean network for the improvement of the collection of elasmobranch statistics. This "Training course on taxonomy and data collection of Mediterranean cartilaginous fish” was planned in the framework of FAO Regional Programs such as GFCM, COPEMED, MEDSUDMED, ADRIAMED and EASTMED.

The main goal of the course was the strengthening of scientific cooperation through joint data collection and analyses of the scientific information previously available on cartilaginous fish in the Mediterranean and Black Sea. Furthermore, this training course was conceived for giving an opportunity for junior scientists to improve their professional skills in the identification of sharks and rays and to perform a joint assessment of large elasmobranchs fish, endangered cartilaginous species and other elasmobranchs collected during scientific campaigns.

The training course was addressed to researchers from Mediterranean countries with the following themes:

1) Introduction to the elasmobranch taxonomy
2) Overview of the background knowledge on elasmobranch fisheries assessment and management techniques.
3) Conservation and long-term dynamics of cartilaginous fish in the Mediterranean Sea; their decline in biodiversity.
4) The importance of the MEDITS trawl surveys for the knowledge of diversity and distribution of elasmobranchs in the Mediterranean. How to organize a single database
5) Taxonomy and field techniques for identification based on *The field identification guide to the sharks and rays of the Mediterranean and Black Sea* (Serena, 2005) and *Standardization of the identification methods and stock assessment approaches to rays of the Mediterranean Sea* (Serena *et al*., in press)
6) Large elasmobranch data collection and database organization based on the MEDLEM project.
7) The use of a standard protocol for specimen collection, preservation and cataloguing.

Unfortunately it was not possible to implement the course because no funds were available at the time.

3. MONITORING OF TRADE IN SHARK PRODUCTS

Organizations for monitoring of international trade

The main governmental agency responsible for the monitoring of trade and many other matters is the Istituto Nazionale di Statistica (ISTAT).

Since decades, following the European Regulations and mandated by the MIPAF, IREPA collects data on elasmobranch species by means of periodic visits to the main fish markets and landing sites along the Italian coasts. For each region, data are collected on the following group of species recording the weights of fishes and their prices at landing:

- catsharks – gattuccio
- smoothhound – palombo
- spurdog – spinarolo
- blue shark – verdesca
- thorback ray – razza chiodata
- brown ray – razza quattrocchi

Monitoring of trade

The monitoring of international trade in sharks products is conducted as follows:

- Customs are the main points of control
- Spurdog and smoothhound are the main types of products in trade
- Italy imports (about 13 000 tonnes in 2005) from about 30 countries. In recent years the most important of them were Spain, Argentina and the Netherlands. Very low quantities are exported (less then 300 tonnes/year)
- No particular tariffs is charged for sharks species
- Because many shark species are assembled for the trade, the identification of species is difficult
- The shark commodities are often sold with the name of "palombo" or "verdesca" even if they are similar species
- Trade controls follows the common rules for food traffic, with no other specific restriction for fish trade.
- There is no trade of protected species, *sensu* CITES (i.e., whale shark, basking shark and great white shark) in Italy.

FAO trade data on sharks

About 98% of the Italian trade in cartilaginous species (10–15 thousand tonnes a year) is represented by imports, while exports account for only 2% of the total trade (around 200 ton/year) (Figures 7 and 8). Exports are irrelevant because the Italian catches of elamosbranchs are much smaller than the national consumption. In both imports and exports, frozen fish represents 90% of the total and the only identified species are *S. acanthias* and *S. canicula* (11% together); all other frozen fish are grouped as "sharks nei". For the last 20 years, the trend in imports (representing approximately 10 times the Italian catches) seems to be quite stable.

In any case the price of fresh and frozen sharks in wholesale trade is fairly low (about Euro 4/kg and Euro 2/kg, respectively) (Figure 9).

Improve the monitoring of trade

Monitoring of trade in Italy is poor and particularly difficult due essentially to:

– difficulties in identifying the species
– lack of technical capacity of customs officers

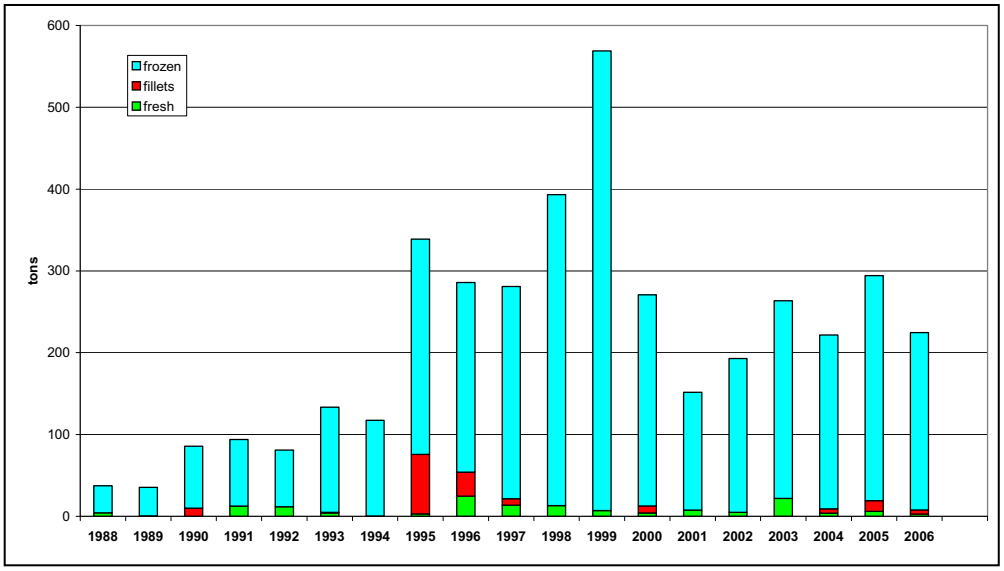

Figure 7: Italian exports of sharks (source FAO)

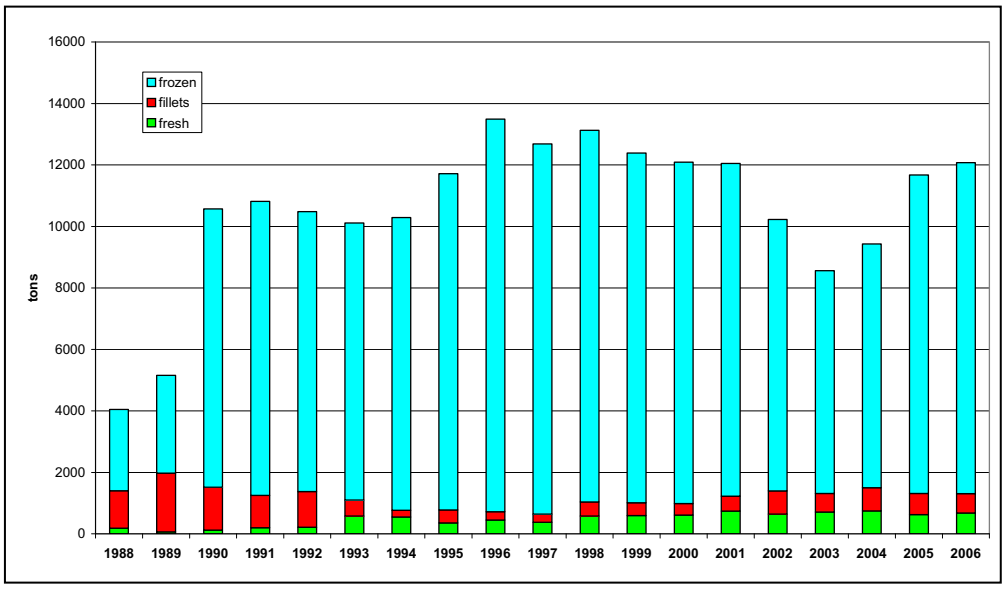

Figure 8: Italian imports of sharks (source FAO)

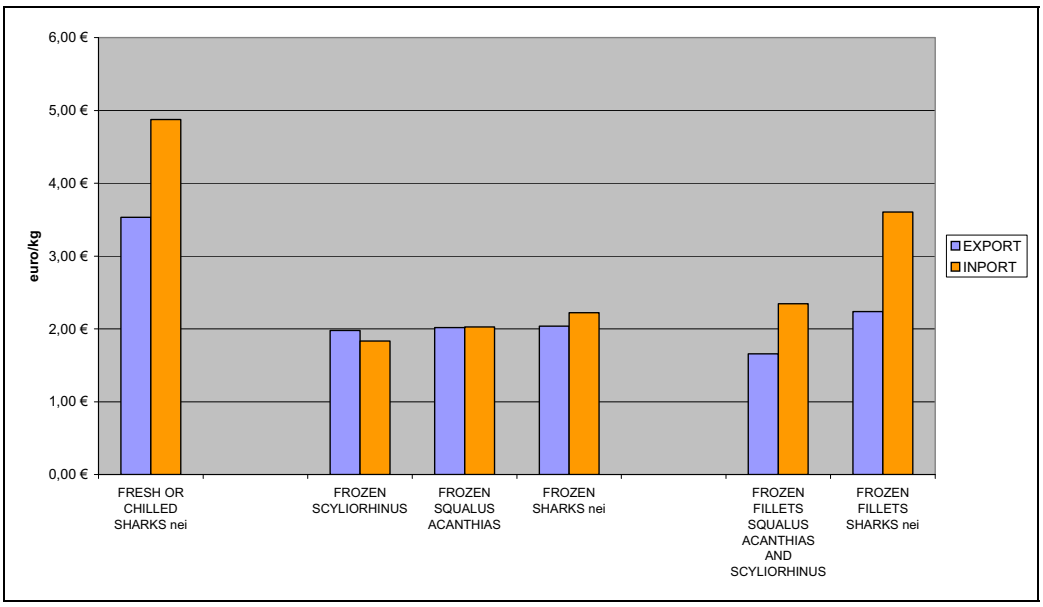

Figure 9: Average price of shark categories in Italian international trade (1988–2006) (Source FAO)

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JAPAN

Hideki Moronuki
Ecosystem Conservation Office, Fisheries Agency

1. Background information about the shark fisheries

FAO capture production data show that global catches of sharks, skates and rays (elasmobranch) have continuously increased from about 200 000 tonnes per year the 1940s to about 800 000 tonnes per year after 1996. In contrast, elasmobranch catches by Japan, which once exceeded 100 000 tonnes per year in the 1940s, have continuously declined since then to a level of 20 000 to 30 000 tonnes per year. This decline in catches by Japan may be attributed to a decreasing demand for shark, skate and ray products (Figure 1).

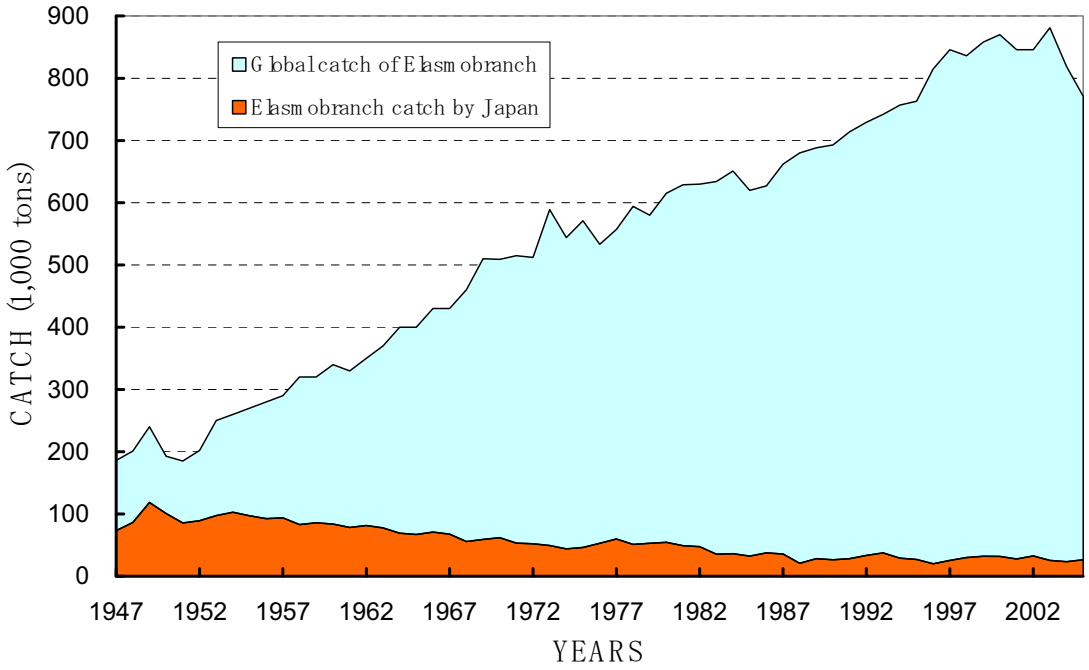

Figure 1: Elasmobranch catches by Japan and worldwide (1947–2005, FAO, 2007)

Elasmobranch fisheries in Japan

Major elasmobranch species groups caught by Japanese fisheries are classified into three groups: pelagic, demersal and coastal. Tuna longline is the major fishery which catches pelagic species, though high seas driftnet fisheries were once major players. Japan's elasmobranch catches exceeded 70 000 tonnes per year in the 1950s, but then gradually declined to 20 000–30 000 tonnes per year in the 1990s and thereafter. The main cause of the decline was the decrease in landings of demersal sharks and rays from the bottom trawl fishery. Although catches of pelagic sharks by tuna longline fisheries also gradually decreased from the level of 20 000 tonnes per year in the 1980s to 15 000–20 000 tonnes per year in the 1990s, and recovered once again to the 20 000 tonnes per year level in the 2000s (Figure 2). Of the total shark catches, catches by tuna longline fisheries, including direct catch of sharks as main targets, comprised 71–87 percent, while shark bycatch by the same fisheries 58–84 percent in the period of 1994–2005. Japanese tuna longline fishing vessels are operating almost all over the world including the Pacific, the Indian and the Atlantic Oceans.

Although there are difficulties in estimating the number of people involved in shark fisheries, it is naturally considered that the number has been decreasing substantially taking into account the fact that the number of tuna longline vessels has decreased in about 20 percent in the 2000s.

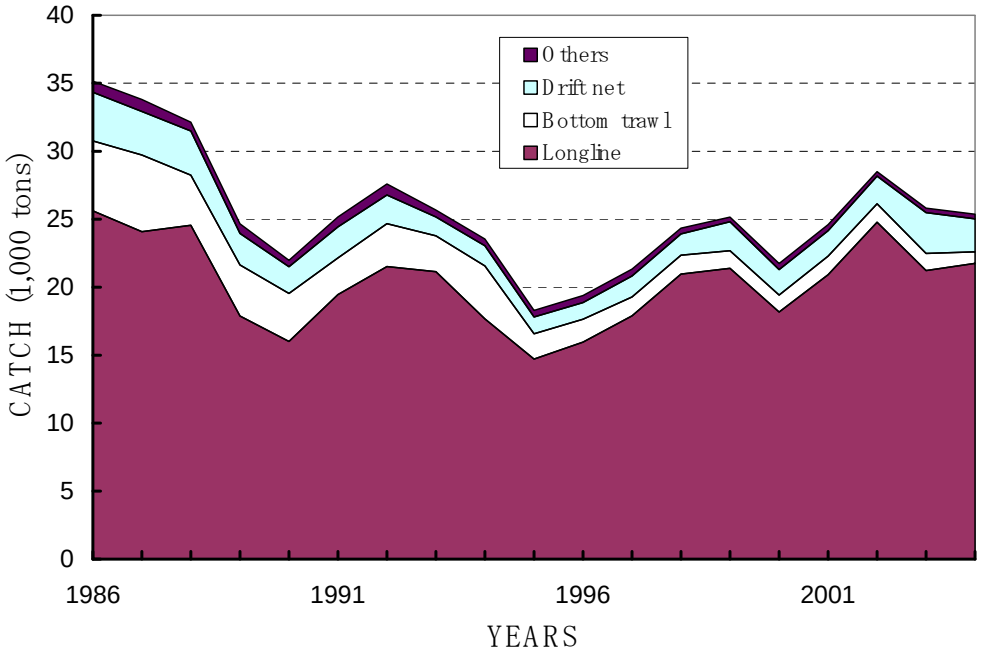

Figure 2: Shark catch by type of fishery (Statistical and Information Division, Ministry of Agriculture, Forestry and Fisheries, 1986–2004)

Contribution of shark fisheries to the national economy in Japan is quite small, and its contribution to the fisheries sector is also very small (0.3–0.5 percent in volume). However, in some particular regions, the importance of shark fisheries has been relatively high reflecting regional food culture and tradition. For example, at Kesennuma of the Miyagi prefecture situated in the Tohoku region (northern part of main island of Japan), contribution of shark catch to its all fishery landings in 1999–2006 were much higher than the national average, ranging between 12.0–21.9 percent in volume, and notably its contribution in value has been gradually increasing from 8.5 percent to 13.3 percent during the same period.

Blue shark is the most commonly caught species in tuna longline fisheries. Before the 1990s, this species used to be discarded at sea, except in near–shore fishing grounds, because of its low market value at that time in Japan. However, in recent years, since their commercial value as food has increased, especially in overseas markets, landings at overseas ports have become increased. Landings of blue shark in 1992–2006 were 10 000–16 000 tonnes per year, accounting for 70–80 percent of the total landings of pelagic sharks (Figure 3).

Shortfin mako is often landed in Japan even by distant-water longline vessels because of their high-quality meat and high commercial value. Landings of shortfin mako in 1992–2006 were 800–1 500 tonnes per year, accounting for 5–8 percent of the total landings of pelagic sharks.

Salmon sharks are mainly landed in the Tohoku region centering on Kesennuma. The commercial value of this species is high because of its high-quality meat, and in addition to its use as food, fins and skins are used for handicrafts. Landings of salmon shark in 1992–2006 were 1 400–4 400 tonnes per year for longline and driftnet fisheries combined, accounting for 8–22 percent of the total landings of pelagic sharks.

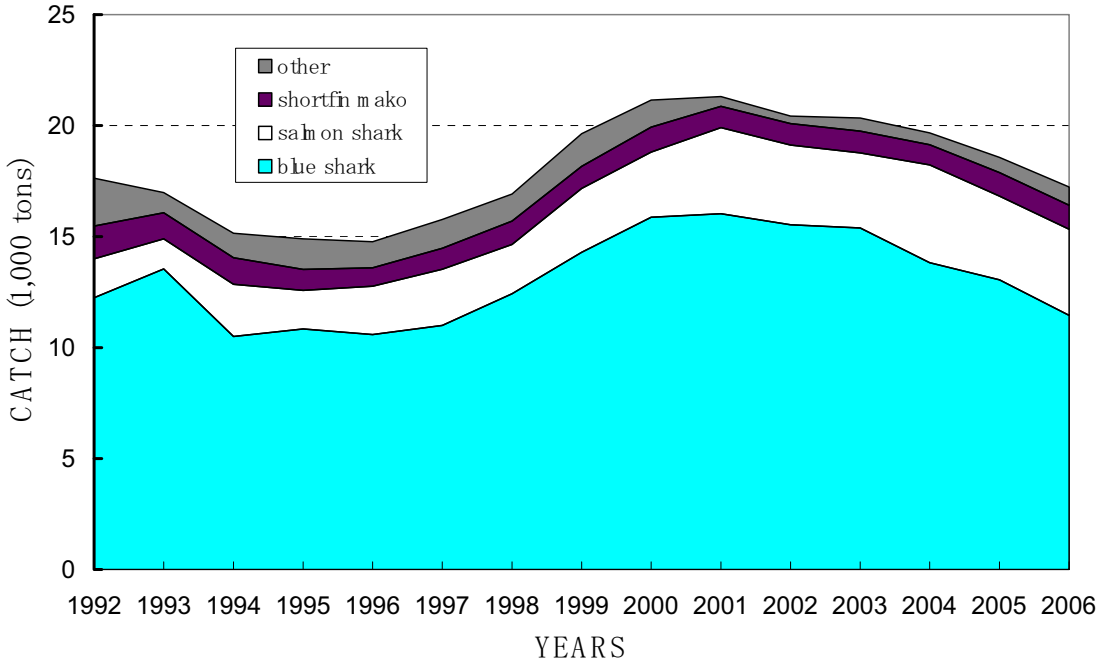

Figure 3: Landed weight of pelagic sharks by species (Fisheries Agency/Fisheries Research Agency, 1992–2006)

Of the other pelagic sharks (oceanic whitetip shark, silky shark, bigeye thresher, crocodile shark), crocodile shark is never used for commercial purpose, even for its fins. According to data from 1992–2005, landings of these species were reported at 2–85 tonnes per year for oceanic whitetip shark, and for thresher shark including bigeye thresher at 250–700 tonnes per year. Landings data for silky shark are not available as this species is not recorded separately, but landings of requiem sharks as a group are reported at 30–130 tonnes per year (Fisheries Agency/Fisheries Research Agency 1994–2007).

Regarding the three species of large sharks, i.e. whale shark, basking shark and white shark, a harpoon fishery targeting basking sharks existed in the 1960s, but, at present, there are no such fisheries targeting these species.

Development and implementation of the NPOA

Following the adoption of the IPOA-Sharks at the twenty-third session of the FAO Committee on Fisheries (COFI) in February 1999, Japan developed its National Plan of Action (NPOA-Sharks) and submitted it to FAO at the occasion of the twenty-fourth COFI in March 2001. Japan is now striving to obtain ensure scientific knowledge and information regarding shark resources under its NPOA-Sharks, and also to ensure rational conservation and sustainable use of shark resources based on such knowledge. Japan submitted reports on its assessment of the implementation of the NPOA-Sharks to the twenty-fifth and twenty-sixth sessions of COFI in 2003 and 2005 in accordance with paragraph 28 of the IPOA-Sharks.

2. Data availability and fishery monitoring systems

Fisheries Agency of Japan (FAJ), one of the agencies belonging to the Ministry of Agriculture, Forestry and Fisheries (MAFF), is responsible for the monitoring of fisheries that catch sharks, with the support by the Fisheries Research Agency of Japan (FRA) in scientific and data-gathering aspect.

Japan has actively participated in almost all RFMOs which are responsible for fisheries management within regions where sharks are caught by Japanese fishing vessels both directly and incidentally. Among those RFMOs, Japan has provided ICCAT with information on catches and landings of sharks in tuna longline fisheries in the Atlantic Ocean for its stock assessment of pelagic sharks in the region. It is foreseen that similar provision of shark information by Japan would be made to other RFMOs in the future.

Data and information on shark catches are collected by FAJ and compiled by FRA through logbooks, observers and research vessels as well as training vessels belonging to high schools and universities. Logbooks provide various types of information including landing by species, number, weight, location of catches and landing ports. In the case of landing at ports in Japan, provision of detailed information in weight and value is mandatory, while conversion factor is used for estimating weight when landed at foreign ports, usually, in the form of headed and gutted. Bycatch data by species have been also collected through logbooks since 2007. Since most of sharks are caught as bycatch in tuna longline fisheries, fishing effort on sharks could be monitored through review of tuna longline fisheries.

Standardized CPUEs which could be used as one of indicators of resource abundances are calculated for various species in their main fishing grounds and provided to respective RFMOs concerned.

For many species of sharks, erroneous species identification might occur during monitoring by observers and/or catch recording by fishing vessels. In order to rectify such situation, several identification tools are elaborated and distributed to fishermen, such as desk pads, brochures and posters. Also, an identification guidebook for observers on board fishing vessels and research vessels is prepared, which contains species identification manual not only for shark species but also for fish, seabirds, sea turtles and others.

Data and information derived from logbooks, observers and through various research activities are compiled and stored at the National Research Institute of Far Seas Fisheries of FRA.

Difficulties and problems encountered

Since the issues surrounding management of sharks have become highlighted relatively recently, there remains a need of improvement in such areas as efficient research and monitoring. Unlike the situation for tunas, swordfish and marlins, since there are no long-term time series of data on both catch and bycatch of sharks, there is still difficulty to grasp long term trend that can be used for stock assessment.

Although there are no fisheries targeting large sharks these days, these species sometimes stray into set nets accidentally. For this reason, there is a need to establish an appropriate mechanism to systematically collect information on incidental catches of large sharks in set nets.

3. Monitoring of trade in shark products

International trade in general is under the responsibility of the Ministry of Economy, Trade and Industry (METI) in cooperation with Ministries/Agencies concerned. Monitoring and control of trade as well as compilations of trade data and information are under the responsibility of the Ministry of Finance (MOF), and thus controls of shark products are conducted at each customs by MOF mainly from the view point of preventing illegal trades. Information on imports and exports in shark products are also compiled by MOF through data collections at customs clearance. FAJ is only responsible for the control and monitoring of specific fisheries products on which international regulations are established by RFMOs and/or international organizations such as ICCAT and CITES.

Japan exports mainly frozen shark meat and dried shark fins and imports almost only frozen meat. During 1998–2007, exports of frozen shark meat have gradually increased from 2 050 tonnes in 1998 to 3 612 tonnes in 2007 (peak: 4 266 tonnes in 2005), while those of dried shark fins have gradually decreased from 347 tonnes in 1998 to 197 tonnes in 2007 (bottom: 168 tonnes in 2005). During the same period, imports of shark products (mostly frozen meat) fluctuated from 885–1 443 tonnes and did not show any clear trend.

Main destination countries of frozen shark meat export include South Africa, Spain, Peru, China and Korea. However, most of exports to South Africa, Spain and Peru are considered “landings” at foreign ports by Japanese tuna longline vessels. Therefore, in terms of “true” export, China, Korea and Vietnam are considered to be main destination countries. Dried shark fin is mainly exported to China, Hong Kong SAR, China and Singapore, being most of it (85–90 percent) exported to China, Hong Kong SAR. Main import countries of frozen shark meets include Spain, Canada, China and Indonesia.

Shark products are subject to import tariffs. Tariff level for dried shark fin is the same as most of other dried fish products (10.5 percent) while those for fresh and frozen shark meats are 2.5 percent, slightly lower than the level applied to most of other fish species (3.5 percent).

There is no identification of species on shark products to be traded, but commodity codes are allocated to shark products by types as follows:

Exports

fresh or chilled:	0302–65–000
frozen:	0303–75–000
fillets:	0304–29–100
dried fin:	0305–59–920

Imports

fresh/chilled:	0302–65–000
frozen:	0303–75–000
fillets, fresh/chilled:	0304–19–930
fillets, frozen:	0304–99–920
dried fin:	0305–59–090

Under the Law Concerning Standardization and Proper Labeling of Agriculture and Forestry Products (The JAS Law), the indication of the source of fisheries product is mandatory for fresh and frozen products and for some processed products, the name of the country of origin has to be properly labeled on every product if it is imported from abroad or processed with fishery products imported from abroad. However, there is no documentation or labeling laws and schemes to control the source of fisheries products in trade.

Since Japan considered it inappropriate to list the above-mentioned three large shark species (i.e. whale shark, basking shark and white shark) in the CITES appendix II without any scientific justification, it has filed reservations on their listings. Therefore, we do not have any specific arrangement for controlling the trade in those species. However, since there is no fishing activities targeting them and since few numbers of those species have been reported as part of the catch (bycatch), it is not considered that the trade in their products did and would occur.

So far Japan has not faced any problem in controlling and monitoring trade in shark products mainly because of relatively small volume to be traded and low contribution of shark products to overall trade in fishery products. Also, since we do not find any problems in resource abundance of shark species caught by Japanese fishers (directly and incidentally), Japan does not feel it necessary to have stricter control system for trade in shark products. However, in order to further facilitate effective monitoring and control of trade in shark products, the following arrangements are considered appropriate to be introduced in the future, if necessary;

- *Establishment of an organization/association on shark products*.
  In order to systematically monitor the distribution of shark products from production to export, it is considered appropriate to establish an organization and/or association of industries concerned including producers, processors, retailers and exporters (if possible, importers as well). Through the monitoring of shark products distribution, it could become easier to check the volume of trade, to identify shark species to be traded, and to control illegal and unreported trade.

- *Compilation of statistics on domestic distribution and consumption*
  Although it is indispensable to have appropriate statistics on trade in shark products, it is preferable to have at the same time statistics on domestic distribution and consumption of shark products in order to identify shark products illegally imported and/or introduced through IUU fishing.

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PANAMÁ

Yehudi Nafisa Rodriguez Arriatti
Departamento de Ordenamiento de la Dirección General de Ordenación y Manejo Integral

1. ANTECEDENTES SOBRE LA PESCA DE TIBURONES

La actividad pesquera en Panamá

Desde 1988 se viene explotando intensamente el recurso tiburón en Panamá atendiendo a la demanda del mercado de la aleta. La actividad pesquera se desarrolla en un noventa y cinco por ciento (95%) en las aguas del Océano Pacifico Oriental, encontrándose en sus costas, el 80% de la población del país. Se desconoce a detalle como se están llevando a cabo las pesquerías, cual es el esfuerzo ejercido y la captura realizada, cuantas y cuales son las especies capturadas y descartas, como están siendo controlados los descartes y el nivel de comercialización de los productos derivados del tiburón, y considerando que se carece de un buen registro histórico de las capturas. Es a partir del 2000 (Cuadro 1) que se ha podido colectar información un poco más detallada de los productos comercializados, ya que antes el tiburón entraba en la categoría de "otros" en los desembarques industriales. Anteriormente no se llevaban estadísticas provenientes de la pesca artesanal, proviniendo toda la información de la pesca industrial.

Cuadro 1. Desembarque en toneladas de los diferentes productos derivados del tiburón

Año	Desembarque en toneladas de la pesca industrial, Puerto de Vacamonte				**TOTAL**
	Carne de tiburón	Aleta	Rabo de tiburón	Manta raya	
1981	-	-	-	-	-
1991	-	-	-	-	-
1996	-	-	-	-	-
1997	-	-	-	-	-
1998	-	-	-	-	-
1999	-	-	-	-	-
2000	2 999	124	-	-	**3 123**
2001	3 215	132	-	-	**3 347**
2002	1 960	147	-	-	**2 107**
2003	1 286	98	0,03	-	**1 384**
2004	1 709	500	2	-	**2 211**
2005	2 492	82	3	14	**2 591**
2006	529	74	0,5	12	**616**
2007	25	0,8	-	1	**27**

Registros de no aleteo*	Pesca artesanal (años)		Pesca industrial (años)		Totales provienen de 12 sitios de desembarque
	2007	2008	2007	2008	
	3,27	6,5	3,27	8,41	
* Estos pesos provienen de desembarque de aletas de la actividad de no aleteo, verificado bajo certificado de inspección ocular					

Existen actualmente un total de 710 embarcaciones industriales y 5 900 embarcaciones artesanales. Esta información corresponde a los monitoreos que se toman de tiempo en tiempo en los sitios de desembarques de productos pesqueros y en las comunidades pesqueras. No obstante, los registros de licencias y permisos de pesca, que en algunos casos están inactivos, más las embarcaciones con diversas licencias, más las embarcaciones no declaradas y las embarcaciones con fines de subsistencia, reflejarán una suma mayor. Actualmente, la Autoridad de los Recursos Acuáticos de Panamá (ARAP) mantiene el siguiente registro: 136 permisos de pesca ribereña o artesanal de langosta, 6 438 permisos de pesca ribereña o artesanal de peces, 2 039 permisos de pesca ribereña o artesanal de camarones, 220 licencias de pesca industrial de pargo, mero y tiburón, 104 licencias de pesca industrial de atún, 206 licencias de pesca industrial de dorado, 50 licencias de pesca industrial de doncella y pajarita, 20 licencias de pesca industrial de anchovetas y arenques, 26 licencias de pesca industrial de cojinúa, 229 licencias de pesca industrial de camarones y 191 licencias de pesca en aguas internacionales.

Pesca incidental, dirigida y especies capturadas

Dentro de lo que es la pesca incidental, no existen datos confiables acerca de estas capturas, pero se sabe por ejemplo, que dentro de la flota camaronera (redes de arrastre) un gran número de rayas y tiburones pequeños son víctimas de la pesca incidental. Para la flota palangrera, en cuanto a la captura incidental de especies no-objetivo, hacen falta realizar estudios específicos en conjunto con la flota pesquera.

Actualmente son 16 especies que forman parte de la actividad pesquera, aunque el número puede ser superior debido a que no existe un registro por especie al momento de los desembarques pero, a través de un monitoreo realizado en 1998 por funcionarios de ARAP, se sabe cuales son algunas de las especies capturadas para su comercialización:

Familia Alopidae	
Tiburón Zorro ojón	*Alopias superciliosus*
Tiburón Zorro pelágico	A*lopias pelagicus*
Familia Triakidae	
Musola media luna	*Mustelus lunulatus*
Familia Carcharinidae	
Tiburón Punta Negra	*Carcharinus limbatus*
Tiburón Azul	*Prionace glauca*
Tiburón Oceánico	*Carcharhinus longimanus*
Tiburón Cazón trompa	*Nasolamia velox*
Tiburón Punta Blanca	*Carcharhinus albimarginatus*
Tiburón Toro	*Carcharhinus leucas*
Tiburon Tollo	*Rhizoprionodon longurio*
Tiburón Tigre	*Galeocerdo cuvieri*
Tiburón Mako	*Isurus oxyrinchus*
Familia Sphyrnidae	
Tiburón Cornuda cruz	*Sphyrna zygaena*
Tiburón cornuda común	*Sphyrna lewini*
Tiburón Martillo gigante	*Sphyrna mokarran*
Familia Pristidae	
Pez Sierra	*Pristis pristis*

De la pesca artesanal se tiene que:

Aquellos que trabajan cerca de la costa, capturan individuos pequeños con redes de luz de malla de 3 y 4 pulgadas, mientras que los pescadores que realizan su faena en aguas más profundas utilizan red de enmalle con luz de malla entre 4 1/2", 5", 6", 7" y 8" para capturar especimenes de mayor tamaño.

Existe actualmente, una tendencia por parte de los pescadores artesanales de utilizar el palangre o línea de fondo como arte de pesca principal para la captura de tiburón, mero, pargo y dorado en aguas más profundas, empleando un promedio de 400 anzuelos que varían de tamaño entre los números 7, 8 y 14. El largo promedio de los palangres oscila entre las 600–2 500 brazas de longitud.

De la pesca industrial se tiene que:

Se encuentra integrada por barcos camaroneros, bolicheros, de cojinúa, así como barcos palangreros que se dedican a la pesca del pargo, mero, tiburón, dorado, y barcos de arrastre para la pesca de doncella y pajarita. Utilizan como principal arte de pesca el palangre, el cual puede medir hasta unas 10 millas, empleando entre unos 400 a 2 000 anzuelos por línea. Este número de anzuelos va a depender mucho de la capacidad de la embarcación

Las licencias PMT (pargo, mero y tiburón) no establecen un porcentaje para la captura de tiburón (lo mismo para el pargo y el mero) permitiéndole a la nave que todo su desembarque sea únicamente "tiburón" si se da el caso.

Tanto para la pesca artesanal como en la industrial, ante la ausencia de una buena pesca de peces de escama, algunos pescadores se dedican a la captura de tiburones generalmente durante los últimos meses del año (octubre, noviembre y diciembre), pero de acuerdo a la encuesta realizada por ARAP en 1998, el recurso presenta cierta estacionalidad.

Para el área del Golfo de Panamá el tiburón se presenta de forma masiva entre los meses de junio a octubre y muy cercanos a la costa; en tanto que para el área más occidental del país entre las provincias de Veraguas y Chiriquí la presencia y captura de tiburones se da de manera más abundante durante la temporada seca (enero-marzo). En los meses restantes, los volúmenes de captura son mucho más reducidos y se dan de manera esporádica.

El mercado internacional y el consumo doméstico

La aleta, que es el subproducto con mayor demanda para exportación, se vende como aleta fresca en Chiriquí entre los B/.2.00–15.00 (1 B/. = 1 USD) y como aleta seca entre los B/.5.00–80.00; en Veraguas se comercializan las aletas frescas o congeladas entre los B/.2.00–15.00 dependiendo del tamaño de la aleta. La libra de cartílago de tiburón en polvo está en B/.8.50 y la totalidad del producto está dirigida a la exportación. La piel es otro subproducto que está adquiriendo una gran demanda como rubro de exportación, generando ganancias de hasta B/.750 000 en el 2001 por la empresa New Life Corporation.

La carne de tiburón se vende a B/.1.00 la libra o ligeramente superior a este valor, y se vende como seco-salado, suplantando la importación de bacalao. La carne de raya se vende a un costo de 0.30 centésimos de dólar la libra. De está última no se conoce bien su mercado, pero ya se ha documentado que los excedentes que no son comprados, son desechados, lo que significa que aún no existe una aceptación por parte del mercado local para este producto.

Plan de manejo

Actualmente se encuentra en desarrollo el Plan de Acción Nacional para la Conservación y Ordenación de los Tiburones el cual deberá estar listo para este mes de octubre para que sea sujeto a evaluación. Se ha considerado que, antes de el plan sea aprobado para su ejecución, muchas acciones dentro del mismo ya pueden ser implemientadas, como la busqueda de zonas de crianza, la implementación de guías de identificación de campo como proyecto piloto, toma de datos biológicos-pesqueros (como proyecto piloto) , ubicación de zonas de reproduccción y evaluar la posibilidad de implementar actividades alternativas en algunos los poblados pesqueros como parte de un Plan Maestro de Turismo que se implementará a nivel nacional para el 2009.

2. DISPONIBILIDAD DE DATOS Y SISTEMAS DE SEGUIMIENTO DE LA INDUSTRIA PESQUERA

Actualmente la Autoridad de los Recursos Acuáticos de Panamá (ARAP), es la autoridad competente en cuanto al manejo y ordenamiento de los recursos pesqueros a nivel nacional a partir del 2006. Se está llevando un control de la actividad de no aleteo en los principales sitios de desembarque y se está

sancionando a quien no cumpla la ley o sea sorprendido con aletas de tiburón y no presente el certicado de desembarque avalado por la institución.

La Autoridad Marítima de Panamá se encarga de llevar las estadísticas pesqueras del puerto de Vacamonte, en el cual desembarca toda la pesca proveniente de embarcaciones industriales tanto extranjeras como nacionales, y es aquí donde se descargan los mayores volúmenes de pesca de tiburón.

La Misión Taiwan tiene un programa en conjunto con algunos pescadores regionales que contribuyen en brindar datos acerca de la actividad pesquera artesanal. Actualmente este programa se ha deshabilitado un poco y la información no tiende a ser muy frecuente, creando una perdida de valiosa información. Años atrás, la Autoridad Marítima de Panamá era la encargda de llevar estos registros y ahora toda esta información a pasado a formar parte de la ARAP.

El programa de observadores de la Comisión Interamericana del Atún Tropical (CIAT) brindan datos relacionados con las pesquerias de cerco, proveniendo la misma de barcos extranjeros pero que se abanderan con bandera de Panamá, siendo esta información bastante completa. Datos como el número de tiburones liberados, descartados, retenidos, cercenados (siendo estas dos úpltimas actividades ilegales y ya no permisibles en ningun atunero) son difundidos a través de los Informe de Cumplimiento. Igualmente brindan información por especie, su talla y cuantos fueron los individuos capturados por especie, pero esta información no aparece en el informe de cumplimiento, por lo que se hace necesario buscar la manera de tener el acceso a la misma. También ofrecen dentro de su informe de cumplimiento los barcos que han cometido alguna falta, su país de origen (en este caso, aquellos que posean bandera panameña) y la sanción impuesta.

La WWF lleva desde hace pocos años un programa de observadores a bordo en barcos palangreros, recopilando información de tipo biológico-pesquero, tal como la especie capturada, si la misma fue incidental o dirigida, talla, esfuerzo pesquero, entre otros. Está por firmarse un memorandum de entendimiento entre la WWF y la ARAP, lo que permitirá que toda la información recolectada a través de este programa, sea facilitada a la ARAP para que la misma forme parte de nuestra base de datos a partir del 2009.

A través de MARVIVA, una Organización no Gubernamental (ONG), se ha encargado de divulgar a nivel nacional la importancia de la conservación del recurso tiburón, así como el rechazo de la actividad del “no aleteo”. Su función también implica visitar los campos pesqueros y hacer evaluaciones acerca de la situación actual referente a la pesca de tiburón en los mismos. Actualmente MARVIVA Y ARAP nos encontramos trabajando en conjunto en la implementación de un programa de educación el cual consistirá en visitar los poblados en donde la actividad pesquera se lleve a cabo, sobre todo en aquellas donde el tiburón forme gran parte de sus capturas y evaluar la posibilidad del desarrollo de actividades alternativas (p.e. ecoturismo).

La administración actualmente cuenta con personal capacitado para poder llevar a cabo investigaciones, pero no con el personal suficiente para poder llevarlas a cabo, por lo cual se hace necesario establecer convenios o acuerdos con instituciones nacionales e internacionales de investigación como universidades, el SENACYT, el Smithsonian Tropical Research Institute (STRI) entre otras, que puedan contribuir con el trabajo de investigación. Igualmente, se hace necesario la obtencion de fondos de ONG´s internacionales dedicadas a la conservación.

No existe hasta el momento un ordenamiento para las pesquerías de tiburón a nivel nacional, pero ya se encuentra en rigor la Ley 9 del 16 de marzo del 2006 que prohibe la práctica del aleteo y promueve el uso integral del tiburón de acuerdo a las normativas establecidas en la misma; también se ha suspendido el otorgamiento de nuevas licencias de pargo, mero y tiburón (PMT) y unicamente se están renovando aquellas licencias que no hayan caducado.

La ARAP con el propósito de fomentar la protección y sostenibilidad del recurso tiburón, la Dirección General de Ordenación y Manejo Integral, ha estado capacitando con talleres a cerca de 1 500 pescadores industriales y a casi 13 060 pescadores artesanales, para que se conciencien sobre como debe llevarse a cabo una pesca sostenible y a su vez el aprovechamiento del animal.

En cuanto a la recolección de información de la actividad pesquera, Panamá no cuenta con datos detallados de las capturas (información biologica-pesquera) por lo que adolesemos de un gran atraso en cuanto a la toma de datos de la actividad pesquera en sí, así como información de las especies capturadas. Esto es lamentable para un país como el nuestro que exporta productos derivados del tiburón en cantidades impresionantes, pero ya es notable por parte del sector pesquero artesanal principalmente, que el recurso ha decaido y sus volumenes de captura ya no son como antes. Tampoco se han tomado muestras de tejido, pero este es un trabajo que ya se está considerando ejecutar de manera inmediata, para posteriormente realizar trabajos de investigación para determinar la estructura poblacional de las especies que se encuentran más vulnerables.

Problemática en el seguimiento de las pesquerias

El gobierno no ha considerado la importancia de invertir más fondos para poder aumentar el recurso humano para fines de vigilancia, asì como considerar el poner biólogos en los sitios de desembarque, igualmente en aduna, lo que permitiría tener un mayor control sobre el recurso tiburón al saber cuales son las especies que se están comercializando y vigilar con mayor cuidado el cumplimiento de la ley.

Se han reportado casos de pesca ilegal, inclusive en áreas protegidas y, aunque en estas áreas la vigilancia tiende a ser un poco más frecuente y estricta, no falta el que comete un acto ilícito.

Existen un número significativo de normas que legislan acerca de cómo las pesquerias deberían ser llevadas a cabo, pero lamentablemente existe poca capacidad de coordinación e implementación de las mismas. Aunque debe considerarse que actualmente se le ha tomado un poco más de consideración a la conservación y recuperación de los recursos pesqueros, se hace imprescindible el ejercer más control en la actividad pesquera, ya que la misma es muy dispersa y es muy difícil tener el control sobre 72 sitios de desembarque, aunque este número puede estar muy subestimado.

Con respecto a la información de posee la FAO de los desembarques y la que reposa en nuestros archivos, definivamente existen discrepancias y las mismas se deben más que nada a la carencia y falta de coordinación entre las entidades competentes que se encargan de recopilar esta información. Además, nos encontramos actualmente en un proceso de homogenizacion en cuanto a la captura de datos proveniente de los distintos caladeros y centros de acopio de la información pesquera. También, existen embarcaciones abanderadas panameñas pero que faenan en aguas internacionales y realizan sus descargas en otros países. Estos barcos deberían de suministrar esta información para las estadísticas de contraloria, pero no existe un control sobre ellos.

3. SEGUIMIENTO DEL COMERCIO DE LOS PRODUCTOS DERIVADOS DEL TIBURÓN

El Vice-Ministro de Comercio Exterior (VICOMEX), que es la entidad encargada de regular todo lo relativo a trámites de exportaciones, coordina su actuación respecto a los trámites de exportaciones con un número plural de organismos, incluidos el Ministerio de Desarrollo Agropecuario (MIDA), a través de la Dirección Ejecutiva de Cuarentena Agropecuaria, Sección de Licencias Fitozoosanitarias de Exportación; el Ministerio de Economía y Finanzas, a través de la DGA, Sección de Permisos Aduaneros; y el Ministerio de Salud (MINSA), a través del Departamento de Control de Alimentos.

Para exportar desde Panamá, se debe presentar el formulario de declaración de exportación, la factura comercial firmada, certificado de origen y el registro tributario de la empresa exportadora. Gran parte de las exportaciones no están sujetas a inspección física, salvo algunas excepciones como la aleta de tiburón por parte de la ARAP.

Para la exportación de aletas de tiburón, la Autoridad de los Recursos Acuáticos de Panamá expide una Certificación para la exportación de Aletas de Tiburón, mediante una nota dirigida al Director General de Autoridad de los Recursos Acuáticos de Panamá, con cuatro balboas en timbres. Para la expedición del mismo son requisitos:

- Pre-Declaración de Aduana (Número).
- Certificado de origen expedido por el Vice- Ministro de Comercio Exterior (VICOMEX), que es la entidad encargada de regular todo lo relativo a trámites de exportaciones.
- Tipo de Licencia (Comercial o Industrial).
- Certificados de Desembarque de no Aleteo firmados por inspectores del Departamento de Fiscalización y Zarpe.
- Visto bueno del Jefe del Departamento de Ordenamiento.
- Inspección del Departamento de Ordenamiento para comprobar la existencia del total de libras a exportar.

La Autoridad Panameña de Seguridad de Alimentos, que es la entidad rectora del Estado la cual se encarga de asegurar el cumplimiento y aplicación de las leyes y reglamentos en materia de seguridad de introducción de alimentos al territorio nacional, bajo criterios estrictamente científicos y técnicos. La misma se encarga de emitir los requisitos sanitarios para la importación de Tiburones refrigerados o congelados, para el consumo humano.

Los embarques de tiburón para importación, además de contar con un certificado sanitario, deben contar con una documentación comprobatoria que comprende: copia del formulario de notificación, certificado de origen del producto, copia de factura comercial del producto y una pre-declaración de aduanas.

Sitios de desembarque y comercio de subproductos

Entre los principales sitios de desembarque para la costa Pacífica de Panamá encuentran Mensabé y Búcaro en la Provincia de Los Santos; Puerto Mutis en la Provincia de Veraguas; Farallón en la Provincia de Coclé; San Carlos, Coquira, y Mercado de Mariscos en la Provincia de Panamá; Boca Parita en la Provincia de Herrera y Remedios y Pedregal en la Provincia de Chiriquí. Se llevan registros de la actividad de no aleteo en 12 sitios de desembarque a partir del 2007, siendo estos: Aguadulce, Coquira, El Nance, Juan Díaz, Mensabé, Mercado del Marisco, Mutis, Palo Seco, Pedregal, Playita, Santa Catalina y Vacamonte. De este último

Es a partir del 2007 cuando se inicio la colecta de datos de la actividad de "no aleteo" a través de la expedición de certificados de inspección ocular. Las personas encargadas de entregar los certificados verifican que los tiburones desembarcados tengas todas sus aletas adheridas al cuerpo para el caso de la pesca industrial, o que las aletas correspondan al 5 por ciento del peso del animal (cuando son cercenadas). En este aspecto, existen discrepancias todavía, ya que hacen referencia de este 5 por ciento a tiburones desvicerados y en ocasiones sin cabeza.

El Puerto de Vacamonte es uno de los mayores receptores de desembarques de tiburón, y es aquí donde gran parte de las naves industriales, tanto nacionales como extranjeras (abanderas panameñas) realizan sus descargas, y la Autoridad Marítima de Panamá (AMP) se encarga de llevar las estadisticas al respecto.

El producto que representa una gran demanda para su exportación es la aleta, siendo los principales compradores China, Región Administrativa Especial de Hong Kong (RAE), Japón, Estados Unidos de América, Costa Rica, Reino Unido y México; otros países como Japón, Venezuela, Trinidad y Tabago, Rep. Dominicana, Taiwan Provincia de China, España y Colombia también son consumidores y se exporta entero congelado y como aleta seca.

Las discrepancias entre los datos de la FAO y los registrados para Panamá por parte de nosotros con respecto a las exportaciones, pudiesen radicar principalmente en que la información que llegan a la Contraloria General de la República de Panamá provienen unicamente de aquellos barcos internacionales que llevan este cargamento y hacen el registro de los productos a exportar. Existe el problema en que algunos barcos se niegan a brindar esta información, y también cabe considerar la falta de comunicación con las empresas que se dedican a la exportación de subproductos de tiburón.

Otro gran problema sobre el cual no tenemos un control y que nos impide poder tener un registro adecuado de la captura y comercialización de productos de tiburón es la venta ilegal en aguas internacionales. Barcos que faenan en aguas juridiccionales panameñas venden sus productos a naves que se encuentran en aguas internacionales; también barcos que pescan en aguas juridiccionales panameñas, desembarcan en otros países, y toda esta información se pierde y se desconoce su paradero.

Especies en el apéndice de CITES e identificación de especies

Como parte contratante de la Convención sobre el Comercio Internacional de Especies Amenazadas de Fauna y Flora Silvestres (CITES), Panamá prohíbe las exportaciones de ciertos animales en peligro de extinción de conformidad con la Convención. Lamentablemente en nuestro país no se están identificando las especies desembarcadas, y por tal motivo se desconoce si se están capturando especies bajo algún estatus especial. Pero este es un problema que se pretende solventar antes de que sea puesto en ejecución el Plan de Manejo, ya que esto se hace una medida urgente.

Se desea iniciar con un plan piloto en donde el objetivo principal será lograr que pescadores artesanales, industriales e inspectores de aduana puedan identificar las especies para poder tener un mejor control sobre el recurso. Se está evaluando la posibilidad de realizar un proyecto en conjunto con la Escuela de Biología de la Universidad de Panamá, con el propósito de obtener datos de tipo biológico-pesquero de la pesca artesanal, para poder desarrollar posteriormente proyectos de investigación.

En lo que a vigilancia y control se refiere, la falta de una carencia de recuros para patrullajes de vigilancia es uno de nuestros principales problemas, aunque se podría decir que estos últimos años ha habido un incremento en cuanto a la atención policiaca frente a las denuncias realizadas, en donde muchas veces la misma viene de parte de pescadores o por parte de personas ajenas a la actividad pesquera.

Siendo conscientes de que la vigilancia es una de nuestras principales debilidades, se requiere de la implementación de un programa de inspección y vigilancia en donde participen los inspectores de la Dirección de Inspección, Vigilancia y Control en colaboración con los sectores productivos y en coordinación con otras dependencias de la administración pública y autoridades locales, según las atribuciones que les corresponda.

SÉNÉGAL

Lamine Mbaye
Direction des pêches maritimes
Division gestion et aménagement des pêches

1. INFORMATIONS DE BASE SUR LES PÊCHERIES DE REQUINS

Les principaux types de pêcheries de requins

Au Sénégal le secteur de la pêche est divisé en deux segments:

- un segment artisanal qui est le plus important car il débarque 70 pour cent des captures;
- un segment industriel.

Les requins sont surtout débarqués par le segment artisanal soit par captures directes avec des unités de pêche spécialisées, soit de manière accessoire par divers types d'unités de pêche.

Trois types d'engins existent dans les pêcheries spécialisées de sélaciens: filet maillant dérivant de fond, filet dérivant de fond et palangre.

Le filet maillant dérivant de fond est utilisé à bord des pirogues de 18 à 22 m, avec des marées de 20 jours en moyenne. Les unités sont de type familial, même si, au besoin, les armateurs recrutent des équipages extérieurs à la famille. En général, les propriétaires ne sont pas embarqués. Ce type d'engin aurait été introduit au Sénégal par les Ghanéens à partir de la Casamance au début des années 1980. Ils ont une maille étirée de 240 mm, 20 m de chute et une longueur allant de 40 à 100 m. L'introduction de ces engins s'est accompagnée de l'utilisation d'embarcations de grande taille (18 à 23 m selon les lieux) propulsées par des moteurs de forte puissance (40 à 55 CV). Les caractéristiques de certaines zones de pêche (embouchures de fleuves et zones estuariennes) ont favorisé le passage vers le filet maillant dérivant dans les pêcheries de sélaciens. Cette adoption a été d'autant plus facile que cet engin a été pendant longtemps utilisé dans la pêche au mulet et à l'ethmalose.

Les filets dormants de fonds ont été également introduits à Joal par les ghanéens au début des années 90 pour assurer un ravitaillement correct des ateliers de transformation du requin. Le filet mesure 20 mètres de long (200 mailles) et 1,40 m de chute (7 mailles). Étant un engin de fond, il dispose de peu de flotteurs (7 au maximum) et de lest adéquat pour assurer une flottabilité de l'engin. De type familial, l'unité de pêche embarque 5 à 6 personnes.

Les palangres sont utilisées pour cibler les requins durant une période de l'année (novembre-mai) par quelques unités de pêche basées au port autonome de Dakar. Les unités de pêche industrielles qui utilisent les sennes tournantes, les palangres et les cannes en débarquent de manière accessoire. Les sites de débarquements sont indiqués dans la figure 1 ci-dessous. Les principaux sites se situent dans la partie sud du pays. Il s'agit, par ordre d'importance, d'Elinkine, Diogué, Kafountine, Cap Skiring.

Le nombre de personnes employées dans les pêcheries

En 2007, une étude sur la reconversion des pêcheurs commanditée par le Plan sous-régional d'action de gestion et de conservation des requins a permis d'avoir une idée assez précise du nombre de personnes dépendant directement de la pêcherie.

Cette étude a montré que les unités de pêche spécialisées se situent dans trois sites: Elinkine, Diogué et Cap Skiring, où soixante-treize unités de pêche spécialisées ont été dénombrées. À raison de dix pêcheurs en moyenne à bord de chaque pirogue, il y a donc 730 pêcheurs de requins. Sachant que chaque pêcheur fait travailler en moyenne cinq personnes à terre (porteurs, mareyeurs, transformateurs et autres métiers), on estime à 3 650 emplois créés, auxquels s'ajoutent les emplois induits (restaurateurs, coiffeurs, balayeurs, boutiquiers, etc.). Par ailleurs, il y a un certain nombre de pêcheurs qui capturent des requins accessoirement ou qui les pêchent seulement pendant une certaine période de l'année et ce nombre est difficile à estimer.

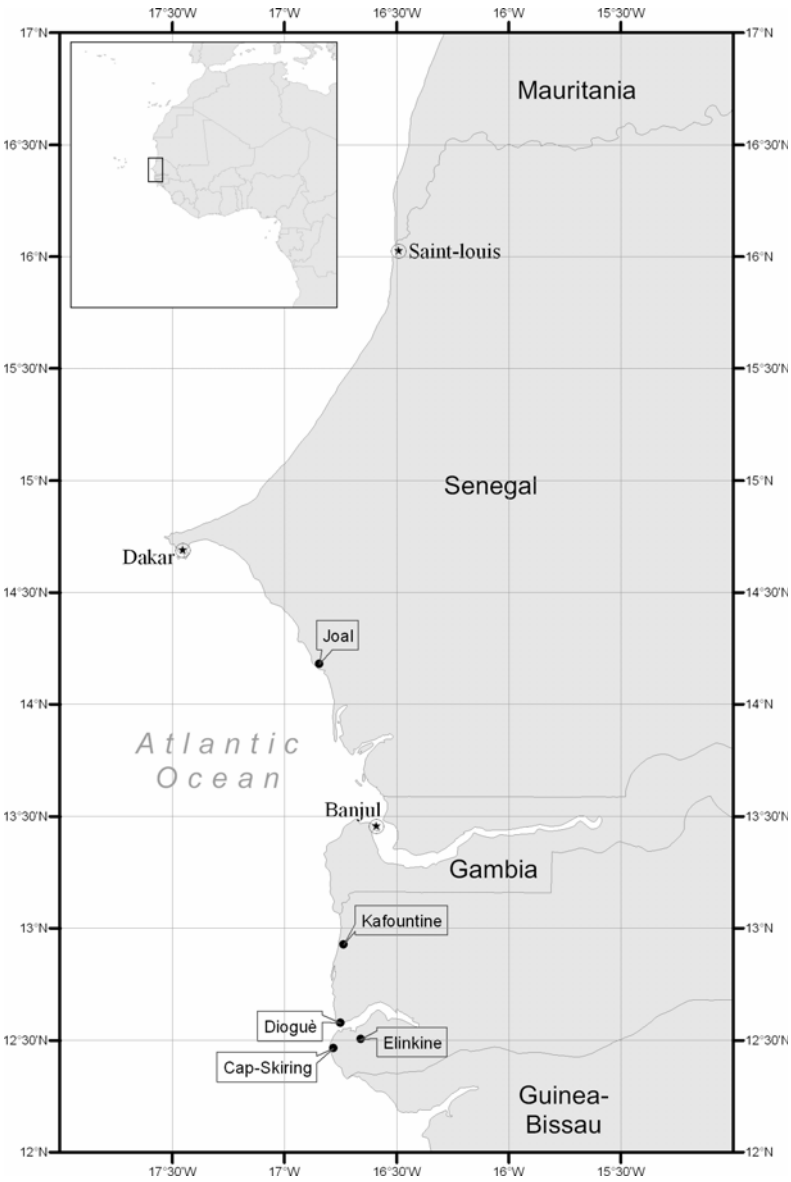

Figure 1: Les principaux sites de débarquements de requins au Sénégal

Les principales espèces qui ont été exploitées et leur statut

Les espèces de requins qui sont pêchées au Sénégal sont indiquées dans le tableau 1.

Tableau 1: Les espèces de requin débarquées au Sénégal

Ordre	Taxon	Nom commun français
1	*Galeocerdo cuvierii*	Requin-tigre commun
2	*Rhizoprionodon acutus*	Requin à museau pointu
3	*Carcharhinus limbatus*	Requin bordé
4	*Carcharhinus carcharhinus*	Requin
5	*Carcharhinus* spp.	Requin
6	*Paragaleus pectoralis*	
7	*Ginglymostoma cirratum*	Requin nourrice
8	*Heptranchias perlo*	
9	*Isurus oxyrinchus*	Requin-taupe
10	*Eugomphodus taurus*	Requin-taureau
11	*Oxynotus centrina*	
12	*Galeus polli*	
13	*Galeus melastomus*	
14	*Scyliorhinus stellaris*	
15	*Sphyrna couardi*	Requin-marteau africain
16	*Sphyrna lewini*	Requin-marteau halicorne
17	*Sphyrna mokarran*	Grand requin-marteau
18	*Sphyrna zygaena*	Requin marteau commun
19	*Squalus blainvillei*	Aiguillat-galludo
20	*Squalus fernandinus*	
21	*Centrophorus granulosus*	Requin chagrin
22	*Centrophorus lusitanicus*	
23	*Lepidorhinus squamosus*	
24	*Centrophorus uyato*	
25	*Centroscymnus crepidater*	
26	*Centroscymnus coleolepis*	
27	*Deania cremouxi*	
28	*Scymnodon obscurus*	
29	*Scymnodon ringens*	
30	*Scymnodon* sp.	
31	*Centroscyllium fabricii*	
32	*Etmopterus pusillus*	
33	*Etmopterus spinax*	
34	*Etmopterus polli*	
35	*Mustelus mustelus*	Émissole lisse

Selon la liste rouge de l'UICN actualisée en 2006, sur les 69 espèces d'élasmobranches recensées dans les captures expérimentales et les statistiques de pêche officielles des pays de la Commission Sous-Régionale des Pêches (CSRP), 14 espèces sont menacées:

Espèces	Statut
Pristis microdon	En danger critique d'extinction
Pristis pectinata	
Rhynchobatus luebberti	
Sphyrna mokarran	
Squatina aculeata	
Squatina oculata	
Squatina squatina	
Rhinobatos cemiculus	En danger
Rhinobatos rhinobatos	
Gymnura altavela	Vulnérables
Leptocharias smithii	
Rhinobatos irvinei	
Sphyrna lewini	
Sphyrna zygaena	

La tendance des captures est présentée dans la figure 2 ci-dessous. Les captures ont augmenté de manière régulière, passant d'environ 4 000 tonnes en 1990 à plus de 10 000 tonnes en 2 000. Après 2 000, une baisse est observée et les captures des dernières années se situent autour de 8 000 tonnes. Cette évolution peut s'expliquer soit par un effort accru de collecte de données ces dernières années, ce qui a eu pour effet de rendre compte de captures plus élevées, soit par une augmentation de la pression de la pêche sur les ressources de requins.

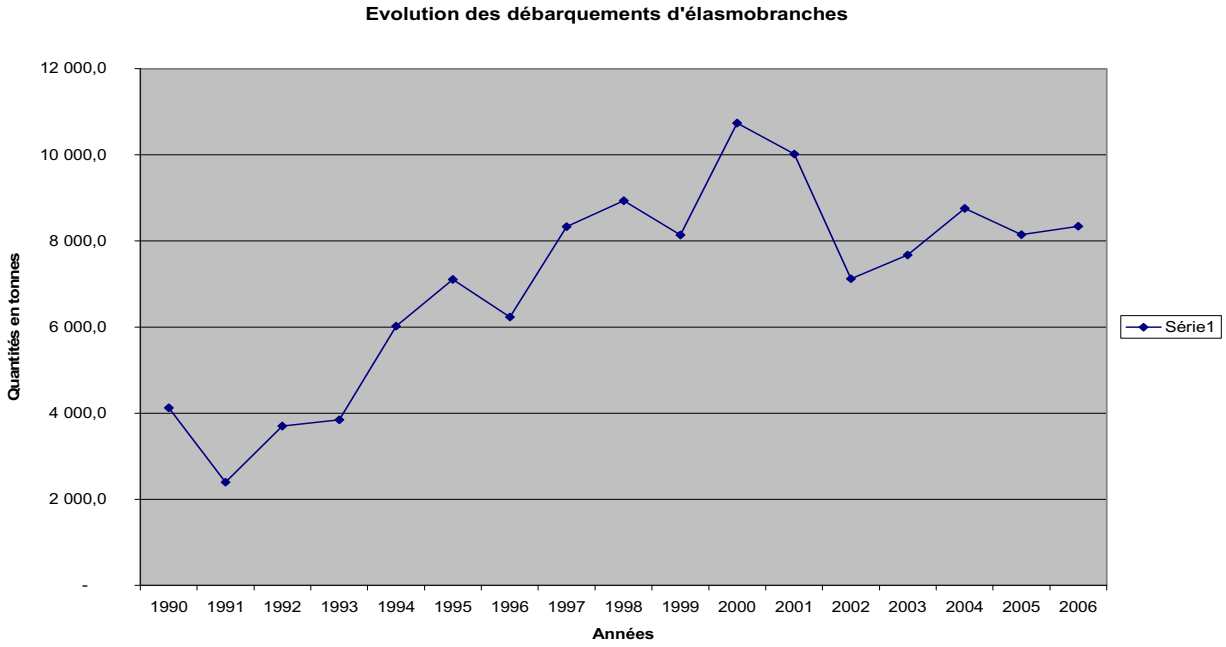

Figure 2: Tendance des captures de requins au Sénégal entre 1990 et 2006 (DPM: Direction des Pêches Maritimes du Sénégal, 2006)

L'importance relative du commerce international et l'utilisation par le pays de requins

Les requins ne sont pas traditionnellement consommés au Sénégal. La quasi-totalité de la production est destinée à l'exportation en particulier vers le Congo, la France, l'Espagne et, dans une moindre mesure, la Grèce. En 2007, 2 100 tonnes de produits issus de requins (ailerons, huile de foie et carcasses) ont été exportées vers ces pays pour une valeur commerciale d'environ 10 millions d'euros.

La situation du développement et de la mise en œuvre du Plan d'action national sur les requins

Le Sénégal a été l'un des premiers pays à élaborer et à adopter un Plan d'action national de gestion et de conservation des requins par l'arrêté ministériel N° 006477 du 25 septembre 2006. Depuis cette date plusieurs actions ont été menées:

- des campagnes de sensibilisation á la situation alarmante des populations de requins auprès des acteurs qui évoluent dans les pêcheries des grands centres de débarquement de requins du pays;
- des sessions de formation des enquêteurs chargés de collecter des données biologiques et socioéconomiques sur la filière requins;
- la production d'un guide d'identification des principales espèces débarquées au Sénégal destiné aux collecteurs de données sur la pêcherie;
- la capitalisation des connaissances sur les pêcheries de requins (synthèse des connaissances biologiques, socioéconomiques, etc., acquises sur cette pêcherie);
- l'étude de la trajectoire des pêcheries de requins dans la sous-région;
- l'introduction du poisson-scie dans la liste des espèces protégées du code de la pêche;
- la médiatisation de la situation alarmante de la pêcherie de requins pour attirer l'attention de l'opinion publique;
- l'identification des indicateurs de suivi de la pêcherie de requins dans l'espace de la CSRP.

2. DONNÉES EXISTANTES SUR LES SYSTÈMES DE SUIVI DES PêCHES

Deux institutions dépendant du Ministère de l'économie maritime sont impliquées dans le système de suivi des pêches: la Direction des pêches maritimes (DPM) est responsable du suivi des pêcheries de requins et la Direction des industries de transformation des pêches (DITP) suit et contrôle les exportations de tous les produits halieutiques dont les requins.

Le Sénégal est membre de la CSRP et en abrite le siège. A ce titre, il participe activement à la mise en œuvre de tous les projets initiés au sein de cette commission. C'est dans ce cadre, qu'il participe à la mise en œuvre du Plan sous-régional d'action de gestion et de conservation des requins (PSRA-requins). Les données qu'utilise le PRSA-requins proviennent de tous les pays membres. En outre, le Sénégal participe à toutes les réunions régionales relatives aux pêcheries de requins comme les sessions de formation sur la biologie des requins, la capitalisation des connaissances biologiques et socioéconomiques acquises sur la pêcherie, l'identification des indicateurs de suivi de la pêcherie de requins au niveau sous-régional.

Grâce à l'appui financier du PSRA-requins, des enquêteurs ont été recrutés dans les principaux centres de débarquement spécialement pour la collecte des données biologiques (taille, poids, sexe, maturité sexuelle, fécondité), socio-économiques (les prix de vente, les quantités, le circuit de distribution, le type d'engin de moteur, la zone de pêche, etc.).

Des fiches d'enquête ont été élaborées et sont remplies à chaque fois que les pirogues débarquent. Les pirogues spécialisées sont toutes enquêtées puisqu'elles ne sont pas nombreuses et qu'elles ne débarquent pas en même temps. Les enquêteurs ont suivi plusieurs formations sur l'identification des espèces de requins et utilisent un guide d'identification des espèces qui a été réalisé par le PSRA-requin.

Les rejets ainsi que les transbordements sont quasi inexistants dans la pêcherie artisanale de requins au Sénégal car l'ensemble des captures est débarqué. Toutefois, il y a parfois des rejets par la pêche industrielle des espèces non ciblées.

Les données collectées dans les centres de débarquement sont envoyées à la Direction des pêches maritimes où elles sont saisies dans une base de données.

L'accès à la pêcherie sénégalaise est libre et les sites de débarquement sont nombreux. Par conséquent, il y a un problème de régulation de l'accès et donc de contrôle de l'effort de pêche qui nécessite des moyens humains, financiers et logistiques de contrôle des pêcheurs. C'est pour cette raison que des enquêteurs ont été recrutés en sus des agents de l'administration.

Le PSRA-requins appuie financièrement le Sénégal pour le recrutement d'enquêteurs supplémentaires. Toutefois, les moyens financiers étant limités, il n'est possible de couvrir qu'une partie des sites de débarquements. Un appui financier, ainsi que des moyens de déplacement seraient nécessaire pour couvrir l'ensemble des sites de débarquements.

Les données transmises à la FAO proviennent de la Direction des pêches maritimes et correspondent aux données disponibles à ce jour.

3. SUIVI DU COMMERCE DES PRODUITS PROVENANT DES REQUINS

La Direction des industries de transformation de la pêche (DITP) est chargée de contrôler les produits avant exportation et délivre, si les conditions sont remplies, un certificat d'origine et de salubrité. Les poins de contrôle, les types de produits, les destinations, les prix et les catégories de produits sont indiqués ci-dessous:

- Les principaux points de contrôle sont l'aéroport, le port et les postes frontaliers.
- Les principaux types de produits commercialisés sont: les ailerons, les carcasses salées séchées, l'huile de requin.
- Les principaux pays importateurs sont: la Chine, Taïwan, Province de Chine, pour les ailerons, l'Afrique centrale et de l'ouest (République démocratique du Congo, Ghana, etc.).
- Les tarifs d'importation des espèces de requins: 100 USD le kilo pour les ailerons, 6 USD le kilo pour les carcasses.
- Il n'y a pas d'indication des espèces commercialisées, seule la catégorie de produits est prise en compte (ailerons, et carcasses salées-séchées).

L'article 28 du décret n°69–132 du 19 février 1969 relatif au contrôle des produits de la pêche indique «Tout produit ayant satisfait aux exigences du contrôle sanitaire prévu dans le présent décret est nanti d'un certificat de contrôle d'origine et de salubrité».

Ce document est exigé pour tous les produits maritimes à l'importation, à l'exportation ou à la circulation à l'intérieur du Sénégal. Il mentionne l'origine des produits, leur nature, la désignation du poisson en langue française ou son nom scientifique, le poids net, le nombre de colis, la date de l'inspection sanitaire, le moyen de transport utilisé, la date d'expédition, la destination. Il est délivré dans les ports, les aéroports ainsi que tous les lieux de débarquement, de production ou de contrôle des produits de la pêche dans les conditions fixées par le titre II du décret.

Les poissons et autres animaux marins à l'importation ne peuvent être livrés à la consommation que munis de ce document sanitaire ou d'un document sanitaire équivalent, non périmé et délivré par des autorités reconnues par le Sénégal.

Il est établi en quatre exemplaires conformément au modèle en annexe. L'original du document sanitaire accompagne le produit pour l'exportation; il constitue le seul document légal permettant au service de douane d'établir des documents de connaissement. Les autres exemplaires sont communiqués à la Direction du commerce, au service de la statistique et à la direction des pêches Maritimes.

Les espèces *Rhincodon typus*, *Cetorhinus maximus*, et *Carcharodon carcharias* ne sont pratiquement pas débarquées au Sénégal et ne sont pas importées. Le problème de contrôle et de suivi du commerce de ces espèces ne se pose donc pas.

L'amélioration du suivi du commerce des produits provenant des requins nécessite des actions à l'échelle sous régionale. En effet, les frontières étant poreuses et les acteurs de la filière mobiles, la concertation entre pays de la sous-région est essentielle pour la mise en place un système de contrôle concerté. Les recommandations suivantes sont proposées:

- L'identification des espèces commercialisées nécessiterait la mise en place d'un système de traçabilité du produit depuis la capture jusqu'à la consommation.

- Le commerce illicite et non reporté pourrait être évité si un système de contrôle d'amont en aval de la filière était mis en place. Aussi, un effort de sensibilisation de tous les acteurs de la filière devrait être fait.
- Les officiers de douane devraient être équipés et formés afin d'améliorer leurs conditions de travail et la qualité de leurs résultats.

Appendice IV de l'annexe VI (Français)

MODÈLE DE CERTIFICAT SANITAIRE POUR L'IMPORTATION DE PRODUITS DE LA PÊCHE DESTINÉS À LA CONSOMMATION HUMAINE

Pays : SENEGAL **Certificat vétérinaire vers l'UE**

Partie I : Renseignements concernant le lot expédié

1.1 Expéditeur

Nom……

Adresse……..

Code postal

Tél.

1.2 N° de référence du certificat *1.2.a.*

1.3 Autorité centrale compétente : ***Ministère de l'Economie Maritime et des Transports Maritimes-Direction des Industries de Transformation de la Pêche-Division des Inspections et du Contrôle (MEMTM-DITP-DIC)***

1.4 Autorité locale compétente _____

1.5 Destinataire

Nom……..

Adresse……..

Code postal

Tél.

1.6.

1.7 Pays d'origine	*Code ISO*	*1.8 Région d'origine*	*Code*	*1.9 Pays de destination*	*Code ISO*	*1.10.*
SENEGAL	***SN***	_____	___	***FRANCE***	***FR***	

1.11 Lieu d'origine

Nom…….....Numéro d'agrément….. ..……..

Adresse……

1.12.

1.13 Lieu de chargement ***DAKAR***

1.14 Date du départ ……..

1.15 Moyens de transport

Avion ☐ *Navire* [x] *Wagon* ☐

Véhicule routier ☐ *Autres* ☐

Identification : ……...

Référence documentaire :BL N°……..

1.16 PIF d'entrée dans l'UE……..

1.17.

1.18 Description marchandise : ***Produits de la pêche.***

1.19 Code marchandise (code SH)

1.20 Quantité

1.21 Température produit

Ambiante ☐ *Réfrigérée* ☐ *Congelé* [x]

1.22 Nombre de conditionnement

1.23 N° des scellés…….....

N° des conteneurs……

1.24 Type de conditionnement

1.25 Marchandises certifiées aux fins de :

Consommation humaine [x]

1.26.

1.27 Pour importation ~~ou admission~~ dans l'UE [x]

1.28 Identification des marchandises

Numéro d'agrément des établissements

Espèce (Nom scientifique))	Nature du produit	*Type de traitement*	*atelier de fabrication*	Nombre de conditionnement	*Poids net*

(voir verso)

N° de référence du certificat :

Espèce (Nom scientifique)	Nombre de conditionnement	*Poids net* **118**	*Atelier de fabrication*	Nature du produit	*Type de traitement*
				ORIGINE SAUVAGE	**CONGELE**
Total			———	———	———

PAYS : SENEGAL **Produits de la pêche**

Partie II : Certification

II. Attestation sanitaire

I.a Numéro de référence du certificat	II.b

II.1. Attestation de santé publique

Je soussigné déclare avoir connaissance des dispositions pertinentes des règlements (CE) n° 178/2002, (CE) n° 852/2004, (CE) n° 853/2004 et (CE) n° 854/2004 et certifie que les produits de la pêche susmentionnés ont été produits conformément auxdites dispositions, et notamment :

- qu'ils proviennent d'un/d'établissement (s) appliquant un programme fondé sur les principes HACCP, conformément au règlement (CE) n° 852/2004,
- qu'ils ont été capturés et manipulés à bord des navires, débarqués, manipulés, et le cas échéant, préparés, transformés, congelés et décongelés de façon hygiénique dans le respect des exigences de l'annexe III, section VIII, chapitres I et IV, du règlement (CE) n° 853/2004,
- qu'ils sont conformes aux normes sanitaires de l'annexe III, section VIII, chapitre V, du règlement (CE) n° 853/2004 et aux critères du règlement (CE) n° 2073/2005 concernant les critères microbiologiques applicables aux denrées,
- qu'ils ont été emballés, entreposés et transportés conformément à l'annexe III, section VIII, chapitres VI à VIII, du règlement (CE) n° 853/2004,
- qu'ils ont été marqués conformément à l'annexe III, section I, du règlement (CE) n° 853/2004,
- que les garanties couvrant les animaux vivants et les produits qui en sont dérivés, s'ils sont issus de l'aquaculture, prévues par les plans relatifs aux résidus présentés conformément à la directive 96/23/CE, et notamment à son article 29, sont réunies,

et

- qu'ils ont subi de manière satisfaisante les contrôles officiels prévus à l'annexe III du règlement (CE) n° 854/2004.

II.2. ([1]) Attestation de santé animale pour les produits issus de l'aquaculture

Je soussigné déclare que les produits de la pêche susmentionnés proviennent de poissons ou de crustacés cliniquement sains le jour de leur récolte et qu'ils ont été transportés dans des conditions n'ayant aucune incidence sur leur statut sanitaire, et notamment que:

- ([1]) ([2]) si les produits sont d'une espèce sensible ([3]) à l'AIS et/ou à la NHE, ils :
  - ([1]) [proviennent d'une source ([4]) considérée comme indemne d'AIS ou de NHE conformément à la législation de l'UE ou norme de l'OIE applicable ([1])]
  - ([1]) [ont été mis à mort et éviscérés]]
- ([1]) ([6]) si les produits sont d'une espèce sensible ([3]) à l'SHV et/ou à la NHI, ils :
  - ([1]) proviennent d'une source ([4]) considérée comme indemne de ([1])SHV/([1])NHI conformément à la législation de l'UE ou norme de l'OIE applicable ([5])],
  - ([1]) [ont été mis à mort et éviscérés]]]

N° de référence du certificat :

Notes

Partie I :

- Rubrique1.8 : région d'origine : pour les produits issus de l'aquaculture, indiquer, s'il y a lieu, les zones figurant sur les listes établies par les décisions 2002/308/CE et 2003/634/CE de la commission. Pour les mollusques bivalves congelés ou transformés, indiquer la zone de production.
- Rubrique 1.11 : lieu d'origine : nom et adresse de l'établissement d'expédition.
- Rubrique 1.15 : numéro d'immatriculation (wagon ou conteneur et camion), numéro de vol (avion) ou nom (navire). Des informations distinctes doivent être fournies en cas de déchargement et de rechargement.
- Rubrique 1.19 : utiliser les codes SH appropriés : 03.01, 03.02, 03.03, 03.04, 03.05, 03.06, 03.07, 05.11.91, 15.04, 15.18.00, 16.03, 16.04, 16.05.
- Rubrique 1.23 : n° des scelles et n° des conteneurs : uniquement lorsque la réglementation l'exige.
- Rubrique 1.28 : nature de la marchandise : préciser s'il s'agit de produits issus de l'aquaculture ou d'origine sauvage. Type de traitement : produits vivants, réfrigérés, congelés, transformés. Atelier de fabrication : y compris les navires-usines, les navires-congélateurs, les entreprises frigorifiques, les établissements de transformation.

Partie II :

- La partie II.2. ne s'applique pas aux lots destinés à la vente au détail, à condition qu'ils soient conformes aux règles d'emballage et d'étiquetage fixés par le règlement (CE) n° 853/2004.

([1]) Biffer les mentions inutiles.

([2]) Cette partie du certificat de santé animale s'applique uniquement si le lot comprend des espèces considérées comme sensibles à l'AIS et/ou à la NHE. Cette disposition concerne les exportations à destination de tous les Etats membres ; il convient de conserver l'une des deux déclarations, sauf si le lot est destiné à une transformation supplémentaire dans un centre d'importation agréé.

([3]) espèces sensibles connues :

Maladie	Espèces hôtes sensibles
NHE	Perche commune (Perca fluviatilis), truite arc-en-ciel (Oncorhynchus mykiss).
AIS	Saumon atlantique (Salmo salar), truite arc-en-ciel (Oncorhynchus mykiss), truite brune (Salmo trutta).
SHV	Morue (Gadus morhua), hareng (Clupea harengus), truite brune (Salmo trutta), saumon chinook (oncorhynchus tshawytscha), saumon coho (O. kisutch), ombre commun (Thymallus thymallus), églefin (Melanogrammus aeglefinus), morue du Pacifique (Gadus macrocephalus), hareng du pacifiue (Clupea harengus pallasi), brochet (Esox lucius), truite arc-en-ciel (Oncorhynchus mykiss), loche de mer (rhinonemus cimbrius), sprat (Sprattus sprattus), turbot (Scophthalmus maximus), corégones (Coregonus sp.).
NHI	Truite arc-en-ciel (Oncorhynchus mykiss), espèces de saumon du Pacifique [saumon chinook (O tshawytscha)], saumon rouge (O. nerka), saumon keta (O. keta), saumon masou (O. masou), saumon rose (O. rhodurus) et saumon coho (O. kisutch), et saumon atlantique (Salmo salar).

([4]) la source peut être un pays, une zone ou une exploitation.

([5]) « Indemne » au sens des dispositions de l'annexe B ou C de la directive 91/67/CEE et des décisions 2001/183/Ce et 2003/466/CE de la Commission. L'absence de maladie au sens de l'édition la plus récente du code et du manuel de l'OIE est également reconnue.

([6]) cette partie du certificat de santé animale s'applique uniquement si le lot comprend des espèces considérées comme sensibles à la SHV et/ou à la NHI. Pour que soit autorisée l'entrée du lot dans un Etat membre ou une partie d'Etat (rubriques 1.9 et 1.10 de la partie I du certificat) déclarée indemne de SHV et/ou de NHI, ou faisant l'objet d'un programme visant à devenir indemne de ces maladies, il faut conserver l'une des deux déclarations, sauf si le lot est destiné à une transformation supplémentaire dans un centre d'importation agréé.

([6]) Une liste des Etats membres et zones en question figure dans les décisions 2002/308/CE et 2003/634/CE de la commission.

- couleur du cachet et de la signature doit être différente de celle des mentions du certificat.

Date.....

Cachet officiel | Signature de l'inspecteur officiel | Nom (en majuscule), titre et qualité

BALEARIC ISLANDS, SPAIN

G. Morey
Dirección General de Pesca
Government of Balearic Islands

1. BACKGROUND INFORMATION ABOUT THE SHARK FISHERIES

This report focuses on the elasmobranch fisheries of the Balearic Islands of Spain. Annex I of the report provides a brief overview of the elasmobranch catches for the whole Spanish fleet.

Most of the elasmobranchs captured off the Balearic Islands (Balearic Islands) are a bycatch product. Only a few directed fisheries exist for the seasonal capture of smooth hounds *Mustelus* spp. (both with trammel nets and bottom longline) and of skates (this one very locally, with trammel net).

The rest of the catches are originated mainly from bottom trawling mainly, both on the insular shelf and the slope, usually down to approximately. 600 meters, reaching sometimes areas of about. 800 meters depth. This type of gear accounts for more than 80 percent of the total elasmobranch capture in the Balearic Islands.

The rest of the fishing fleet in the Balearic Islands is composed of very few (n=5) pelagic longline boats in Mallorca Island, some of them inactive at present; ten purse seiners, that contributes 0,05 percent of the elasmobranch capture in the Balearic Islands, and about 350 small-scale fishing boats that uses a variety of gears as trammel nets targeting for littoral fish species and cuttlefish, gill-nets targeting for red mullet (*Mullus surmuletus*) or spiny lobster (*Palinurus elephas*) and bottom longline targeting mainly dusky grouper (*Epinephelus marginatus*) and species of the Family Sparidae. All these fisheries are carried out over the insular shelf.

The official statistics of the number of people involved in the fishery are not accurate and do not represent the real number of fishers currently working at sea. Based on our own experience, and on the number of fishing vessels included in every category, the number of active fishers in the Balearic Islands is approximately 696, distributed among fisheries as described in Table 1.

Table 1: Number of fishing vessels and number of active fishers in each fishery of the Balearic Islands

	Small-scale	**bottom trawling**	**Purse seine**	**Bottom longline**	**Pelagic longline**	**TOTAL**
No. vessels	338	54	10	10	5	418
No. fishermen	453	192	24	15	12	696

Table 2 shows the commercial value (first sell at the central fish auction wharfs) for the total catch in the Balearic Islands from 2002–2006, as well as for the elasmobranchs and their relative importance in relation to the total catches. The mean values for elamobranchs during this period was 574.500 €/year, representing 2,83 percent of the total commercial value of the Balearic Islands fisheries.

Table 2: Commercial value of elamosbranch catches in relation to the total catches in the Balearic Islands.

Year	Elasmobranchs		Total catch
2002	Value (€ x 1000) per cent	504.7 2.8	17 719.6
2003	Value (€ x 1000) per cent	517.8 2.9	17 828.3
2004	Value (€ x 1000) per cent	631.3 3.0	21 008.9
2005	Value (€ x 1000) per cent	582.6 2.7	21 967.3
2006	Value (€ x 1000) per cent	636.0 2.8	23 008.1

Table 3 shows the values of the gross domestic product (GDP) in the Balearic Islands for the period 2002–2006, and the contribution of the Balearic Islands fisheries (regarding both the total catch and the elasmobranchs only) to this GDP.

Table 3: Contribution of fisheries to the GDP of the Balearic Islands

Year	PIB Balearic Islands (000 €)	Contribution to GDP (%)	
		Elasmobranchs	TOTAL capture
2002	17 2269.7	0.003	0.103
2003	–	–	–
2004	20 900	0.003	0.101
2005	22 618.2	0.003	0.097
2006	24 200.5	0.003	0.095

Table 4 shows the catch volumes for the main species of elasmobranchs caught in the Balearic Islands between 1996 and 2006. Trends in landed biomass have been analysed for some elasmobranch species, although the error in their identification when labelled would result in biased estimations. Thus, in situ monitoring of marketed sharks should be conducted for estimating this bias.

Table 4: Elasmobranchs landings (tonnes) reported in the Balearic Islands between 1996 and 2006 (Source: Fisheries Department – Balearic Islands Government)

Name	Scientific name	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Catshark	*Scyliorhinus* spp.	56.7	61.4	56.1	53.6	53.6	28.4	123.6	108.4	120.0	93.5	88.0
Blackmouth catshark	*Galeus melastomus*	5.6	6.3	6.5	8.3	3.7	3.5	13.5	21.4	26.1	13.4	10.4
Smooth hound	*Mustelus* spp.	5.0	7.3	6.2	4.7	3.9	1.4	6.4	6.2	4.0	3.9	3.7
Longnose spurdog	*Squalus blainvillei*	1.9	6.6	1.5	0.5	0.6	0.4	0.6	0.7	2.7	3.0	2.5
Gulper shark	*Centrophorus granulosus*	2.7	1.7	1.4	1.2	1.6	0.3	0.9	0.7	2.0	1.9	1.4
Small shark	"TOLLOS"	0	0	0.6	0.4	6.4	0.4	0.7	3.4	2.5	3.6	6.6
Bluntnose sixgill shark	*Hexanchus griseus*	2.0	5.7	6.3	7.8		1.8	9.8	10.2	5.0	3.9	4.8
Blue shark	*Prionace glauca*	1.7	1.2	0.3	0.1	0.4	0.0	2.1	2.3	1.1	2.7	2.0
Tope shark	*Galeorhinus galeus*	0	0	0	0	0	0	0.0	0.4	0.7	0.4	0.3
Lamnidae	*Lamnidae*	0	0	0	0.0	0	0.0	0.0	0.1	0.2	0.1	0.1
Large shark	SHARK	3.9	0.3	0.4	0	0	0	0	0	0	0	0
Batoidae	Rays & skates	88.6	88.8	86.7	67.9	64.6	28.8	110.4	100.5	115.8	104.9	123.4
Elasmobranchs (not specified)	"BASTINA"	76.0	77.5	67.1	0	0	0	0	0	0	0	0
	TOTAL	244.1	256.7	233.1	144.6	135.3	65.2	268.1	254.4	280.4	231.5	243.2

Notes to Table 4:

- Catsharks: this category includes both species of catsharks occurring off the Balearic Islands: the smallspotted catshark *Scyliorhinus canicula* and the nursehound *S. stellaris*, despite the latter is only occasionally captured, and its contribution to the total amount could be considered as negligible.
- Smooth hounds: Pending on accurate identification of some specimens that could be in fact *Mustelus punctulatus*, the vast majority of the captured specimens are *M. mustelus*.
- Small sharks ("Tollos"): this category, under the Spanish name "tollos" includes a variety of small demersal sharks of low commercial value that, despite being landed, very often are not sold. Species as *Dalatias licha* (mainly) *Etmopterus spinax*, or *Oxynotus centrina* are fall into this category.

- Bluntnose sixgill shark (*Hexanchus griseus*): in the official landing statistics this species appears under the category "Peregrino", which is the Spanish name for the basking shark *Cetorhinus maximus*. This issue has been corrected for this document. Nevertheless, the only reported capture (and marketing) of a true basking shark in the Balearic Islands for the period 1996–2006 occurred in 2001, when a ca. 7 m specimen was captured in a trap net. The figures corresponding to this individual were joined to those corresponding to *H. griseus* under the category "Peregrino".
- *Lamna nasus*, very likely the values correspond to the shortfin mako *Isurus oxyrinchus*.
- Large sharks: probably this category includes some lamnid sharks, as well as sharks of the genus *Carcharhinus*, and the common thresher *Alopias vulpinus*.
- Batoidea: Only very large stingrays are marketed, the rest being discarded at sea. For the values included herein, the vast majority of the capture should be considered as belonging to the family Rajidae.
- "Bastina": this is the Catalan name for the elasmobranchs. This category appears in the data because the low level of accuracy when reporting the landings for some ports and for some years.

The Balearic fleet provides fish and sea products for local consumption. Any possible exportation to extra-balearic markets should be considered as negligible. Nevertheless, pelagic longliners operating around the Balearic Islands seldom land their capture in Balearic Islands ports, but in their base ports. For this reason, although most of the pelagic sharks reported in the Balearic Islands official landing statistics belong to non-Balearic Islands pelagic longliners, it has to be taken into account that a very large portion of their capture are landed at ports located in the eastern and southeastern coast of Spain and, therefore, reported elsewhere.

A National Plan of Action of Sharks has not been implemented in Spain. It is pending on the elaboration of the European Union-International Plan of Action-Sharks.

2. DATA AVAILABILITY AND FISHERY MONITORING SYSTEMS

There is no specific monitoring program for the shark fisheries in the Balearic Islands. The only institution that regularly carries out monitoring surveys (both on commercial and experimental vessels) is the Spanish Institute of Oceanography (IEO). Surveys are mainly bottom trawling. Nevertheless, as a result of some surveys carried out by the Fisheries Department of the Balearic Islands Government, data on distribution, abundance and occurrence of elasmobranchs in littoral fisheries have been collected since 2000.

Data on the landings are compiled by the organization responsible for the commercialization of the fish and sea products in the Balearic Islands. These data are subsequently provided to the Fisheries Department (Balearic Islands Regional Government), which in turn provides them to the Fisheries Ministry (Spanish Government).

In the Balearic Islands, data on fish and other sea products are provided to the Fisheries Department by the organization responsible for the commercialization (first sale) of these products. These data are detailed daily by species, biomass landed, prize, and for each fishing vessel. Therefore, data can be analysed in whatever level of accuracy required, since every vessel has been previously identified regarding its own type of fishery (small-scale, purse seine, pelagic longline, bottom trawl). Nevertheless, some limitations exist, the most important being those coming from the discarded capture, that are not reported, and from the pooling of several species into a commercial category.

In relation to discards, some few scientific papers have been produced to evaluate this issue. For Balearic Islands waters, an article was published in 2003 on the bycatch of the two of the most important species (*Galeus melastomus* and *Etmopterus spinax*) in the bottom trawling fishery (Carbonell *et al.*, 2003).

Concerning the correct identification of the species landed, the Balearic Islands Fisheries Department is developing a project for monitoring this issue. This includes regular visits to the central fish auction wharf for reporting the species being sold and their proper identification, and comparison with the statistics provided by the organization responsible of the fish commercialization.

At present, species are identified, when landed at every fishing port, by non-specialized staff, that often reports some several species into a same commercial category (see Table 4 and notes to this table). Field

guides are not being used by fishermen or port staff to properly identify species. Only a few researchers have been trained to correctly identify shark and ray species. As recognized in several documents, this is a key factor for a proper monitoring of shark fisheries.

Abundance, biomass and catch per unit of effort (Cpue) of elasmobranchs have been analysed from several fishery-dependent and fishery-independent surveys carried out within several MPAs existing in the Balearic Islands (e.g. Morey *et al*., 2006). Also, the distribution patterns and indices of abundance were obtained from some bottom trawl surveys on the Balearic Islands shelf and slope (Massutí and Moranta, 2003). Nevertheless, a special emphasis should be stressed on better determining these indices in the next future.

Despite the quantity of scientific surveys and scientific monitoring on board fishing vessels, there exists a lack of detailed information on shark fisheries and/or biology. Only a few researchers in Spain have published articles on these issues, but no regular programs or lines of research have been implemented. Sporadic or anecdotal information is available through International Commission for the Conservation of Atlantic Tunas (ICCAT) scientific papers regarding pelagic fisheries.

Information for the Balearic Islands on pelagic longliners is very scarce and fragmentary, due to only five vessel are licensed to make use of this gear, and most of the sharks (and teleosts as well) captured off the Balearic Islands are landed at ports located in the Spanish mainland and thus they are not reported in the Balearic Islands statistics.

Regarding illegal, unreported and unregulated (IUU) fishing, overall only the unreported component could be considered as non-negligible in the Balearic Islands. This unreported fishing means that a minor part of the capture is sometimes sold directly to some particular consumers or restaurants. But in the case of sharks, it should be considered as negligible (if indeed existing).

3. MONITORING OF TRADE IN SHARK PRODUCTS

International trade does not exist for Balearic Islands shark fisheries. Only recently, in Formentera Island an artisanal industry has developed for the commercialization of canned dried skates and rays, which is a traditional product there. However, the magnitude of this trade is not known for the moment. Overall, sharks are marketed as a fresh product in the local markets.

The level of identification is different for each species in trade. The following list includes comments on this issue for the species regularly or occasionally present at the central fish auction wharf:

- *Hexanchus griseus*: labeled as “Peregrino” (=basking shark, *C. maximus*), but because the true basking sharks were reported only once at the fish auction wharf (2001), statistics for *H. griseus* can be easily separated from the total.
- *Squalus* spp.: correctly identified under the Balearic common name “Quissona”.
- *Centrophorus granulosus*: correctly identified under the Balearic common names “ullàs” or “ullot”.
- *Dalatias licha*: Not correctly identified, it can labelled as both “negret” or “tollo”, a name commonly used for deep-sea sharks of low commercial value.
- *Alopias vulpinus*: Not correctly identified, it can labelled as both “tauró” (=shark) or as Lamnidae.
- *Isurus oxyrinchus*: Not correctly identified, it can labelled as both “tauró” (=shark) or as Lamnidae.
- *Galeus melastomus*: correctly identified under the Balearic common name “moixina”.
- *Scyliorhinus canicula*: correctly identified under the Balearic common name “gató”.
- *Scyliorhinus stellaris:* Not correctly identified, it is labelled as *S. canicula*.
- *Galeorhinus galeus*: Despite the existence of the category “Cassó” (=*G. galeus*) at the statistics, this species is very often confused with smooth hounds *Mustelus* spp. and labelled as Mustelus. The category “Cassó” is of a very low reliability.
- *Mustelus mustelus (*and possibly *M. punctulatus*): correctly identified to genus level under the Balearic common name “mussoles” for this genus.
- *Carcharhinus* spp.: Very few specimens recorded, they are likely to be reported as “tauró” (=shark).
- *Prionace glauca:* correctly identified under the Balearic common name “tintorera”.

All batoid elasmobranchs are reported as “rajada”, which is the local name for species of Rajidae. Therefore, it is impossible to carry out any analysis at species level for this group. Nevertheless, the vast majority of the marketed batoids are indeed Rajidae, stingrays being a minor portion of the landed biomass.

Fish marketed in Spain must show its own identification card to consumers at sale points. This includes the fishing area (FAO codes), common name and scientific name (not always correct), source (captured at sea or from aquaculture), presentation to consumers (including whether the fish is presented fresh or frozen, headless, gutted, filleting). In the Balearic Islands, additional information is presented regarding the name of the fishing vessel and its port.

Of the shark species listed in CITES Appendices, only the white shark *C. carcharias* and the basking shark *C. maximus* have been reported in the Balearic Islands. The last reported capture of *C. carcharias* dates from 1976. During the 1996–2006 period, only three captures of the basking shark have been recorded in the Balearic Islands. Two of them were discarded at the sea, and only one was marketed. Some additional captures were reported in the Spanish Levantine coasts (Catalonia and Valencia), where captures of basking sharks seem to be more frequent. These individuals are commonly landed, although no information about their commercialization was available to the author.

Improving the monitoring of trade in shark products

As mentioned before, the lack of trained specialists for monitoring shark fisheries (both onboard and at landing sites) has been identified as one the main key issues for solving the incorrect identification of elasmobranches in catches and trade.

The implementation of specific programs for shark fisheries and shark biology programs should include trained specialists for monitoring fisheries onboard and landing sites as well.

Annex I

Sharks landings in Spain

The Spanish fishing grounds ("caladero nacional", within the EEZ until 200 miles off Spanish coasts) are divided into four areas:

a) Cantabrian Sea and NE-Atlantic: the fishing fleet from Galicia region (NW Spain) comprises approximately 50% of the Spanish fleet in number of vessels and 40% in tonnage. The rest of the Cantabrian fleet (North Spanish coast) constitutes 6% of the fishing vessels and 20% of the vessels tonnage.
b) Gulf of Cadiz: representing 10 percent of the total Spanish fleet in terms of both number of vessels and tonnage.
c) Canary Islands: Less than 4 percent in number of vessels and tonnage.
d) Mediterranean Sea: 30 percent of the Spanish fishing fleet in number of vessels and tonnage.

The Spanish fishing fleet differs among areas, especially in terms of fishing gears and fishing tactics. An important fleet that operates in international waters exist in NW Spain. The most important species reported in Spanish landings is the blue shark *Prionace glauca* (see Tables A1, A2 and A3), captured by the drifting longline fishery from NW coasts mainly, and also by drifting longliners from Andalusia (southern Spain region, at both sides of the Straits of Gibraltar).

The second important taxa in Spanish landings are the Batoids (no species-specific data exist). Batoids are the single most important taxa in shark landings in the Balearic Islands (46 percent of sharks landed biomass). The Balearic Islands fleet could be interpreted as representative of the Spanish Mediterranean fleet which is mainly composed by bottom trawlers in terms of vessels tonnage and fishing capacity/effort.

The understanding of the relative contribution from each area's fishing fleet to the whole shark capture (and at species level as well) in Spain is a goal to be achieved in the very next future.

An overview of shark fisheries in Spain is described below (Source: Fisheries Ministry):

– Directed fisheries:
1. Pelagic long line fishery: up to 275 vessels mainly targeting swordfish *Xiphias gladius*, shortfin mako *Isurus oxyrinchus* and blue shark *Prionace glauca*.
2. 5–6 bottom longliners targeting deep-water sharks in international waters.
3. Trawlers in NAFO area fishing for rays. 15–18 vessels.

– Bycatch fisheries:
1. About 210 bottom trawlers and bottom longliners fishing in European waters that capture some deep-water sharks and rays.
2. Bottom trawlers in coastal areas of Spain that catch rays and demersal sharks.

Table A1: Elasmobranch landings (tonnes) from the drifting pelagic longline fleet reported in Spain between 2002 and 2007 (Source: Ministerio de Medio Ambiente, Medio Rural y Marino)

Pelagic longliners	**Landed biomass (tonnes)**							
Species	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**Mean**	**%**
Prionace glauca	25 238.9	27 111.7	31 271.0	32 225.4	35 884.0	38 325.9	31 676.1	80.4
Carcharhinus & mackerel sharks	7 496.0	3 916.1	4 322.8	4 334.3	3 930.4	27 25.3	4 454.1	11.3
Isurus oxyrinchus	344.2	793.1	1 010.5	1 513.9	2 003.0	2173.9	1 306.4	3.3
Sharks not specified	684.3	664.8	506.0	591.9	391.0	249.4	514.6	1.3
Lamna nasus	792.4	609.4	513.7	387.9	357.6	296.0	492.8	1.3
Sphyrna lewini	323.0	180.5	287.0	203.9	32.6	18.9	174.3	0.4
Rest of sharks	368.1	563.2	589.7	872.3	894.9	1380.8	778.2	2.0
Total	35 246.8	33 838.7	38 500.7	40 129.6	43 493.5	45 170.2	39 396.6	-

Table A2: Elasmobranch landings (tonnes) from the bottom longline fleet reported in Spain between 2002 and 2007 (Source: Ministerio de Medio Ambiente, Medio Rural y Marino)

Bottom longliners	**Landed biomass (tonnes)**							
Species	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**Mean**	**%**
Squalus acanthias	70.4	50.4	25.5	341.7	722.5	2 672.2	647.1	35.6
Centrophorus granulosus	409.3	510.1	301.7	137.7	12.2	1.2	228.7	12.6
Prionace glauca	256.6	161.9	225.7	57.4	169.6	197.7	178.2	9.8
Fam. Squalidae	34.5	86.6	735.5	8.6	2.8	1.7	144.9	8.0
Gen. Carcharhinus & macherels sharks	86.7	20.8	56.8	25.2	384.5	7.8	97.0	5.3
Galeorhinus galeus	76.3	147.6	122.2	40.3	42.3	43.8	78.8	4.3
Batoidea	70.6	70.8	95.1	71.8	74.9	52.1	72.5	4.0
Centroscymnus coelolepis	0	0	23.2	131.3	175.1	35.2	91.2	5.0
Batoidea	78.2	76.5	68.1	56.5	32.5	51.1	60.5	3.3
Sharks not specified	25.7	20.5	150.2	70.5	8.1	69.3	57.4	3.2
Fam. Scyliorhinidae	155.5	34.7	62.9	47.7	32.8	4.6	56.4	3.1
Rest of sharks	61.4	71.6	144.5	172.2	158.3	212.8	136.8	7.5
Total	1 325.2	1 251.4	2 011.4	1 161.0	1 815.6	3 349.4	1 819.0	

Table A3: Elasmobranchs landings (tonnes) from the bottom trawl fleet reported in Spain between 2002 and 2007. The main part of the bottom trawl fleet is made up of skates, mostly on NAFO area, and they under TACs and quotas (Source: Ministerio de Medio Ambiente, Medio Rural y Marino)

Bottom longliners	**Landed biomass (tonnes)**							
Species	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**Mean**	**%**
Batoidea	7 318.8	9 666.6	8 707.0	5 469.9	5 388.4	4 973.3	6 920.7	56.9
Batoidea	2 606.8	2 554.6	2 184.5	2 357.4	3 276.7	2 792.1	2 628.7	21.6
Fam. Squalidae	510.7	993.1	885.0	572.0	455.3	290.2	617.7	5.1
Fam. Scyliorhinidae	175.5	236.8	431.1	321.0	304.4	313.7	297.1	2.4
Gen. *Scyliorhinus*	339.2	277.4	225.4	243.9	246.2	175.2	251.2	2.1
Elasmobranchs	969.8	200.1	86.5	43.6	16.0	0.2	219.4	1.8
Galeorhinus galeus	198.4	240.1	237.5	205.5	197.7	183.6	210.5	1.7
Elasmobranchs	1 136.4	1 249.7	995.8	857.6	981.6	911.1	1 022.2	8.4
TOTAL	13 255.7	15 418.4	13 752.8	10 070.9	10 866.3	9 639.5	12 167.2	

SRI LANKA

Champa Amarasiri
National Aquatic Resources Research and Development Agency (NARA)

1. BACKGROUND INFORMATION ABOUT THE SHARK FISHERIES

Marine fisheries sector plays an important role in the Sri Lankan economy. The sector contributes around 70 percent of the animal protein consumed in the country. This is largely contributed by the local fishing industry, which in 2006 produced 215 980 tonnes of fish thus accounting for 84 percent of the total quantity of fish consumed. The annual per capita availability of fish and fishery products in the recent past has varied between 17.5 kg and 18.5 kg. The marine fisheries sector is divided into three sub-sectors for administrative and analytical purposes, viz coastal, offshore and deep sea and high seas. Coastal area is defined as the waters above the continental shelf and the average width is 22 km from the coast line. Offshore and deep sea fishing takes place beyond the continental shelf up to the boundary of the EEZ while high sea fishing takes place in international waters (Figure 1).

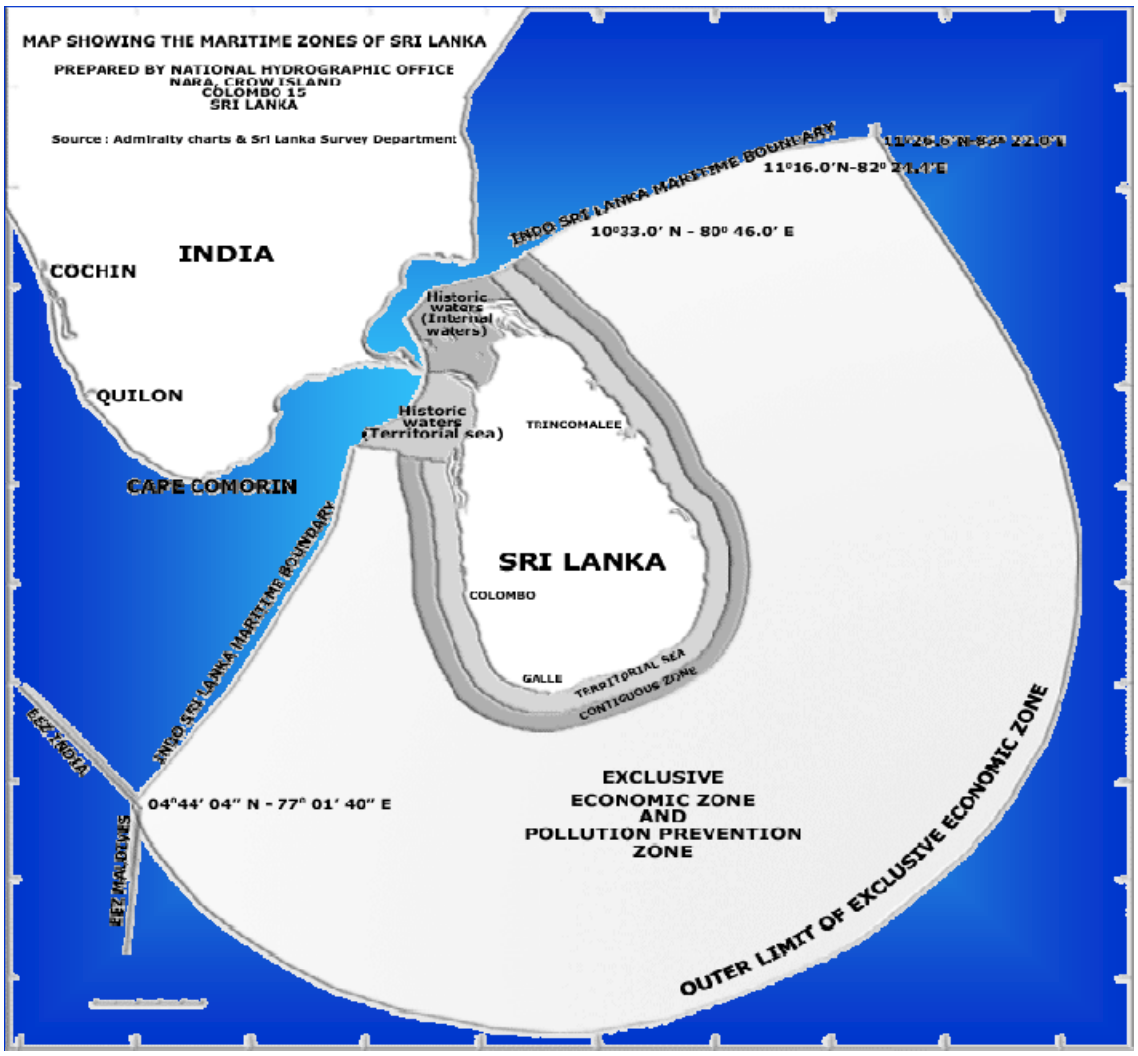

Figure 1: Sri Lanka territory and exclusive economic zone (Source: Survey Department of Sri Lanka).

Sharks are exploited by offshore fisheries as well as coastal fisheries in both pelagic and benthic habitats. The main fisheries involved in shark fishing are offshore gillnet fishery, offshore shark longline fishery, offshore tuna longline fishery and deepwater benthic shark fishery (spiny shark fishery). Sharks are also landed as incidental catches in a number of other fisheries such as bottom-set gillnet fishery for skate, bottom-set gillnet fishery, bottom-set longline fishery and beach seine fishery.

The Offshore shark fishery

The fisheries conducted beyond coastal waters are called offshore fisheries. Fishing takes place mainly in the exclusive economic zone and beyond. Main gears used are large-mesh gillnets and shark/tuna longlines. The fishery has developed since mid 1980s and today, over 2 500 boats operate in the fishery (Table 1). The fishery targeting the migratory stocks of tuna, billfish and sharks was the fastest growing sector in the marine fishing industry during the last two decades; production increasing from 8 665 tonnes in 1990 to 25 006 tonnes in 2000, equivalent to 17 percent of the national fish production. But a declining trend of shark catch can be observed for the last seven years. Sri Lanka contributed 3.1 percent of the global catch of sharks during 1990–2004 being the tenth country of world ranking in shark fishery. In 2004 the contribution reduced to 2.4 percent (Lack and Sant, 2006).

Table 1: Offshore fleet development from 1982–2006 and catches, including sharks

Year	No. of boats	Fish catches	Shark catches
1988	534	20 078	3 927
1989	650	24 440	4 314
1990	775	31 000	8 665
1991	900	36 000	22 168
1992	1 025	41 000	18 445
1993	1 150	46 000	15 106
1994	1 275	54 704	9 047
1995	1 639	76 112	19 462
1998	1 639	73 240	20 941
2000	1 430	84400	25 006
2001	1 572	87 360	20 700
2002	1 614	98 510	11 108
2003	1 530	90 830	12 805
2004	1 581	98 720	7 566
2005	na	na	2 390
2006	2 613	94 620	2 101

The drift longline fishery

The drift longline fishery for sharks (shark longline fishery) is an offshoot of the tuna longline fishery which was introduced to Sri Lankan fisheries in the late 1950s along with the introduction of the new 3.5 GT inboard engined craft. Each of these new boats was provided with twenty bundles of tuna longline. However, the high cost of bait and low catches of tuna has limited the popularity and expansion of tuna longlining. Instead, fishermen were forced to use cut pieces of tuna, dolphin, etc., as bait and began landing more and more sharks and the tuna longline fishery gradually transformed into a drift longline fishery for sharks. Drift longline fishery for shark was usually conducted by the 3.5 GT coastal day boats and the offshore multi-day boats. While the coastal day boats use up to 200 hooks per operation, the offshore boats use 350–500 hooks per operation.

The main line is 5–6 mm diameter and made of kurolon, polyethylene, polypropylene or polyamide. The use of kurolon has declined in recent years and more polyethylene and polypropylene lines are now being used. Branch lines are 4mm diameter and 7–17 m in length, and the distance between two branch lines 15–27 m so that each bundle consisting of five hooks would be 75–135 m in length. With a buoy line of 3–10 m length, the fishing depth of the lines range from 10 to 27 m from the surface. When used in combination with a drift gillnet the shark longline is shot first, followed by the net.

Personal communications with fishermen revealed that off west coast of Negombo, about 15 multi-day boats of over 13 m are exclusively engaged in drift longline fishing for sharks. Most of these boats are reported to undertake fishing trips which last one to one and half months and, one boat is claimed to have spent 52 days

on a single trip. About 1 000 hooks (200 bundles) are used during fishing operations. With such extended trips, the fishery is primarily for the lucrative shark fin export trade. The fish brought on ice is of poor quality and often converted into dried fish.

Offshore shark long lining was very popular in early 90s. In 1993/94 period the average number of fishing operations of shark longline per month was 2496. Maximum catches of sharks were reported in 1999 and 2000.

Tuna longline fishery

The offshore tuna longline fishery is reported to have been in use in Sri Lanka for the last 40 years. Because of the high price and the target species are fetching, and as a result it has got spread to virtually every major fishing town in the country.

Fishing is carried out in the offshore region during the period December to March in the southern and the western waters, while in the eastern region fishing is done from May to November. In the northwest and Southwest Coast of Sri Lanka fishers on small boats also have started the operation of this gear ten years back. Tuna longlines operated from Sri Lanka are similar to those typical Japanese tuna longlines. Most of the fishers make the complete gear with monofilament lines. The main line is usually a No. 250–400 monofilament. Tarred Kuralon ropes of 4–6 mm diameter are also used as the main line. 10–40 m length of No. 200–300 monofilament is used as branch lines. Different length of branch lines within the above are fixed to the main line on a random basis. Branch lines are attached to the main line at every 3050 m. G–7 type buoys are attached to the main line at every 5–6 hooks; by 3–4 mm polypropylene buoy lines of about 40 m in length. Swivels are used for the main lines and the branch lines to prevent excessive twist of the lines. Standard shark hooks are attached to the branch line through pieces of 2 m SS wire.

About 100–200 hooks are shot off a 3.5 tonnes boat while the No. of hooks used on a small boat ranges between 50–75. Baits used in this fishery are squid/cuttlefish, herrings, flying fish and scads.
Both offshore gillnet fishery and longline catch sharks as by-catch.

The species composition of sharks in an experimental fishery conducted using both gillnets and longlines are given in the Table 2.

Table 2: Species composition of sharks in tuna longline and drift gillnet fisheries conducted within EEZ of Sri Lanka (percentage by weight and number) in 1996 (source Joseph, 1999).

Species	Drift gillnet fishery		Tuna longline fishery	
	% weight	% number	% weight	% number
Silky shark	74.3	88.5	32.6	44.8
Blue shark	11.2	2.2	46.3	31.4
Oceanic whitetip shark	3.1	2.9	2.6	4.0
Shortfin mako shark	3.9	1.0	7.7	7.7
Longfin mako shark	0.6	0.2	1.6	1.8
Thresher shark	3.4	3.9	4.4	4.4
Pelagic thresher shark	–	–	0.7	1.0
Big-eye thesher shark	–	–	0.4	0.4
Smooth hammerhead shark	1.7	0.7	0.6	0.4
Scalloped hammerhead shark	1.8	0.5	3.1	4.0

Deepwater benthic shark fishery

This fishery is carried out in the deeper waters (150–200m) of the continental slope targeted for *Centrophorus uyato* and *C. granulosus*. The fishing takes place off the northwest (Battalangunduwa Island

and Talawila), south west (Panadura, Beruwala) and south (Mirissa) parts of the country. The resources are also available in the east coast but there is no established fishery in the area. The fishery is seasonal and starts in September and lasts until the end of February of the following year. The estimated production for Northwestern shark production for 2004 was 194 877 kg and 260 000 kg in 2007.

Craft and gear used in deepwater benthic shark fishery

In the Kalpitiya Penninsula , 5–5.5 m fibre glass boats are used for this fishery. These crafts are powered by 10–15 hp outboard engines. Total number of boats engaged in the fishery is around 80–90. The fishery is conducted using baited hooks. The average number of hooks per boat ranges from 550–900. *Escualosa thoracata, Hilsa kelee, Nematalosa nisus, Sardinella fimbriata* and other sardinella species are the popular baits for this fishery (Dissanayake, unpublished). The operational depth varied from 150–2000m. The fishing starts around 9.00 pm and making approximately 10–12 hours of fishing.

Shark species in Sri Lankan landings

Taxonomy of sharks has been relatively neglected by Sri Lankan fish taxonomists, possibly on account of the difficulties inherent in many species, as well as the paucity of specimens. Various authors have from time-to-time attempted to catalogue the Sri Lanka sharks. Mendis (1954) listed 15 species and Munro (1955) upgraded the list to 22. De Silva (1984) listed 44 confirmed and 11 unconfirmed species in his check list. Several of these unconfirmed species have subsequently been recorded in Sri Lanka waters. Amarasooriya and Dayaratne (1994) listed 44 species from the west and south western coast landings and Amarasooriya (1999) added 4 more species to the list. The two species of gulper sharken in the deep water longline fishery. Three species recorded by Munro (1955), namely *Atelomycterus marmoratus*, *Hemigaleus balfouri* and *Chaenogaleus macrostoma* were not recorded in the study by Amarasooriya and Dayaratne (1994). Further, Amarasooriya and Dayaratne (1993) also contend that the two species described by Munro (1955) as Tawny nurse shark, *Nebrius concolor* (Ruppell, 1837) and Rusty shark, *Ginglymostoma ferrugineum* (Lesson, 1830) are synonyms of Tawny nurse shark, *Nebrius ferrugeneus* (Lesson, 1830), as described in Compagno (1984). Nine species, *Notorhyncus cepedianus* (Peron, 1807), *Chiloscyllium plagiosum* (Bennet, 1830), *Eugompohdus taurus* (Rafinesque, 1818), *Chaenogaleus macrostoma* (Bleeker, 1852), *Hemigaleus microstoma* (Bleeker, 1852), *Carcharhinus amblyrhynchoides* (Whitely, 1934), *C. dussumieri* (Valenciennes, 1839), *C. sealei* (Pietschmann, 1916) and *Rhizoprionodon oligolinx* (Springer, 1964) recorded by De Silva (1984) were not recorded by Amarasooriya and Dayaratne (1993). De Silva (1984) recorded the presence of great white shark, *Carcharodon carcharius*, but no further records have been made of this species in Sri Lanka. De Bruine, Russel and Bogusch (1994) included 43 species as being of interest to the marine fisheries industry. The latest study by De Silva (1999) accepts 61 species of sharks belonging to 5 orders and 17 families. These species comprise the currently known shark species from both the territorial waters of Sri Lanka and the exclusive economic zone. However it is important to note that a few species of sharks caught extra-territorially are some times unloaded in Sri Lankan ports. Although 40–61 species have been recorded from Sri Lanka, only about 12 species dominate the landings (Tables 3 and 4).

Taxonomy of Sri Lanka's skates and rays has received even less attention. Munro (1995) included 29 species while De Bruine, *et al.,* (1994) accepted 30 and updated the taxonomy. De Silva (1999) included a total of 31 species from four orders and nine families as being present in Sri Lankan waters. The author also suspects that many species of rays remain to be documented from Sri Lankan waters.

Table 3: Species composition of shark landings in Sri Lanka (percentage by weight).
Source: Williams (1995) and Dayaratne *et al.* (1996)

Species	Coastal fishery		Offshore fishery	
	1994	**1995**	**1994**	**1995**
Silky shark	61.2	71.3	59.4	56.4
Blue shark	1.0	13.9	12.7	11.7
Oceanic whitetip shark	0.1	0.1	7.9	8.7
Other requiem sharks	2.2	1.2	2.7	4.8
Mako shark	6.2	10.5	6.7	4.5
Thresher shark	15.8	2.4	3.6	6.0
Hammerhead shark	9.2	0.6	6.3	6.7
Other sharks	4.3	–	0.7	1.2

Biology

Biology of the Sri Lankan sharks is even less studied subject. Few attempts have been made to study the population dynamics of silky sharks. It was estimates that the asymptotic length and growth coefficient of silky shark were 325 cm and 0.3 per year respectively. The recruitment pattern of *C. falciformis* showed one peak around late July to early August.

Socio-economic aspects

Shark fins

Shark fisheries are always associated with other fisheries. Therefore there is no separate socio economic analysis for shark fisheries. The shark fisheries do create wealth in the case of the export of shark fins from deepwater benthic shark fishery and make a significant contribution to the economy. There is no information on the division of income between the fishers, processors and exporters.

The shark fin industry in Sri Lanka is poorly documented. The only source of information available is export figure maintained by the Sri Lanka Customs. The retail value of fins varies with species, fin type condition and regional preference.

Shark fins have been exported from Sri Lanka since late 60s. The trade has developed rapidly over the last decade due to high economic gain. In 1999 the country exported about 89 tonnes of shark fins worth Rs 170 million (about US$ 1.5 million).

The fins are exported to 6–10 countries, including China, Hong Kong SAR, Singapore, Malaysia, Maldives and China but most of the products go to China, Hong Kong SAR and Singapore where they are further processed for fin rays or fin needles (Table 5). Exports are high in the months of May and June due to festive season in China.

Table 4: List of shark species identified in fish landings

Family	Species	Common English name
Hexanchidae	*Hexanchus griseus*	Cow shark
Squalidae	*Centroschyllium ornatum*	Ornate dogfish
	Centrophorus moluccensis	Gulper shark
	C. uyato	Gulper shark
	Dalatias licha	Kitefin shark
Echinorhinidae	*Echinorhinus brucus*	Bramble shark
Hemiscylliidae	*Chiloscyllium griseum*	Grey bamboo shark
	C. indicum	Slender bamboo shark
Ginglymostomatidae	*Nebrius ferrugineus*	Tawny nurse shark
Stegostomatidae	*Stegostoma fasciatum*	Zebra shark
Rhinodontidae	*Rhinodon typus*	Whale shark
Odontasididae	*Odontaspis noronhai**	Bigeye sandtiger shark
	*O. ferox*8*	Small tooth sand tiger shark
Pseudocarchariidae	*Pseudocarcharias kamoharai*	Crocodile shark
Alopidae	*Alopias pelagicus*	Pelagic thresher shark
	A. superciliosus	Bigeye thresher shark
	A. vulpinus	Thresher shark
Laminidae	*Isurus oxyrinchus*	Shortfin mako shark
	I. paucus	Longfin mako shark
Triakidae	*Mustelus manazo*	Starspotted smooth hound shark
	M. mosis	Arabian smooth hound shark
Hemigaleidae	*Hemipristis elongatus*	Snaggletooth shark
Carcharhinidae	*Carcharinus altimus*	Bignose shark
	C. albimarginatus	Silvertrip shark
	C. amblyrhynchos	Grey reef shark
	*C. amboinensis**	Pigeye shark
	C. brevipinna	Spinner shark
	C. falciformis	Silky shark
	C. hemiodon	Pondicherry shark
	C. limbatus	Blacktip shark
	C. longimanus	Oceanic whitetip shark
	C. macloti	Hardnose shark
	C. melanopterus	Blacktip reef shark
	*C. plumbeus**	Sandbar shark
	C. sorrah	Spot-tail shark
	C. wheeleri	Blacktail reef shark
	Galeocerdo cuvier	Tiger shark
	*Lamiopsis temmincki**	Broadfin shark
	Loxdon macrorhinus	Sliteye shark
	*Negaprion brevirostris**	Lemon shark
	Prionace glauca	Blue shark
	Triacnodon obesus	Whitetip reef shark
	Rhizoprionodon acutus	Milk shark
	Scolidon laticaudus	Spadenose shark
Sphyrnidae	*Eusphyra blochii*	Winghead shark
	Sphyrna lewini	Scalloped hammerhad shark
	S. mokaraan	Great hammerhad shark
	S. zygaena	Smooth hammerhad shark

* Only one specimen recorded.

Table 5: Shark fin exports from Sri Lanka (2007 and 2008 up to August)

Country	2007 (kg)	2008 (kg) up to August
China, Hong Kong SAR	63 247	28 756
Malaysia	2 786	503
Singapore	190	1 279
Maldives	200	0
Bahrain	162	0
Australia	60	0
China	0	4 210
Cyprus	0	162
Mauritius	0	2 500
Taiwan, Province of China	0	1 500

Dried fins of silky shark, oceanic whitely and hammer head sharks, greater than 12" fin-base length fetch Rs.3 000–4 200/kg. The price paid in wet form is around Rs.1200–1 300/kg. Large fins of species such as blue shark and the threshers fetch Rs.2 800/kg in dried form and Rs. 600/kg in wet form. Medium size fins between 8" to 12" fin-base length fetch Rs.2 100/kg (dry) and Rs.800/kg (wet). Smaller fins of less than 8" fin-base length are paid Rs.1 500/kg (dry) and Rs.500/kg (wet). The quantity and value of shark fins exported since 1990 are given in Table 6. In addition, cleaned shark jaws and teeth are available for sale, mainly to tourists. However, no information is available on the quantities sold or the income generated through such sales. Unconfirmed reports suggest that prices for cleaned shark jaws range from Rs.500 to 3 000.

Table 6: Quantity and value of shark fins exported from Sri Lanka (Source: Statistical Unit, Dept. of Fisheries and Aquatic Resources).

Year	**Quantity (tonnes)**	**Value (Rs. million)**
1990	51.38	35.13
1991	182.24	108.62
1992	89.55	135.16
1993	58.60	98.93
1994	81.15	110.37
1995	126.88	162.81
1996	52.3	111.51
1997	83	183.0
1998	77	138.0
1999	89	170.0
2000	119	305.0
2001	85	242.0
2002	83	215.0
2003	83	336.0
2004	110	343.0
2005	74	165.0
2006	75	140.0
2007	67	127.0

Shark oil
Deep benthic shark fishery is mainly exploited to extract squaline rich liver oil which has a high demand in the international market. It is estimated that nearly 78 000 kg of oil is extracted and exported to Japan. Export figures, and other socio-economic information related to this fishery is not available. It was observed that fishing effort has decreased for the last few years mainly due to the lack of proper market facility to export products. However, the situation is improving as there are two more buyers involved in the fishery.

Number of fishers involved in shark fisheries and their geographical spread

The number of fishers in the marine sector has increased from 79 686 in 1921 to 98 444 in 1989 (Sivasubramanium, 1995) and to nearly 120 000 in early 90s, inclusive of those who are engaged in aquaculture. In addition, some 30 000 people are reportedly employed in related and service activities such as fish trade, processing, boat building, fishing gear manufacture, etc. The sector currently provides direct employment to about 650 000 people comprising 150 000 in fishing, 100 000 in associated service activities and 400 000 in fish trade. Number of fishers involved particularly in shark fisheries is not reported. However, it is estimated that nearly 15 000 fishers are engaged in offshore fisheries in general. Out of that, between 250–300 are engaged in shark longline fishery. In addition nearly 200 fishers are engaged in spiny shark fishery mainly from Northwestern area.

2. FISHERY AND TRADE MONITORING SYSTEMS

Agencies involved in information collections

Statistical unit
The principal entity involved in fisheries statistics collection is the Statistical Unit (SU) of the Ministry of Fisheries and Ocean Resources. The Department of Fisheries and National Aquatic Resources Agency (research institute under the Ministry of Fisheries) are the actual data collectors. SU act as the central collation agency of fisheries statistics. Ceylon Fishery Harbours Cooperation, Ceylon Fisheries Cooperation and Sri Lanka Customs are also involved in data collections relevant to their interests. Fishing boat Owners Association, Fish Trader Organizations, Fishing boat and gear manufacturers, boat builders, some ice and fuel suppliers may maintain fisheries related data for their own interests. The SU prepares regular fisheries statistical reports for four main agencies: MFOR, Central Bank of Sri Lanka, Dept. Census and Statistics and FAO.

NARA
NARA collects offshore fisheries data mainly for stock assessments purposes. The NARA programme covers 36 species including six tuna species, two species of seer, four species of billfishes and eight species of sharks. The data collected are total number of boats landed/day for each category and some length data of tuna, bill fish and some shark species. The landing survey by NARA covers selected harbours and anchorages from each fishing zone. The landings of offshore boats take place in western, southern and eastern coasts only. The landing area is divided into seven fishing zones. At least 30 percent of the landed boats are sampled. Sampling is carried out 10 days per month per zone by two samplers.

Department of Fisheries (DFAR)
The monitoring of coastal fisheries (artisanal fisheries) is conducted by Department of Fisheries. There are 15 Fisheries Administrative Districts along the coastal zone of the country to administrate the fisheries activities. Each District has number of Fishery Inspectors. These Fisheries Inspectors are assigned to various duties including data collection. Generally they visit the landing sites one day per week particularly to collect fish statistics. They select well representative landing sites within their division to collect statistics to estimate the monthly production. They interview fishers and fisher's organizations to verify the figures.

Sri Lanka Customs (SLC)
Sri Lanka Customs collect export and import data of fishery products and currently they have the authority of controlling export and import of shark products.

Reporting
The SU prepares four types of reports for the MFOR:

- Weekly fish prices report;
- Monthly fisheries statistics report;
- Quarterly fisheries statistics report and,
- Annual fisheries statistics report.

The Central Bank requires the SU to produce a monthly report on fish production, subsidies to the fisheries sector, fish imports and fish exports. The report must conform to a special format required by the Central Bank.

NARA prepares an annual report on large pelagic fish production for MFOR, with production presented on a monthly basis. NARA produces annual statistics on tuna and tuna like fishes and shark data to the IOTC. The data includes nominal catches, discards, fishing craft statistics, effort and biological information on important species.

Major limitations encountered in data collection and reporting

The major limitations encountered in the information collection are lack of adequate staff including scientists, taxonomists, samplers and data entry operators. Currently NARA has only one scientist, 12 samplers and one data entry operator to cover entirely offshore fisheries. Their main interest is for tuna landings. As there are 14 harbours, 36 anchorages and nearly 600 beach landings at least the staff should be doubled and some should be dedicated to collect shark catch information to obtain scientifically acceptable catch information regarding the fisheries.

The others limitation is the lack of funds to expand the sampling programme. The existing allocation is not adequate to expand and improve the sampling programme as it would involves additional traveling, training, awareness material, etc.

Lack of adequate base line information is also another limitation to improve and reorganize the sampling strategies. Therefore it is needed to conduct a quick frame survey prior to establish such sampling and information collecting programme.

Existing legal and policy support

The ten year development policy framework
The ten year development policy framework of the fisheries and aquatic resources sector (2007–2016) provided the policy direction for offshore and high seas fishery management in general. The plan also highlighted the importance of conservation of the coastal and aquatic environments and promotion of principles of responsible fisheries.

Fisheries act and regulations
The Fisheries and Aquatic Resources Act No.2 of 1996 establishes the basic institutional framework required for fisheries management. The Act lays emphasis on management of fisheries and sustainable development with due recognition of conservation measures. Some of the most important new provisions are (a) licensing of all major fishing operations, (b) declaration of areas for fisheries management and (c) conservation. All important fisheries are to be brought under a licensing scheme for the first time, effectively limiting entry to otherwise open access fisheries. About 80 regulations have already being Gazetted under this Act – concerning registration of fishing boats, licensing of fisheries, registration of fishermen, fisheries in selected lagoons, export of live fish, fish landings, gear regulations for inland fisheries, regulations for aquaculture activities and furnishing information on fisheries and catches and handling and distribution of fish.

The legislation pertaining directly to the shark and shark related fisheries is very limited. The only regulation gazetteed under Fisheries Act is Regulation of the Landings of Fish (Species of Shark and Skates) Regulations, 2001. The regulation says “A licence holder (Licence holder means a person who is in possession of a valid licence issued under the Fishing Operations Regulations of 1996 published in gazette Extraordinary No 948/25 of November 07, 1996) may land fish belonging to the species of Sharks or Skates,

so long as the fins of such species of fish are attached to such fish. And no licence holder shall land only the fins which have been removed from any fish belonging to the species of shark or skate"

The Fauna and flora protection Act

The Fauna and Flora protection Act of Sri Lanka is being amended and it is proposed to include Whale shark as protected species.

IOTC

There is no national management plan particularly to manage the shark fisheries. However Sri Lanka is involved in regional management plans. IOTC has taken initiative in 2005 to manage the Indian Ocean Sharks under the IOTC Resolution 05/05. The main objective is to ensure the sustainability of shark stocks as well as to adopt a National Plan of Action for the conservation and management of sharks. As a member of the IOTC Sri Lanka has the responsibility of providing required data to implement conservation and management measures. Sri Lanka provides catch and effort data of shark fisheries to IOTC annually.

NPOA

Offshore fisheries management plan is being prepared mainly to address the tuna fisheries development. No separate attempts have been made to prepare a shark management plan. However, Sri Lanka has been requeting FAO for technical and financial assistance to prepare the NPOA – Shark for Sri Lanka. Further Bay of Bengal Program (BOBP-IGO) has had a Regional Consultation on Preparation of Management Plan for Shark Fisheries in 28–29 March 2008. The participated countries were India, Sri Lanka, Maldives and Bangladesh.

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UNITED STATES OF AMERICA

John Carlson, Karyl Brewster-Geisz and Brad Wiley
National Marine Fisheries Service

1. BACKGROUND INFORMATION ABOUT THE SHARK FISHERIES

Fisheries that catch elasmobranch species in the United States can be divided into four general categories: directed commercial, incidental commercial, directed recreational, and incidental recreational. Directed fisheries are those that target sharks, skates and rays, whereas incidental fisheries catch sharks secondarily while fishing for other species. In virtually every fishery there are incidental catches or bycatch of sharks. Gillnet, longline, trawl, purse seine, pot, and hand-gear fisheries all experience some level of shark catches with varying levels of shark bycatch and bycatch mortality. Some fisheries have both catch and bycatch of sharks in that some species are retained while others are discarded, depending on market value.

Atlantic and Gulf of Mexico commercial fisheries
The main directed commercial fisheries that catch sharks in Federal waters along the United States Atlantic and Gulf of Mexico coasts include the pelagic longline fishery, the bottom longline fishery, and the shark coastal gillnet fishery. Other commercial fisheries in the Atlantic Federal waters are mostly incidental in nature and include shark handgear, swordfish handgear, tuna purse seine, tuna handgear, tuna harpoon, coastal gillnet, shrimp trawl, and menhaden purse seine. The authorized gears for directed and incidental fisheries for Atlantic sharks in Federal waters are longline, gillnet, rod and reel, handline, and bandit gear.

Fishing gear types that result in shark catches can vary from gillnets that drift on the ocean's surface to those that are sunk and fished on the bottom. Both the bottom longline and gillnet fisheries are generally active in the northwest Atlantic Ocean and Gulf of Mexico. Bottom longline fishermen have generally targeted sandbar, *Carcharhinus plumbeus*, and blacktip sharks, *Carcharhinus limbatus*, but also catch and land hammerhead, *Sphyrna* spp. bull, *Carcharhinus leucas*, and blacknose sharks, *Carcharhinus acronotus*. Bottom longline characteristics vary regionally with gear normally consisting of about 2.9–43.4 km of weighted longline and 500–1500 hooks (Hale and Carlson, 2007). Shark gillnet fishermen target smaller coastal sharks such as Atlantic sharpnose, *Rhizoprionodon terraenovae*, blacknose, finetooth, *Carcharhinus isodon*, and blacktip sharks. Some vessels use their net to encircle a school of sharks. Nets can be up to 2 km in length of varying mesh size from 7.3–30.4 cm (Carlson and Bethea, 2007).

Pelagic sharks are typically caught incidentally in the commercial tuna and swordfish pelagic longline fisheries. The pelagic longline gear varies depending on area and target but in general consists of a heavy monofilament mainline (7–65 km long), which is suspended at various depths below the surface and from which are suspended numerous lengths of lighter monofilament line with a single large hook at the end. Hooks are placed along the line at a ratio of 11–19 hooks/km, resulting in a total of 80–1 200 hooks. The gear free-floats on the surface of the ocean, with the hook depths varying from 35 to 60 m (Beerkircher *et al.,* 2004). Shortfin mako, *Isurus oxyrinchus*, porbeagle, and thresher, *Alopias* spp., sharks are the pelagic species that are most likely landed due to relatively high ex-vessel prices. However, few sharks are landed due to the relatively low ex-vessel prices compared to ex-vessel prices of tuna and swordfish and the need to keep shark meat separated from the tunas and swordfish in the hold. Some shark species, particularly blue sharks, *Prionace glauca*, are frequently discarded because of their unpalatable meat.

Currently 214 United States fishermen are permitted to target sharks (excluding dogfish) in the Atlantic Ocean and Gulf of Mexico, and an additional 285 fishermen are permitted to land shark incidentally. Recent amendments to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan based on updated stock assessments are expected to eliminate the major directed shark fishery in the United States Atlantic. The amendments implement a shark research fishery, which allows the United States National Marine Fisheries Service (NMFS) to select a limited number of commercial shark vessels on an annual basis to collect life history data, and data for future stock assessments. Furthermore, the revised measures affect quotas, drastically reduce retention limits, and modify the authorized species in commercial shark fisheries. Specifically, commercial shark fishermen not participating in the research fishery are no longer allowed to

land sandbar sharks, which have been the main target species for most fishermen. Additionally, commercial fishermen are required to maintain shark fins naturally attached to the shark carcass through landing. The revised measures also affect authorized species in recreational shark fisheries; modify time/area closures for commercial shark vessels deploying bottom longline gear; and modify regions, seasons, and shark dealer reporting frequency in the commercial shark fishery.

The United States fishery for spiny dogfish targets large individuals (larger than 2.3 kg in weight, and 83 cm in length), which are primarily mature females, to meet processing and marketing requirements (NEFSC, 2006). Spiny dogfish are also frequently caught as bycatch in a large numbers and discarded during groundfish operations. The principal commercial fishing gears used to catch spiny dogfish are otter trawls, longlines and sink gillnets. The fishery for spiny dogfish operates in the northwest Atlantic Ocean from North Carolina north to the Gulf of Maine. Recreational catches of spiny dogfish are of little significance.

The principal commercial fishing method in the Atlantic Ocean used to catch skates and rays is otter trawling (NEFSC, 2000). However, skates can be caught commercially with trawl, gillnet, longline, handline, and dredge fishing gear. There are seven species of *Raja* occurring along the North Atlantic coast of the United States that are captured regularly in fisheries: little skate (*Raja erinacea*), winter skate (*Raja ocellata*), barndoor skate (*Raja laevis*), thorny skate (*Raja radiata*), clearnose skate (*Raja eglanteria*), rosette skate (*Raja garmani*), and smooth skate (*Raja senta*). Skates have been reported in New England fishery landings since the late 1800s. Reported landings of skates have increased substantially in recent years, partially in response to increased demand for lobster bait domestically and for skate wings in export markets. However, improved statistical data collection may also account for some portion of the increase in reported landings. Wings are taken from winter and thorny skates, the two species currently known to be used for human consumption. Bait landings are likely composed primarily of little skate, based on areas fished and known species distribution patterns.

Eastern Pacific commercial fisheries

Pelagic sharks are harvested in commercial fishing in United States Pacific waters in the driftnet fishery off California and incidentally in the commercial tuna and swordfish pelagic longline fisheries. The driftnet fishery targets common thresher shark and shortfin mako (Holts *et al.,* 1998). California legislation established the drift gill net fishery as a limited entry fishery. In 2006, there were 89 permits issued in the drift gillnet fishery, down from 150 permits in 1980. Most catches of shark in pelagic longline fisheries are incidental, but at times shortfin mako and thresher sharks are targeted directly (Holts *et al.,* 1998). Both the drift net and pelagic longline fisheries commonly catch blue sharks, but this species is typically discarded because of their unpalatable meat.

The west coast groundfish fishery operates over a broad depth range with significant fishing activities by trawl, longline and pots out to 1 500 m. There is a limited commercial fishery for spiny dogfish, primarily harvested with bottom trawls. Trawls also encounter brown cat shark, *Apristurus brunneus*, filetail cat shark, *Parmaturus xaniurus*, and longnose cat shark, *Galeus longirostris*, which indicates that these species probably are bycatch in this deepwater fishery.

In the Bering Sea and Aleutian Islands (BSAI), the three shark species most likely to be encountered in trawl and longline fisheries are the sleeper shark (*Somniosus pacificus*), the piked or spiny dogfish shark (*Squalus acanthias*), which are both member of the family Squalidae, and the salmon shark (*Lamna ditropis*). Spiny dogfish are demersal, occupying shelf and upper slope waters from the Bering Sea to the Baja Peninsula in the North Pacific, and worldwide in non-tropical waters. Pacific sleeper sharks range as far north as the Arctic Circle in the Chukchi Sea west off the Asian coast and the western Bering Sea, and south along the Alaskan and Pacific coast. Salmon sharks range in the North Pacific from Japan through the Bering Sea and Gulf of Alaska to southern California and Baja, Mexico. They are considered common in coastal littoral and epipelagic waters, both inshore and offshore. Salmon sharks have been considered a nuisance for both eating salmon and damaging fishing gear and investigated as potential target species in the Gulf of Alaska. Salmon sharks are rarely encountered in commercial fisheries or bottom trawl surveys in the BSAI.

There are no directed fisheries for sharks in the Bering Sea or Aleutian Islands (BSAI), but some incidental catch of sharks results from directed fisheries for commercial species. Most incidentally captured sharks are not retained. Spiny dogfish are allowed as retained incidental catch in some managed fisheries, and salmon

sharks are targeted by some sport fishermen in Alaska state waters. Incidental catches of shark species in the BSAI fisheries have been very small compared to catch rates of target species. Recently a plant in Kodiak has been retaining some spiny dogfish.

Sharks in the BSAI are currently managed in aggregate as part of the "other species" complex in the BSAI Fishery Management Plan (FMP). The other species complex includes sharks, skates, sculpins, and octopus. All of the other species are considered ecologically important and may have future economic potential. The Total allowable catch (TAC) for the other species complex is constrained by the BSAI optimum yield (OY) cap of two million metric tons. Sharks have only been reported to species in the catch since 1997 and have made up from one percent to five percent of "other species" catch from 1997–2006.

In the Gulf of Alaska (GOA), sharks have also been managed as part of the "other species" complex, with catch reported only in the aggregate with octopus, squids, and sculpins. The shark species complex in Alaska may consist of up to 10 species, however, spiny dogfish, Pacific sleeper shark, and salmon sharks are by far the three most common species caught. There is no directed fishery for sharks in the GOA at this time. Spiny dogfish and Pacific sleeper sharks are taken incidentally in bottom trawl and longline fisheries, but most sharks are not retained. In 2007, 637 tonnes of sharks were reported caught in the GOA. This represented 30 percent of the total catch in the other species complex. On average since 1997, sharks catches have been just over 1 000 tonnes and accounted for approximately 26 percent of the other species complex.

Western, Central and South Pacific fisheries

The United States Flag Pacific Islands comprise the State of Hawaii, the Territories of American Samoa and Guam, the Commonwealth of the Northern Marianas, and six other United States Flag Pacific Island groups under military (Wake Island, Johnson Atoll) or Federal (Howland and Baker, Jarvis, Kingman Reef and Palmyra Atoll, Midway) control. A tuna and swordfish longline fishery operating out of Hawaii is the largest federally regulated United States domestic fishery in the western and central Pacific. Longline fishermen must use circle hooks and certain types of bait to reduce sea turtle bycatch. A smaller artisanal longline fishery also operates out of Pago Pago, American Samoa. The balance of pelagic fisheries production is generated by small troll and handline vessels and by a small skipjack pole-and-line fleet in Hawaii. Nearshore fisheries, such as troll and handline, come primarily under the management authority of the state or territorial governments. A United States purse seine fleet operates under an international treaty in the Western Pacific.

The United States Pacific longline fisheries do not target sharks. Blue sharks are the most common shark species taken. They are caught more frequently in the shallow-set swordfish longline fishery (an average of 25 sharks per set) than in the deep-set tuna longline fishery (an average of 9.5 sharks per set). Most tuna vessels, unlike swordfish vessels, use wire traces on their gear at the end of branch lines. This causes blue sharks to be retained on the line in the tuna fishery more frequently than in the swordfish fishery. However, 66 percent of the blue sharks are released by the crew cutting the branch line, which likely results in high survivorship. Bigeye thresher, the pelagic thresher, the common thresher, the shortfin mako, and the longfin mako are also caught on longline gear although these species are more likely going to be caught in gillnet gear off California. Sharks caught most commonly by small-scale gears along insular islands are makos and threshers, silky (*Carcharhinus falciformes*) and Galapagos (*Carcharhinus galapagensis*) (Dalzell, Laurs and Haight, 2008).

United States recreational fisheries

Recreational fisheries targeting sharks have existed in the United States for many years. Many recreational anglers use hook and line gear from beaches, piers, or boats in coastal waters (NMFS, 2007). Charter vessel fishing for sharks is becoming increasingly popular in the western Atlantic Ocean although target species vary by region. Atlantic sharpnose and blacktip sharks are targeted in the southeast Atlantic and Gulf of Mexico regions, whereas shortfin mako and thresher shark are targeted in the northeast Atlantic regions. California supports a large recreational fishery that actively targets sharks, mostly shortfin mako, thresher, blue, and leopard sharks, *Triakis semifasciata*. In Oregon and Washington, anglers while fishing for Pacific salmon and bottomfish, catch spiny dogfish and limited numbers of other sharks incidentally, but the recreational dogfish catch in Washington is large. Alaskan anglers have shown increasing interest in salmon shark fishing in recent years, but the fishery remains small.

Several tournaments target sharks. Many shark tournaments occur in New England, New York, and New Jersey, although other regions hold shark tournaments as well. In 2004, the twenty-fourth Annual South Jersey Shark Tournament hosted over 200 boats and awarded over US$220 000 in prize money, with an entry fee of US$450 per boat. The "Mako Fever" tournament, sponsored by the Jersey Coast Shark Anglers, in 2004 awarded over US$55 000 in prizes, with the first place vessel receiving US$25 000. In 2004, the eighteen Annual Monster Shark Tournament in Martha's Vineyard, Massachusetts was broadcast on ESPN, and featured a new fishing boat valued at over US$130 000 awarded to the winner.

Status of sharks

In United States fisheries in 2007, three out of 12 shark stocks or stock complexes with a known overfishing status are listed as subject to overfishing (Table 1). Four out of ten shark stocks or stock complexes with a known overfished status are listed as overfished. Twenty-two and 24 shark stocks or stock complexes have an unknown or undefined status in terms of their overfishing and overfished status, respectively.

Domestic and international use

The primary United States domestic market for shark products is for meat, with the ex-vessel price (paid when offloaded) rarely exceeding over US$1.0 per 0.5 kg. However, the main driver of the commercial shark fishery is the demand for fins in foreign markets (except for spiny dogfish and skates). Top quality fins are regularly sold for over US$20 per pound (wet weight). In addition to direct consumption and production of shark products, net benefits from shark fisheries are also derived from the existence value of sharks for non- consumptive user groups (e.g. some people value knowing that sharks exist in the sea or value seeing sharks underwater). Although no quantitative estimates of existence value for sharks are available, it is likely very high given the fascination of the public with sharks (a similar estimate for sea turtles placed existence value at about US$8 billion).

The summaries of annual United States imports and exports of shark fins are based on information submitted by importers and exporters to the United States Customs and Border Protection and United States Census Bureau as reported in the NMFS Trade database. Exports of shark fins far exceed imports in both weight and value. The total weight and value of imports has increased every year since 2003. In 2006, the total weight of shark fin exports declined however the value increased compared to 2005. The vast majority of shark fins exported in 2006 were sent from the United States of America to China, Hong Kong SAR, Germany, Canada, and Japan, and small amounts were sent to Mexico and Netherlands. The mean value of fins per metric ton has been increasing since 2002, most notably in the China, Hong Kong SAR market. Mean values of dried shark fins for all countries combined has fluctuated between US$9 445/tonnes and US$84 211/tonnes from 2001 to 2006. China, Hong Kong SAR's significantly higher dollar value to quantity, as compared to shark fin trade with other countries, is associated with the higher quality demanded in China, Hong Kong SAR's inelastic market, and historically high consumption patterns.

National Plan of Action

The United States participated in the development of and endorsed the FAO's International Plan of Action (IPOA) for the Conservation and Management of Sharks. Consistent with the IPOA, the United Stated of America developed a National Plan of Action (NPOA) for the Conservation and Management of Sharks in February 2001.

2. DATA AVAILABILITY AND FISHERY MONITORING SYSTEMS

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) forms the basis for fisheries management in federal waters, and requires the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service to promulgate and enforce regulations. Shark fishery management in Federal waters of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea (excluding dogfishes, skates, and rays) has been the responsibility of the Secretary of Commerce. Dogfish, skates, and rays in the Atlantic Ocean are managed by the New England Fishery Management Council (NEFMC), the Mid-Atlantic Fishery Management Council (MAFMC), the South Atlantic Fishery Management Council (SAFMC), the Gulf of Mexico Fishery Management Council (GMFMC), or the Caribbean Fishery Management Council (CFMC). In the Pacific, three regional councils are responsible for developing fishery management plans for sharks: the Pacific Fishery Management Council (PFMC), the North Pacific Fishery

Management Council (NPFMC), and the Western Pacific Fishery Management Council (WPFMC). The PFMC's area of jurisdiction is the EEZ off California, Oregon, and Washington; the NPFMC covers Federal

Table 1: Status of shark stocks and stock complexes in United States fisheries in 2007. Source: NMFS (2008)

Management plan	Stock or stock complex	Overfishing?	Overfished?
Spiny dogfish FMP NEFMC & MAFMC	Atlantic spiny dogfish	No	Undefined[1]
Consolidated Atlantic highly higratory species FMP — NMFS highly migratory species Division	Sandbar shark[2]	Yes	Yes
	Gulf of Mexico blacktip shark[3]	No	No
	Atlantic blacktip shark[3]	Unknown	Unknown
	Large coastal shark complex[4]	Unknown[5]	Unknown[5]
	Finetooth shark[6]	No	No
	Atlantic sharpnose shark[6]	No	No
	Blacknose shark[6]	Yes	Yes
	Bonnethead shark[6]	No	No
	Small coastal shark complex[7]	No	No
	Shortfin mako[8]	Unknown	Unknown
	Porbeagle shark[8]	No	Yes
	Blue shark[8]	Unknown	Unknown
	Dusky shark[9]	Yes	Yes
	Pelagic shark complex[10]	Unknown	Unknown
Pacific Coast groundfish FMP — PFMC	Leopard shark	Unknown	Unknown
	Soupfin shark	Unknown	Unknown
	Spiny dogfish	Unknown	Unknown
West coast highly migratory species FMP & Pelagic fisheries of the Western Pacific region FMP — PFMC & WPFMC	Common thresher – North Pacific	Unknown	Unknown
	Shortfin mako – North Pacific	Unknown	Unknown
	Blue shark – North Pacific	No	No
	Bigeye thresher shark – North Pacific	Unknown	Unknown
	Pelagic thresher shark – North Pacific	Unknown	Unknown
Pelagic fisheries of the Western Pacific region FMP — WPFMC	Longfin mako – North Pacific	Unknown	Unknown
	Oceanic white tip shark – Tropical Pacific	Unknown	Unknown
	Silky shark – Tropical Pacific	Unknown	Unknown
	Salmon shark – North Pacific	Unknown	Unknown

Coral reef ecosystems of the Western Pacific region — WPFMC	Coral reef ecosystem multi-species complex – Hawaiian Archipelago[11]	Unknown	Unknown
	Coral reef ecosystem multi-species complex – American Samoa[11]	Unknown	Unknown
	Coral reef ecosystem multi-species complex – Northern Mariana Islands[11]	Unknown	Unknown
	Coral reef ecosystem multi-species complex – Guam[11]	Unknown	Unknown
	Coral reef ecosystem multi-species complex – Pacific remote island areas[11]	Unknown	Unknown
Gulf of Alaska groundfish FMP — NPFMC	Other species complex[12]	Undefined	Undefined
BSAI groundfish FMP — NPFMC	Other species complex[13]	No	Undefined

Notes about Table 1:

[1] There is currently no definition contained in the spiny dogfish FMP to make a determination of overfished because there is no approved minimum biomass level; however, based on current NMFS recommended biomass threshold, the biomass estimates indicate the stock is not overfished.
[2] This stock is part of the large coastal shark complex, but is assessed separately.
[3] This stock is part of the large coastal shark Complex, but is assessed separately.
[4] In addition to sandbar shark, Gulf of Mexico blacktip shark, and Atlantic blacktip dhark, the large coastal shark complex also consists of additional stocks including spinner shark, silky shark, bull shark, tiger shark, lemon shark, nurse shark, scalloped hammerhead shark, Great hammerhead shark, and smooth hammerhead shark.
[5] External peer reviewer of the assessment felt it was unclear what exactly the results of the assessment represented, making it impossible to support the use of the results for management of the complex. While the previous stock assessment had concluded that the stock was subject to overfishing and overfished, the Panel stressed that results of previous assessments that used the same approach and similar data, perhaps of lesser quality, would attract the same kind of criticisms.
[6] This stock is part of the small coastal shark complex, but is assessed separately.
[7] The small coastal shark complex consists of four species: finetooth shark, Atlantic sharpnose shark, blacknose shark and bonnethead shark.
[8] These stocks are part of the pelagic shark complex, but are assessed separately. Assessments for blue shark and shortfin mako were conducted by the International Commission for the Conservation of Atlantic Tunas (ICCAT); the porbeagle shark assessment was conducted by Canada but results were deemed applicable for the United Stated of America since the stock is likely to be shared by both countries.
[9] Dusky sharks are a prohibited species and are assessed separately.
[10] In addition to shortfin mako, blue shark, and porbeagle shark, the pelagic shark complex also consists of oceanic whitetip shark and thresher shark. This complex also consists of stocks that cannot be retained in recreational or commercial fisheries, which include bigeye thresher shark, bigeye sixgill shark, longfin mako shark, sevengill shark and sixgill shark.
[11] This complex contains up to 146 “currently harvested coral reef taxa” [five of which are sharks (grey reef shark, silvertip shark, galapagos shark, blacktip reef shark, and whitetip reef shark)] and innumerable “potentially harvested coral reef taxa.”
[12] The other species complex consists of Pacific sleeper shark, salmon shark, spiny dogfish and numerous octopi, squid and sculpins.
[13] The other species complex consists of Pacific sleeper shark, salmon shark, spiny dogfish and numerous skates, octopi and sculpins.

waters off Alaska, including the Gulf of Alaska and the Bering Sea/Aleutian Islands; and the WPFMC's jurisdiction covers Federal waters around Hawaii, Guam, American Samoa, the Northern Mariana Islands, and other United States non-self governing insular areas of the Pacific.

Data collection and monitoring

The collection of United States commercial fisheries landings data is a joint state and federal responsibility. The cooperative State-Federal fishery data collection systems obtain landings data from state-mandated fishery trip-tickets, landing weigh-out reports provided by seafood dealers, federal vessel logbooks of fishery catch and effort, and shipboard and portside interview and biological sampling of catches. State fishery agencies are usually the primary collectors of landings data, but in some states NMFS and state personnel cooperatively collect the data. Survey methodology differs by state, but NMFS makes supplemental surveys to ensure that the data from different states and years are comparable.

For recreational fishing, the basic design for collecting fishing statistics consists of a complemented surveys approach that includes telephone surveys of fishing effort and an access-site intercept survey of angler catch. In the Atlantic, recreational harvest of sharks is obtained from the Marine Recreational Fishery Statistics Survey (MRFSS), the NMFS Headboat Survey, and the Large Pelagics Survey (LPS). In the Pacific, recreational harvest of sharks is also obtained from various surveys that are run by the different states (e.g. the California Recreational Fisheries Survey, the Oregon Department of Wildlife and Fisheries Ocean Recreational Boat Survey).

National Marine Fisheries Service also deploys fishery observers to collect catch and bycatch data from United States commercial fishing and processing vessels. Mandatory observers are required in many fisheries that target sharks or catch them as bycatch. All at sea observers are trained in fish identification and commonly record numbers and disposition as well as collect biological data. Depending on the program or design, observer coverage (as a percent of the total effort) can range from 1–2% to 100%. For example, Hawaii based pelagic longline vessels targeting swordfish require 100% coverage for shallow sets whereas the Atlantic Pelagic Longline Observer Program that places observers on United States flagged vessels in the northwest Atlantic Ocean, Gulf of Mexico and Caribbean Sea targets 8% coverage. The Atlantic shark research fishery has 100% observer coverage. Further information on the diversity of observer programs can be found at: http://www.st.nmfs.noaa.gov/st4/nop/index.html.

Regional fishery management organizations

The United States Government continues to work within regional fishery management organizations to facilitate shark research, monitoring, and management initiatives, as appropriate. The United States has successfully led efforts to ban shark finning and implement shark conservation and management measures within a number of such organizations in recent years such as the North Atlantic Fisheries Organization (NAFO), Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), International Commission for the Conservation of Atlantic Tunas (ICCAT), Western and Central Pacific Fisheries Commission (WCPFC) and the Inter-American Tropical Tunas Commission (IATTC).

Problems with data monitoring

Despite the array of data collection programs, limitations still exist in the monitoring of sharks catches. In some landings collection programs, sharks are still not recorded to species level and many catches are reported as "unclassified sharks" or "shark". However, in an attempt to improve quota monitoring, species-specific dealer reported information and overall data quality, workshops to train Federal Atlantic shark dealer permit holders or their proxies to properly identify shark carcasses have been recently implemented. These workshops are open to the public and enforcement officers often attend to aid in their identification skills.

Logbooks filled out by fishers also suffer from an occurrence of under-reporting and over-reporting of some shark species, and misidentification of species. For fishers whose first language is not English, the potential to misidentify and misuse generic words such as "brown shark" "white shark" or "blue shark" is very high. For example, "white shark" may not mean "*Carcharodon carcharias*" but rather, "white shark" means any shark that has large patches of white or is just lighter in color than sharks they more commonly caught (Burgess *et al.,* 2005). Fishers may also under-report bycatch over time as individuals develop a growing

perception that those reports result in increasingly restrictive management regimes (Cortés, Brown and Burkischer, 2007).

Observer programs likely collect the best data regarding species identification and the disposition of the catch and bycatch. However, observer programs are very expensive to implement resulting in low levels of coverage in some fisheries or a general lack of coverage in others. In recent years, the safety of the observer onboard the fishing vessel has resulted in a lack of coverage because the vessel was deemed unsuitable to carry an observer.

3. TRADE MONITORING

The United States of America collects general trade monitoring data through the United States Bureau of Customs and Border Protection (CBP; imports) and the US Bureau of the Census (Census Bureau; exports and imports). These programs collect data on the amount and value of imports and exports categorized under the Harmonized Tariff Schedule (HTS). Many species have distinct HTS codes, and some species are further subdivided by product (e.g. fresh or frozen, fillets, steaks, etc.). NMFS provides Census Bureau trade data for marine fish products online for the public at www.st.nmfs.gov/st1/trade/index.html. Some species, such as sharks, are grouped together, which can limit the value of these data for fisheries management when species-specific information is needed. These data are further limited since the ocean area of origin for each product is not distinguished. Export data for sharks is gathered by the Census Bureau, and includes trade data for sharks from any ocean area of origin. In 2008, National Marine Fisheries Service published a final rule that requires all shark fin importers and exporters in the United States to obtain a permit to aid in monitoring of the trade of shark fins (73 FR 31380). Shark exports are not categorized down to the species level, with the exception of dogfish, and are not identified by specific product code other than fresh or frozen meat and fins. Due to the popular trade in shark fins and their high relative value compared to shark meat, a specific HTS code was assigned to shark fins in 1998. It should be noted that there is no tracking of other shark products besides meat and fins. Therefore, NMFS cannot track trade in shark leather, oil, or shark cartilage products.

In addition to the HTS tariff number for commodities under its jurisdiction, the United States Food and Drug Administration requires product codes. An on-line system allows traders to create product codes to more specifically describe certain commodities. Codes can be created to identify shark generically for certain fish or seafood commodities.

The United States Fish and Wildlife Service (FWS) require a wildlife declaration to be filed with detailed species information as part of its import/export enforcement. HTS tariff numbers are flagged to identify commodities subject to FWS declaration requirements. United States Customs and Border Protection cannot release such shipments until the FWS requirements are satisfied. Because of the lack of specificity of some tariff numbers, it is not always clear which shipments require a FWS declaration. In such cases, the tariff numbers are subject to screening and targeting to find undeclared wildlife. A United States Government inter-agency import/export screening system is under development which will require traders to file either FWS-created product codes or certain data elements, including scientific name, with their customs entry in order to determine if a FWS declaration is required.

Identification of whole sharks in trade does not appear to present a problem to enforcement officers in the United States. Several identification manuals are used in different regions of the United States. USFWS Wildlife inspectors also use a variety of materials at the ports to identify live sharks and parts or derivatives, including identification materials distributed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and materials produced by State wildlife authorities. Inspectors also use on-line materials such as the Smithsonian guide to certain shark teeth,[1] the United States Food and Drug Administration Regulatory Fish Encyclopedia,[2] and the on-line guide created by California Fish and Game.[3] Parts and derivatives for human or animal consumption from sharks species not listed under CITES

[1] www.nmnh.si.edu/paleo/sharkteeth/index.html.
[2] www.cfsan.fda.gov/~frf/rfe0.html- limited for shark species.
[3] www.dfg.ca.gov/mrd/mspcont5.html.

are exempt from the USFWS import/export declaration process, although such specimens must be in compliance with State, other Federal, or foreign law.

DNA testing is used to identify shark species from parts or meat. Two federal labs conduct such forensic work, the United States Fish and Wildlife Service in Ashland, OR, and the NOAA forensic lab in Charleston, SC. The Guy Harvey Research Institute (e.g., Shivji *et al.,* 2002) has developed streamlined techniques for identification of many major commercially and CITES listed shark species including basking and white shark. No DNA marker is available for whale sharks; however, fins of these species can be identified by their unique patterns. Moreover, the development of a genetics primer to identify any smalltooth sawfish parts in trade is near completion.

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APPENDIX 8

Five years of implementation of the project: "Strengthening the Sub-regional Plan of Action for the Conservation and the Sustainable Management of Shark Populations within the "*Commission sous-régionale des pêches*" (CSP): outcomes and perspectives".

Mika Samba Diop
Coordinateur du projet PSRA-Requins,
CSRP, Dakar, Sénégal

Since 2004, the Sub-Regional Commission of Fisheries (CSRP), with the technical and financial support of the International Foundation of Banc d'Arguin (FIB) has been implementing the subregional Plan of Action for the conservation and the sustainable management of shark populations (PSRA-Requins). During the period 2004–2008, National Plans of Action for sharks (PAN-Requins) have been elaborated by six countries of the CSRP (Guinea Bissau; Cape Verde, Gambia; Guinea; Mauritania; Senegal) resulting in the improvement of our knowledge on shark populations and on their fisheries, including the economical and social aspects.

These results were obtained through the following actions:

- Training of the fishery observers and fishery biologists on species identification, methods to study the biology of shark (reproduction, growth) and to collect accurate fishery data;
- Development of a field guide for the identification of West African sharks and rays;
- Establishment of a network of fishery observers;
- Collection and analysis of fishery and socio-economical data;
- Evaluation of shark by-catch in industrial fisheries;
- Synthesis of national studies (SIAP: Système d'information et d'analyse des pêches);
- Study on the commercial networks of shark products;
- Description of the specialized landing sites;
- Description of the stakeholders involved in shark fisheries;
- Study of the migrations of fishing communities targeting sharks within the CSRP region;
- Updating the assessments of West African shark and ray species for IUCN Red List;
- Contribution to the elaboration of the proposal for the listing of sawfishes in CITES Appendix 1 (adopted at CoP 14, in 2007);
- Production of a video documentary on the origin and development of shark fisheries within CSRP region.

These actions allowed the understanding of the evolution of shark fisheries in all the CSRP countries.

In November 2007, a workshop was held in Dakar to evaluate the results of the project. The workshop concluded that:

- An important work has been done which significantly increased our knowledge on shark fisheries (description of the fisheries and the state of the exploited shark populations), and on the respective role of all stakeholders.
- The project strengthened the capacities and the skills of the fishery observers and biologists, managers and students involved in shark studies, thanks to the organisation of annual training seminars.
- The information provided by the scientists and fishery managers' show that most of the West African shark populations are overexploited. In some cases, even the litters of gravid females are exploited.
- The socio-economic data show that the shark fisheries are no longer profitable, but they are supported by "hidden" stakeholders involved in the shark fin market.
- The strong declines of shark populations caused the specialized fishermen to undertake long migrations, inducing important social and security problems.

- The implementation of some national plans of action (PAN-requins) is not satisfactory, as the measures are not strong enough to really modify the fishing practices. They should be reinforced to have a real impact.
- The status of most West African species has been evaluated for the IUCN Red List. For many species, the quantitative data are still not sufficient to provide an assessment, but the most common species are Near Threatened or even Endangered. However, no conservation measures have been taken in the subregion so far.
- The listing of all sawfish species in CITES Appendices was supported by the CSRP. But again, no regional regulation has been taken for these very vulnerable fishes close to extinction. Their distribution range in West Africa has strongly shrunk during the last decades and the sawfishes seem now restricted to the remote Bissagos archipelago. A project of a protected area in this archipelago (developed in collaboration with Noe Conservation) should help in the protection of the habitat of the remaining fish.

Based on these conclusions, the Workshop made the following recommendations:

1. creation of an West African observatory for sharks;
2. elaboration of pilot plans for the reconversion of the fishing communities, including the transformation of the shark products by the women;
3. standardization of management measures for shark fisheries within CSRP region;
4. development of research programmes to reduce the by-catch in industrial fisheries;
5. continuation of the series of training seminars for the fishery observers and biologists.

Since January 2008, the following actions have been undertaken:

1. Definition of pilot plans for the reconversion of specialized fishermen.
2. Definition of the aims of a West African shark observatory.
3. Definition of pilot plans for the reconversion of women involved in the shark products processing.

However, financial supports are needed to continue the actions already undertaken and to implement other actions in stand-by due to lack of means.

The Technical Workshop on the Status, Limitations and Opportunities for Improving the Monitoring of Shark Fisheries and Trade considered global and country specific information on shark fisheries and trade to identify limitations and strategies for improving their monitoring. Reports from a selected number of main shark fishing and trading nations described the status of shark fisheries and the efforts towards the development of a National Plan of Action for Sharks. The workshop recommended actions to promote the implementation of National Plans of Action for Sharks and to address specific problems affecting catch and trade monitoring, including lack specificity in data, underestimated catch volumes and limitations in the customs codes used in trade monitoring.

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