# SHARK NEWS

**SHARK NEWS 16** NEWSLETTER OF THE IUCN SHARK SPECIALIST GROUP **OCTOBER 2004**

# International trade in white shark *Carcharodon carcharias* products from New Zealand

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## The fisheries

White sharks *Carcharodon carcharias* are widely distributed within New Zealand's exclusive economic zone (EEZ), occurring in coastal and oceanic waters from at least 33°S to 52.5°S, and are taken in a number of non-commercial and commercial fisheries. Recreational and customary fishers mainly take white sharks as bycatch in gillnets, and occasionally on longlines (Duffy unpubl. data). Sport fisheries for white sharks in New Zealand are largely undeveloped and fishers often tag and release those they do catch (Mossman 1993; Wilson 2002). A protective beach meshing programme run by Dunedin City Council (DCC) operates seasonally off Brighton, St. Clair and St. Kilda beaches. Although targeted, no white sharks have been taken since 1975. All sharks taken are disposed of at sea unless requested for research (L. Bell, DCC, pers. comm.). White sharks are not considered capable of sustaining a target fishery in New Zealand and commercial fisheries regulations prohibit directed fisheries (Francis 1998). They are taken as bycatch, however, in bottom-set longline, dropline and gill net fisheries, and occasionally in trawl and tuna longline fisheries (Ministry of Fisheries Catch Effort Database, Duffy unpubl. data). Landings and sale of bycatch is permitted.

Commercial fisher removing the head of a 4.5m white shark taken in Foveaux Strait, New Zealand. Photo courtesy of Gordon Pyper, Invercargill, New Zealand.

## Commercial catch

Reported commercial landings have averaged only 197kg (s.e. ± 84) green weight per year for the last nine years (Table 1). However, problems with these data include misreporting of fin weight as green weight and non-reporting. For example, in the 1999–2000 fishing year total green weight for fisheries management area (FMA) 3 was the same as the landed weight of fins reported for that FMA (Ministry of Fisheries Catch Effort Database). Problems with the data can also be seen in Table 1 where the reported landings for FMA3 and FMA5 in 1993–94 and 1997–98 respectively are well below the weights of near-term embryos and the smallest known free-living white sharks (Francis 1996). Significant non-reporting is evident when the landings reported in Table 1 are compared to those estimated by the author from media reports, fisher interviews and examination of specimens (Table 2). Weights given in Table 2 were estimated from total length using Compagno's updated length-weight formula (Compagno 2001). The author's estimate of commercial landings from 1993–94 to 2002–03, incomplete as it is, is more than 11 times reported landings for the same period (i.e. 20,750kg c.f. 1,797kg; 65 fish c.f. about 15). Non-reporting appears to be particularly bad in FMAs 2, 4 and 8 but may be an artefact of the author's intensive data collection in these areas.

A number of factors contribute to non-reporting. Most importantly, fishers are only obliged to record catch and effort data for the five most important species in each set or shot of their gear. As white sharks are relatively uncommon they are unlikely to meet this reporting criterion. Even if a large white shark does make up the bulk of a particular catch fishers are unlikely to regard it as valued part of the catch and therefore record it. Often only the head or jaws are retained. The landed weight will only be reported if the meat and/or fins are landed to a licensed fish receiver, and even then this is dependent on the fisher correctly identifying the shark.

## Goods in international trade

No data are available on the volume of white shark goods imported and exported from New Zealand. Tariff codes for goods for human consumption are only available for six commercially important chondrichthyan taxa. All remaining chondrichthyans are lumped under a generic code for "other" fishes. There is also only a single code for goods not for human consumption made from fish, and another for collections and collector's pieces of zoological interest (The Working Tariff Document of New Zealand).

**This special issue on CITES also includes ...**

**Table 1. Commercial landings (kg) of *Carcharodon carcharias* in New Zealand waters reported by licensed fish receivers.**

| Fishing Year* | Fishery Management Area | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 1993–94 | ... | ... | 6 | ... | ... | ... | ... | ... | ... | 6 |
| 1994–95 | ... | ... | ... | ... | ... | ... | ... | ... | 37 | 37 |
| 1995–96 | ... | ... | ... | ... | ... | ... | 200 | ... | ... | 200 |
| 1996–97 | 136 | ... | ... | ... | ... | 60 | 200 | ... | ... | 396 |
| 1997–98 | ... | ... | ... | ... | 5.1 | ... | ... | ... | ... | 5.1 |
| 1998–99 | ... | ... | ... | ... | ... | ... | ... | ... | 38 | 38 |
| 1999–00 | ... | 32 | 24 | ... | ... | 228 | ... | ... | 30 | 314 |
| 2000–01 | ... | ... | ... | ... | 705 | ... | ... | ... | 48 | 753 |
| 2002–03 | 48 | ... | ... | ... | ... | ... | ... | ... | ... | 48 |
| **Total** | 184 | 32 | 30 | 0 | 710.1 | 288 | 400 | 0 | 153 | 1797.1 |

Source: Catch Effort Database, Ministry of Fisheries. *1 October to 30 September.

**Table 2. Estimated live weight in kg (no. of sharks bracketed) of *Carcharodon carcharias* taken as bycatch in New Zealand commercial fisheries recorded by the author.**

| Fishing Year* | Fishery Management Area | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 4 | 5 | 7 | 8 | 9 | |
| 1990–91 | ... | 117(1) | 1,596(2) | ... | 151(1) | ... | ... | 1,865(4) |
| 1991–92 | ... | ... | ... | ... | ... | ... | 2,058(2) | 2,058(2) |
| 1992–93 | 30(1) | 427(1) | ... | ... | ... | 117(1) | 25(1) | 599(4) |
| 1993–94 | 872(3) | ... | ... | 246(1) | 1,217(1) | ... | ... | 2,336(5) |
| 1994–95 | ... | ... | ... | ... | ... | 77(1) | ... | 77(1) |
| 1995–96 | ... | ... | 2,409(3) | ... | ... | 118(1) | 252(1) | 2,779(5) |
| 1996–97 | 326(2) | 427(1) | 3,330(4) | ... | 356(1) | 870(1) | 969(7) | 6,278(16) |
| 1997–98 | ... | 1,326(8) | ... | 339(1) | 226(1) | 870(1) | 279(7) | 3,041(18) |
| 1998–99 | ... | 131(2) | ... | 890(2) | ... | 1,487(3) | ... | 2,508(7) |
| 1999–00 | ... | 537(2) | 239(1) | ... | ... | ... | ... | 776(3) |
| 2000–01 | 26(1) | ... | ... | ... | ... | ... | 362(3) | 388(4) |
| 2001–02 | ... | ... | ... | 412(1) | ... | ... | 1,555(1) | 1,967(2) |
| **Total** | 1,254(7) | 2,966(15) | 7,574(10) | 1,888(5) | 1,799(3) | 3,689(9) | 5,500(22) | 24,670(71) |

No commercial captures were recorded in 2002–03. *1 October to 30 September.

Reported commercial landings suggest white sharks are taken for their fins and meat. However, as there no landed state codes for shark heads or jaws, these data are unlikely to capture sharks taken only for their jaws or teeth (Ministry of Fisheries Catch Effort Database). Reported landings of headed and gutted, and dressed carcasses are small and most meat is probably sold domestically for "fish and chips". Although Hong Kong traders do not consider white shark fins to be high quality (S. Clarke pers. comm.) and domestic traders do not advertise top prices for them, the value of shark fins is such that many commercial fishers routinely fin all large sharks. Shark fins have only been reported by species since the start of the 1999–2000 fishing year. Since then reported landings of white shark fins total only 55kg (Ministry of Fisheries Catch Effort Database). However, it is possible some landings have been reported under redundant generic codes (C. Percy, Ministry of Fisheries, pers. comm.), and as discussed above non-reporting is problematic. Most shark fins landed in New Zealand are exported.

Although New Zealand fisheries regulations require commercial fishers to land their catch to a licensed fish receiver and prohibit customary and recreational fishers selling their catch, there are no effective restrictions on the private sale of shark jaws and teeth. Consequently foreign traders and collectors generally purchase white shark jaws and teeth directly from the fisher. Between 1995 and 2001 a Scottish collector purchased 24 white shark jaws of varying ages and provenance from New Zealand (A. Sprott pers. comm.). Following protection of white sharks in Australia in September 1999 Australian buyers began sourcing jaws and teeth (including damaged, half pulp and hollow shell teeth) from New Zealand. Prices for undamaged jaws and teeth offered to New Zealand vendors are shown in Table 3. An Australian advertisement for jaws and teeth ran in the fishing industry magazine *Seafood New Zealand* from April 2000 to June 2001. A similar advertisement with a New Zealand contact ran in *Seafood New Zealand* from August to December 2001. These advertisements have ceased and it is not known if the company involved continues trading. Shark fin buyers occasionally purchase shark jaws (C. Powell, commercial fisher, pers. comm.) and some private trading occurs on the internet (*The New Zealand Herald*, November 27, 2003).

## Value of jaws and teeth in trade

The international trade in white shark jaws and teeth appears to be low volume but high value. In 2002 reported US imports consisted of six "bones", 1 "skull", 300 teeth and 13kg of "bones" (A. Barden, TRAFFIC, pers. comm.). A survey of 20 vendors (19 US, 1 Australian) trading on the internet in October 2003 found 293 lots of shark jaws for sale with a total stated value of US$65,937. This sample contained at least 55 elasmobranch taxa, of which about half (50.5%) were carcharhinids (Table 4). White shark jaws represented only 2.7% (n=8) of the lots (Table 4). Lots of carcharhinid jaws often consisted of packages of several small jaws. Large jaws were individually priced. Jaw prices varied according to species, size and quality. White shark jaws attracted premium prices, and comprised 60% of the total stated value (Table 4). Prices for six white shark jaws, including three from New Zealand, ranged from US$1,350 to $12,500. The next most valuable species were Greenland shark *Somniosus microcephalus* (US$1,000 to $2,500) and goblin shark *Mitsukurina owstoni* (US$2,100). Large tiger shark *Galeocerdo cuveri* jaws reached US$499. Six vendors offered 90 white shark teeth for sale. Prices for unmounted specimen teeth 1 1/6 in. to 2¼ in. enamel height ranged from US$45 to $425. The highest price for a single tooth was US$1,150 for a 2½ in. tooth with a "pearlized" epoxy cap.

## Management implications

Without accurate fisheries and trade data the impact of international trade on the New Zealand white shark population can not be assessed. However, the high value of jaws and teeth undoubtedly encourages fishers to retain, rather than release white sharks. It also has the potential to encourage illegal target fishing in areas where large adults are known to aggregate. The latter has the potential to rapidly deplete local white shark populations and stifle the development of ecotourism at these sites. Large white sharks are known to aggregate at several sites around the Chatham Islands east of South Island, New Zealand and two operators are independently investigating white shark cage diving opportunities there. Historically the sharks at the Chathams have been fished for their liver oil, and hunted for trophies and as pests.

Export of white shark goods from Australia, other than for scientific or exhibition purposes, was prohibited in January 2002 after Australia had listed the species on Appendix III of CITES. The 2003 internet survey found two US vendors offering a total of 18 teeth imported from Australia for sale.

**Table 3. Prices (Australian $) for undamaged white shark jaws and teeth circulated in New Zealand in November 1999.**

| Tooth size (in.) | Jaws | Teeth |
|---|---|---|
| 1 | 500 | 10 |
| 1 1/8 | 650 | 15 |
| 1 ¼ | 850 | 22 |
| 1 3/8 | 1,100 | 31 |
| 1 ½ | 1,500 | 41 |
| 1 5/8 | 2,000 | 52 |
| 1 ¾ | 2,700 | 65 |
| 1 7/8 | 3,600 | 85 |
| 2 | 4,500 | 110 |
| 2 1/8 | 5,500 | 135 |
| 2 ¼ | 6,500 | 160 |
| 2 3/8 | 7,750 | 190 |
| 2 ½ | 9,250 | 230 |
| 2 5/8 | 12,000 | 280 |
| 2 ¾ and up | 20,000 | 500 |

(Source: Vic Bond, SharkAus. Damaged, half pulp and hollow shells not included.)

**Table 4. Number and total stated value of elasmobranch jaws offered for sale by 20 internet vendors.**

| Taxa | No. | US$ |
|---|---|---|
| Unidentified carcharhinids | 52 | 1,151.17 |
| *Carcharhinus* spp. | 128 | 5,501.00 |
| *Galeocerdo cuvier* | 22 | 4,173.99 |
| *Sphyrna* spp. | 10 | 559.00 |
| *Carcharodon carcharias* | 8 | 39,200.00 |
| *Isurus* spp. | 27 | 4,516.00 |
| Batoids | 24 | 985.00 |
| Other | 22 | 9,850.98 |
| **Total:** | **293** | **65,937.14** |

*Note*: **total value was calculated from a sample of 269 jaws as prices were unavailable for the remaining 24 (including two *Carcharodon* jaws).**

As Australia was the country of origin for three of the five shipments of white shark goods reported imported to the US in 2002 it is likely these teeth were legally obtained. However, lack of protection and trade monitoring in New Zealand has led to official concerns that white shark jaws and teeth taken illegally in Australia are being exported through New Zealand (S. Williams, DEH, Australia, pers. comm.). The only direct evidence for this appears to be a shipment of seven Australian white shark jaws re-exported from Auckland, New Zealand, to Texas in May 2001 (J. Nicodemus, NOAA special agent, pers. comm.; M. Shivji, pers. comm). The company involved claimed the jaws had been exported to New Zealand prior to full protection taking effect.

A genetic study (Pardini *et al.* 2001) and tag recapture off the northwest North Island (B. Bruce, CSIRO, pers. comm.) indicate New Zealand and Australian white sharks are a shared stock. It is not known if this is a fishery relevant stock, but it is possible that depletion of white sharks in New Zealand waters could undermine efforts to protect the species in Australia.

## Acknowledgements

Commercial landings data were provided by the New Zealand Ministry of Fisheries Research Data Management Group. Wilbur Dovey, Department of Conservation, Allan Bruford, New Zealand Customs Service and Craig Pierce, Statistics NZ provided advice and information on trade monitoring. Andrew Sprott, Edinburgh, provided detailed information on New Zealand white shark jaws in his private collection.

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# Editorial

At the end of this IUCN Quadrennium, we have been reviewing Shark Specialist Group (SSG) activities in 2001–2004. This has been an extraordinarily productive and busy time, during which our membership rose significantly to >170 individuals from >60 countries (although Africa and Asia are still under-represented), organised into ten ocean regions. The Quadriennium began in 2001 with the award of a grant from the UK Department of Environment Global Wildlife Division for the employment of a full time Programme Officer (Rachel Cavanagh), which stimulated a huge increase in activity and productivity. This was followed by a two-year grant for core funds from the David and Lucile Packard Foundation for implementing our priority areas of work. We have also received generous donations from the US State Department's Voluntary Contributions to IUCN and sponsorship from other sources, many of them for our Red List work programme.

These additional resources have enabled us to undertake a great deal of work on CITES issues, implementation of the UN FAO IPOA-Sharks, and other fisheries management and biodiversity initiatives. Overall in 2001–04, the SSG was represented on the IUCN delegation at two FAO COFI meetings, two COFI Fish Trade meetings, an FAO Technical Consultation, three CITES Animals Committee meetings, an intercessional Shark Working Group, and two meetings of the Conference of Parties to CITES. Members also attended FAO expert panels and many other fisheries meetings. Our input to these key areas of work is described in more detail on pp. 4–5.

We have undertaken intensive work on our Red List Programme, with five workshops held in 2003 and two in 2004 (see p. 19), 373 global and 67 regional species assessments completed and submitted to IUCN. Several hundred more assessments are under review for the 2005 Red List (see our website for more information).

SSG participated in the 'Shattering the Myth' initiative on marine species extinction risk, with representatives attending the World Parks and the World Fisheries Congresses. We assisted IUCN with developing their Information Paper in response to a draft European Union finning regulation. A motion on Shark Finning will bring this issue to the attention of the World Conservation Congress in 2004.

In addition to *Shark News*, we have put considerable resources into improving our website, posting regular updates and information documents. We will be posting our global status report there in the near future and updating it on line. Members have presented numerous scientific and technical papers referring to SSG activities and prepared a manual on Elasmobranch Fisheries Management Techniques, intended to contribute towards sustainable shark fisheries and IPOA-Sharks implementation, on behalf of the APEC Fisheries Working Group (pdf on the website and see p. 18).

Planning is now underway for 2005–08. Our present grants end in early 2005, yet demand for SSG advice and information continues to rise. We really need a matching increase in funding in order to meet the many requests for assistance that we receive, but competition for grant aid is becoming increasingly intense. Top priority will be completing Red List assessments for all chondrichthyan taxa and dissemination of the results, continued support for CITES activities and promoting implementation of the IPOA-Sharks. We plan several shark management workshops and a joint management workshop with Project Seahorse and the Grouper and Wrasse Specialist Group.

Our work has only been possible through the huge efforts of our members and generosity of our donors and other supporters (who are too numerous to list on this page). Thank you and enjoy this special CITES issue!

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# Shark Conservation and Management through CITES

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The Convention on International Trade in Endangered Species (CITES) came into force in 1975 in response to concerns about the potential detrimental effects on species' survival of high levels of international trade in wild animals and plants. CITES establishes the international legal framework for the prevention of trade in endangered species of wild fauna and flora, and for effective regulation of international trade in other listed species that may become threatened in the absence of such regulation. About 166 States are Party to CITES, which is one of the most effective of the international wildlife conventions because it has the power to suspend international trade in hugely valuable wildlife products if Parties fail to comply with its provisions.

White shark *Carcharodon carcharias* jaws and teeth enter international trade as desirable angling trophies and highly-priced curios. Photo: Rusty Hudson.

While a relatively small number of threatened species are listed on Appendix I, which prohibits international trade other than under exceptional circumstances, the great majority of species (nearly 30,000) are listed on Appendix II. Appendix II strictly regulates and monitors trade, to ensure that it is not detrimental to the status of wild populations, although the volumes of trade in these listed products are largely regulated by the Parties that harvest them. Amendments to these two Appendices may only be proposed by States for debate at the Meeting of the Conference of Parties to CITES (CoP, held every two to three years), where a two-thirds majority vote is required for them to be adopted. (See www.cites.org for more information.)

CoP13, opening in Bangkok as we go to press, has the potential to be an important influence on future shark conservation and management activities.

## Sharks and CITES

Sharks first appeared on the CITES agenda during CoP9 in 1994, when Resolution Conf. 9.17 on 'The Status of International Trade in Shark Species' was adopted in response to concern about the impact of rising volumes of shark fin entering international trade. It called for the CITES Animals Committee (AC) to review all information concerning the biological status of sharks and effects of international trade and to submit a report to CoP10 in 1997, and for FAO and other international fisheries organisations to improve their research programmes and to submit new information to CoP11 in 1999.

Significant progress through FAO with the development and adoption of the FAO International Plan of Action for the Conservation and Management of Sharks (IPOA–Sharks) reported at CoP11 led to the repeal of Res. Conf. 9.17 and may have contributed to the rejection of proposals to list basking shark, whale shark and white shark on Appendix II. By 2002, however, it had become apparent from information collated by the IUCN Shark Specialist Group and TRAFFIC that, with a few notable exceptions, most states had made no progress with implementation of the IPOA–Sharks, most fisheries remained unmanaged and international trade was still unmonitored. There was increasing evidence of depletion of many shark populations. A new Shark Resolution was therefore adopted to stimulate further activity (see below) and two species, basking shark and whale shark, were listed (by a narrow margin) on Appendix II.

## Resolution Conf. 12.6: Conservation and Management of Sharks

This Resolution, adopted at CoP12 in 2002, recognised the lack of progress with implementation of the IPOA-Sharks and identified several actions to monitor and redress this problem. Among these, the CITES AC was directed to:

- *critically review progress towards IPOA-Sharks implementation before CoP13;*
- *examine information provided by range States in shark assessment reports and other available relevant documents, with a view to identifying key species and examining these for consideration and possible listing under CITES;*
- *make species-specific recommendations at the 13th meeting and subsequent meetings of the Conference of the Parties if necessary on improving the conservation status of sharks and the regulation of international trade in these species.*

This work has progressed fairly well during the two meetings of the AC held since CoP12 and by an intercessional AC Shark Working Group, despite the short interval between CoPs 12 and 13. There has been significant input from the Shark Specialist Group, which has continued to review the implementation of the IPOA–Sharks and has provided information on key species of concern (see SSG website links to CITES).

## Recommendations to CoP13, October 2004

The AC's report (CoP13 Doc.35, www.cites.org) proposes a number of important draft Decisions that will be debated and voted upon at CoP13. These include directing the CITES Secretariat to seek funding for a technical workshop on the conservation and management of sharks for relevant experts and stakeholders (including representatives of major shark-fishing Parties, the AC, FAO, Regional Fisheries Management Organizations, the fishery sector, IUCN/SSC Shark Specialist Group and fishery experts). This will review progress with the IPOA–Sharks, identify and prioritize key shark species, make species-specific recommendations on improving the conservation status of sharks and the regulation on international trade in these species, and summarize its findings and recommendations for review and consideration by the AC. The AC will use the report to make their own species-specific recommendations, examine progress with implementation of Conf. Res. 12.6 and assess the need to update the Resolution, and report to CoP14.

Furthermore, as directed by Res. Conf. 12.6, the AC has recommended the following species-specific recommendations by which Range States could improve the conservation status of sharks and regulation of international trade in species of particular concern:

- *Range States of spiny dogfish Squalus acanthias and school, tope or soupfin shark Galeorhinus galeus shall improve data collection and reporting to FAO of catches, landings and trade; improve research and fisheries management measures, including collaborative research and science-based management of shared stocks; develop precautionary and adaptive management measures for poorly-known stocks and rebuilding plans where necessary; and seek assistance from FAO for capacity-building in coastal shark fisheries management where necessary.*
- *Range States of porbeagle shark Lamna nasus shall improve data collection and reporting to FAO, ICCAT and other Relevant Regional Fisheries Organizations (RFOs) on catches, landings and trade; urge the World Customs Organization to establish a harmonized international code for porbeagle sharks; and establish cooperative, bilateral and multilateral research, stock assessment and fisheries management programmes for shared stocks, through RFOs where appropriate.*
- *Range States of freshwater stingrays, family Potamotrygonidae, shall review the status of these species, jointly examine cross-border trade and illegal trade, and consider Appendix-III listings, where appropriate, to control exports.*
- *Range States of sawfishes, family Pristidae, to undertake, as a matter of urgency, a review of the status of these species in their coastal waters, rivers and lakes and, if necessary, introduce conservation and trade measures to reduce the risk of extinction.*
- *Range State of gulper sharks, genus Centrophorus, shall adopt a precautionary approach to the management of these and other deep sea species, including monitoring of catches, landings and trade at species level, preparation of good identification guides, improved use of observers, and development of standard carcass forms to improve reporting, which should include the species as well as their products.*
- *Range States of requiem sharks, genus Carcharhinus, guitarfishes, order Rhinobatiformes and devil rays, family Mobulidae shall pay particular attention to the management of fisheries and trade in these taxa, including undertaking reviews of their conservation and trade status.*

More generally:

- *All Parties shall develop, adopt and implement, through bilateral arrangements, regional fisheries organization, FAO and other international bodies, new international instruments and regional agreements for the conservation and management of sharks of the high seas, pelagic shark species and straddling shark stocks.*

It remains to be seen how many of these Decisions are rejected, adopted, amended or even added to during the debates at CoP13.

Europe is the world's largest importer of spiny dogfish, here smoked and sold as 'Schillerlocken' (upper centre). Photo: Sarah Fowler.

## Shark listing proposals

Only one shark listing proposal survived the pre-conference Range State consultation process and has been submitted for debate and voting at CoP13.

Australia and Madagascar propose listing the white shark *Carcharodon carcharias* on Appendix II in order to regulate international trade in the low volume, high value products (jaws, teeth and fins) of this rare and vulnerable top marine predator. The proposal describes the significant and ongoing population declines in many centres of distribution that qualify the species for an Appendix II listing. It points out that Appendix II listing would help ensure that exploitation of this globally threatened species is regulated and monitored and that international trade is not detrimental to its survival. It would also contribute to the implementation of national conservation and management measures, the FAO IPOA–Sharks, UN Fish Stocks Agreement, and the Convention for the Conservation of Migratory Species.

An *ad hoc* FAO Expert Group has examined the listing proposal and other available data, but was unable to determine whether the species had declined sufficiently world-wide to meet the CITES listing criteria (white sharks are so rarely recorded that quantitative data on population trends are extremely hard to obtain).

Two draft Appendix II shark listing proposals were circulated by Germany to Range States for comment at the end of 2003 and presented to the AC in early 2004: the porbeagle shark *Lamna nasus* and the spiny dogfish *Squalus acanthias* (see pp.6–7). Both these species enter international trade in large quantities, much of this to the EU, are widely distributed and highly migratory, and have been very seriously depleted in some regions as a result of unregulated target fisheries. Very few Range States are managing these species with the aim of rebuilding stocks and developing sustainable fisheries. Internal debates within the European Union resulted in agreement that both species met the scientific criteria, but a vote on whether to submit them to CoP13 failed to reach the necessary qualified majority (in the case of spiny dogfish, this was primarily due to the large number of abstentions rather than to a significant 'no' vote).

A draft proposal to list the globally Critically Endangered family of sawfishes, Pristidae, on Appendix I of CITES did not get as far as full Range State consultation. Had it done so, many Range States might have been alerted to the extirpation of these species from their coastal waters, estuaries, rivers and lakes (see pp.10–11).

The AC recommendations can, however, if adopted and implemented, lead to the recovery and management of these and other shark species of particular concern, as well as improved international management of shared and high seas stocks. The draft Decisions will hopefully be seen by Range States as a constructive alternative to CITES listings and supported in debate.

News of the outcome of CoP13 will be published on the SSG website and in the next issue of Shark News.

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# Spiny dogfish miss the boat to CITES, again

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A proposal to monitor and control the international trade in spiny dogfish sharks *Squalus acanthias* under the Convention on International Trade in Endangered Species (CITES) was defeated before reaching the 13th Conference of the Parties (CoP). Germany's proposal to list spiny dogfish on CITES Appendix II failed to garner sufficient support to be advanced (by the European Union (EU) to the 13th CoP in October 2004. Despite this, draft Decisions from the CITES Animals Committee (AC) offer some hope for improving the conservation status of this often overlooked yet imperiled species.

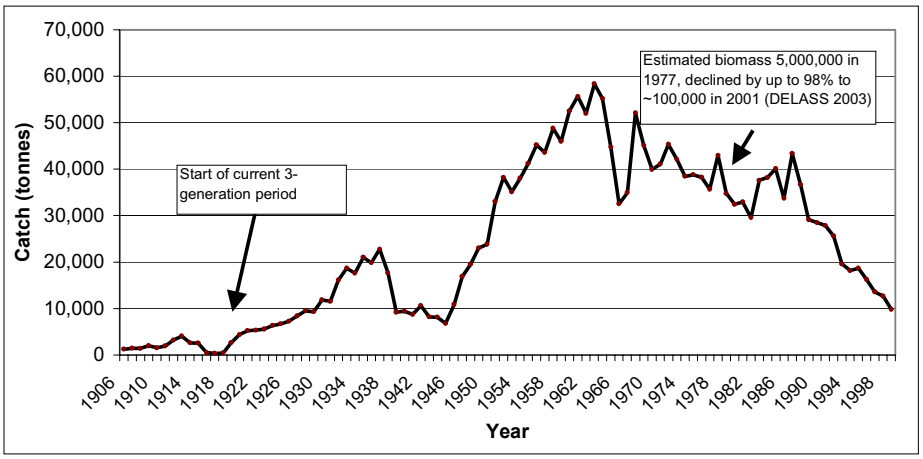


Figure 1. *Squalus acanthias* catches in ICES areas, Northeast Atlantic.

## Vulnerability

A small shark found in temperate waters of both hemispheres, the spiny dogfish is a very slow growing and long-lived species: maximum reported age in the Northwest Atlantic is 40 years (females) and 35 years (males) (Nammack 1985). Estimates for other areas approach 100 years (Compagno 1984). Age at maturity varies among stocks: from 12–23 years (females) and 6–14 years (males). Spiny dogfish give birth after an 18–24 month gestation period; among the longest of all animals (Compagno 1984). A 1998 study found spiny dogfish to have the lowest intrinsic rebound potential of 26 shark species analysed (Smith *et al.* 1998). These factors, along with the tendency for fisheries to target reproductive females (due to their large size), make spiny dogfish stocks particularly prone to depletion and slow to recover.

## Catches

According to the Food and Agricultural Organization (FAO), dogfish catches reached a peak in 1972 (73,500 metric tonnes (t)), then declined and stabilized to between 36,000–51,000t in the 1990s, with most of the catch coming from the North Atlantic. Northeast Atlantic landings were sustained at levels of 30–50,000t per year for most of the 1960s–1980s. Since the mid 1980s, landings in this region declined sharply while those from elsewhere mostly increased. By 2001, Northeast Atlantic reported landings had dropped to 27% of their historical peak. Northwest Atlantic catches were primarily from foreign vessels from 1966–1977 with a peak of 25,000t in 1974. US vessels dominated the fishery until 2000 with peak catches in 1996 at 28,000t. Canadian catches rose nearly six times from 1997–2001 and now represent the largest proportion of the landings from this stock (NEFSC 2003).

Other populations yielding significant landings are in the Northeast Pacific (off western North America), the Southwest Pacific (mainly New Zealand) and Northwest Pacific (Japan). Catches from Japanese coastal and offshore fisheries dropped from more than 50,000t in 1952 to 10,000t in 1965 (Taniuchi 1990). Japanese offshore trawler catches from the Pacific North Area declined to a record low of 115t in 1999. (Government of Japan 2003). Catches of spiny dogfish in New Zealand have more than doubled over the past decade, from 2,500–5,000t in the late 1980s to 5,000–10,000t in the 1990s (MFish 2003).

## Population trends and conservation status

The 2003 IUCN Red List assessment for Spiny Dogfish is "Near Threatened" globally. Populations in the Northwest and Northeast Atlantic, however, are currently assessed as "Vulnerable" and "Endangered" respectively. The 2003 report of the EU 'Development of Elasmobranch Assessments' (DELASS) Project assessed the Northeast Atlantic spiny dogfish population as "severely depleted" and suggested stock depletion to below 5% of carrying capacity (K) in 2001. Other scenarios carried out in this assessment revealed population status as low as 2% of K.

Also in 2003, a Northwest Atlantic stock assessment documented a 75% decline in reproductive female dogfish since the US fishery began in 1988 (NEFSC 2003). Consequently, the number of pups has been at record low levels for seven consecutive years (1997–2003); this recruitment failure (Figure 2) is expected to persist for several years. Recent declines in pup survivorship, due likely to smaller mothers producing smaller, weaker young, were also reported. Recovery, even under optimistic assumptions, is estimated to take two to three decades (NEFSC 2003).

## International trade

In contrast to many other shark species, the most economically valuable part of a spiny dogfish is not its fins or teeth, but its meat, which enters international trade in very large quantities. European demand drives dogfish fisheries around the world. In 2001, the EU provided the world's largest market for spiny dogfish meat, consuming at least 65% of world reported landings. France has been historically the largest consumer of dogfish meat with the UK as its top European supplier. From 1988–1994, Norway was the largest non-EU supplier of fresh or chilled spiny dogfish to the EU, followed by the US. In the late 1980s, depletion of European stocks led to increased imports from other countries, principally the US and Argentina (Rose 1996). In recent years, as the US Atlantic population declined and came under management, trade increased in Atlantic Canada and several countries in the Southern Hemisphere, notably New Zealand (Mfish 2003). Dogfish fins and liver oil are also traded (Rose 1996).

## Management status

Only Canada, the US, the EC and Norway currently impose any species-specific measures for spiny dogfish. To date, none of these restrictions has led to rebuilding. New Zealand has proposed precautionary limits on emerging fisheries beginning in October 2004 (Mfish 2003). Although US federal Atlantic science-based catch limits were implemented in 2000, those in adjoining state waters were as much as 11 times higher until May 2004. In addition, Canadian restrictions for the same population are higher than those in U.S waters (Government of Canada 2002). Indeed, there are no bilateral or international management measures for spiny dogfish anywhere in the world, despite the need for consistent measures for shared,

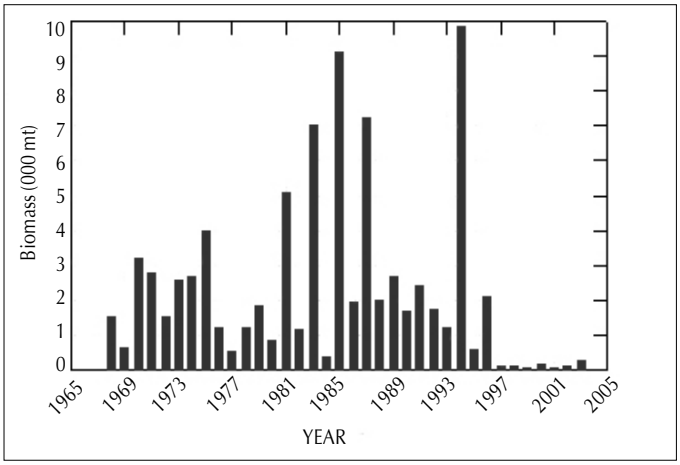


Figure 2. Biomass estimates of *Squalus acanthias* pups, Northwest Atlantic (source: National Marine Fisheries Service, Northeast Fisheries Science Center).

migratory stocks. Monitoring and reporting of dogfish fisheries (target catch, bycatch, discards and landings) and of international trade are also inadequate.

## Attempts for spiny dogfish CITES listings

As early as 1996, conservation groups were calling for CITES protection for these special sharks. Prior to CoP10, the US rejected a proposal from the Ocean Wildlife Campaign for listing spiny dogfish on Appendix II. Although agreeing that the species met the criteria, the US was concerned over the complexities of implementation. In 1999, the Humane Society and the International Wildlife Coalition formally requested that the US propose spiny dogfish for listing in Appendix II at CoP11. Federal officials acknowledged significant decline and international trade in Northwest Atlantic dogfish and noted that if such unmanaged exploitation continued, the species would meet the criteria for listing in Appendix I. They concluded, however, that a new fishery management plan could rebuild the population and decided not to propose listing.

In 2003, Germany implemented Conference Res. 12.6 by compiling information on the conservation status of and trade in two nationally threatened German shark species (spiny dogfish and porbeagle shark *Lamna nasus*). Deciding that they met the criteria for listing on CITES Appendix II, a proposal was drafted for review by CITES Parties. Such a listing would have resulted in trade monitoring and regulation, but failed to gain the political approval of the qualified majority of the 25 EC Member States and was not submitted for consideration at CoP13 (Fowler *et al.* 2004).

## Advice from the CITES Animals Committee

A Working Group of the CITES AC reviewed Germany's spiny dogfish proposal in April 2004. Most members agreed that the species appeared to meet the Appendix II criteria. The AC has since recommended that Range States for spiny dogfish improve data collection and reporting to FAO of catches, landings and trade; improve research and management, including collaborative research and science-based management of shared stocks; develop precautionary and adaptive management for poorly-known stocks (and rebuilding plans where necessary); and seek assistance from FAO for capacity-building where necessary. These recommendations will be considered at CoP13.

## Conclusion

Since CITES took its first step towards international shark conservation in 1994, spiny dogfish populations have continued to deteriorate in places all over the globe. A CITES Appendix II listing for spiny dogfish is wholly appropriate and could vastly improve the status of data collection and conservation of this beleaguered species. Short of CITES listing, adoption and prompt implementation of the draft Decision regarding spiny dogfish offered by the Animals Committee (see pp.4–5) could go a long way towards improving the outlook for the species. Still, considering the strong case for CITES listing and the unfortunate, ongoing depletion of stocks, the spiny dogfish is likely to continue to command the attention of NGOs and concerned countries beyond CoP13.

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# Global whale shark tourism: a "golden goose" of sustainable and lucrative income

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International trade in their high value meat poses a considerable threat to whale sharks. In 2002, the 12th meeting of the Conference of Parties to CITES listed the species on Appendix II in an attempt to ensure that international trade is not detrimental to their populations. The value of whale shark ecotourism, particularly for developing countries, was emphasised during the CoP12 debates.

## The role of shark tourism

As management and conservation costs rise, wildlife is under pressure to pay for itself. Whale sharks *Rhincodon typus* have not escaped this expectation. Despite IUCN's Red List classification as "Vulnerable", due in part to declines in both catch per unit effort and sightings in many areas, and the recent CITES Appendix II listing, some fisheries continue to target this threatened species (Fowler 2000, Anon. 2002). Consequently, tourism is viewed as an important means of providing States, particularly developing countries, with a sustainable source of revenue and endowing live whale sharks with value.

A juvenile male whale shark takes a close look at divers on the Belize Barrier Reef. Photo: Rachel T. Graham.

The rapid growth in popularity of "shark tourism" (Davis 1998, Anderson 2002) has raised awareness about sharks and has even led to some shark conservation measures being adopted (Graham 2003). Such changes in perceptions about sharks – from revulsion to fascination – coupled with increased measures for their protection are timely in light of the dramatic declines documented in global shark populations due to overfishing (Baum *et al*. 2003, Myers and Worm 2003).

Few sharks provide more emotional appeal than the whale shark. Unlike many other shark dives, viewing whale sharks does not involve baiting or feeding and is therefore closer to the "wild" experience sought by visitors. In addition to their impressive size (up to 20m long) and title of "Largest Fish in the Sea" (Chen *et al*. 1997), they have several important assets for shark encounter tourism: docile nature, planktivorous, surface feeding and relatively slow moving. Although global whale shark abundance remains unknown, and estimates hampered by their large-scale migrations (Eckert and Stewart 2001, Eckert *et al*. 2002, Graham 2003), tourism is lucky: whale sharks aggregate predictably near many coasts to feed, often on a seasonal basis (Taylor 1996, Clark and Nelson 1997, Colman 1997, Stevens *et al*. 1998, Heyman *et al*. 2001, Graham 2003). Such behaviour provides the accessibility and predictability that underpin tourism success (Taylor 1996, Davis *et al*. 2001, Newman *et al*. 2002, Alava *et al*. 2002, Graham 2003).

This predictable behaviour has also made whale sharks highly vulnerable to fisheries. Although caught incidentally in many countries, several target fisheries exist (Anon. 2002); these have proved unsustainable following dramatic declines in catch per unit effort over short time periods (Chen *et al*. 2002, Alava *et al*. 2002). Some countries have protected whale sharks (Philippines, India, USA, Mexico, Thailand, Maldives, Australia, Seychelles, Honduras) and conferred site-specific protection through establishing marine reserves that encompass predictable whale shark aggregation grounds (Ningaloo Reef, Australia; Gladden Spit, Belize; Holbox-Yucatan Peninsula, Mexico; and the Galapagos Islands, Ecuador). In many locations, enforcement of protective measures is poor with illegal fisheries taking place (Anon. 2002).

## "A live shark is worth more than a dead one"

This oft repeated argument merits closer scrutiny for validation with respect to whale sharks. In Taiwan, Chen and Phipps (2002) documented whole whale sharks sold for US$7,116 for a 2,000kg individual and US$21,400 for a 10,000kg shark, with retail prices for meat ranging from US$4.9–17.2kg$^{-1}$. By comparison, in Ningaloo Reef, Western Australia, Davis *et al*. (1997) estimated whale shark tourism revenues at Aus$4.7 million (US$3.1 million) for a two-month season and a more recent estimate (for 2002) is Aus$12 million (US$7.8 million) (W. Aus. Dept. of Cons. and Land Mngmt. pers. comm. 2003). From visitor surveys conducted in Belize in 2002, Graham (2003) estimated the value of a six week whale shark tourism season at US$3.7 million nationally and US$1.35 million to the five stakeholder communities of the Gladden Spit Marine Reserve. This site on the Belize Barrier Reef hosts a seasonal congregation of whale sharks that feed on the eggs of snappers (Heyman *et al*. 2001). There are at least 12 additional sites worldwide for predictable sightings of whale sharks, (Mexico-Baja, South Africa, Mozambique, Honduras, the Seychelles, Galapagos (Ecuador), Thailand, Maldives, India, Japan, Malaysia and Philippines). With land-based tours from US$40–266 per day and luxury live-aboard tourism worth considerably more, global whale shark tourism could be worth conservatively at least US$47.5 million annually[1]. With the exception of Australia, the majority of this revenue is captured by developing countries and presents a considerable incentive to conserve whale sharks. Populations are broadly distributed throughout the world's tropical seas with encounters confirmed in at least 120 countries (Fowler 2000, CoP12 2002) and whale shark tourism is expanding: new sites are being discovered and established sites are experiencing rapid rises in tourism (J. Ketchum pers. comm. 2002, M.C. Garcia pers. comm. 2003, M. Alava pers. comm. 2002, Graham 2003).

[1] Estimating US$ 3million site$^{-1}$ yr$^{-1}$ based on a quarter of Australia's yearly revenue as whale shark tourism at other sites is not as developed as Ningaloo Reef.

Ascertaining a value for an individual shark is complex, particularly if the population is unknown and the shark migrates between several tourism sites. In Belize, a minimum of 106 individuals have been photo-identified, and many travel throughout the Belize Barrier Reef returning yearly to feed (Graham 2003). Using the 2002 Belize whale shark tourism survey results, each shark is worth at least US$34,906 annually. Anderson and Ahmed (1993) recorded a similar annual value of US$33,500 for each grey reef shark *Carcharhinus amblyrhynchos* in the Maldives. If whale sharks live to at least 60 years old, as suggested by Pauly (2002), then an individual might be worth US$2,094,340 over its lifetime providing it repeatedly visits the tourism site. Several whale sharks tagged in Belize have moved between Gladden Spit and tourism sites in Honduras and the Yucatan, Mexico (Graham 2003), therefore producing greater revenue. If each site generates as much as Gladden Spit, then a whale shark's value could effectively be tripled to give US$104,718 individual$^{-1}$ yr$^{1}$ for the Mesoamerican Barrier Reef. Immigration of new individuals to Gladden Spit yearly suggests that the regional population is larger, thereby decreasing the individual value of each shark. Nevertheless, the economic argument for protecting whale sharks is undeniable.

## Strict regulation is required

Although revenue from tourism is providing economic support for non-consumptive use of high-profile wildlife such as whale sharks (Davies 1990, Graham 2003), tourism is not always the panacea of wildlife conservation, as it can negatively impact the animals (Olson *et al*. 1997, Butynski and Kalina 1998, Isaacs 2000, Orams 2000, 2002). Recent declines in whale shark sightings at Gladden Spit are perhaps linked to the increase in number of divers and boats at the aggregation site. Divers have been observed to affect the courtship and spawning behaviour of aggregating snapper, thus potentially affecting whale shark predictability (Graham 2003). In the Yucatan, Belize, Australia and Donsol (Philippines), access to whale shark sites is restricted through the exclusive use of trained local guides and/or by limiting visitation. Western Australia only permits 15 licensed tour operators to conduct whale shark tours (Davis 1998). In Belize, access is restricted: only 6 boats with 14 divers each are allowed into the aggregation site during any of the day's four two-hour slots. A better understanding of the demands and pressures of wildlife tourism on target species is needed to provide management and policy guidelines to help avoid negative impacts to whale sharks. This is of particular concern at aggregation sites located near large tourist destinations.

A whale shark's ability to "pay for itself" repeatedly through tourism is clear. Moreover, tourism benefits are sustainable and more widely distributed throughout communities and range nations than through fisheries. However, the application of strict management controls are necessary to foster the sustainability of whale shark tourism, and ensure that tourism does not destroy its resource base and kill the proverbial "golden goose".

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# Quantifying trade in sawfish rostra: two examples

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Sawfish fins are highly priced in some regions, they have valuable meat and their rostra are of high value as curios. At the 10th CITES Conference of the Parties (CoP10) in 1997, the USA submitted a proposal to list all sawfishes on Appendix I. This was rejected on votes, with lack of documented international trade cited as one of the arguments. Sawfishes were highlighted as a serious cause for concern in a recent paper submitted by the IUCN Shark Specialist Group to the 20th Meeting of the CITES Animals Committee (AC20 Inf. 21, see www.cites.org). As a result, the Animals Committee has drafted the following Decision, directed to Parties, for the consideration of CoP13 in October 2004 (CoP13 Doc. 35):

"Range States of sawfishes, family Pristidae, shall undertake, as a matter of urgency, a review of the status of these species in their coastal waters, rivers and lakes and, if necessary, introduce conservation and trade measures to reduce the risk of extinction."

Sawfish rostra being sold at the Ver-O-Peso Market in Belem, Brazil, among other medicinal folklore products. Photo: Anderson da Silva Viana.

Sawfishes rank among the most endangered of all elasmobranchs, having experienced massive population declines over much of their range throughout the last century. These dramatic losses have been primarily attributed to incidental take as bycatch in nets targeting other species. All seven nominal sawfish species have been listed as Endangered or Critically Endangered on the IUCN Red List of Threatened Species since 2000. More recently, several nations including the United States, Australia, and Brazil, have enacted legislation in an effort to protect vulnerable sawfish populations within their waters. Though rarely targeted, sawfishes nonetheless provide a valuable source of income for fishermen who take them as bycatch – their toothed rostra have long been valued as trophies and curios. Freeing a live sawfish from a net can be both dangerous and costly: sawfishes are powerful animals and disentanglement often requires expensive nets to be cut. Removing the rostrum from an ensnared sawfish facilitates easy removal from the net with the benefit of providing supplementary income. There is remarkably little data available concerning trade in sawfish rostra. This article offers observations on the current scale and character of trade in sawfish rostra from two divergent sources: bycatch from fisheries in northern Brazil, and international online auctions hosted by eBay.

## Trade in northern Brazil

As detailed in Charvet-Almeida (2002), local and international trade in sawfish meat, fins, and rostra occurs in several port cities along Brazil's northern coast. Saws from juvenile and neonate sawfishes are sold to tourists for around US$3–8 each. Inexpensive and damaged saws are also cut into pieces and sold as a local folk medicine, each 1–2cm chunk costing around US$1. Ground into a powder and infused in a tea, this is considered an effective treatment for asthma.

Small and medium sized rostra (up to 100cm) also find their way into the international cockfighting market, where rostral teeth are utilized to fashion artificial spurs for roosters. Cockfighting is illegal in Brazil, so most rostra used for this purpose are purchased by foreign buyers. Although several Latin American countries condone this traditional "sport", it remains unknown how many rostra are used for this annually. Sawfish rostral teeth became the favoured material for detachable spurs during the late 1970s, after endangered sea turtle shell became too scarce to harvest, and extensive testing revealed that rostral teeth were more durable than other potential animal materials (Cogorno Ventura 2002). According to a recent article on the history of artificial spur selection in Peru, participants prefer rostral teeth from juvenile females, where the tooth has a black vein running through it and a translucent "caramel"-colored tip (ibid.). Each tooth is split longitudinally into four sections, and then polished. Care is taken to maintain flexibility, so sawfish spurs are often refrigerated, submerged in oil, and kept away from heat. In 2002, a pair of spurs was worth US$20 (ibid.) and there is evidence that scarcity may be driving the price even higher. A major Peruvian cockfighting website which sells both raw rostral teeth and finished spurs, has doubled its prices since 2002; a pair of spurs now costs US$42–48 (Gallos Pedraglio 2004). Given that *Pristis perotteti* and *P. pectinata* rostra have between 28–68 teeth each, the retail value of one rostrum used for this purpose could now be as high as US$2,380–6,528. The site clearly targets an international audience, including pricing for Peru, the United States, and "other countries".

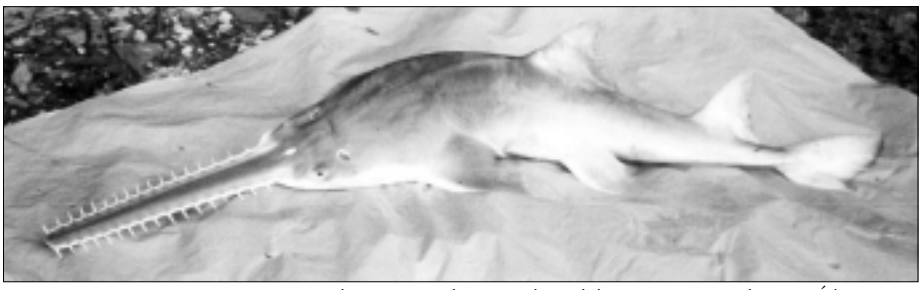
While data on the scale of trade for these diverse purposes are just beginning to be compiled, it is estimated that between 1,000–1,500 small or medium size rostra (up to 100cm) are sold annually at the Vigia market, one of five major markets in northern Brazil trading sawfish rostra.

Larger rostra are often purchased by Asian shark fin buyers, who also purchase sawfish fins, though these are locally deemed of intermediate quality. These buyers prefer huge rostra (between 120–180cm), paying between US$150–500 for each saw. Shark fin buyers usually meet the fishing boats as they arrive at the docks, paying in US$ or local currency for rostra ordered prior to sale. It remains unclear what these rostra are used for or which nation(s) import them, though it is probable that they are exported as curios. It is estimated that perhaps 90–180 large rostra are sold annually at the Vigia market alone.

Estimates of annual sawfish rostra sales are not currently available for the other four major ports/markets, but given that previous efforts to regularly market sawfish products have resulted in population collapse (Thorson 1982), this activity should be monitored and reduced in order to avoid further sawfish population declines.

## Trade on eBay

Established in September 1995, eBay has grown into the world's largest online auction house, hosting over 971 million auctions in 2003, with more than 114 million registered users worldwide (eBay Inc. 2004). The first attempt to quantify the scale of trade in sawfish rostra on eBay was initiated in February 2004 (by Matthew McDavitt). This year-long survey will record various statistics concerning the rostra sold, compiling data on frequency of sale, average prices and lengths, species traded, sources of rostra, and nationality of buyers and sellers. Table 1 presents preliminary data compiled at the six-month mark of the study, February 1–July 31, 2004.



Juvenile specimen of Largetooth sawfish *Pristis perotteti*. Photo: Dr Éden Soares.

*Pristis* species are sought-after aquarium exhibits. Photo: Sun International Resorts, Bahamas.

The majority of eBay sellers (99%) and buyers (89%) who offered or purchased sawfish rostra did not regularly trade in them. Only a single seller offered more than two rostra during the six-month study period, offering ten unique saws for auction. About two thirds of the sales were domestic (64.3%), with international sales comprising 35.7%. Of the 122 unique rostra offered during the study to date, only a third included information on how the seller obtained the rostrum. The most popular sources were: bought at an estate sale (33.3%), inherited from a relative (33.3%), and found in a new residence (13.9%). Only 6.7% of the listings provided capture location and date, spanning the Americas, Africa, Asia, and Oceania, with capture dates ranging from 1900 – 1968. It appears that, 1) most sawfish rostra sold on eBay lack capture data, and 2) what data are available suggest that the rostra offered are mainly older trophies, caught decades ago.

As demonstrated in Table 2, average sale prices for rostra vary predictably with length. Interestingly, the Indo-Pacific species *Anoxypristis cuspidata* dominates the offered rostra (40.2%), with the remaining species more or less evenly distributed. It is currently impossible to distinguish *P. perotteti* from *P. microdon* based on rostral morphometrics, so these species were grouped as "Largetooth spp." The United States leads as the largest buyer and seller of sawfish rostra on eBay, followed by the United Kingdom, Australia, and several European countries (Table 3). However, this distribution in nationality is likely more a product of the comparative scale of eBay trade in each country, rather than a reflection of national demand. Assuming the trends observed during the first half of this study continue, the annual trade in sawfish rostra on eBay would total approximately 210 rostra sold per year with a sales value of over US$25,000.

**Table 1. eBay Sales Data Overview.**

| | |
|---|---|
| Average rostra offered/month | 20 |
| Average rostra sold/month | 18 |
| Average length of rostra (mm) | 726 |
| Average sale price (US$) | $119 |
| Maximum price per rostrum (US$) | $1,242 |
| Average price/300mm (US$) | $48 |
| Projected rostra sold/year* | 210 |
| Estimated annual sales* (US$) | $25,084 |

*assumes six-month trends continue for entire year.

**Table 2. eBay Sales Data by Species.**

| Species | Percent of Rostra Offered | Average Length (mm) | Average Sale Price (US$) |
|---|---|---|---|
| *Anoxypristis cuspidata* | 40.2% | 600 | $72 |
| Largetooth spp. | 17.2% | 766 | $90 |
| *Pristis zijsron* | 16.4% | 1,116 | $261 |
| *Pristis pectinata* | 10.7% | 597 | $66 |
| Indeterminate* | 15.6% | 666 | $115 |

* generally a mix of *P. zijsron* and *P. pectinata*, where photo did not allow positive identification.

**Table 3. Nationality of Buyers and Sellers.**

| Nationality | % of Sellers | % of Buyers |
|---|---|---|
| United States | 33% | 40% |
| United Kingdom | 23% | 14% |
| Australia | 26% | 8% |
| Germany | 14% | 13% |
| Belgium | 1% | 13% |

## Implications

As these preliminary data from contrasting sources demonstrate, trade in sawfish rostra, whether derived from recent bycatch or historical trophies, occurs regularly, with large rostra yielding very high prices. Surely trade in sawfish saws also occurs in other nations where bycatch is taking place. Given the critical population status of most or all sawfish species, it is crucial that this trade is at least documented and urgently curtailed so that demand no longer provides an incentive to kill entangled animals.

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# Conservation perspectives and management challenges for freshwater stingrays

**Maria Lúcia Góes de Araújo, Patricia Charvet-Almeida, Maurício Pinto de Almeida and Henrique Pereira, Brazil.**

South American freshwater stingrays belong to a single family Potamotrygonidae, represent an important part of the Neotropical ichthyofauna and belong to the only group of elasmobranchs completely restricted to freshwater. Potamotrygonids exhibit some life history features similar to their marine counterparts (low fecundity, late maturation and slow growth), with the additional constraint of being confined to freshwater habitats. Some are endemic to small areas and thus have limited tolerance to both natural and anthropogenic disturbances (Compagno and Cook 1995, Barcellos 1996).

## Threats

Some of the main threats to potamotrygonids include artisanal longline for food purposes, an activity not monitored until recently and information is still limited. Commercial fisheries with trawl nets along the Solimões-Amazonas River system are known to capture freshwater stingrays as bycatch, and again, limited information is available. Negative 'persecution' fisheries occur in some areas, actively encouraged by some tourism companies in an attempt to avoid accidents involving tourists and freshwater stingrays. This "beach cleaning" activity goes unregulated because the Brazilian Environmental Agency (IBAMA) does not consider it an official type of fishery. In addition, habitat damage such as can occur during mining activities and dam construction, has the potential to threaten freshwater stingray populations more severely than any of the fisheries (Charvet-Almeida *et al*. 2002, Araújo *et al*. 2004).

## Ornamental trade

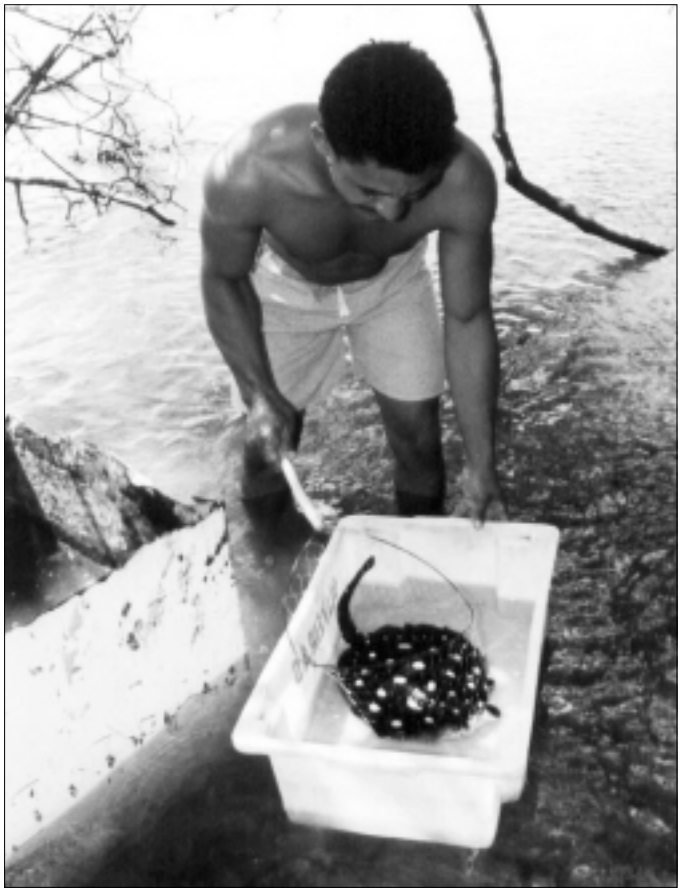
Freshwater stingrays have been caught as ornamental fish for more than two decades in the Brazilian Amazon, representing an important income for some riparian communities. Several fishermen rely on this activity for their subsistence at least during part of the year and most are concerned about the conservation of this resource to guarantee the continuity of their work. The ornamental fish industry is also interested in maintaining freshwater stingray populations in order to continue to meet market demands.

Until recently there was no regulation of this activity in Brazil and no data existed prior to 1996 (Araújo 1998). In 1990 IBAMA prohibited the exportation of freshwater stingrays for ornamental purposes. In 1997, a partnership between IBAMA and scientific institutions led to the development of a revised regulation with a species-specific export quota system, and a prohibition on the ornamental fishery and export of some species (IBAMA 022/98). A recent review of the regulation resulted in more species included in this quota system (IBAMA 036/2003). Official exportation statistics of freshwater stingray from Brazil have been available since 1998.

**Table 1. Status of freshwater stingray ornamental trade regulation in Brazil.** (All these species are known to be in international trade except for those marked *, for which no trade information is available).

| Species | Legal status/Quota |
|---|---|
| *Plesiotrygon iwamae,* | ) |
| *Paratrygon aiereba,* | ) |
| *Potamotrygon brachyura,* | ) |
| *P. castexi, P. constellata, P. dumerilii,* | Export from Brazil illegal |
| *P. falkneri, P. histrix, P. humerosa,* | ) |
| *P. ocellata*, P. schuemacheri*,* | ) |
| *P. scobina* and *P. signata* | ) |
| *P. motoro* | Export from Brazil legal (5,500 units/year) |
| *P. cf. histrix* | Export from Brazil legal (5,000 units/year) |
| *P. orbignyi* | Export from Brazil legal (2,000 units/year) |
| *P. schroederi* | Export from Brazil legal (1,500 units/year) |
| *P. henlei, P. leopoldi* | Export from Brazil legal (1,000 units/year) |
| *P. magdalenae, P. yepezi* | No information available[1] |

[1] These species are in international trade but as they do not occur in Brazil, no information is available regarding any regulatory measures.



An ornamental fisherman handling a *Potamotrygon leopoldi* after capture. Photo: Patricia Charvet-Almeida.

## International cooperation required

Many species of freshwater stingrays are found in more than one country in the Neotropical region, although as yet there are no records of shared stocks. Brazil is apparently the only country with a specific regulation to control (and in some cases prohibit) the export of freshwater stingray species for the ornamental trade (Table 1). Trade data of potamotrygonids from other South American countries are not available, yet there is evidence of unregulated ornamental fisheries and export of species for which these activities are regulated or prohibited in Brazil, for example, the collection of *Paratrygon aiereba* for the ornamental trade is prohibited in Brazil, but this species is legally exported from Peru.

The regulation of the international trade is difficult and complex. For example, much of the trade occurs in the border areas between Brazil and neighbouring countries, and monitoring this is extremely difficult due to the lack of safety in these regions. An international partnership between range states to regulate the ornamental trade is necessary. In addition, there are species on the market still unknown to science; the existence of polychromatism confounds identification (mainly diverse dorsal colour patterns within the same species) (Almeida *et al*. 2002, Almeida *et al*. 2003, Almeida 2003); and given that so little is known about this unique group of elasmobranchs, further ecological research is required to guarantee adequate conservation and management of the river stingrays.

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The above article summarises an Information Document presented to the 20th Meeting of the CITES Animals Committee (Araújo *et al*. 2004). The next article (right) is taken from the final report by Getulio Rincon on his IUCN Shark Specialist Group endorsed project "Conservation of freshwater stingrays in the River Tocantins". This was grant-aided by the Chicago Zoological Society's Chicago Board of Trade Endangered Species Fund.


# Freshwater Stingray Exhibition


**Getulio Rincon**
**Unesp–Instituto de Biociências, Brazil.**


***"I did not know they were so beautiful!"*** This was probably the most commonly heard expression during the Freshwater Stingray Conservation Project exhibition week in Marabá city, Brazil, held in July in a central square aquarium close to the Tocantins river bank. Ten specimens of *Potamotrygon henlei* (arraia de fogo) and *Paratrygon aiereba* (aramaçã) were exhibited in two glass aquariums and one 8,000 litre concrete tank, where about 4,000 local residents and tourists of Marabá could see them and find out more about the biology and ecological importance of stingrays.

*Potamotrygon henlei* before release. Photo: Freshwater Stingray Conservation Project.

We aimed to demystify the aggressiveness of this feared group of fishes and consequently reduce unnecessary persecution and mortality (see p.12). Classes on the biology, ecology and conservation needs of stingrays and the Tocantins river were provided twice a day, even in the water with the animals. All children had the opportunity to see a glove puppet play about stingrays and to choose a name for a young stingray born during the exhibition week. Plastic bags were provided to tourists to collect garbage and help keep the beaches clean. Three thousand folders about stingrays and one thousand invitations to visit the exhibition were distributed. The fishing community was also invited to participate in the exhibition week and an oral presentation about stingrays is scheduled for September, when all fishermen will be able to plan actions on the conservation of stingrays and find alternatives in order to decrease fishing effort in the region of Marabá.

By the end of the exhibition, a petition for the protection of freshwater stingrays had collected 1,400 signatures. Considering that these animals are not popular with local residents, the great number of visitors and signatures during the week are evidence of the interest in these animals and understanding of their importance. All stingrays were set free after the exhibition and some citizens helped us to release them (see photo). We believe the project planted a very important seed for the conservation of freshwater stingrays and connected related social groups and government departments, so that they can collaborate in finding alternatives for some environmentally damaging actions. Much hard work is still required, however, to change the popular local concept of infinite natural resources.


We thank the Chicago Zoological Society's Chicago Board of Trade Endangered Species Fund for its support, the IUCN-SSC Shark Specialist Group, NUPEC, Brazilian Elasmobranch Society-SBEEL, the city of Marabá-Pará, especially the Secretary of Tourism, Culture and Sports-SECDETUR, Ray Troll, UniCEUB and Peixe Vivo.



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# World's first international elasmobranch fishing limit adopted:

## Northwest Atlantic skates to receive Quota Management in 2005

**Sonja Fordham, The Ocean Conservancy, USA.**

Five years after the adoption of the United Nations Food and Agriculture Organisation International Plan of Action for Sharks (IPOA-Sharks), the world's first international fishing limit for an elasmobranch has been adopted. In September 2004, at their annual meeting in Nova Scotia, Parties to the Northwest Atlantic Fisheries Organization (NAFO) agreed to establish a total allowable catch (TAC) for depleted thorny skates *Amblyraja radiata* in Canadian and international waters around the Grand Bank (Division 3LNO).

### Advice and allocation

NAFO scientists advised Parties that thorny skate catches from this region in 2005 and 2006 should not exceed 11,000 tonnes (t). This advice was incorporated into a proposal for a TAC from the US. In the final consensus agreement, however, the TAC was set at 13,500t for 2005–2007. The majority of this annual quota will be divided among the European Union (8,500t), Canada (2,250t) and Russia (2,250t). The US will not receive a NAFO skate allocation.

### Population and conservation status

The NAFO Scientific Council reported that thorny skate biomass around the Grand Bank declined markedly from 1985 to 1994 and has since remained low. Abundance in this area is currently near a historic low. The remaining skates are concentrated on the southwestern part of the Grand Bank, a phenomenon similar to that observed for northern cod just prior to collapse. This "hyper-aggregation" leaves thorny skates increasingly vulnerable to fishing. Catches can remain deceptively high as abundance declines.

The thorny skate is currently under review for addition to the IUCN Red List of Threatened Species based on a recommendation from the IUCN Shark Specialist Group Red List Workshop for North and Central America held in June 2004. The US and Canada have highlighted thorny skate as a species of concern. Canada has imposed a thorny skate quota; the US prohibits possession of the species.

### NAFO Parties on skates

The US unsuccessfully proposed science-based NAFO catch limits for thorny skates in 2002 and 2003. In 2002, despite an international symposium on elasmobranch fisheries convened by NAFO the week before, no other NAFO Parties supported skate limits. In 2003 and 2004, Canada and Japan voiced support for regulating NAFO skate fisheries. After the TAC was agreed this year, the US submitted a statement expressing disappointment that the limit exceeds the scientific advice. Many NAFO decisions are reached in closed meetings, so positions of all Parties are not clear. Concerned readers in NAFO member countries are encouraged to contact their fisheries officials and request an official position on skates.

### Outlook

Although the new thorny skate limit is higher than the catch level advised by scientists, it is the first of its kind in the world and represents a significant step towards international conservation of sharks, skates and rays. At the very least, the new TAC can prevent NAFO thorny skate fisheries from continuing to expand.

The next challenge is to reduce future skate TACs to levels consistent with scientific advice. This will be difficult without more pressure from conservationists and scientists from NAFO Parties outside the US NAFO permits observers (if applications are submitted well in advance and approved). The next annual meeting is scheduled for Tallinn, Estonia in September 2005.

NAFO Contracting Parties include Bulgaria, Canada, Cuba, Denmark (with respect to the Faroe Islands and Greenland), Estonia, the European Union, France (with respect to Saint Pierre et Miquelon), Iceland, Japan, Korea, Latvia, Lithuania, Norway, Poland, Russian Federation, Ukraine and the United States.

For more information on NAFO, visit http://www.nafo.ca/

This thorny skate, captured by commercial trawl in the Gulf of Maine, was collected by the University of New Hampshire as part of a Northeast Consortium project to study their life history. Photo: Jeff Kneebone.

## Pacific Shark Research Center releases Life History Data Matrix

**Peter Kyne, University of Queensland, Australia**

Moss Landing Marine Laboratories' Pacific Shark Research Center (PSRC) has released a web-based Life History Data Matrix (LHDM) for eastern North Pacific chondrichthyans. The matrix presents and consolidates essential information on 102 species of sharks, rays and chimaeras known from the eastern Bering Sea to the southern tip of Baja California, Mexico.

The release of the LHDM, one of the primary objectives of the PSRC, represents a significant achievement for the group. Its creation was based on an extensive literature review relating to the fauna in the eastern North Pacific, as well as information from other locations for wider-ranging species. Information from the literature was complemented by data from ongoing field studies by the PSRC.

The matrix summarises information on taxonomy, geographic range, age and growth, longevity, reproduction, demography, trophic interactions, habitat utilization, genetics, recruitment, behaviour and parasitology of each species. The matrix is displayed on a number of spreadsheets, together with explanatory notes, a literature list and regional maps.

While displaying what is known about the eastern North Pacific fauna, the matrix also highlights, just as importantly, what is not known, and will serve to direct future research in order to fill in gaps in the knowledge of the regional fauna. It is hoped this matrix could inspire those in other regions to compile and make available similar information.

The LHDM is available at the PSRC website (http://psrc.mlml.calstate.edu/).

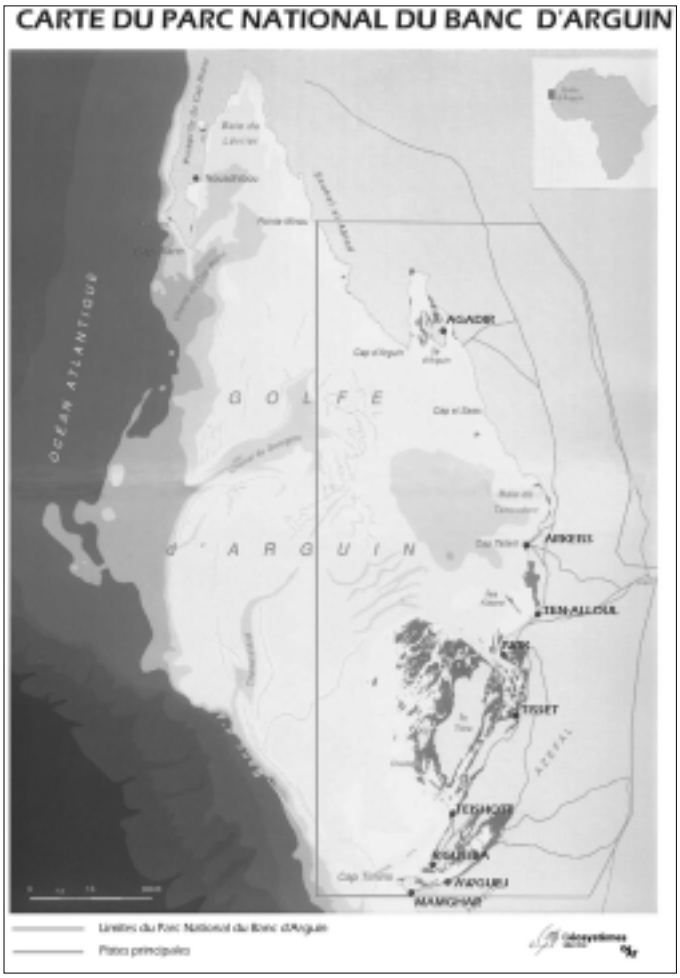
# A 6,000km$^2$ coastal sanctuary for sharks and rays in Mauritania, West Africa

**Mathieu Ducrocq, Fondation Internationale du Banc d'Arguin**

The Banc d'Arguin National Park (PNBA), in Mauritania, West Africa, created in 1976, is one of the biggest marine protected areas (MPA) of the continent. It consists of 6,000km$^2$ of shallow water, seagrass beds, islands, sandy plains and gigantic mudflats emerging at low tide. It's the destination for half of the palearctic migrating birds (from Northern Europe and Siberia); over 2.5 million birds feed there every winter.

The PNBA protects about half of the Banc d'Arguin and Baie du Lévrier coastal ecosystem, forming a major natural tool for the reconstitution of marine resources at a regional scale.

The Imraguen, small scale coastal fishermen, traditionally divided their time between fishing for grey mullet and breeding camels in the Sahara Desert. This changed when they inherited the wooden sailing boats of Canarian fishermen in the 1950s and started spending all year in their villages, developing new fisheries. First they targeted sciaenids then, with the rising global demand for shark fins in the mid 1980s, they moved on to sharks, guitarfishes and sawfishes.




The sawfishes are now extinct, and shark populations declined steeply during the 1990s. The Imraguen are the only people authorized to fish in the park, with a maximum of 110 wooden sailing boats; motors are prohibited in the marine part of the PNBA.

In 1997, the Banc d'Arguin International Scientific Council asked the PNBA to start a shark conservation project. Funded by the International Foundation for the Banc d'Arguin (FIBA), in 1998 the project began to study exploited populations of sharks and rays by monitoring landings in the Imraguen villages.

Imraguen wooden fishing boats. Photo Mathieu Ducrocq.

The first results showed that the Banc d'Arguin was a very important place for the reproduction and breeding of many coastal shark species. The fishermen were targeting great concentrations of pregnant females of some species (*Rhizoprionodon acutus*, *Paragaleus pectoralis* and *Dasyatis marmorata*) and juveniles of others (*Sphyrna lewini*, *Ginglymostoma cirratum*, *Carcharhinus brevipinna* and *Carcharhinus limbatus*). Some other species were heavily targeted, such as *Rhinobatos cemiculus*, with stock age structure demonstrating a strong reduction in the proportion of adults in the catch. The total annual catch was around 1,500 tonnes until 1998, before the first fishery reduction measures were introduced.

Adopting a participatory approach, in late 1998 the FIBA and PNBA established a consultation based on presenting the scientific results of the study to fishermen and the fishing administration. Limits on shark fisheries have since been negotiated and decided progressively during annual negotation workshops held jointly with the fishermen.

At the same time, FIBA funded projects to help fishermen living in the PNBA develop new fishing activities, targeting teleost fishes and improving the organisation of their activities. These included developing local fish processing facilities and providing local cooperatives with credits for buying cars and marketing their own fish products. (The villages are 250km from the market, in the desert, and most of the income from their sales of fish products were previously benefiting other economic actors). As a result, their overall income has risen, and shark exploitation has progressively fallen in relative economic importance for the majority of the fishermen.

In December 2003, a final agreement was signed, halting all forms of target fisheries for sharks and rays in the PNBA. While *R. acutus*, *S. lewini* and *Rhinoptera marginata* are still taken as bycatch in nets targeting sciaenids, other species are now well protected throughout the PNBA. The future management of the sciaenid fishery will tend to reduce the remaining shark bycatch by identifying and closing the fishery during those periods and in those zones where the highest levels of shark bycatch occur.

The PNBA is one of the leaders of the marine protected areas involved in the regional marine conservation programme (IUCN, WWF, FIBA and Wetlands International), but the sub-regional plan of action for the conservation and the management of sharks (Mauritania, Senegal, Gambia, Guinea, Guinea Bissau and Cape Verde Islands, also funded by FIBA) now proposes that all MPAs in the sub-region should also become non-fishing zones for sharks in future years. Indeed, shark fishing is already prohibited in some small sub-regional MPAs: João-Vieira Poilão Marine Turtles National Park (NP), Orango NP, Cacheu Mangal NP and Urok Islands Community Management Area in Guinea Bissau; Sine Saloum NP, Bamboung Bolon Marine Reserve and Madeleine Islands NP in Senegal.

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# Recent News

## Recent megamouth shark records

**William White[1], Fahmi[2] and Rachel Cavanagh[3]**
**[1]Murdoch University, Australia. [2]Research Centre for Oceanography, Jakarta, Indonesia. [3]IUCN Shark Specialist Group.**

A juvenile male megamouth shark *Megachasma pelagios* was found stranded on Gapang Beach, Sabang in northern Sumatra, Indonesia on 13 March 2004. The specimen was donated by Ton Egbers, Lumba Lumba Dive Centre and will be stored at the Museum Zoologicum Bogoriense in Bogor, Indonesia, the eighth megamouth to enter a museum collection. This is the smallest megamouth specimen (1.77m total length) examined to date and the 21st specimen reported since the discovery of the species in 1976 off Hawaii (Taylor *et al*. 1983). All previously examined specimens have been subadults or adults with the exception of one juvenile specimen, a 1.90m male caught off southern Brazil in 1995 (Amorim *et al*. 1995, 2000). Differences in the morphology of the dorsal and anal fins of this Indonesian specimen compared to other examined specimens were noted (White *et al*. in press). This is the second record of a megamouth from Indonesia, the first being a sighting in 1998 when a large megamouth was observed, possibly being attacked or 'played with', by three sperm whales off Nain Island, Bunaken Archipelago in North Sulawesi (Compagno 2001).

On 19 April 2004, the 22nd megamouth specimen, a 5.63m adult female, was found washed ashore in Tokyo Bay, Japan. In addition, at the time of going to press, a photo was sent to Miguel Romero (Shark Specialist Group member from Peru) that clearly depicts the capture of another (23rd) specimen. This was caught on 8 March 2004 off the Pacific coast of South America between Peru and Ecuador (02º54.374, S, 81º14.858, W), and is the first known record from this region.

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## First record of the false catshark from the east coast of Australia

**Jeff Johnson and Peter Kyne,**
**Brisbane, Australia**

A 2.77m false catshark *Pseudotriakis microdon* Capello, 1868 was recently captured in the Coral Sea off Queensland, Australia. This represents the second record of this species from Australia and the first from off the east coast of the continent.

*Pseudotriakis microdon* is recorded predominately from the Northern Hemisphere where it is known from the Western and Eastern North Atlantic, the North Western Pacific (Japan and Taiwan) and the Eastern Central Pacific (Hawaii). In the Southern Hemisphere there exists only limited records; from the Aldabra Islands in the Western Indian, and in the Australasian region from off New Zealand and a single record off Cape Leeuwin, Western Australia (Allen and Cowan 1995, Compagno 1998).

Photo: Jeff Wright.

The recent specimen, a mature male, was captured by an exploratory commercial fishing vessel using a multi-hook dropline in 350m depth off Frederick Reef in the Coral Sea. Little is known of the deepwater fauna of the seamounts and deepwater reefs in this area, and this specimen represents a significant record of a species that appears to be rare, particularly in the Southern Hemisphere.

Tthe false catshark is listed as Data Deficient on the IUCN Red List of Threatened Species. This indicates the lack of information on this wide-ranging but sporadically distributed rare species. The false catshark appears to have severely limited reproductive parameters with a fecundity of two embryos (Yano 1992) and a gestation period estimated at >1 year, and possibly greater than two or three years (Yano, pers. comm.). Localised populations of this large shark could be rapidly depleted if it began to be captured more regularly, however, at present it is of little interest to fisheries and is only taken as sporadic bycatch.

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## SSG Co-Chair Sarah Fowler awarded OBE

After over 20 years of dedication to marine conservation, Co-Chair of the IUCN Shark Specialist Group, Sarah Fowler, has been honoured as an Officer of the Order of the British Empire (OBE) in the 2004 Queen's Birthday Honours list. It is great to see Sarah's tireless efforts to strengthen international shark conservation and management being recognised and rewarded at this high level.

Sarah has commissioned and managed research on sharks, and has personally developed and run projects in the UK and around the world. Sarah has been involved in the Shark Specialist Group (SSG) since its establishment in 1991 and is currently Co-Chair with John (Jack) Musick. Sarah has represented the SSG at many international fora, including CITES and FAO. She has also been a member of the Board of Directors of the Marine Conservation Society, is currently a Trustee of the Shark Trust (a UK registered charity), and until last year was President of the European Elasmobranch Association. Sarah was responsible for founding both of the latter two organisations. She has been appointed a member of the Marine Stewardship Council's Stakeholder Council and was appointed to the Council of English Nature earlier this year.

## SSG Regional Vice-Chair Randall Arauz Wins Prestigious Conservation Award

Congratulations are due to Randall Arauz who received the UK's top conservation prize, the Whitley Gold Award, earlier this year from HRH Princess Ann at the Royal Geographical Society in London. Randall, from Costa Rica, is President of 'PRETOMA' (http://www.tortugamarina.org), Central American Director of the Sea Turtle Restoration Project (http://www.seaturtles.org) and Regional Vice-Chair of the newly established Central American branch of the IUCN Shark Specialist Group (a title he shares with Oscar Sosa from Mexico).

The Whitley Awards recognise outstanding conservation work by individuals around the world. "*The commitment and dedication of all our Whitley Award finalists is humbling and inspiring. We short-listed 8 finalists from as far afield as the Gobi Desert in Mongolia; the Pacific Islands; Costa Rica and Africa. They are all fighting to save wildernesses from being ruined; wildlife from being driven to extinction. They have achieved remarkable successes. Each has overcome daunting obstacles to emerge as national champions in their countries,*" said Edward Whitley, founder of the Whitley Awards and Chairman of the Whitley Laing Foundation. As winner of the top Gold Award, Randall has been awarded £60,000 to further his work in marine conservation.

A main focus of Randall's work is on declining shark populations in the eastern Pacific Ocean. A natural coordinator with endless energy, Randall is dedicated to reducing the practise of shark finning, as well as being closely involved in the protection of other endangered marine species such as turtles and dolphins. As Edward Whitley said "*Aruaz can talk to anyone ranging from the local fishermen to the fishing companies to the President of Costa Rica. He has done the science, knows his facts and has campaigned to change the fishing laws.*"

For more information go to http://www.whitleyaward.org

# Publications

**Compiled by Rachel Cavanagh and Peter Kyne**

### *Shark product trade in Hong Kong and Mainland China and implementation of the CITES shark listings.*

**A report by TRAFFIC East Asia. ISBN: 962-86197-6-4.**

This report examines the shark product trade, and regulatory and monitoring systems in Mainland China and Hong Kong for implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The basking shark *Cetorhinus maximus* and whale shark *Rhincodon typus* were listed in Appendix II following the 12th Conference of the Parties to CITES (CoP12), in November 2002, and the white shark *Carcharodon carcharias* was listed in Appendix III, by Australia, in 2001. These listings require that trade in products from these species be subject to a permitting system for regulation and monitoring. Trade in the CITES-listed sharks consists mainly of whale shark meat, white shark jaws and teeth; and fins of all three species. Much of the shark product trade has historically been concentrated in Chinese communities, particularly Hong Kong, which has long served as an entrepôt for Mainland China. The effectiveness of global shark trade regulation and monitoring measures in these markets will thus have a major influence on the overall effectiveness of global measures.

During the 1990s, Hong Kong controlled the majority of unprocessed fins imports, but re-exported them to Mainland China for processing. With the increasing economic liberalization of Mainland China, Hong Kong traders no longer monopolize the trade flow. This presents problems in quantifying the trade, since, for reasons which remain unclear, Mainland China's shark fin import figures do not seem to reflect the true quantities of fins in trade. The best estimates of market parameters in 2000 suggest that the trade is growing by more than five per cent a year, with Hong Kong capturing 50% of the global trade. A large proportion of traded shark fins are eventually consumed in Mainland China and trade statistics showing a ten-fold increase in frozen shark meat imports to the Mainland since 1998 may also signal an expanding market for this product.

Due to delays in overhauling its CITES-implementating legislation, Hong Kong had not made legislative provision for implementing the three shark listings at the time of writing, but intended to do so this year. Mainland China implements CITES listings through administrative orders and implemented the Appendix-II shark listings as soon as they became effective, in February 2003. Hong Kong maintains a well-developed import control system at air, sea and land checkpoints. Enforcement personnel have the necessary tools to implement the CITES controls but greater involvement of specialist personnel will be necessary to identify products from listed shark species, particularly in cases where these are mixed with products from similar, unregulated species. Only limited information on the Customs control system of Mainland China could be ascertained. However, several positive actions were identified: a briefing was held by the CITES Management Authority for trade representatives in Shenzhen (Guangdong Province – Mainland China's main centre for shark fin imports) to inform them of the new CITES requirements in early 2003; shark fin tariff compliance and food quality regulatory actions have been taken; and the Mainland authorities implemented a single manifest system with Hong Kong in January 2004 (i.e. authorities require that the same manifest (cargo list) is presented to each jurisdiction). With the exception of the activities of the Customs Authority in Mainland China, which could not be fully assessed under this study, all processes necessary to allow the implementation of CITES listings appear to be in place in both jurisdictions.

The prospects for improving the effectiveness of trade regulation for protected species are considered in this report. Technology (X-ray equipment and intelligence databases) is already at work in one or both jurisdictions. Genetics-based tools for species identification are technically feasible but will require effective cargo-screening procedures as a pre-requisite for meaningful application. Customs officials must be given species-specific guidance when screening shipments which could contain products from listed sharks. In the case of Hong Kong, it may be possible to increase the involvement of protected species officers in the screening process without undue labour demands. Differences between the regulatory frameworks for protected species in Hong Kong and Mainland China should not necessarily hinder co-operation and there are signs that greater integration of Customs procedures, which may lead to broader co-operation on related issues, is occurring.

Key recommendations of this study are:

- Given the heavy reliance on visual (including x-ray-enhanced) screening by non-specialist Customs officers for inspecting cargo, it is essential that basic information on shark products be included in, and disseminated through, centralized intelligence databases as soon as CITES shark listings take effect.
- Information on shark products such as likely size ranges, countries of origin and methods of packing (e.g. frozen, dried, sorted or mixed) should also be compiled and circulated.
- CITES Management Authorities should remain abreast of developments in genetic identification tools for shark products and consider producing guidelines governing the use of forensic testing in enforcement actions.
- Specialist officers should be involved in screening more frequently through increased use of referral procedures.
- Channels of communication between both CITES Management Authorities and respective trade communities should continue to be used.
- Hong Kong and Mainland China should use the opportunity presented by implementation of the single manifest system to reconcile discrepancies in commodity categories for shark products by amending Customs codes, and to promote further integration of intelligence systems.
- Mainland China should prioritize completion of its National Plan of Action for Sharks, actively engage in relevant regional fisheries organizations to ensure effective management of shark resources harvested in high seas areas, and consider means of improving, or initiating, shark catch documentation for its fleets operating in areas not controlled by regional fisheries organizations.
- In order to ensure a proper balance of enforcement priorities, the CITES Management Authorities of Mainland China and Hong Kong should participate in decisions regarding the allocation of general Customs compliance-monitoring resources.

The full report can be downloaded from: http://www.traffic.org/news/press-releases/Traffic_East_Asia_Sharks.pdf

To obtain a hard copy please contact: Samuel Lee, Programme Officer, TRAFFIC East Asia. Tel: (852) 253-00-587, Fax: (852) 253-00-864, Email: samuelee@pccw.imsbiz.com

## *Sharks, Rays and Chimaeras of California*

**David A. Ebert. 2003. University of California Press, Berkeley. ISBN 0-520-22265-2 (hardcover); 0-520-23484-7 (paperback).**

A practical field guide, this book summarises the present status of knowledge on the 43 species of shark, 22 species of batoid (skates and rays) and three species of chimaera found off the Californian coast. Dr. David Ebert's extensive knowledge of the fauna of California together with his wide expertise on chondrichthyan diversity, systematics and biology place him in an ideal position to author this guide. The book's introduction details the history of research on Californian chondrichthyans, the local marine environment, chondrichthyan classification, distribution and general biology (reproduction, migratory patterns, age and growth, size, food and feeding behaviour, ecology, ecosystems, fisheries and shark attack). Diagnostic keys are provided at the order, family and species level. Each species account provides a species description, information on habitat and range, natural history, human interactions (covering fisheries, utilisation and attacks on humans) and nomenclature (detailing how the species got it name and any systematic notes). For each species, whole specimen, ventral snout and, for sharks, teeth illustrations are shown (illustrations by Matthew D. Squillante). A checklist of Californian species, glossary, contacts for museums and research institutions, and a reference section are also provided, together with illustrations of numerous eggcases. The guide has a wide appeal, from ichthyologists and natural historians to divers, fishers and the general public alike. Due to the facts that a relatively small 17% of sharks found in the state are endemic to the eastern North Pacific (ENP); 60% of the state's batoids are endemic to the ENP and that California itself has no endemic chondrichthyan species this book should appeal not only to Californians but to the wider community.

## *Biology of Sharks and Their Relatives*

**Jeffrey C. Carrier, John A. Musick and Michael R. Heithaus (Eds). 2004. CRC Press, Boca Raton. ISBN 0-8493-1514-X.**

Following in the footprints of Perry Gilbert's 1963 and 1967 collections of research papers and William Hamlet's 1999 *Sharks, Skates and Rays: The Biology of Elasmobranch Fishes*, this latest offering from the CRC Marine Biology Series presents a major collection on chondrichthyan research. In contrast to Hamlett's work which focused on anatomy and fine structure, this book, in the editors' words, has "taken a different approach, and present[s] a broad survey of the evolution, ecology, behavior, and physiology of sharks and their relatives". The book is divided into three parts – Phylogeny and Zoogeography; Form, Function and Physiological Processes; and Ecology and Life History – with 19 contributions from eminent chondrichthyan researchers. This volume is easy to navigate through, and each chapter provides an up-to-date summary and review of the present state of knowledge in each field of chondrichthyan research. It should also serve to inspire future research and direct efforts at increasing our understanding of the fascinating biology and ecology of sharks and their relatives.

## *Elasmobranch Fisheries Management Techniques*

**Edited by John A. Musick and Ramón Bonfil, 2004. APEC Secretariat. ISBN 981-04-9682-6.**

Available as a pdf from http://www.flmnh.ufl.edu/fish/organizations/ssg/EFMT2004.htm

This manual provides the basic information to manage shark fisheries. It was conceived and edited by John A. Musick and Ramón Bonfil under the auspices of the IUCN Shark Specialist Group with support from the Asia Pacific Economic Cooperation (APEC). The objective of this comprehensive manual is to provide the information necessary for fisheries managers to effectively address the FAO International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks), thus leading to sustainable shark fisheries.

The manual provides a step-by-step approach to collecting the information necessary for adequate stock assessment and sustainable shark management. Each chapter progresses from simple to more complex techniques. The manual begins by explaining the objectives of fisheries management and methods that may be used to achieve those objectives. Chapter 3 describes how to identify sharks and rays. Chapter 4 describes the value and methodology of tagging

studies in shark management and Chapter 5 provides similar treatment for genetic techniques. Chapter 6 explains how to determine age and growth and Chapter 7 describes techniques to study reproductive biology. Chapter 8 describes how to estimate mortality. In Chapter 9 demographic population models are reviewed and in Chapter 10 stock assessment and population dynamics models are explained. Chapters 11 and 12 describe, respectively, fisheries-dependent and fisheries-independent sampling procedures. Chapter 13 reviews options that may be available for managing elasmobranch stocks. Lastly, Chapter 14 provides a brief overview of elasmobranch utilisation.

# Recent Meetings

**Compiled by Peter Kyne**

## 20th Meeting of the CITES Animals Committee

**Johannesburg, South Africa, 29 March–2 April 2004**

Sarah Fowler represented the IUCN Shark Specialist Group, and other SSG members were also present. A report by the Earth Negotiations Bulletin is available at:http://www.iisd.ca/cites/CITA20/. Shark-related documents from this meeting are available via http://www.flmnh.ufl.edu/fish/organizations/ssg/citesanicom.htm

## 4th World Fisheries Congress

**Vancouver, Canada, 2–6 May 2004**

The proceedings of the Congress will be published in approximately one year. Copies will be available from the American Fisheries Society at http://www.fisheries.org

## 20th American Elasmobranch Society Meeting

**Norman, Oklahoma, USA, 26–31 May 2004**

Abstracts are available from http://www.flmnh.ufl.edu/fish/organizations/aes/abst2004.htm (oral) & http://www.flmnh.ufl.edu/fish/organizations/aes/abst2004p.htm (posters).

## IUCN Shark Specialist Group North and Central America Red List Workshop

**Sarasota, Florida, USA, 15–18 June 2004**

Mote Marine Laboratory in Florida hosted this workshop focusing on North and Central America, the sixth in the SSG's global series to assess the conservation status of chondrichthyans for the IUCN *Red List of Threatened Species*. More than 50 experts took part including scientists from government agencies, universities, conservation groups and private institutions.

Support was received from The Ocean Conservancy, The Bernice Barbour Foundation, The Curtis and Edith Munson Foundation, The Ocean Foundation, National Shark Research Consortium, NOAA/NMFS and Mote's Center for Shark Research. Nearly 200 species assessments were drafted and will be submitted to the 2005 IUCN *Red List of Threatened Species*. A report will be prepared by the SSG summarising the conservation status of chondrichthyans in the region and recommendations for their management.

## IUCN Shark Specialist Group International Batoid Red List Workshop

**Cape Town, South Africa, 6–10 September 2004**

The latest in a series of Red List workshops convened by the SSG, this expert meeting focused on the often neglected batoid fauna. Hosted by Marine and Coastal Management, South Africa and funded primarily by Conservation International, this meeting drew together global batoid experts from Argentina, Australia, Brazil, Chile, Germany, Italy, Japan, Malaysia, Namibia, Russia, South Africa, South Korea, UK and USA.

Assessments for over 300 species were drafted and the group raised concern about the general status of batoid populations, which face increasing pressure from both directed and bycatch fisheries. These threats, together with an often narrow geographical range and/or habitat specificity resulted in many recommendations for threatened species listing. Concern was also raised over unresolved taxonomic issues and the general lack of research and attention afforded this, the most diverse group of chondrichthyans. Assessments undertaken at the workshop will be submitted to the 2005 IUCN *Red List of Threatened Species*.

# Subscribing to *Shark News*

The SSG does not charge a formal subscription for this newsletter, (administration costs would be too high, particularly when handling foreign currency). We do, however, greatly welcome all institutional and personal contributions towards the cost of printing, mailing, and other SSG work. Currently, each issue costs around US$ 3,500, including printing, distribution and editing. The mailing list is more than 900 worldwide, ranging from SSG scientists and government agencies to interested members of the general public. We welcome offers to part-sponsor Issue 17 ands have no sponsors for future issues at this stage.

Donations may be made as follows:

1. by cheque or Bankers Order in US$ to Sonja Fordham at the Ocean Conservancy (marked payable to "TOC – Shark Specialist Group, account number #3020"), or

2. by cheque or Bankers Order in £ sterling to Rachel Cavanagh (made payable to the "Shark Specialist Group"), or

3. by credit card. Send details to Rachel Cavanagh.

Invoices for subscriptions (£5.00 per issue) can be sent to organisations or libraries unable to contribute without a formal request for payment. All addresses are given below.

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**Return to: Rachel Cavanagh, SSG Programme Officer, c/o TRAFFIC International, 219a Huntingdon Road, Cambridge CB3 0DL, UK.**
Please send donations in US$ to Sonja Fordham, Ocean Conservancy, 1725 DeSales Street NW, Washington, DC 20036, USA.

The National Aquarium in Baltimore (NAIB, www.aqua.org) is a major feature of the Inner Harbor and Maryland's premier tourist destination, drawing about 1.5 million visitors per year. NAIB displays a diversity of fishes, invertebrates, reptiles, amphibians, birds, and mammals, many in complex multi-species exhibits. NAIB staff support its mission: '*to stimulate interest in, develop knowledge about, and inspire stewardship of aquatic environments*'.

Elasmobranchs have been a focus of the Aquarium since its inception. Representatives of fifteen families: nine shark species and eleven batoid species from the Atlantic, Indo-Pacific, freshwater and circumglobal species are displayed in two major exhibits: the one-million litre 'Wings in the Water' and the 850,000 litre ' Open Ocean'. The Aquarium educates visitors on the importance of elasmobranchs to natural ecosystems and supports the education, conservation, and research on elasmobranchs, both institutionally and collaboratively. It has participated in the National Marine Fisheries Service Cooperative Shark Tagging Program since 1981.

The NAIB upholds high husbandry standards for collection animals. NAIB staff have been instrumental in advancing elasmobranch husbandry and applied research in areas such as transport , maintaining difficult species, collaborative husbandry and medical support of injured specimens, and behavioural training. Elasmobranch research has resulted in over 50 publications, presentations and abstracts at professional conferences. The Aquarium also supports external researchers through access to animals or specimens.

NAIB's Conservation Education Department is extremely active from local to international level. It has developed partnerships with local, state and federal agencies, emphasises community involvement, and has provided letters of support for relevant legislation and direct support to key groups involved with elasmobranch conservation (e.g., the Ocean Conservancy and the IUCN Shark Specialist Group). Its educational programmes, including 'sleep with the sharks', reach school-age children, helping them gain appreciation for elasmobranchs and their important role as predator, understand the need for their conservation, and replace several "myths" regarding sharks and rays with facts.

Elasmobranchs are fascinating species that play important roles in marine and freshwater ecosystems. They will continue to comprise a major component of NAIB's exhibits and remain a focus for education, conservation, research and captive management programmes.

*Alan D. Henningsen, NAIB, Pier 3, 501 E. Pratt Street, Baltimore, MD 21202, USA. E-mail: ahenningsen@aqua.org*

We gratefully acknowledge the donations for newsletter production received from The National Aquarium in Baltimore, sponsor of this issue, and the Wildlife Conservation Society, Christine Snovell and James Dyer.

# Forthcoming meetings

### European Elasmobranch Association Conference
**London, England, 22–24 October 2004.**
www.sharktrust.org/eea

### 4th International Fisheries Observer Conference
**Sydney, Australia, 8–11 November 2004.**
www.fisheriesobserverconference.com

### 57th Annual Meeting of the Gulf and Caribbean Fisheries Institute
**St Petersburg, Florida, USA, 8–11 November 2004.**
www.gcfi.org/Conferences/57th/StPete2004.htm

### The Good, the Bad, and the Ugly: Integrating Marine and Human Ecology into Fisheries Management
**Sarasota, Florida, USA, 9–11 November 2004.**
www.bio.fsu.edu/mote/current.html

### 2004 IUCN World Conservation Congress
**Bangkok, Thailand, 17–25 November 2004. www.iucn.org**
Theme: People and Nature – Making a Difference.

### 6th International Aquarium Congress
**Monterey, California, USA, 5–10 December 2004.** www.iac2004.org

### 7th Indo-Pacific Fish Conference
**Taipei, Taiwan, 16–20 May 2005.** www.ipfc7.org

### 21st American Elasmobranch Society Meeting
**Tampa, Florida, USA, 6–11 July 2005.**
www.flmnh.ufl.edu/fish/organizations/aes/futmeet.htm

### First International Marine Protected Areas Congress
**Geelong, Australia, 23–27 October 2005.**
www.impacongress.org

## Editorial details

*Shark News* aims to provide a forum for exchange of information on all aspects of chondrichthyan conservation matters for Shark Group members and other readers. It is not necessary to be a member of the Shark Specialist Group in order to receive this newsletter.

We publish articles dealing with shark, skate, ray and chimaeroid fisheries, conservation and population status issues around the world; circulate information on other relevant journals, publications and scientific papers; alert our readers to current threats to chondrichthyans; and provide news of meetings. We do not usually publish original scientific data, but aim to complement scientific journals. Published material represents the authors' opinions only, and not those of IUCN or the Shark Specialist Group. Publication dates are dependent upon sponsorship and receiving sufficient material for publication, usually one or two issues per annum.

Manuscripts should be sent to Rachel Cavanagh at <rachel.cavanagh@ssc_uk.org>. They should be composed in English, legibly typewritten and double-spaced. Tables and figures must include captions and graphics should be camera-ready.

Length of features: (word counts include titles and references): The lead article, with two good size illustrations, should be no more than 1,300–1,400 words. A single column article should be 550–600 words, (450–500 words leaves space for a small illustration). A full page (2 column) article with good-sized illustration should be 800–1000 words. Other main articles, for an inside two page spread with one large or two medium-sized illustrations, should be 1,800–2,000 words, depending on the number of illustrations. Short newsy communications and letters are also welcome.

**Writing style**: This newsletter goes to members of the general public and to managers and policy-makers, as well as to elasmobranch specialists, fisheries scientists and the conservation community. We need a clear and brief style of writing. It is also essential to break up the text with plenty of sub-headings, and to provide one or two photographs or graphics. There is room for small tables, but nothing too long and complex. Author's name, affiliation and address must be provided, with their fax number and email address where available.

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