FIRST CHOICE OR FALLBACK?

AN EXAMINATION OF ISSUES RELATING TO THE APPLICATION OF APPENDIX III OF CITES TO MARINE SPECIES

ANNA WILLOCK, MARKUS BURGENER AND ANA SANCHO

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Front cover photograph: ***Main photograph***: Sea surrounding Isabela Island, Galapagos Islands. ***Inset, from top to bottom***: Great White Shark *Carcharodon carcharias*; Sea cucumber fishing, Isabela Island, Galapagos Islands; Confiscated wet abalone *Haliotis midae*.

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by Anna Willock, Markus Burgener and Ana Sancho

Credit: WWF-Canon /Pablo Corral

Anchored fishing boats near Isabela Island, Galapagos

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EXECUTIVE SUMMARY

This study looks at the appropriateness of Appendix III of CITES (the Convention on International Trade in Wild Species of Fauna and Flora) as a tool for conserving marine species. CITES is an international agreement between governments, formulated to ensure that international trade in specimens of wild animals and plants does not threaten their survival. It controls international trade in specimens of selected species using a licensing system. The species covered by CITES are listed in three Appendices, according to the degree of protection they need. CITES member countries (or Parties) may list a protected, native species in Appendix III of CITES if they consider the support of fellow Parties is needed to regulate its international trade. Appendix III differs from Appendices I and II in several ways. Specifically, and notably in the context of this report, these differences include the facts that:

- a Party may unilaterally list a species in Appendix III at any time;
- there are no provisions relating to introduction from the sea (i.e., from waters beyond the national jurisdiction of any State) for Appendix-III listed species;
- there is no specific provision for the listing of look-alike species in Appendix III;
- all specimens classed as personal and household effects are exempt in all circumstances under Appendix III; and
- Appendix III listings may be for certain named parts or derivatives of a species only.

A perceived increase in the use of the Appendix for marine species was the motivation for this study, whose aims are to:

- contribute to an improved understanding of Appendix III in relation to its application to marine species;
- provide assistance to CITES Parties considering listing marine species in Appendix III; and
- highlight areas relative to marine species and Appendix III that may require clarification by the CITES Conference of the Parties.

Three marine species were chosen for case studies to review the application of Appendix-III conditions to trade in such species in general. These were the Great White Shark *Carcharodon carcharias* (formerly in Appendix III), the sea cucumber *Isostichopus fuscus* (currently in Appendix III), and the abalone *Haliotis midae* (a possible candidate for Appendix III). From the case studies, it was apparent that the differences inherent in Appendix-III conditions in combination with some peculiarities of marine species produce some special sets of circumstances, which relate to:

- the **identification of specimens in trade**;
- the **nature of the trade** (whether typically commercial/large-scale or in personal and household effects);
- **introduction from the sea**; and
- **co-operation among range States** for a listed species.

Identification of specimens is intrinsic to the functioning of any CITES listing. In the particular case of Appendix-III listed marine species, the ease with which specimens can be identified may be affected by the fact that they are often traded in highly processed forms, complicating or preventing visual recognition. Commodity codes are unlikely to classify to species level as consignments of marine products are most usually categorized in highly generic terms. Additionally, products from marine species are frequently in a highly perishable state, requiring rapid clearance at border controls. Lastly, the fact that it is not practicable to list all look-alike species for many Appendix-III species (a provision sometimes used under Appendix II) heightens the need for specimens to be readily identifiable. In all three case studies, the identification of specimens was problematic; the meat and fins of the Great White Shark are not easily distinguished from those of other sharks and many sea cucumber and abalone species are visually similar once processed.

Because the conditions of trade for Appendix III exempt personal and household effects from control, **the nature of trade** is pivotal to the effectiveness of a listing in the Appendix. This has particular relevance for marine species, many of which are traded for their value as tourist souvenirs and curios. The Great White Shark case study indicated the inability of Appendix-III controls to "reach" such trade; the fact that, at the time of writing, only five instances of CITES-recorded trade have been logged since 2001 is likely to be a manifestation of this situation. Perlemoen items are also traded as souvenirs, but this should not affect the value of an Appendix-III listing in this case, since the souvenir trade is a by-product of the main trade in meat, which would be subject to the controls of the Appendix.

As **introduction from the sea** of a specimen of an Appendix-III species needs no prior granting of a certificate (unlike the case for Appendices I and II), this may facilitate fraudulent practice. This could occur if catches harvested illegally in a country's waters were "legitimized" through mis-declaration as high-sea harvest and the subsequent obtaining of "valid" documentation for onward trade. The lack of requirement for documentation for introduction from the sea under Appendix III also reduces or removes the capacity to provide information on harvest area for listed species. For these reasons, a species which is taken on the high seas, but also taken in domestic waters - such as the Great White Shark - is unlikely to be appropriate for listing in Appendix III.

Experience shows that listing of a species in Appendix III by multiple range States is unusual, yet a lack of **co-operation among range States** undermines the effectiveness of a listing. As it is only CITES documents from listing Parties whose issuance is conditional on the legal acquisition of specimens, every range State that is not a listing Party is potentially a conduit for illegally taken specimens. The sea cucumber study illustrates this weakness; only Ecuador has listed *Isostichopus fuscus* in Appendix III, which means that specimens fished off the Galapagos could be transhipped at sea and then landed in any other range State, from where they could be exported without any check on the legality of their origin. For as long as multiple listings of Appendix-III species are uncommon, co-operation among range States in other ways - for example, in the harmonization of content and format of certificates of origin - is especially important.

Although not peculiar to marine species and the effective implementation of Appendix III, proactive communication with importing States and liaison with industry were identified from the case studies as further factors likely to affect the proper enforcement of Appendix III. Liaison with importing States prior to listing in Appendix III is called for in *Resolution Conf. 9.25 (Rev.)*.

In conclusion, it is clear that the success or failure of an Appendix-III listing for a marine species will depend greatly on full assessment of the factors at play and knowledge of the full scope of the provisions available under this Appendix. Parties considering listing a species in Appendix III should consider several factors before deciding to proceed. Besides general recommendations for the better use of Appendix III, there follow recommendations specific to the three case study species.

Recommendations specific to maximizing the benefits of an eventual Appendix-III listing of Perlemoen are for consultation with the domestic abalone industry in South Africa and for consideration of the omission of live and canned Perlemoen from the listing, to simplify and rationalize implementation. The generation of species-specific trade data for sharks is recommended for improved implementation of the existing CITES listing of the Great White Shark while the provision of suitable training and materials is recommended to aid identification of both shark and sea cucumber specimens in trade. Recommendations for increased inspection of sea cucumber fishing in the Galapagos and for a review of the legislative and enforcement powers of those territories importing *Isostichopus fuscus* also derive from the sea cucumber case study.

Recommendations for enhancement of the effectiveness of Appendix-III listings in general are:

For prospective listing Parties:

- to consider whether the majority of trade in specimens is for commercial purposes or personal effects;
- to consider the utility of the listing where a species is harvested from domestic waters and on the high seas, owing to the lack of clarity of provisions applying to Appendix-III specimens introduced from the sea;
- to the extent possible, to undertake work with range and importing States to develop solutions to identification issues;
- to implement the recommendations of *Resolution Conf. 9.25;*
- to ensure that documentation required for the listing complements any existing national measures relating to permit requirements for the species;
- to consult with domestic industry to gauge and develop potential for co-operating with CITES processes and documentation requirements.

For listing Parties:

- to ensure a high level of collaboration and communication among range States in order to raise awareness of the listing and, in particular, to enhance the ability to detect landings of marine species illegally harvested or transhipped from the jurisdiction of listing Parties;
- to maintain a high level of liaison with major importing countries, to raise awareness of the listing and assist in targeting of enforcement activities by Customs authorities in importing territories.

For CITES Parties in general:

- to work to standardize the format of certificates of origin and certificates of re-export;
- to clarify the process for granting certificates of origin for Appendix-III marine species harvested on the high seas, landed in a CITES Party and subsequently exported.

INTRODUCTION

This report was written in response to a perceived increase in the use of Appendix III of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) for marine species. Appendix III is intended for CITES member countries (or Parties) that wish to list a protected, native species because they seek the support of fellow Parties in regulating its international trade. This recourse to Appendix III has occurred because such a listing has been seen as a potentially useful accompaniment to national efforts to regulate trade, sometimes after failed Appendix-II listings. , it appeared appropriate to examine the application of Appendix III to marine species, to assess whether there were any peculiar aspects of this combination and how these, where found, might be addressed. This report seeks to:

a) contribute to an improved understanding of Appendix III in relation to its application to marine species;
b) provide some assistance to CITES Parties considering listing marine species in Appendix III; and
c) highlight areas relative to marine species and Appendix III that may require clarification by the CITES Conference of Parties.

The issues identified and conclusions reached in this report are drawn from case studies of three marine species that have been used as examples to illustrate special difficulties that may be encountered in applying Appendix-III provisions to such species. The three species are the Great White Shark *Carcharodon carcharias*, the sea cucumber *Isostichopus fuscus*, harvested in the Galapagos Islands of Ecuador and elsewhere along the Pacific coast north to Mexico, and a South African endemic species of abalone, *Haliotis midae*. The Great White Shark was listed in Appendix III from October 2001 until January 2005, at which time it was transferred to Appendix II, which provides a higher level of protection under CITES. The sea cucumber has been listed in Appendix III since October 2003, while the abalone species, known as Perlemoen, has been considered for Appendix-III listing in South Africa.

The three case studies provide:

- background information on the species, including on fishing activity, national management measures, and the difficulties experienced in ensuring the effectiveness of these;
- a consideration of CITES Appendix-III issues as they relate to the species; and
- suggested recommendations for improving CITES implementation, in the cases of the Great White Shark and *Isostichopus fuscus*, and for advising the Government of South Africa with regards to an Appendix-III listing of Perlemoen.

A general conclusion, and recommendations for improving implementation of Appendix III, follow the case studies.

BACKGROUND

Although CITES Appendix III plays a more limited role in the conservation and sustainable use of wildlife subject to international trade than do Appendices I and II, it has the potential to contribute to improved conservation for species, including marine species. It can be a valuable tool through which a CITES Party can enlist the co-operation of other Parties in the protection of species under its national jurisdiction, particularly in circumstances where illegal harvest is occurring to supply foreign markets. It also provides a mechanism for gathering information on the extent of trade, the source of that trade, and patterns of supply and demand, that can be used to strengthen conservation and management measures. Although there are examples of Appendix-III listings with successful outcomes, the issue of *CITES World* in July 2003, which was devoted to an exploration of Appendix III, noted that "of the Convention's three species lists, Appendix III is by far the least known, least used and most poorly understood" (Anon., 2003a). There is a danger that Parties are likely to be less inclined to implement the requirements - including the associated administrative burden - of Appendix III if they do not fully understand it and appreciate its potential. Moreover, the use of Appendix III in circumstances other than those for which it was designed could undermine the credibility of the CITES (Wijnstekers, 2001).

General background to CITES

CITES is an international agreement between governments, formulated to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The text of the Convention was agreed on 3 March 1973 and on 1 July 1975 CITES entered in force. At the time of writing, there are 167 member countries (Parties) to CITES.

CITES works by subjecting international trade in specimens of selected species to certain controls. These require that all international trade of species covered by the Convention has to be authorized through a licensing system. The species covered by CITES are listed in three Appendices, according to the degree of protection they need. Each Appendix has different requirements and levels of protection afforded to the species listed in them.

Appendix I offers the highest protection for a species under CITES and includes species that are threatened with extinction. International trade in these species is subject to particularly strict regulation, only authorized in exceptional circumstances, and never for primarily commercial purposes. Specimens to be traded must have been legally obtained and shipped in such a way as to minimize injury or cruelty. Export and import permits are granted for authorized trade in Appendix-I species, except in the case of "introduction from the sea", where a certificate is required. "Introduction from the sea" is defined in (Art. I (e)) of CITES) as "transportation into a State of specimens of any species which were taken in the marine environment not under the jurisdiction of any State".

A species listed in **Appendix II** is not necessarily threatened with extinction, but may become threatened if trade is not regulated. Trade in Appendix-II species is only allowed, therefore, if

it has been determined that it will not be detrimental to the survival of the species. Specimens to be traded must have been legally obtained and must be shipped in such a way as to minimize injury or cruelty. Export permits and certificates are required, as applicable, to validate trade. No import permit is necessary, but the importation of any specimen of a species included in Appendix II requires the prior presentation of either an export permit, re-export certificate or, as with Appendix I, a certificate for specimens introduced from the sea.

Appendix II also includes so-called "look-alike species", i.e. species of which the specimens in trade look like those of species listed for conservation reasons. This is necessary to ensure effective regulation of trade where specimens are so similar that "a non-expert, with reasonable effort, is unlikely to be able to distinguish between them" (*CITES Resolution Conf. 9.24*).

A description of the role and permitting system for Appendix III is presented in more detail in the following sections.

The role of Appendix III and process for listing species

CITES Parties have developed a recommended process to be followed by a Party wishing to list a species in Appendix III and this, and the role of the Appendix, is expressed in *Resolution Conf. 9.25 (Rev.)*. Appendix III is for Parties to list native species for which they judge the co-operation of other Parties is needed to control illegal trade. A listing Party is requested to ensure that its "national regulations are adequate to prevent or restrict exploitation and to control trade, for the conservation of the species" and that its "national enforcement measures are adequate to implement these regulations". Appendix III is unique in that a Party may unilaterally list or de-list a species at any time, whereas listing and de-listing in Appendices I and II requires the support of two-thirds of the Parties present and voting at a meeting of the Conference of the Parties to CITES (CoP) or support by postal vote. Besides stipulating the conditions already mentioned, *Resolution Conf. 9.25 (Rev.)* also requests Parties to consult with any other range States, with known major importing countries, and with the CITES Animals or Plants Committees before moving to include a species in Appendix III.

Permitting requirements of Appendix III

Species listed in Appendix III may only be traded internationally if accompanied by the appropriate permit or certificate.

Parties exporting specimens of species listed in Appendix III must provide:

- a CITES export (or re-export) permit in the case of Parties that have listed the species
- a certificate of origin or re-export certificate in the case of non-listing Parties.

Export permits may be granted only when the Management Authority of the exporting State is satisfied that the specimen was not illegally obtained, but such an assurance is not a condition of issuance for certificates of origin and re-export certificates.

Parties importing specimens of species listed in Appendix III must confirm that the shipments are accompanied by the correct export documentation (see above).

Comparisons of conditions of trade for specimens in Appendices I, II and III

Appendix III differs from Appendices I and II in several ways, as noted below.

- Unlike the case for species listed in Appendix I or Appendix II, there is **no requirement for the Scientific Authority of an exporting State to make a non-detriment finding** for Appendix-III species prior to authorizing export of specimens of the species. A non-detriment finding verifies that exports of a given species will not be detrimental to its survival and this is therefore an important difference between Appendix III, on the one hand, and Appendices I and II, on the other.

- A further difference between Appendix III and Appendices I and II is that the **provisions of Appendix III apply only to those parts or derivatives specified in the listing**. For example, the listing of Big-leaf Mahogany *Swietenia macrophylla* in Appendix III included an annotation that only logs, sawn wood and veneer sheets were included under that listing. By contrast, the listing of a plant species in Appendix I, or of an animal species in Appendix I or II, applies to any recognizable part or derivative of the species (Anon., 2003a). Listings of plants in Appendix II can be annotated to include specific parts and derivatives only.

- As with Appendices I and II, a Party may enter a reservation with regard to a listing in Appendix III. A Party entering a reservation is not bound by the provisions of the Convention relating to trade in a particular species listed in the Appendices (or in a part or derivative listed in Appendix III). Whereas a reservation must be taken out within 90 days of the species being listed in the case of Appendices I and II, **a Party may take out a reservation at any time for a species listed in Appendix III**.

- As the purpose of an Appendix-III listing is to assist a Party in regulating trade in a species within its national jurisdiction **there are no provisions relating to "introduction from the sea" for species in Appendix III**. Since introduction from the sea refers to "transportation into a State of specimens of any species which were taken in the marine environment not under the jurisdiction of any State", this may have implications for some marine species and is explored further in this paper, specifically in the case study on Great White Shark.

- **Specimens of Appendix-III species which are considered to be personal and household effects are exempt from CITES controls**, whereas such specimens of species listed in Appendices I and II are only exempt in certain, specified circumstances.

- The "look-alike" provision under Appendix II (see *General background to CITES*) is an important provision for marine species as specimens of these are often traded in high

volumes and in a highly processed state, making distinction between some species difficult. **There is no specific mention in the text of the Convention (Article II) relating to the inclusion of look-alike species in Appendix III, as there is for Appendix II**, although there is nothing to prevent a Party from listing a species on this basis. It would not be empowered to list look-alike species outside its jurisdiction, however, and this would limit the benefits of this provision, therefore, for Appendix-III species.

These differences in conditions applying to specimens of Appendix-III species as compared to those of species in Appendices I and II of CITES are summarized in **Table 1**.

Table 1

Summary of some of the notable differences in conditions applying to specimens of Appendix-III species as compared to those of species in Appendices I and II of CITES

Provision	Difference for Appendix-III listed species
Listing process	A Party may unilaterally list a species in Appendix III at any time
Introduction from the sea	No provisions relating to introduction from the sea for Appendix-III listed species
Non-detriment findings	No requirement for a non-detriment finding to be made
Nature of listing	Can include only certain parts or derivatives of the species
Reservation	Can be taken out at any time and can be taken out in respect of any particular part or derivative
Look-alike species	No specific provision for the listing of look-alike species
Personal and household effects	All personal and household effects are exempt in all circumstances

Species in Appendix III and circumstances surrounding their listing

Around 300 species are currently listed in Appendix III, many having been listed since the first days of the Convention. Of all the species currently listed in Appendix III, only five have been listed by more than one country. Some species are endemic to the listing Party and can be listed by that Party only, therefore. Where non-endemic species are listed by only one Party, this may be because considerations vary from range State to range State. It could equally be that awareness of a listing or the conservation status of a species is not common to all range States. Brief outlines of the listings of three species in Appendix III are provided below, as examples of different types of circumstances leading to such listings.

Credit: © WWF-Canon/André Bartschi

Big-leaf Mahogany *Swietenia macrophylla*, an Appendix-III species subsequently listed in Appendix II

In a number of cases, the inclusion of species in Appendix III has followed unsuccessful proposals for listing in

Appendix II and, in some of these cases, listing in Appendix II has eventually been attained. Proposals to list Big-leaf Mahogany in Appendix II were rejected at CoP8 (1992) and CoP9 (1994). Following this, the species was included in Appendix III by Costa Rica, in 1995. A further proposal to list it in Appendix II was considered at CoP10 before the species was finally included in that Appendix at CoP12. According to information presented at CoP12, some benefit had been derived from the Appendix-III listing - more effective regulation of harvest, as well as of national and international trade (Anon., 2002a). The Basking Shark *Cetorhinus maximus* was listed in Appendix III by the UK, on behalf of the European Union, following the unsuccessful Appendix-II proposal considered at CoP11, in 2000. A proposal to list the species in Appendix II was again considered at CoP12 and, while there had been no additional trade information generated through the Appendix-III listing, the Parties voted to include it in Appendix II at that meeting.

Credit: © WWF-Canon /Helmut Diller

Atlantic Walrus *Odobenus rosmarus rosmarus*, an Appendix-III species since 1975

The Atlantic Walrus *Odobenus rosmarus rosmarus* was listed in Appendix III by Canada in 1975 for the stated reason of monitoring international trade levels (P. Hall, Fishery Management Co-ordinator (Marine Mammals), Central and Artctic Region, Fisheries and Oceans Canada, cited in Anon., 2003a). Regular reviews of the issuance of CITES permits were carried out in order to detect changes in the volume and nature of trade in products from the species. By 2003, the Government of Canada concluded that "additional protective measures for the Atlantic Walrus [were not] warranted, given the current level of international trade". However, national CITES authorities would "continue to use international trade records as an index of global consumption" (P. Hall, Fishery Management Co-ordinator (Marine Mammals), Central and Artctic Region, Fisheries and Oceans Canada, cited in Anon., 2003a).

Appendix III may appear a particularly attractive device for marine species, since it brings a taxon within the purview of CITES while avoiding the general debate regarding CITES engagement in some marine species issues that may make listings in Appendix I or II difficult to achieve. Several marine species are currently listed in Appendix III, including the sea cucumber *Isostichopus fuscus*. The backgrounds to the listing of this species and to the Appendix-III listing of the Great White Shark are considered in the case studies later in this report.

CASE STUDIES TO EXAMINE SPECIAL DIFFICULTIES THAT MAY BE ENCOUNTERED IN APPLYING APPENDIX-III PROVISIONS TO MARINE SPECIES

CASE STUDY 1: GREAT WHITE SHARK *CARCHARODON CARCHARIAS*, *LISTED IN APPENDIX III OF CITES BY AUSTRALIA, 29 OCTOBER 2001; TRANSFERRED TO APPENDIX II WITH EFFECT FROM 12 JANUARY 2005.*

Background

Introduction

The Great White Shark *Carcharodon carcharias* is a relatively long-lived, late-maturing shark that is widely distributed throughout temperate and sub-tropical waters. Males mature at three-and-a-half metres and females at four metres in length (Last and Stevens, 1994) and both can grow to six metres in length (Compagno, 2001). The maximum age of a Great White Shark is unknown, but it has been estimated to be around 27 years (Compagno, 2001). The Great White Shark is one of the largest shark species and known globally owing to its wide distribution and popularization in film and folklore.

Great White Sharks are taken in both commercial and recreational fishing activities, including as by-catch. A number of products from this shark are valued in international trade, particularly its teeth and jaws, which are sought after in the curio trade. The fins and meat of Great White Sharks also enter international trade, as well as its cartilage and skin.

Credit: Ron and Valerie Taylor, IUCN Shark Specialist Group

Great White Shark *Carcharodon carcharias*

The Great White Shark is recognized under international law as being a highly migratory species, through its inclusion in Annex I of the United Nations Law of the Sea Convention (UNCLOS) and in Appendices I and II of the Convention on Migratory Species (the Bonn Convention). The species is classified as Vulnerable in the *IUCN Red List of Threatened Species* (Anon., 2003b). The rationale for this includes the fact that it is highly vulnerable to fisheries because of its very low reproductive potential. The Red List assessment noted, '…where detailed population data are available, these have indicated that the abundance and average size of white sharks has declined.' The assessment concludes that collation of further data could see its global status moved up to 'Endangered' (Fergusson *et al*., 2003).

Fishing activity for Great White Sharks

There is no known, legal, commercial fishery targeting Great White Sharks, however anecdotal evidence suggests that some illegal targeting of the fish takes place in the coastal waters of some countries. As previously stated, the sharks are also taken as by-catch in certain fisheries, including pelagic longline fisheries for tuna, gillnet and driftnet fisheries. They have also been a popular target of game-fishing in the past, however, a number of countries where such activities were more common have moved to protect the species, including in some cases from charter and recreational activities.

Great White Sharks are the focus of eco-tourism operations, including diving among the sharks while protected by metal cages off the coasts of South Africa, Australia, the USA and Mexico.

Management and regulation

National laws

The Great White Shark is protected off the coasts of South Africa, Australia, Namibia, the Maldives, off the Atlantic and Californian coasts of the USA, and in the Mediterranean (including off Malta) (Anon., 1999; Compagno, 2001; Martin, 2003). In addition, a number of countries also have in place regulations that relate in general to shark species, such as bans on finning, which may have an impact on fishing activities for Great White Sharks.

The Great White Shark is listed as 'vulnerable' under the Australian Government's *Environmental Protection and Biodiversity Conservation Act 1999* and is fully protected in "Commonwealth waters", in other words in waters between three and 200 nautical miles from the Australian shore.

International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks)

The United Nation's Food and Agriculture Organization (FAO) has developed an International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks). IPOA-Sharks was developed in 1997 and adopted by the FAO's Committee on Fisheries (COFI) at its twenty-

third session in 1999. The IPOA-Sharks is a voluntary instrument that relevant to all States in whose waters sharks are caught and to States whose vessels catch sharks on the high seas. It recommends that such States undertake an assessment of their shark issues and, if necessary, develop a National Plan of Action (NPOA) to address any that emerge as requiring attention. These could include, for example, the need to facilitate the identification of shark species and reporting of species-specific biological and trade data. There has been limited implementation of the IPOA. In 2001, 116 countries reported catching sharks to the FAO (FAO, 2003a) but, as reported to the twenty-fifth session of COFI in February 2003, only six of these countries had developed an NPOA for sharks, although a further 11 had partially developed NPOAs (FAO, 2003b).

The Bonn Convention

As previously mentioned, the Great White Shark is listed under the Bonn Convention, in both Appendix I (for endangered migratory species requiring strict protection measures) and Appendix II (for species with an unfavourable conservation status that would benefit from the implementation of international co-operative agreements for their conservation and management). No co-ordinated action has yet been taken under the Bonn Convention in relation to the protection of Great White Sharks. However, Parties to the Convention which have not entered a reservation with regard to the listings are required, under Article III of that convention, to take certain actions aimed at protecting the species including, with limited exceptions, prohibiting take.

CITES

The Great White Shark was first put forward for a CITES listing in 2000, at CoP11, where Australia and the USA proposed it be included in Appendix I. When it was clear that this proposal would not receive the support required for acceptance it was modified during that same meeting for listing in Appendix II, but failed to gain the requisite support of two-thirds of the Parties present and voting. In 2001, Australia took the step of listing the Great White Shark in Appendix III and the listing took effect on 29 October that year. Japan and Norway took out reservations to the listing. At CoP13, in October 2004, the species was listed in Appendix II of CITES, following submission of a proposal by Australia and Madagascar. The listing takes effect on 12 January 2005.

The rationale for the Appendix-III listing, according to the Australian Government, was as follows:
"This listing requires Australia to issue CITES permits to allow trade and all other Parties trading in the species to issue a Certificate of Origin (stating where the specimens come from). These certificates of origin will be reported to the Secretariat each year in the Party's annual report, enabling a trail to be built up of where exports of the species are coming from and where they were going. This will assist Australia to regulate trade in specimens and enable all Parties to gain a greater understanding of trade in the species and any parts or derivatives of the species" (Environment Australia, 2002).

In line with recommendations to Parties listing a species in Appendix III, Australia had domestic laws in place to 'prevent or restrict exploitation and to control trade, including penalties for illegal taking, trade or possession and provisions for conservation' (*Resolution Conference. 9.25 (Rev)*).

International trade

Information on international trade in shark products is generally not available on a species-specific basis. This makes it difficult to identify the extent of trade in Great White Shark, what products are available and the value placed on these. However several investigations have been undertaken that have provided some information on trade in shark products by species. Internet searches for sites listing Great White Shark products for sale also provide some insight into domestic and international trade.

Rose (1996) notes that the **meat** from Great White Shark is considered suitable for human consumption and often used when caught. Great White Shark **fins** are commercially valuable and considered to be a medium-grade product in Taiwan (Chen *et al*., 1996), but those of other shark species are more prized (Rose, 1996). The **skin** of Great White Sharks is known to be used in sharkskin leather products, such as watchbands and belts (see for example, http://www.paneristi.com/straps/dirk/). However, the most valuable Great White Shark products in international trade are **teeth** and **jaws**. There are numerous internet sites offering the teeth for sale. Recent prices for single Great White Shark teeth range between USD25 to USD1700 (Anon., 2003c; Anon., 2003d; Anon., 2003e). The jaws of Great White Shark are also highly valued on the curio market with internet sites offering jaws for sale at prices between USD1800 and USD4500 (Anon., 2003f). A recent press article in New Zealand reports a fisher offering the jaw of a female Great White Shark for sale, with bids starting at US10 000 (Beston, 2003). Recent reports in the South African press have alleged that, with a decline in abalone stocks, poachers are now illegally targeting Great White Shark for jaws and teeth to sell to foreign tourists (Gosling, 2003).

A number of internet sites advertizing Great White Shark products note that these products may become unavailable in the near future as countries move to protect the species. For example one site notes that "Our Great White teeth are from Australia where they are still legal to export. G.W's were just put on the Endangered Species list in South Africa, Australia may follow, order while we have them" (Anon., 2003g). Further anecdotal evidence of the effect that protection laws may have on the international trade in Great White Shark products is provided by a statement by a US collector of fossilized shark teeth, Jim Rathbone, quoted in the *New Zealand Herald*, in which he said that "since Australia clamped down on trade in great white shark parts", prices in the USA had "gone through the roof" (Beston, 2003).

The application of Appendix-III conditions to international trade in Great White Sharks

The following aspects emerged as particularly pertinent to the success of the Appendix-III listing of the Great White Shark, 2001-2005.

Identifying specimens in trade

The ability to identify Great White Shark specimens was clearly integral to the effectiveness of Appendix-III controls and to the value of the Appendix-III listing for recording the nature of international trade in Great White Sharks. For Great White Shark teeth and jaws, identification is easy as these are very distinctive. Therefore, with sufficient training, Customs officers in general should have little difficulty identifying them and determining whether CITES documentation would be required. However, it is generally difficult visually to distinguish other Great White Shark products, such as fins, meat and cartilage, from those of many different shark species.

Credit: Peter M. Kyne, University of Queensland.

Great White Shark head

The inability readily to identify some Great White Shark products known to be in international trade makes it difficult to pinpoint product in the market place that may have been derived from illegal fishing and/or trade and so take action. A genetic test has recently been developed that can differentiate Great White Shark products, such as meat and fins, from those of other shark species (Chapman *et al*., 2003). The application of this test within the market place or at points of import has the potential to assist in identifying illegal trade in Great White Shark products. In practical terms, however, it is likely that such a test would only be used as a secondary measure to verify whether product identified by visual means was indeed derived from CITES-listed species. As noted by Clarke, 2004, "while molecular genetics provides a powerful new tool, it emphasizes rather than eclipses the need for effective screening tools and procedures".

Recording specimens in trade

There have been few records of CITES-reported trade since the Great White Shark was listed under CITES in October 2001 (see **Table 2**). Since the most highly valued and sought-after products - curio and trophy items, such as mounted jaws and shark teeth necklaces - may often be traded as personal or household effects and, as such, exempt from the provisions of the Convention for Appendix III, no CITES documentation or reporting was required for export, re-export or import of these products. As a result, the Appendix-III listing could not provide information on the sources and destinations of many Great White Shark products that are likely to be commonly purchased and carried internationally. Ironically, the high prices of Great White Shark curio and trophy items means that they are also the products most likely to stimulate directed fishing for the species or retention of incidental by-catch, both activities identified as key threats to the conservation status of this shark. It is also possible that jaws and teeth destined for the commercial trade, including those which may have been obtained illegally, would be have been imported and mis-declared as 'personal effects' to circumvent CITES documentation requirements. Also of relevance to the recording of specimens in trade is the fact that Hong Kong, which together with mainland China dominates the global trade in consumable shark products, has only recently implemented the Appendix-III listing for the Great White Shark, and the Appendix-II listing for Basking Shark and Whale Shark (Anon., 2004).

Table 2

CITES-reported trade in *Carcharodon carcharias*

Year	Importer	Exporter	Quantity	Unit	Term	Purpose	Source
2002	USA	Australia*	1		Bones	Commercial	Wild
2002	USA	Australia	1		Skulls	Commercial	Wild
2002	USA	Australia	300		Teeth	Commercial	Wild
2002	USA	Taiwan	5		Bones	Commercial	Wild
2002	USA	South Africa	13	kgs	Bones	Scientific	Wild

Note: * Recorded exports from Australia relate to a single permit granted in regard to pre-Convention specimens (M. Hall, Department of Environment Australia, *in litt.* to A. Willock, TRAFFIC Oceania, 20 November 2003).

Source: CITES annual report data compiled by the UNEP-World Conservation Monitoring Centre (UNEP-WCMC).

Introduction from the sea

Great White Sharks are classified as highly migratory species under international law and, given that the species may be taken as a by-catch in high-sea longline fishing and its valuable jaws and teeth retained, there is potential for products from Great White Sharks to be introduced from the sea. As there is no regulation in CITES for introduction from the sea in relation to specimens of species listed in Appendix III (see Comparisons of conditions of trade for specimens in Appendices I, II and III), no CITES documentation was required by Parties to land Great White Shark specimens from the high seas so long as the species was listed in that Appendix. Since there is no need either for a Party to provide CITES documentation to land the same from national waters, this means that information on the origin of Great White Shark product, whether taken from national waters or on the high seas, did not need to be recorded, according to the requirements of Appendix III. While not germane to the main purpose of Appendix III - that of assisting a country to control exports in its protected wildlife - the monitoring of introduction from the sea of Appendix-III specimens would have the potential to record fishing activity which may pose a threat to listed species. This is particularly important for highly migratory pelagic fish, such as the Great White Shark, that may move between the waters of a number of coastal States and high-sea areas.

In practice, it may be problematic to issue export permits for Great White Shark specimens deriving from catches on the high seas, as satisfaction that specimens have been legally obtained - as was required by Australia as the listing Party under Appendix-III conditions and as will now be required under Appendix-II conditions - may be hard to achieve. CITES Parties other than Australia would have been required to issue certificates of origin for exported specimens of Great White Shark according to Appendix-III requirements, but the purpose of so doing would have been obfuscated in the case of specimens deriving from the high seas, as they would not actually have originated in those Parties. An agreement to include a note on certificates of origin and export permits stating whether a specimen was introduced from the sea, as opposed to originating from the issuing country, could be useful in these circumstances.

Co-operation among Great White Shark range States

Only Australia listed the species in Appendix III (see Management and regulation, *CITES*). This was despite the fact that there are potentially over 90 Great White Shark range States, at least six of which afford the species some level of protection within their own waters. This raises questions as to why some of these did not move to list the species in Appendix III. This could have been because of one or a combination of the following:

- there may be a lack of awareness of trans-boundary movement of curio items, such as teeth and jaws, since information about the source and extent of trade in these may be limited by the fact that, when identified as personal effects, they were exempt from Appendix-III controls;
- range States that do have protective measures in place for Great White Sharks may not have considered it necessary to engage the co-operation of other Parties to enforce those measures;

- there may be concerns regarding the practical difficulties in readily distinguishing some Great White Shark products, such as fins and meat, from other shark species in trade;
- it may be that some States did not consider that the level of international trade in Great White Shark products warranted an Appendix-III listing;
- some range States may not have been aware that they also could include the species in Appendix III;
- there may have been an unwillingness to shoulder the costs and administrative burden of an Appendix-III listing;
- there is a view that global protection of highly migratory fish species, such as the Great White Shark, is more appropriately dealt with by regional fisheries bodies and national fisheries authorities and this may have influenced decisions not to list the species in Appendix III.

Conclusions and recommendations for improving the effectiveness of the Appendix-III listing for the Great White Shark

The stated purpose of Australia in listing the Great White Shark in Appendix III was to identify the origin and destination of products derived from the species and to provide a greater understanding of trade in parts or derivatives of the species. The listing made little headway in meeting these purposes. Since the listing of the Great White Shark in Appendix III entered into force, there have been only five recorded imports of specimens of the species at the time of writing, according to CITES trade data, three of which related to pre-Convention specimens. The reasons for this are unclear but may include the Appendix-III exemption on personal and household effects, difficulties in identifying some shark products in trade, and delays in implementation of the listing in major importing markets. There is also the possibility that there is limited commercial international trade in Great White Shark products. However, there are continuing, and arguably growing, concerns regarding threats to Great White Shark conservation, in part attributed to its demand in international trade.

Based on the findings of this case study and bearing in mind that the Great White Shark will be listed in Appendix II of CITES with effect from 12 January 2005, the following **recommendations** are made for the successful implementation of that listing:

- Customs officers in relevant countries should have sufficient training and materials available by which to identify Great White Shark teeth and jaws.
- Species-specific trade data on sharks, as called for under the FAO IPOA-Sharks, should be introduced and, where they have not yet done so, major shark-producing countries should accelerate the development of complementary measures for shark conservation, specifically the development and implementation of national and regional plans of action for sharks.

CASE STUDY 2: SEA CUCUMBER *ISOSTICHOPUS FUSCUS*, LISTED IN APPENDIX III OF CITES BY ECUADOR, WITH EFFECT FROM 16 OCTOBER 2003

Background

Introduction

The sea cucumber *Isostichopus fuscus* is distributed in the Eastern Pacific from Baja California, Mexico, to Ecuador, including the Revillagigedo, Coco and Galapagos Islands (Hickman, 1998). Range States are, from North to South, Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Ecuador and, possibly, Peru. In the Galapagos Islands (Ecuador), the species is distributed throughout the archipelago, usually in shallow waters (to 39 m depth; but mainly between five to 12 m) (Altamirano and Martinez, 2002).

Isostichopus fuscus has an elongated body, with a soft texture. It is dark brown in colour and spotted with orange papillae. It can grow up to 39 cm in length and is sexually mature at around 21 cm, or four to five years of age (Herrero-Perezrul *et al*., 1999).

Credit: Ana Sancho, TRAFFIC South America

Sea cucumbers *Isostichopus fuscus* in the cooking pot

Sea cucumbers are not only served as a delicacy in banquets and celebrations, notably in East Asian cuisine, but also, along with shark fins, as a traditional tonic for disease prevention and longevity (Chen, 2003). Export figures from *Banco Central del Ecuador* show that the main destinations for *Isostichopus fuscus* from Ecuador are Taiwan, China, the USA and Hong Kong.

In Ecuador, fishing and trade of the species is regulated by various national laws and the Government of Ecuador placed *Isostichopus fuscus* in Appendix III of CITES in 2003. The species is also protected in Mexico, the only country besides Ecuador that has traded this species at significant levels.

Fishing activity for Isostichopus fuscus

Isostichopus fuscus is known to be fished in Ecuador, Peru, Venezuela (Buitrago and Boada, 1996; Rodríguez-Milliet and Pauls, 1998) and Mexico (Fuente-Betancourt *et al.*, 2001). The species is reported to be over-exploited in Peru (M. Moreno, IMARPE, *in litt.* to A. Sancho, TRAFFIC South America, August, 2004).

Credit: WWF-Canon/Pablo Corral

Children fishing on Isabela Island in the Galapagos

Harvesting of *Isostichopus fuscus* commenced in the mainland waters of Ecuador in the late 1980s, primarily in the waters of the Guayaquil and Manabí Provinces. It is almost exclusively the only species of sea cucumber fished in Ecuador and the only species from Ecuador for which there is a known market. From the late 1980s, there was a steep increase in the national harvest levels, which rose from three tonnes, in 1988, to 29 t in 1991. As a result, the resource became over-exploited in mainland waters and the harvest subsequently moved to the Galapagos in 1991 (De Paco *et al*., 1993) and, since 1999, the sea cucumber fishery has been the most important source of income of the Galapagos fishing sector (Murillo *et al*., 2003).

Since *Isostichopus fuscus* occurs in shallow waters around the Galapagos, it is easy to fish using a hookah, a system whereby divers breathe via a hose to the surface.

Farming of Isostichopus fuscus

In Ecuador, farming of *Isostichopus fuscus* recently started in abandoned shrimp ponds on the mainland. Although financially profitable sea cucumber farming for restocking wild populations has taken place in several Asian countries (China, Indonesia, India, Philippines and Viet Nam) (Chang *et al.*, 2003), by the end of 2003, farms in Ecuador had only had success in production up to the larval stage. It is not known whether farming of *I. fuscus* occurs in any country other than Ecuador (Hamel *et al.*, 2003).

Management and regulation

National laws

Only Mexico and Ecuador are known to have traded *Isostichopus fuscus* at significant levels. Both countries have national laws to protect the species, but it is not known whether the species is protected by law anywhere other than these two countries.

Ecuador

The sea cucumber fishery off the Ecuadorian mainland and the Galapagos was closed in 1992 and the mainland fishery has remained closed since that time. In 1994, a plan was developed

for a limited opening of the fishery in the Galapagos for three months, from mid-October to mid-January 1994. The catch limit was far exceeded, however, and the fishery was subsequently closed on 15 December 1994, until 1998. In 1999, following pressure exerted by the artisanal fishing sector, the Inter-Institutional Management Authority (AIM) of the Government of Ecuador authorized the re-opening of the sea cucumber fishery in the Galapagos. (The Galapagos Marine Reserve is managed not only by AIM, but also the Participatory Management Board, which involves five stakeholder groups.)

Regulations established for management of the sea cucumber fishery in the Galapagos include the following:

- The fishery is authorized exclusively for *Isostichopus fuscus* in the waters of the Galapagos archipelago.
- Fishing is authorized on an annual basis, theoretically according to sea cucumber population levels, but political and socio-economic pressures have pushed AIM to ignore technical recommendations resulting from the monitoring of populations. Since 1999, there has been a limited harvest season for a maximum of 60 days around the months of May to July, with an established quota in most years.
- There is a minimum capture size of 20 cm for fresh sea cucumbers (corresponding to six centimetres for a dried specimen).
- Fishing can only occur in authorized areas. The archipelago is zoned into areas where capture is allowed and no–take areas. There is a buffer zone of one nautical mile around each island.
- Only fishermen in possession of a licence (issued to artisanal fishermen by the Galapagos National Park Service (GNPS)) can participate in the fishery.
- All fishermen, boat owners and boats participating in the fishery must be registered with the GNPS. Fishermen have to provide data on fishing sites and harvest quantities and allow monitoring and inspection of the fishery.
- All fishing boats are obliged to collaborate with the Government's monitoring system for the fishery, including by carrying fishing observers on board, if requested by the GNPS.
- Small boats must return to port each day after harvest and process their produce in the islands; other boats, including larger boats, can stay at sea for several days, accessing remote areas of the archipelago and drying product in specific authorized areas.
- Unloading is only authorized between the hours of 7 a.m. and 7 p.m. and only at authorized ports.
- Transhipment is prohibited.
- Camps for drying sea cucumbers in the Galapagos National Park are prohibited.

Regulations in effect to control trade of sea cucumbers in Ecuador include:

- Regulations for a chain of custody for the fishing, transport and trade of sea cucumbers in the Galapagos. These stipulate procedures, including documentation requirements, for all stages of the sea cucumber trade, from harvest to local trade, to processing and transport of the product to the Ecuadorian mainland. The chain of custody regulations cease to apply when the cargo leaves Ecuador.

- A requirement for traders to register with the GNPS.
- A requirement to provide data on harvest quantities.
- The monitoring of traders during the five working days of the week.
- A five-day period established for all sea cucumber trade within the Galapagos after the annual closure of the fishery.

The effectiveness of these regulations is compromised by weak implementation, owing to several factors, including the large size of the Galapagos Marine Reserve, insufficient patrolling capacity and corruption (see International trade, *Illegal trade*). There have been multiple cases of illegal harvest of sea cucumbers detected by authorities in the Galapagos. They include harvest outside the fishing season, harvest in no-take areas, and harvest of specimens under the minimum size. A 33% decline in the average weight per sea cucumber from 1999 to 2003 (Altamirano and Martínez (2002); M. Altamirano, Charles Darwin Research Station, *in litt.* to A. Sancho, TRAFFIC South America, November 2003; M. V. Toral-Granda, Charles Darwin Research Station, *in litt.* to A. Sancho, January 2004) corresponds to the fact that a substantial percentage of harvest has been below the 20-centimetre minimum size limit (Murillo *et al.*, 2003). Informal camps built in unauthorized places on different islands of the archipelago for drying sea cucumbers, legally or illegally harvested, have also been detected. The offenders were prosecuted but, in general, few of those acting against the Galapagos Marine Reserve regulations are prosecuted, including illegal fishers and traders of sea cucumbers. The weak judicial system of the country makes it vulnerable to pressures from local politicians and traders, which enable those involved in illegal fishing to act with impunity.

Mexico

In Mexico, *Isostichopus fuscus* was classed as "threatened" in 1994 and the fishery was closed. From March 2000, the species has been protected by a special regulation in Mexico and commercial fishing permits have not been issued for sea cucumbers in Mexico since then.

CITES

The Government of Ecuador begun to explore the possibility of including *Isostichopus fuscus* in CITES in 2000. Although measures had been established in the Galapagos to control illegal trade and harvest of the species, this had not prevented the continuation of illegal harvest and, in August 2003, the Government took the step of listing the species in Appendix III as a complementary control measure. In accordance with the Convention, the listing took effect on 16 October 2003, i.e. 90 days after the date on which the inclusion was communicated to the Parties. No other Party besides Ecuador has listed *Isostichopus fuscus* in CITES Appendix III.

The listing does not differentiate between wild and farmed specimens, so any exports of farmed specimens would require the same CITES export permits as wild-caught specimens. The exception would be where the Management Authority was satisfied that any farmed specimens were bred in captivity, in which case a certificate of captive breeding may be issued in lieu of an export permit. So far, there has been no trade of farmed *Isostichopus fuscus* from Ecuador, however.

International trade

The domestic market for sea cucumber in the Galapagos and mainland Ecuador is extremely small and the vast majority of the harvest is exported. For example, in 2002, around 90% of the harvest was exported. From 1990 to 2003, Ecuador exported 554 t of dried sea cucumbers, with a FoB (freight on board) value of almost USD7.5 million. The main destinations, according to export figures, are Taiwan, China, the USA and Hong Kong. Hong Kong alone is known to have traded sea cucumbers with 76 countries and territories over the past 10 years (S. Lee, TRAFFIC East Asia, *in litt*. to A. Sancho, TRAFFIC South America, January, 2004).

Prices

Isostichopus fuscus in the Galapagos are sold individually, and/or by weight. The prices of semi-dried sea cucumber in the Galapagos from 1999 to 2002 varied significantly, from USD0.80 to USD0.33 per sea cucumber (Murillo *et al*., 2003) and from USD4.72 to USD3.09 per kilogramme. Dried sea cucumbers of a range of species are sold in US markets for an average of USD39 per pound (USD86/kg) for larger specimens and USD45 (USD99/kg) for smaller ones (staff at TRAFFIC North America, *in litt.* to A. Sancho, November 2003). Prices of dried sea cucumber in Hong Kong vary from USD48 to USD251 per kilogramme. Varieties are mostly spiky (Stichopodidae) (Clarke, 2002).

Credit: Ana Sancho, TRAFFIC South America

Sea cucumber *Isostichopus fuscus* catch in the Galapagos Islands

Illegal trade

There have been multiple cases of illegal international trade of sea cucumbers detected by authorities in the Galapagos. Illegally harvested sea cucumbers are taken out of the Galapagos by diverse means, including in luggage declared to contain personal effects and in ships, probably also including larger foreign vessels that illegally enter the Galapagos Marine Reserve on their way to non-Ecuadorian ports (M. Altamirano, Charles Darwin Research Station, pers. comm. to A. Sancho, TRAFFIC South America, October 2003).

One of the known routes for the laundering of illegal Galapagos sea cucumbers involves final processing in Guayaquil, followed by overland transportation to Peruvian ports, from where the processed goods are exported as a local product (J. Vizcaino, Galapagos National Park Service,

pers.comm. to A. Sancho, TRAFFIC South America, October 2003). The volume of domestic sea cucumber trade in Peru is much larger than in Ecuador, not only because several species are captured, but also because there is a higher local consumption, owing to a significant population of Asian origin (J. Vizcaíno, Galapagos National Park Service, pers. comm. to A. Sancho, TRAFFIC South America, October 2003).

The application of Appendix-III conditions to international trade in *Isostichopus fuscus*

Isostichopus fuscus is the first species that Ecuador has included in Appendix III and so it is the first time it has applied the conditions of that Appendix as a listing Party. An initial meeting prior to the inclusion of the species in CITES in 2003 was convened by the Ministry of Environment to establish roles and responsibilities, including the designation of new CITES Management and Scientific Authorities in the Galapagos. However, the inclusion of *I. fuscus* in Appendix III has caused confusion in Ecuador regarding the administrative and enforcement implications of the listing, as well as the extent to which the listing can address current issues with sea cucumber management (A. Sancho, TRAFFIC South America, pers. obs.).

Credit: Ana Sancho, TRAFFIC South America

Sea cucumber *Isostichopus fuscus* from the Galapagos packed ready for transport

Identification of specimens in trade and co-operation among range States for the species clearly emerge as particularly pertinent to the success of this listing, as in the case of the Great White Shark Appendix-III listing. Unlike the Great White Shark, however, *Isostichopus fuscus,* being a coastal species, is not introduced from the sea and CITES lack of provision for Appendix-III specimens is not therefore a problematic feature of the sea cucumber listing. There are no available data for CITES-recorded trade in *I. fuscus* at the time of writing, the first fishery since the inclusion of the species in CITES having opened only in August 2004. The recording of trade is not, therefore, an aspect of the sea cucumber listing that can be assessed yet.

Identifying specimens in trade

One of the main issues to be addressed for the successful implementation of this listing relates to species identification, given that *Isostichopus fuscus* is very similar to other sea cucumber species, when dried or frozen. There are over 1200 known species of sea cucumbers and, when processed, most of the external characteristics of sea cucumbers disappear and only the presence or absence of spikes, which remain after processing, can be used by a non-expert as a distinguishing feature. Even then, this only allows separation into two groups (spiked or non-spiked sea cucumbers) and each group includes many different species. Only specialized identification techniques may be able to distinguish further, possibly using body wall ossicles, taxonomic characteristics unique to each species of sea cucumber and which remain intact after all processing techniques for *I. fuscus*. Nonetheless, detailed identification guides, especially in major sea cucumber consuming territories, such as China, including Hong Kong, and Taiwan may help implement the Appendix-III listing of *I. fuscus*. Although CITES documents accompanying *I. fuscus* exports from Ecuador must declare the scientific species name, the specimens may be re-exported from other places, including other range States, without mention of the specific name.

Credit: Ana Sancho, TRAFFIC South America

Fresh sea cucumber *Isostichopus fuscus*

Co-operation among Isostichopus fuscus *range States*

All range States for the species are Parties to CITES. Prior to listing *Isostichopus fuscus* in Appendix III, the Ecuadorian Government wrote to the Animals Committee in each range State, the main importing countries and the CITES Secretariat, seeking their opinion. No responses were received (Sergio Lasso, CITES Management Authority, pers. comm to A. Sancho, TRAFFIC South America, September, 2004). As of 1 August 2004, no CITES Party had entered a reservation with regard to the Appendix-III listing, but nor had any other range State joined Ecuador in listing the species, although at the CITES sea cucumber workshop in March, in Kuala Lumpur, Mexico announced its intention to list *I. fuscus* in Appendix III.

The capacity for Appendix III controls to help close down illegal trade in *Isostichopus fuscus* could increase significantly if all range States were to list the species in Appendix III. This would at least constitute a stated commitment on their parts to protect the species and, specif-

ically with regard to Appendix-III commitments, to determine that specimens had been legally obtained before issuing CITES export permits . As things stand, it is likely that some range States are not even aware of their duty to issue CITES certificates of origin for *I. fuscus* (A. Sancho, TRAFFIC South America, pers. obs., 2004).

Ecuadorian authorities have not received any communication concerning *Isostichopus fuscus* from other range States since the species was included in Appendix III. It appears that Ecuador's decision is being viewed as a pilot exercise and that other countries are awaiting the results before making any decisions regarding listing *I. fuscus* themselves (S. Lasso, CITES Management Authority, Ministry of Environment of Ecuador, pers. comm. to A. Sancho, TRAFFIC South America, November 2003). Of relevance, may be the fact that Guzmán *et al*., (2002) state that management and conservation problems experienced by the fishery in Ecuador have led Asian entrepreneurs to look for alternative sources of *I. fuscus* in the region. This has already resulted in the development of this fishery along the Pacific and Caribbean coasts of some countries in tropical America, mainly Venezuela and Mexico (Guzmán *et al*., 2002).

Conclusions and recommendations for improving the effectiveness of the Appendix-III listing for Isostichopus fuscus

The Ecuadorian Government included *Isostichopus fuscus* in Appendix III with the expectation that the co-operation of other Parties would assist in addressing the illegal harvest of the sea cucumber for international trade. Since the listing has only recently come into effect, it is premature to judge the extent to which it will achieve this.

A significant amount of work is currently underway in the Galapagos to improve the existing conservation and management measures for the Galapagos Marine Reserve. Improvements in such areas as monitoring, control and surveillance of commercial fishing vessels are anticipated within the next couple of years, including the implementation of satellite-based vessel monitoring systems. Effective implementation of the CITES Appendix-III listing of *Isostichopus fuscus* would complement these efforts, as well as the current chain of custody requirements. However, given the problems of identifying processed *I. fuscus* and the current lack of buy-in to the Appendix-III listing from other range States, implementation of the listing presents a considerable challenge. The following **recommendations** are suggested to assist in meeting this challenge:

- Identification guides that clearly distinguish *Isostichopus fuscus* from all other sea cucumbers subject to international trade should be developed and distributed for effective implementation of the CITES Appendix-III listing. The guides should include descriptions of the exported products, to enable identification by the authorities of exporting, re-exporting and importing countries.
- Given that illegal practice has been reported, inspection capacity in the Galapagos to reduce illegal fishing, transhipment and landings should be increased, so that sea cucumber landings are in accordance with the law - and therefore meet the requirements of Appendix III for exports of listed species from listing Parties.

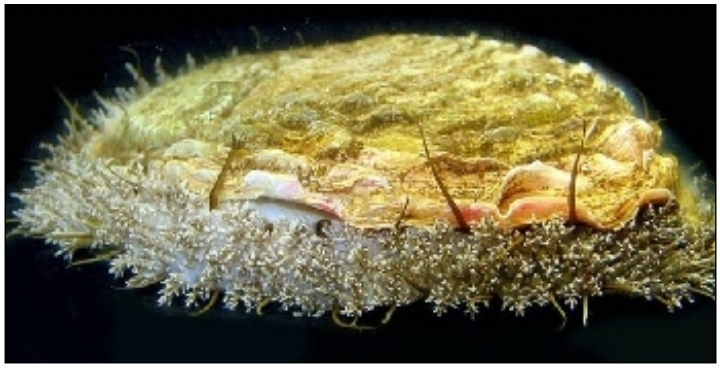
- Given their influential position in the trade, importers of *Isostichopus fuscus* - such as China, including Hong Kong, and Taiwan - should be encouraged to review their legislative and enforcement capacity to implement the Appendix-III listing of *I. fuscus* and to identify areas where this may need to be strengthened. (Taiwan is not a Party to CITES, but implements provisions of the Convention.)
- A high level of communication with other range States should be maintained, to increase awareness of the *Isostichopus fuscus* listing, and to promote assistance in identifying potential illegal imports from Ecuador.
- Range States should be urged to reconcile harvest of *Isostichopus fuscus* from their waters with export volumes of the same, in order to show up re-exports of any illegally obtained product from Ecuador.
- Training in Appendix-III implementation - for example, training in identification of *Isostichopus fuscus* and familiarization with CITES export permits - should be provided to management and enforcement authorities. Such training should be undertaken on a regular basis, as rotation of control personnel at export points is high.
- Awareness and understanding of CITES within the fisheries sector should be improved by giving short training seminars on CITES, including on the role of the different Appendices and their implementation.

CASE STUDY 3: PERLEMOEN *HALIOTIS MIDAE*, A POSSIBLE CANDIDATE FOR LISTING IN APPENDIX III OF CITES

Background

Introduction

Haliotis midae is one of three common abalone species endemic to South Africa. The species is known there as Perlemoen, the name being derived from the Dutch *Paarlemoer*, meaning mother-of-pearl (Tarr, 2003). No other abalone species of any commercial value exists in the Southern African sub-continent and *H. midae* is accordingly the only abalone species targeted in this region (Anon., 2003h).



Credit: R.ob Tarr

Live abalone *Haliotis midae*

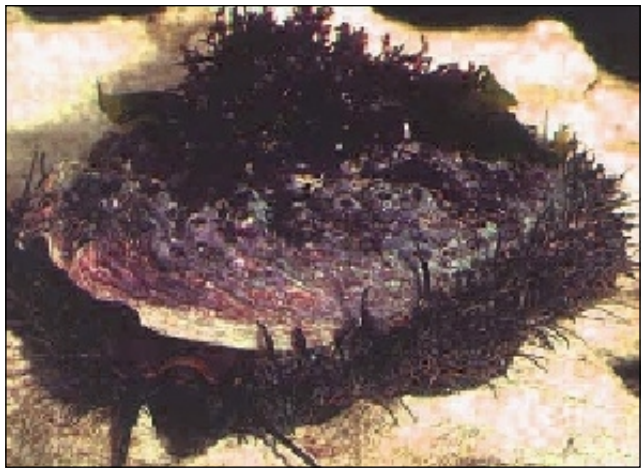
Perlemoen attain a shell length of up to 230 mm (Hecht, 1994) and approximately 24% of their total weight is meat (Tarr, 1989). Sexual maturity may be reached at different sizes, depending on water temperature (Tarr, 1995). Abalone are dioecious (having the two sexes in separate individuals) and use external fertilization and successful breeding depends on high densities of individuals (Tarr, 1989). It is believed that they can live in excess of 30 years, though there are inadequate data to confirm this (R. Tarr, Department of Environmental Affairs and Tourism: Branch Marine and Coastal Management, pers. comm. to M. Burgener, TRAFFIC East/Southern Africa, January 2004).

The meat of Perlemoen is highly valued and considered to be an aphrodisiac in some East Asian countries (Hauck and Sweijd, 1999). Its shells are also sought after as ash-trays, soap-holders and food receptacles (Tarr, 1989). As a result of demand for Perlemoen as a delicacy, the South African resource began to be over-exploited in the late 1960s (Tarr, 1989) and illegal harvesting, as well as environmental change, have severely impacted the resource. Current projections indicate that the resource can only sustain harvest at approximately 14% of the levels possible before illegal harvesting began to escalate in the early 1990s (R. Tarr, Department of Environmental Affairs and Tourism: Branch Marine and Coastal Management, *in litt*. to M. Burgener, TRAFFIC East/Southern Africa, 2003).

Fishing activity for Perlemoen

Catch records for the Perlemoen fishery exist from 1953, when 770 t of Perlemoen were harvested, canned and exported to East Asia. Reported catch peaked in 1965, with a harvest of

2800 t, after which it declined annually as stocks became depleted. Concern over the declining catch rate and resource abundance led to the establishment in 1968 of a maximum production quota of 386 t of final product after processing, i.e. the mass of canned, frozen or dried abalone (approximately 1400 t whole mass) (Tarr, 2003). In 1983, the quota was changed from a production quota to a whole mass quota to address irregularities in the system. The term "whole mass" refers to the total weight of the animal, including the shell, (and is also referred to as the "unshucked" weight). This quota has periodically been reduced and was set at 430 t whole mass (118.5 t product mass) for the 2002/03 season. The total annual quota is divided amongst fishing zones, each of which has a separate quota. Once the quota has been reached in a zone, the zone is closed to further harvesting for that season (R. Tarr, Department of Environmental Affairs and Tourism: Branch Marine and Coastal Management, pers. comm. to M. Burgener, TRAFFIC East/Southern Africa, January 2004).



Credit: Rob Tarr

Whole Abalone *Haliotis midae*

The commercial catch is harvested mainly from four of the seven fishing zones, where licensed commercial divers operate from small boats using a hookah system (whereby an air compressor pumps air to the diver via a length of hose). The Perlemoen are collected in mesh bags that are sent to the surface where they are checked by crew to ensure that they are within the legal size limit (Tarr, 2003). Catches are sealed at the slipway by fisheries control officers or marine resource monitors (A. Mackenzie, Department of Environmental Affairs and Tourism: Branch Marine and Coastal Management, pers. comm. to M. Burgener, TRAFFIC East/Southern Africa, November 2003). The catch is then usually prepared for export, since there is very little domestic consumption. Some Perlemoen is exported live and the rest is transported by road to factories where it is processed (usually by hand) and either frozen, canned or dried (Tarr, 1992).

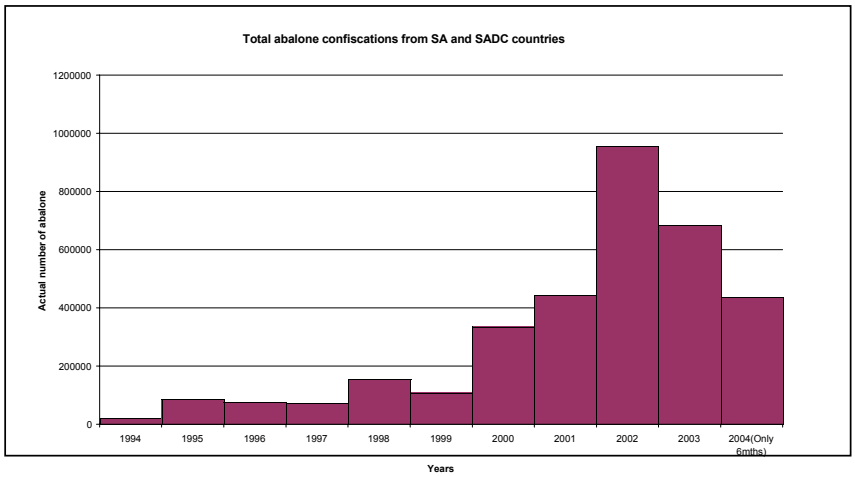
The Marine and Coastal Management branch of the South African Department of Environmental Affairs and Tourism announced in November 2003 that there would be no season for recreational abalone fishing until the resource had recovered from its depleted state (DEAT, 2003).

Illegal fishing

The amount of Perlemoen harvested illegally is estimated to equal between 25 and 100% of the commercial quota (Tarr, 2000). **Figure 1** shows the number of Perlemoen that have been confiscated by South African officials and those in other SADC (South African Development Community) countries, 1994 to 2004. It cannot conclusively be determined to what extent the increased number of confiscations is a result of enhanced law enforcement efforts or to what extent the result of an increase in poaching. Of particular concern is the fact that the average size of illegally harvested Perlemoen is becoming increasingly small and the area of operation is expanding. Considering that Perlemoen recruit in-shore, and that illegal harvesters are operating systematically in in-shore waters, the scope for Perlemoen population growth is limited (Tarr, 2000).

Figure 1

Number of illegally harvested Perlemoen confiscated during the period 1994 to 2004



Source: A. Mackenzie, R. Tarr, Department of Environmental Affairs and Tourism: Branch Marine and Coastal Management.

Farming of Haliotis midae

Farmed production of Perlemoen in South Africa began in the early 1990s and has increased rapidly, reaching 450 t whole mass (i.e., including shell) in 2002, when its production exceeded that of the capture fishery. A small number of mature Perlemoen are harvested occasionally from the wild as brood stock. Adult Perlemoen are induced to spawn and the larvae and juveniles are grown in land-based facilities until they reach 'cocktail size' for export (Tarr, 2003). There are currently 11 farms producing Perlemoen for export, mainly to Asia. Production for 2003 was expected to reach 550 t and, with the proposed expansion of some existing farms and with new farms reaching market potential, a production of approximately

750 t has been projected for 2004 (T. Probyn, Department of Environmental Affairs and Tourism: Branch Marine and Coastal Management, *in litt*. to R. Tarr, Department of Environmental Affairs and Tourism: Branch Marine and Coastal Management, October 2003). The majority of the farmed abalone are marketed live.

Most farms export live Perlemoen approximately three times a week in response to overseas orders that are generally received only two to three days prior to export. The Perlemoen farming industry has indicated that it needs to operate within the constraints of a short response time in order to remain competitive in the international market and maintain a good relationship with buyers, to ensure that projected increases in supply are taken up (A. Du Plessis, Abalone Farmers' Association, pers. comm. to M. Burgener, TRAFFIC East/Southern Africa, September 2003). Farmed Perlemoen can be marketed at any size (Cook, 1997).

Attempts to farm Perlemoen in the USA have thus far not succeeded, but a farm has been established in Namibia and, in 2003, it started producing small quantities of Perlemoen (approximately five tonnes) for export (A. Du Plessis, Abalone Farmers Association, pers. comm. to M. Burgener, TRAFFIC East/Southern Africa, November 2003).

Management and regulation

National laws

Regulations governing commercial fishing for Perlemoen

The *Marine Living Resources Act 18* of 1998 regulates the harvesting, processing, sale and trade in Perlemoen and is enforced by the Marine and Coastal Management division of the Department of Environmental Affairs and Tourism. A shell breadth of 114 mm, which corresponds to a shell length of 138 mm, has been set as the legal minimum size for capture, to allow Perlemoen a chance to breed for one or two years before harvest (Tarr, 1989). Besides the size restriction, restrictions on season, area and landing sites apply. Fishing for Perlemoen is only allowed on weekdays and during daylight hours (Matthews, 2001).

Marine and Coastal Management introduced a new policy for managing Perlemoen fishing in October 2003. According to the policy, co-management of the Perlemoen resource will be introduced through the granting of long-term harvesting rights to members of coastal communities. The intention is that this will provide an incentive for regulation by the rights-owners themselves (Anon., 2003i).

The *Marine Living Resources Act 18* specifies penalties of up to ZAR2 million (USD337 610[1]) or a period of imprisonment up to five years for the contravention of permit regulations. In October 2003, the regulations to the Act were amended to increase fines for contravention of certain other regulations from a previous maximum of ZAR40 000 (USD6752) to ZAR800 000 (USD 135 044).

[1] at November 2004 rate

Regulations governing recreational fishing for Perlemoen

A moratorium has been placed on the recreational harvesting of Perlemoen until such time as the resource has recovered significantly and the commercial fishery is no longer under threat of closure. This ruling is contained in the *Final Policy on the Allocation of Commercial Fishing Rights in the Abalone Fishery: 2003* of the Marine and Coastal Management branch of the Department of Environmental Affairs and Tourism (Anon., 2003i).

Regulations governing trade in Perlemoen

It is against the law to sell farmed Perlemoen in South Africa because of the potential difficulties in differentiating between farmed and illegally harvested wild abalone, in particular under-sized Perlemoen. At present, however, a concession is allowed for those Perlemoen farms that have a restaurant to sell their product for consumption on site (R. Tarr, Department of Environmental Affairs and Tourism: Branch Marine and Coastal Management, *in litt*. to M. Burgener, TRAFFIC East/Southern Africa, February 2004).

Import and export permits are required in South Africa for all consignments containing wild-harvested Perlemoen in international trade. Export permits are issued by Marine and Coastal Management, per consignment of Perlemoen, whether live or processed. These permits are valid for six days in the case of live Perlemoen and three weeks for processed Perlemoen. Specific export permits for the farming industry are required, but these are not consignment-based and are obtained quarterly by the relevant exporters and are valid for all consignments sent by that company during the quarterly period (D. Frederics, Department of Environmental Affairs and Tourism: Branch Marine and Coastal Management, pers. comm. to M. Burgener, TRAFFIC East/Southern Africa, September 2003).

Infractions of national regulations governing Perlemoen harvest and trade, and related enforcement

Infractions of South Africa's regulations for control of Perlemoen harvest and trade have been widely reported. Illegal harvesting of marine resources has been recognized as a priority crime in South Africa since 1997 (Hauck and Sweijd, 1999) and, despite the regulations and penalties in place, the main threat to the wild populations of Perlemoen is illegal harvesting (Hauck and Sweijd, 1999).

An increase in Perlemoen poaching at the end of the 1990s and into the 2000s coincided with reports of consolidation of the trade and the formation of sophisticated marketing networks with reported connections to the drug trade and organized crime (Hauck and Sweijd, 1999). This was despite the fact that there had been numerous seizures of large quantities of abalone during 2001 (350 000 specimens were confiscated) and many associated arrests (Anon., 2002b). The primary cause of this escalation of the illegal trade in Perlemoen appears to be related to political changes in post-apartheid South Africa. Following the establishment of a new government in 1994 and greater emphasis on individual constitutional rights, expectations were

raised among the residents of previously disadvantaged coastal communities who demanded formalized access to the abalone resource previously denied them. Transformation of the country's fisheries was, however, considered too slow by many members of coastal communities and illegal harvesting and trade increased (Tarr, 2000). Other factors contributing to an increase in illegal harvesting include the declining value of the South African rand against major foreign currencies, budget cuts for many relevant government departments, including Marine Coastal Management and the South African Police Services, and continued unemployment and poverty (Tarr, 2000).

Two full-time joint operations of the South African Police Services and the South African National Defence Force have been launched to combat illegal trade in Perlemoen. These operations deploy approximately 70 staff on a full-time basis throughout the year and use high-speed vessels and divers from the South African Navy, sniffer dogs, unmanned aerial vehicles, helicopters and fixed wing aircraft. In 2003, South Africa's first environmental court was established in Hermanus, specifically to deal with Perlemoen-related criminal cases (R. Tarr, Department of Environmental Affairs and Tourism: Branch Marine and Coastal Management, *in litt.* to M. Burgener, TRAFFIC East/Southern Africa, 2003).

International trade

As previously mentioned, there is very little domestic consumption of Perlemoen and over 90% of abalone harvested is exported according to officials in both government and industry. The major importers of Perlemoen are Hong Kong, China, Japan, Malaysia, the Republic of Korea, Philippines, Singapore and Taiwan. The majority of abalone goes to Hong Kong (R. Oktober, Tunamarine (Pty) Ltd. and A. Du Plessis, Abalone Farmers Association, pers. comm. to M. Burgener, TRAFFIC East/Southern Africa, November 2003). Export data for Perlemoen are not available from the South African branch of Customs and Excise as South Africa does not have a specific Harmonized System (HS) Customs code for the species.

Credit: M. Burgener, TRAFFIC East/Southern Africa

Abalone preserved in brine, on sale in Hong Kong

Prices

At import, live abalone has sold for between USD30 and USD40/kg since 1996, dried abalone for approximately USD300/kg in 2000, frozen, shucked abalone for USD80-86/kg, and frozen, in-shell abalone for approximately USD26/kg, during the 2000/01 season (Pulfrich, 2001).

Illegal trade

Records of the Census and Statistic Department of Hong Kong show that over 200 000 kgs of frozen, shucked Perlemoen and over 100 000 kgs of dried Perlemoen were imported from Mozambique, Namibia, Tanzania, Swaziland and Zimbabwe to Hong Kong during 2002 and the period January-June 2003. Since Perlemoen is endemic to South Africa and since South African exporters have indicated that they do not export Perlemoen, in any form, to other African countries (A. Du Plessis, Abalone Farmers Association and R, Oktober, Tunamarine (Pty) Ltd., pers. comm. to M. Burgener, TRAFFIC East/Southern Africa, October and November 2003), it is almost certain that all this Perlemoen was illegally harvested in South Africa, smuggled into the other African countries, and then re-exported to Hong Kong. The exception may be imports from Namibia in 2003, which could have been legally farmed product.

Credit: FCO K. Thompson

Abalone *Haliotis midae*, confiscated in Hong Kong

Appendix III and trade in Perlemoen

A brief history of events surrounding the consideration of an Appendix-III listing

Despite having adequate and strict regulation of the legal fishery and despite the adoption of numerous enforcement measures, South Africa has been unsuccessful in addressing the illegal harvesting of Perlemoen. With trade in Perlemoen being almost entirely international it has accordingly become necessary to explore the use of tools that would involve the assistance of consumer States in tackling illegal trade in the species.

The South African Government has been considering the option of listing Perlemoen in one of the CITES Appendices for some time and, in December 2001, Marine and Coastal Management held a workshop on the potential for a CITES Appendix-II listing of Perlemoen and Patagonian Toothfish *Dissostichus eleginoides*. A brief explanation of Appendix-III listings was provided, but this option was not discussed during the workshop. Consideration was also given to the development of a bilateral agreement with China on trade in Perlemoen, but this was not pursued owing to the fact that Perlemoen is exported not only to China but also to many other Asian countries. Since the workshop in 2001, Marine and Coastal Management has held no formal discussion with industry on a potential Appendix-III listing for Perlemoen.

In the African regional report to the 18th meeting of the CITES Animals Committee in April 2002 it was noted that, because poaching of abalone did not seem to be decreasing, discussions

among South African stakeholders on a possible CITES listing were underway (Anon., 2002b). Despite indications that South Africa would list Perlemoen in Appendix III at CoP12, this did not take place. A subsequent statement by the Government of South Africa reported in the press indicated that it was nevertheless taking steps to list the species in that Appendix (Anon., 2003j).

Industry representatives, and in particular the Perlemoen farming sector, have indicated that, while they are supportive of initiatives that would help to address the illegal harvesting of and trade in Perlemoen, they are concerned that a CITES listing could cause administrative problems and have a detrimental impact on their business activities. They have indicated that they would like to collaborate with Marine and Coastal Management in developing a CITES permitting system that satisfies CITES criteria as well as the needs of industry (R. Oktober, Tunamarine (Pty) Ltd. and A. Du Plessis, Abalone Farmers Association, pers. comm. to M. Burgener, TRAFFIC East/Southern Africa, November 2003).

The application of Appendix-III conditions to international trade in Perlemoen

The ability to identify specimens of Perlemoen in trade, and to record them, emerge as being of prime importance with respect to the effectiveness of any eventual Appendix-III listing, as outlined below. Recording specimens in trade would necessitate some changes in the current administrative system. Introduction from the sea and the question of co-operation with other range States do not apply to Perlemoen, which is endemic and inhabits coastal waters.

Identifying specimens in trade

While Perlemoen has frequently been described anecdotally by South African fisheries and enforcement officials as having a distinctive frill by which it can be differentiated from other abalone species (R. Tarr, M. Kroese and A. Mackenzie, Department of Environmental Affairs

Credit: Rob Tarr

Detail of finely branching fringe of abalone *Haliotis midae*

and Tourism: Branch Marine and Coastal Management, pers. comms to M. Burgener, TRAFFIC East/Southern Africa, 2003), this biological characteristic does not appear to be described in relevant scientific literature. It is generally possible to distinguish Perlemoen from other abalone species in their live state. Identification of live Perlemoen in transit from source via South African and other Southern African border posts may not pose significant problems, as this is the only abalone species traded commercially in this region. In importing countries, identification of live Perlemoen is more likely to be complicated, as officials need to be able to distinguish it from other commercially traded abalone species which may be imported.

Credit: FCO K Thompson

Dried abalone *Haliotis midae*

It becomes extremely difficult to identify Perlemoen once the species has been processed. As the vast majority of illegally traded Perlemoen is in a processed form, usually dried or salted, the visual identification of Perlemoen by enforcement officials in importing States, on the basis of biological characteristics, does not appear to be feasible. Because of this, should the species be listed in Appendix III, an awareness among enforcement officials of trade routes and patterns for Perlemoen and other abalone species will be beneficial. The fact that Perlemoen is the only commercially harvested abalone species in Africa should be highlighted and exports of Perlemoen from countries other than South Africa and Namibia should accordingly then be subject to more rigorous inspection and investigation.

While certain Perlemoen products may be difficult to distinguish from some other abalone products there are also abalone species in trade for which visual differentiation would be possible. The production of an identification guide for enforcement officers in importing countries would therefore potentially assist in narrowing the scope of products for further examination.

Research carried out in South Africa on the use of genetic markers has enabled scientists to distinguish between different abalone species. The results of this research have been tested in court in cases where the accused have claimed that the confiscated product is not Perlemoen but another abalone species (N. Sweijd, Director, Benefit Programme, *in litt.* to M. Burgener, TRAFFIC East/ Southern Africa, January 2004). These identification techniques are not practically suitable for use by Customs and other enforcement officials but are of potential use in cases where there is a suspicion that the product is being traded illegally and there is accordingly a need to determine the species of abalone involved.

Canned abalone product presents obvious problems for visual identification, and destruction of the product is the only way to access the specimen. The entitlement to list only certain products (parts and derivatives) from an Appendix-III species means that canned product could be excluded from any eventual listing, on the basis that the species cannot be identified without destroying the goods. However, while the legal canning industry in South Africa is now strictly regulated, there is concern that illegal operations could emerge if canned product did not require CITES documentation. A case of an illegal Perlemoen canning operation, discovered in the Mpumalanga province of South Africa, has been reported. As an alternative to excluding canned product from an Appendix-III listing, control of the trade in canned Perlemoen could be attempted through the adoption of methods similar to those employed in the caviar trade. In the case of this latter trade, labels to authenticate caviar exports have been designed by the State Committee for Fisheries of the Russian Federation and in use since February 2004, in accordance with CITES *Resolution Conf. 12.7*. The labels are printed on adhesive paper and are non-reusable. Any attempt to remove the label or open the container results in damage to the label. Each label also bears a holographic design to deter counterfeiting.

Credit: FCO K Thompson

Wet abalone *Haliotis midae*

In summary, the ability to identify Perlemoen products in international trade would be crucial to the effectiveness of an Appendix-III listing and the solution to this issue is likely to be found in a combination of measures. These include producing identification guides; specifying the range of potential look-alike products; use of genetic testing, where appropriate; including only some forms of Perlemoen in a listing; possibly a labelling system; raising awareness of likely trade routes and source countries for Perlemoen; and developing close relations between enforcement agencies in South Africa and importing countries.

Recording specimens in trade

A transition from the existing permit system to the use of CITES **export permits for the capture fishery**, if Perlemoen were listed in Appendix III, should not pose significant

challenges to Marine and Coastal Management as export permits are currently required for all Perlemoen consignments. Moreover, the information currently provided on Perlemoen export permits is very similar to that required in CITES export permits. Currently, export permits are valid for six days, three weeks, or three months and these same validity periods could apply to CITES export permits, for which the maximum period of validity is six months from the date on which they were granted (see CITES *Resolution Conf. 12.3*).

As **export permits for farmed Perlemoen** are not consignment-based, the current system would need to be revised, should the species be listed in Appendix III. Each consignment of farmed Perlemoen would need its own corresponding CITES export permit or, if the Management Authority were satisfied that the specimens had been bred in captivity, a certificate of captive breeding. As there are currently approximately 30 consignments of farmed Perlemoen being exported per week, Marine and Coastal Management would require additional capacity to process the substantially increased number of permit or certificate applications, especially given the short turnaround time required by the Perlemoen farming sector for the processing of applications. Further, allowance would have to be made for growth in the Perlemoen farming sector.

To address these practical issues, South Africa could consider the option of issuing CITES export certificates to exporters of farmed Perlemoen. This is currently done for a CITES Appendix-II species, Nile Crocodile *Crocodylus niloticus*, where a pre-determined number of signed export certificates (normally 50) is given to certain registered captive-breeding operations. The certificates, which are not individually numbered, are valid for a period of six months and can only be issued for articles manufactured from the captive-bred crocodiles (D. Hignett, Western Cape Nature Conservation Board, pers. comm. to M. Burgener, TRAFFIC East/ Southern Africa, November 2003). This procedure is permitted under the terms of CITES *Resolution Conf 10.6, Control of Trade in Tourist Specimens*. While this Resolution would not apply to the trade in CITES Appendix-III abalone, a similar process could be explored.

A further option which could be considered in order to avoid the need to establish new procedures and/or increase resources to deal with the commercial demands for live exports of Perlemoen from farming facilities is that of omitting live specimens from the Appendix-III listing. In this way, export, re-export or import of such specimens would not require CITES documentation. The potential for traders of illegally obtained Perlemoen to exploit the exclusion of live specimens from an Appendix-III listing would be minimal, as the vast majority of illegally obtained Perlemoen is exported in dried or salted form. Further, transporting live product to market requires a more sophisticated infrastructure than the transport of preserved product, to which poachers are less likely to have ready access.

As Perlemoen is endemic to South African waters, the only potential source of **CITES certificates of origin** would be countries which had not listed the species in Appendix III and which had Perlemoen farms. The only known farm outside South Africa exporting Perlemoen is in Namibia.

Conclusion and recommendations for assessment of the suitability of Perlemoen for listing in Appendix III

Perlemoen has been severely over-exploited, largely as a result of illegal harvesting and there are very real concerns that the resource may become commercially extinct in the near future. Despite numerous domestic enforcement measures, illegal harvesting and trade in the resource continues, resulting in corresponding reductions in the annual commercial quota and closure of the recreational fishery in 2003. In the light of the international nature of the Perlemoen trade, South Africa would benefit from the assistance of importing States in monitoring and regulating the trade in Perlemoen in its attempts to stem illegal exports of the species. This assistance could be obtained, in theory, by the listing of Perlemoen in Appendix III of CITES. However, the effectiveness of such a listing would be dependent on success in addressing the potential problems relating to identification of the species in trade and administration of permitting requirements.

The following **recommendations** are provided to assist consideration of whether or not to move forward with an Appendix-III listing of Perlemoen. The Government of South Africa should:

- Undertake consultation with importing countries to pinpoint potential identification issues and to develop workable solutions to these.
- Undertake consultation with the domestic Perlemoen industry to obtain feedback on its potential for co-operating with CITES processes and documentation requirements.
- Ensure that information on Perlemoen trade dynamics and routes can be kept up-to-date, including through monitoring of any further establishment of Perlemoen farms outside South Africa.
- Give consideration to omitting live and canned Perlemoen from an Appendix-III listing.
- Examine the capacity to strengthen relationships between enforcement officials in importing countries and those in South Africa, in order to ensure that awareness of a listing and of the patterns of the Perlemoen trade can be maximized.

DISCUSSION

The case studies in this report describe some of the circumstances that have led Parties to list a marine species in Appendix III, or to consider taking this action. In the case of the sea cucumber *Isostichopus fuscus*, the Appendix-III listing was viewed as a necessary extension of, and complement to, national regulatory efforts. In the case of the Great White Shark, the stated reason for the listing was to track the origin and destination of specimens in trade, with a view to assisting its regulation in Australia. It is possible that, in some cases, the listing of marine species in Appendix III may have been motivated as much by a desire to place that species on the CITES agenda as by an expectation that the listing would help to reduce illegal trade. Especially in such cases, the practicability and benefits of listing should be carefully weighed, in order not to undermine the credibility of CITES. In all prospective Appendix-III listings of marine species, however, it is important that the purpose of listing and likely outcome be properly assessed, in order that the potential complexities are realized.

The case studies highlight factors which can influence the effectiveness of listings of marine species, in particular, in Appendix III. Many of these issues are common to terrestrial species and many of the problems relating to the application of Appendix III are common also to Appendices I and II. However, there are characteristics of Appendix III, and of marine species and the fisheries that exploit them, that may make the application of Appendix III to marine species a particularly challenging exercise. These relate to identification of specimens in trade; co-operation among range States; introduction from the sea; and whether or not the trade is predominantly commercial in nature and are discussed below.

Ease of identification of specimens in trade

The effective implementation of an Appendix-III listing is dependent on the ability of Customs and other officials to be able to identify specimens derived from listed species. Identification problems may often be pronounced for marine species as these are often widely traded in a highly processed form, making it difficult, and in some cases impossible, to distinguish visually between the products of listed and unlisted species. Very few marine species in international trade have species-specific and/or product-specific Customs commodity codes. Instead, imports and exports are often recorded under general codes for categories such as ‘frozen fish fillet’ or ‘aquatic invertebrates’. In addition, products of marine species are often traded in a perishable state, requiring rapid clearance procedures at border points.

The fact that it is almost certainly not possible to list all look-alikes for many Appendix-III species heightens the need for Appendix-III specimens in trade to be readily identifiable as deriving from listed species. However, even if marine species or their parts and derivatives were included in Appendix III for look-alike reasons, the fact that so many of these, particularly fish, appear similar in processed form (for example, fillets) could make use of this device unwieldy.

In all three case studies, the identification of specimens in trade was problematic. For example, while the teeth and jaws of the Great White Shark are readily distinguishable, with training, from those of other shark species, other products, such as meat and fins, are not easily distinguished. The inability of Customs officials visually to distinguish some Great White Shark products limited the effectiveness of this Appendix-III listing. With regard to the listing of the sea cucumber *Isostichopus fuscus,* while only a small number of sea cucumber species are harvested for trade, many of these are visually similar when processed. Given the huge volume of trade in sea cucumber products it is unlikely that a listed species will be visually identified in a shipment in the absence of information leading to a closer inspection of that shipment.

There is a range of tools that could be applied, often in combination, to mitigate problems of identifying specimens from regulated species.

- Identification guides may be useful enforcement tools for some specimens. They are widely used and identification manuals for marine species have been produced, for example, for hard corals and seahorses. Importing countries are likely to rely on specific intelligence regarding shipments that potentially contain listed species, rather than on detecting these through random inspections and visual identification. In such circumstances, identification guides may prove an invaluable secondary verification tool. On the other hand, for some marine specimens, especially if traded in high volumes and in highly processed form, identification guides may have limited value as a primary tool and more sophisticated techniques may be the only means by which to distinguish species in trade.
- It is unlikely that sophisticated identification tools - DNA testing, microscopic examination or x-ray - could be used as primary means of detecting specimens of listed species, but there is potential to use these methods as a secondary measure, to verify whether specimens identified visually are derived from a listed species.
- Some forms of product could be omitted from an Appendix-III listing, for example canned Perlemoen, which would ease the burden on enforcement officials to identify problematic specimens, without adding significantly to the risk of illegal trade.
- Awareness of likely trade routes and source countries for products from listed species could be a valuable tool in narrowing down the identity of traded specimens.

Potential for communication and co-operation between range States of Appendix-III species

The fact that the three species considered in the case studies ranged from endemic to highly migratory highlighted issues relating to the enforcement of Appendix-III listings, as well as possible reasons why multiple range States may not move to list species in the Appendix. The desirability of consultation among range States prior to inclusion of a species in Appendix III has been recognized in principle in CITES *Resolution Conf. 9.25 (Rev.)*. Ideally, discussions among range States would result in co-listings of species in Appendix III, but experience to date with the listing of non-endemic marine species in Appendix III has shown that listing by multiple range States is unusual, for whatever reason. For example, in the cases of the Basking Shark and Great White Shark, no range States other than the proponents of the listing included

the species in Appendix III, despite the fact that both species are classified as highly migratory. Although officials from Mexico have indicated that they will move to list *Isostichopus fuscus* in Appendix III, none of the 10 range States besides Ecuador have yet listed the species in this Appendix.

The reasons for limited listing by range States are unclear and undoubtedly vary by species and by country, but are likely to fall into two broad categories. First, some countries may consider that listing in Appendix III is unnecessary, given the range of measures put in place by national fisheries authorities and, in certain cases, by regional fisheries organizations. Second, there may be concerns about the capacity for effective implementation of an Appendix-III listing, particularly regarding the potential difficulty in identifying products from marine species. It is also possible that there is a general lack of understanding among some Parties about the nature and use of Appendix III, or that there is little trade from some range States and they do not therefore consider listing a priority issue. Whatever the reasons, the fact that more range States for Appendix-III species are not listing Parties undermines the effectiveness of listings in this Appendix, because.the issuing of CITES documents from non-listing range States is not conditional on satisfaction that specimens have been legally obtained. This opens the way for these States to be used as conduits for illegally taken specimens. Illegally harvested sea cucumbers from the Galapagos, for example, can be transhipped at sea and then landed in any other range State for *Isostichopus fuscus*, from where they may be exported without any check on the legality of their origin necessary according to Appendix-III requirements.

For as long as range States do not come forward in greater proportion to co-list species in Appendix III, co-operation and communication between listing and non-listing range States is all the more crucial to the enhanced effectiveness of Appendix-III listings. Sharing information on trade routes, encouraging links between exports and management measures (where these exist) and sharing information and experiences with management measures used for species are just some examples of the type of communication which would be beneficial. Experience with Big-leaf Mahogany, formerly in Appendix III and listed by some range States only, showed that a high level of co-ordination was required to ensure a degree of consistency in format and information in certificates of origin and, in turn, to reduce confusion among importers and enhance their ability to apply a consistent approach to imports (Anon. 2003a).

The procedure for Appendix-III species harvested on the high seas

The Great White Shark case study highlights the fact that there are no provisions within CITES relating to specimens of Appendix-III species introduced from the sea. While in the case of Great White Sharks introduction from the sea may occur only rarely, for many marine species, particularly pelagic fish species, the majority of the harvest occurs in high-sea areas. This lack of provision is presumably because Appendix III is a tool to assist a country in the enforcement of its national regulations and the potential for Appendix-III species to be harvested from the high seas (i.e., from waters beyond the jurisdiction of any State) may therefore not have been contemplated. As a consequence, Appendix-III species harvested on the high seas and

subsequently landed at the port of a CITES Party require no CITES documentation. While it is true that any products subsequently exported would require CITES documentation, the criteria for issuance of these would be difficult or impossible to meet. The fact that the products did not actually originate from national territory would obfuscate the purpose of a certificate of origin and confirming the legality or otherwise of harvest, a necessary condition of issuing an export permit, may prove particularly challenging.

The lack of clear guidance for treatment of Appendix-III specimens introduced from the sea may help to facilitate trade in illegally harvested catches of Appendix-III species, since these could enter trade with an accompanying certificate of origin from the Party in which they were landed, ostensibly harvested from the high seas, but actually illegally harvested from another country's waters. This form of illegal fishing (i.e., mis-reporting of catch taken in coastal State waters as having been taken on the high seas) is already a major problem in some large, commercial fisheries managed by regional fisheries organizations, such as the fishery for Patagonian Toothfish *Dissostichus eleginoides* (Willock, 2002).

Apart from giving rise to confusion and circumstances assisting illegal trade, the current lack of a requirement under Appendix III for information on introduction from the sea limits the value of a listing in this Appendix, as it fails to take advantage of an opportunity to obtain information on harvest area. The area of harvest may be an important consideration for the long-term sustainability of a migratory or straddling-stock marine species and, as such, valuable information for both national fisheries authorities and relevant regional fisheries organizations, particularly where area-specific conservation measures have been applied.

In conclusion, a species harvested predominantly from high-sea areas (that is also taken in domestic waters) is unlikely to be appropriate for listing in Appendix III because of the lack of provision relating to introduction from the sea for this Appendix. Although an Appendix-III listing may provide information on international trade in products of such species, it is unlikely to be effective in addressing issues relating to their illegal harvest for trade. If further marine species that are harvested in high-sea areas are listed in Appendix III, there will be a need to clarify the process for granting certificates of origin or export permits for catches of such species landed in a CITES Party and subsequently exported.

Evaluation of the nature of trade (commercial or personal effects)

A range of marine species is commercially valuable as curios, particularly in the tourist trade. Perlemoen and Great White Shark products, such as items made from polished shell and tooth necklaces, are examples from the case studies. The fact that personal and household effects of Appendix-III species are exempt from CITES controls makes the main purpose of trade - commercial or personal - relevant to the success or failure of a listing. In the case of Perlemoen and a number of other abalone species, the type of products sold to tourists are a by-product of harvesting for the more lucrative commercial trade in the Perlemoen meat. Therefore the provisions of Appendix III would yield information on the primary products traded and those of

particular concern to the listing country. However, in the case of the Great White Shark, the most valuable products from the animal, and therefore those that could be expected to stimulate harvest of the animals for trade, are those routinely sold as personal or household effects. If a species is in international trade primarily in the form of specimens in demand as personal and household effects, therefore, the effectiveness of an Appendix-III listing, from an implementation perspective, is likely to be significantly reduced. Additionally, the potential of such a listing for providing information is reduced in such cases, as it would provide little insight into demand, sources and markets.

Other issues relating to the application of Appendix III to marine species

Although not peculiar to marine species and the effective implementation of Appendix III, the following were identified from the case studies as further factors likely to affect the proper enforcement of Appendix III.

Proactive communication with importing countries

Raising and maintaining awareness of Appendix-III species and issues among importing countries is likely to require a proactive approach by listing Parties, beyond the recommendation in *Resolution Conf. 9.25* that a Party should inform the known major importing countries of its intention to list a species and seek their opinion. For example, intelligence-sharing with importing Parties should include, where possible, information on trade routes for the species and volume of trade. There may be limited understanding or knowledge on the part of importing States as to their roles in international trade or the extent of local demand, especially if traded and valued under generic names, for example, 'bêche-de-mer', in the case of sea cucumber.

Outreach to industry and education

Outreach to industry and education was identified as likely to be important for the effective implementation of a Perlemoen Appendix-III listing. In general, industry is often well positioned to assist in the development of practical responses to implementation issues, which may prove extremely useful, especially for more complex marine species. For example, industry may be the best source of information as to whether certain species, and the products derived from it, can be easily identified in trade and as to practical methods on how to do this.

Legitimate industry can often prove to be an invaluable source of intelligence on the movement of illegally obtained products in trade, as well as on general information on trade routes and volume flows from particular regions. Traders in particular may have an incentive to ensure that product flows smoothly and that illegally obtained product, which may attract lower transaction costs, is not competing with legitimate product.

CONCLUSIONS

The case studies in this report demonstrate that there are special factors complicating implementation of listings of marine species in Appendix III. Together with the subsequent Discussion section, they highlight the need for Parties to consider carefully the suitability of a marine species for listing in Appendix III. The fact that Appendix-III enforcement may be a lesser priority than enforcement for Appendix I and II amplifies this need, as competing priorities and limited resources of Customs agencies may result in there being little opportunity to develop solutions to Appendix-III implementation issues in the day-to-day running of implementation itself.

The extent to which the workability of the listings of the Great White Shark and *Isostichopus fuscus* in Appendix III has been affected by the factors peculiar to marine species in this Appendix is not precisely discernable. However, in the case of the Great White Shark, the Appendix-III listing was not able to provide the insight into international trade as the Government of Australia intended. It is too early to judge the success of the Appendix-III listing of *I. fuscus*, viewed as a necessary extension of, and complement to, national regulatory efforts. It is clear that identifying specimens in trade and other factors are likely to be problematic and that the ground will need to be well prepared for any listing of Perlemoen in Appendix III.

In conclusion, deriving positive outcomes from listing marine species in Appendix III will depend much on full assessment of the factors in play and knowledge of the full scope of the provisions available under Appendix III. Drawing on experience in the practical application of these provisions is likely to be invaluable.

RECOMMENDATIONS

In addition to the specific recommendations made in relation to the three species in the individual case studies, the following general recommendations are made to enhance the potential for effective application of Appendix III to marine species:

Recommendations for prospective listing Parties

Any CITES Party considering the inclusion of a marine species in Appendix III should:

- consider whether the majority of trade in specimens is for commercial purposes or personal effects;
- consider the utility of the listing where a species is harvested from domestic waters and on the high seas, owing to the lack of clarity of provisions applying to Appendix-III specimens introduced from the sea;
- to the extent possible, undertake work with range and importing States to develop solutions to identification issues;
- implement the recommendations of *Resolution Conference 9.25;*
- ensure that documentation required for the listing complements any existing national measures relating to permit requirements for the species;
- consult with domestic industry to gauge and develop potential for co-operating with CITES processes and documentation requirements.

Recommendations for listing Parties

Any CITES Party with a marine species listed in Appendix III should:

- ensure a high level of collaboration and communication among range States in order to raise awareness of the listing and, in particular, to enhance the ability to detect landings of marine species illegally harvested or transhipped from the jurisdiction of listing Parties;
- maintain a high level of liaison with major importing countries, to raise awareness of the listing and assist in targeting of enforcement activities by Customs authorities in importing territories.

Recommendations for CITES Parties in general

CITES Parties should:

- work to standardize the format of certificates of origin and certificates of re-export;
- clarify the process for granting certificates of origin for Appendix-III marine species harvested on the high seas, landed in a CITES Party and subsequently exported.

REFERENCES

Altamirano, M. and Martínez, P. (2002). *Propuesta para inclusión del pepino de mar,* Isostichopus fuscus *en el apéndice III de CITES*. Galápagos, Ecuador. Unpublished document.

Altamirano M, Toral-Granda, M.V. and Cruz, E. (in press). The application of the adaptative principle to the management and conservation of *Isostichopus fuscus* in the Galápagos Marine Reserve. In: Lovatelli A., Conand, C., Purcell, S., Uthicke, S., Hamel, J.-F. and Mercier, A. (Eds.). *Advances in sea cucumber aquaculture and management.* FAO, Rome.

Anon. (1999). Proposal to include *Carcharodon carcharias* (Great White Shark) on Appendix I of the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES). *Document 11.59.3, Annex 1* of the eleventh meeting of the Conference of the Parties to CITES, Gigiri (Kenya), April 2000.

Anon. (2002a). Conservation of *Swietenia macrophylla*: Report of the Mahogany Working Group. Document *CoP12 Doc. 12.47* of the twelfth meeting of the Conference of the Parties to CITES, Santiago (Chile), 3-15 November 2002.

Anon. (2002b). Document *AC18 Doc. 5.1 (Rev.1)* of the eighteenth meeting of the CITES Animals Committee. San José, Costa Rica. http://www.cites.org/eng/cttee/animals/18/summary_record.pdf, viewed 14 January 2004.

Anon. (2003a). *CITES World.* Official Newsletter of the Parties. Issue Number 11. CITES Secretariat, Geneva, Switzerland.

Anon. (2003b). *2003 IUCN Red List of Threatened Species*. http://www.redlist.org, viewed 14 January 2004.

Anon. (2003c). Shark Teeth. http://www.jawsandteeth.com/modern_shark_teeth.htm, viewed 20 November.

Anon. (2003d). Modern Teeth. Stacey's Shark Teeth. http://www.sharkteeth.co.uk/modern.htm, viewed 20 November.

Anon. (2003e). Modern Great White Shark Teeth. Stacey's Shark Teeth. www.sharksteeth.com/Teeth/moderngreatwhite.htm, viewed 20 November.

Anon. (2003f). Great White Shark Jaws. Stacey's Shark Teeth. http://www.sharksteeth.com/greatwhitejaw.htm, viewed 20 November.

Anon. (2003g). Shark Teeth. The Boone Trading Company. http://www.boonetrading.com/Pg38.html, v iewed 20 November.

Anon. (2003h). The abalone mapping project. http://www.vetigastropoda.com/ABMAP/RSA.html., viewed 14 October 2003.

Anon. (2003i). *Final policy on the allocation of commercial fishing rights in the abalone fishery:2003*. http://www.environment.gov.za, viewed 13 October 2003.

Anon. (2003j). CITES listing for Perlemoen. *The Weekend Argus* (South Africa), 21 September.

Anon. (2004). *China takes a first step towards controlling the world's largest trade in shark fins.* TRAFFIC press release. 17 September 2004. Viewed at http://www.traffic.org/news/press-releases/shark_trade.html, 26 September 2004.

Beston. A., (2003). Shark caught in net, now for sale on the internet. *New Zealand Herald* (New Zealand). 27 November.

Chang Yaqing, Yu Changqing, and Song Xin. (2003). *Sea cucumber* (Apostichopus japonicus) *pond polyculture in Dalian, Liaoning Province, China.* Abstracts from the workshop on advances in sea cucumber aquaculture and management (ASCAM).

Chapman, D.; Abercrombie, D.; Douady, C.; Pikitch, E.; Stanhope, M. and Shivji, M. (2003). A streamlined, bi-organelle, multiplex PCR approach to species identification: application to global conservation and trade monitoring of the great white shark, Carcharodon carcharias. *Conservation Genetics* 4(4): 415-425.

Chen, J. (2003). Overview of sea cucumber farming and sea ranching practices in China. *Beche de mer information Bulletin*, 18 May 2003.

Clarke, S. (2002). *Trade in Asian Dried Seafood: Characterisation, Estimation and Implications for conservation*. WCS Working paper No. 22.

Clarke, S. (2004). *Shark Product Trade in Hong Kong and Mainland China, and Implementation of the CITES Shark Listings*. TRAFFIC East Asia, Hong Kong.

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

Cook, P. (1997). Abalone farming in South Africa. In: Stuttaford, M. *Fishing Industry Handbook: South Africa, Namibia and Mozambique 1997, 25th edn*.

De Paco, C.; Hurtado, M., MacFarland, C.; Martínez, P.; Reck G. and Richmond, R. (1993). *Evaluación de la Pesquería de pepinos de mar en las Islas Galápagos.* UICN, Ecuador. Unpublished report.

Environment Australia (2002). *Great White Shark Recovery Plan*, July 2002. Australia.

FAO (2003a). *FISHSTAT Plus. Universal Software for Fishing Statistical Time Series, Version 2.3*. Fishing Information, Data & Statistics Unit, FAO, Rome, Italy.

FAO (2003b). COFI/2003/3Rev.1 - *Progress in the Implementation of the Code of Conduct for Responsible Fisheries and Related International Plans of Action*. Committee on Fisheries, Twenty-fifth Session, Rome, Italy, 24 – 28 February 2003.

Fergusson, I., Compagno, L. and Marks, M. (2000). *Carcharodon carcharias*. In: Anon., 2003. *2003 IUCN Red List of Threatened Species*, viewed at www.redlist.org, 24 November 2003.

Gosling, M. (2003). Great White Sharks under attack by curio pirates. *Cape Times* (ZA) 16 October.

Guzmán, H. and Guevara, C. (2002). Population structure, distribution and abundance of three commercial species of sea cucumber (Echinodermata) in Panama. *Caribbean Journal of Science*, 38(3-4): 230 – 238.

Hamel, J. F, Ycaza, R. and Mercier, A. (2003). Larval development and juvenile growth of the Galapagos sea cucumber *Isostichopus fuscus*. *SPC Beche de mer Information bulletin,* 18. May 2003.

Hauck, M. and Sweijd, N.A. (1999). A Case Study of Abalone Poaching in South Africa and its Impact on Fisheries Management. *ICES Journal of Marine Science,* 56: 1024-1032.

Hecht, T. (1994). Behavioural thermoregulation of the abalone, *Haliotis midae*, and the implications for intensive culture. *Aquaculture,* 126 (1994): 171-181.

Herrero Pérezrul, M. D.; Reyes Bonilla, H.; García Domínguez, F.; Cintra-Buenrostro, C.E. (1999). Reproduction and growth of *Isostichopus fuscus* (Echinodermata: Holothuroidea) in the southern Gulf of California Mexico. *Marine Biology* (1999) 135: 521- 532.

Hickman C. P. (1998). *A Field Guide to Sea Stars and other Equinoderms of Galapagos. Galapagos Marine Life Series*. Sugar Spring Press, Lexington, Virginia, USA. 83pp.

Houthoofd, I. (1997). Towards some solutions relating to the conservation of abalone. SAJELP 4(2): 301-314

Last, P. R. and Stevens, J. D. (1994). *Sharks and Rays of Australia*. CSIRO Australia.

Martin, R. A. (2003). Brief Overview of the Great White Shark (*Carcharodon carcharias*). http://www.elasmo-research.org/education/white_shark/overview.htm, viewed 20 November 2003.

Matthews, S. (2001). *Fisheries Compliance: Protecting our marine living resources for the future*. Marine and Coastal Management, Rogge Bay.

Murillo, J.-C., Martínez, P., Toral, M.-V.and Hearn, A. (2003). Pepino de mar. In: Danulat, E. and Edgar, G. J. (eds.). *Reserva Marina de Galápagos: Línea Base de la Biodiversidad* . Charles Darwin Foundation/Galápagos National Park Service, Galapagos, Ecuador. Pp 176-198.

Pulfrich, A. (2001). The Abalone Fishery. http://www.envirofishafrica.co.za/ess/ess2000 website/abalone.htm

Richmond, R. and Martínez, P. (1993). Sea cucumber fisheries in the Galapagos Islands: Biological aspects, impacts and concerns. Unpublished report submitted to IUCN. 18 pp.

Rose, D. A. (1996). *An Overview of World Trade in Sharks and other Cartilaginous Fishes*. TRAFFIC International, Cambridge, UK.

Sant, G. (1995). *Marine Invertebrates of the South Pacific: an examination of the trade*. TRAFFIC International, Cambridge, UK.

Tarr, R. (2003). *The Abalone Story*. http://www.environment.gov.za/mcm/inshor/abstory.htm, viewed 20 November 2003.

Tarr, R. J. Q. (1989). *Abalone*. In: Payne, A. I. L and Crawford, R. J. M. (eds.) *Oceans of Life off Southern Africa*. Cape Town, South Africa.

Tarr, R. J. Q. (1992). *The Abalone Fishery of South Africa*. The University Press, Cambridge, UK.

Tarr, R. J. Q. (1995). Growth and movement of the South African Abalone Haliotis midae: a reassessment. *Mar. Freshwater Res.*, 1995(46): 583-590.

Tarr, R. J. Q. (2000). The South African abalone Haliotis midae fishery: a decade of challenges and change. *Can. Spec. Publ. Fish. Aquat. Sci*. 130: 32-40. Workshop on rebuilding abalone stock in British Columbia. Campbell, A. (ed.).

TRAFFIC South America (2000). *Evaluation of the trade of sea cucumber Isostichopus fuscus (Echinodermata , holothuroidea) in the Galapagos islands during 1999*. Quito, Ecuador.

Wijnstekers, W. (2001). *The Evolution of CITES, 6th edn.* CITES Secretariat, Geneva, Switzerland.

Willock, A. (2002). *Uncharted Waters: Implemention Issues and Potential Benefits of Listing Toothfish in Appendix II of CITES*. TRAFFIC International, Cambridge, UK.

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For further information contact:
The Executive Director
TRAFFIC International
219a Huntingdon Road
Cambridge CB3 0DL
UK
Telephone: (44) 1223 277427
Fax: (44) 1223 277237
Email: traffic@trafficint.org

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